

4.0 EXISTING CONDITIONS

This chapter highlights the existing conditions in the study area.

The material presented in this chapter was generated from secondary source and field survey information that was available when the alternatives were generated and evaluated. Once the preferred alternative was identified, additional field investigations were conducted to assess the specific impacts of the preferred alternative and develop appropriate preliminary mitigation measures. Those details are included in **Chapter 8** of this report.

4.1 NATURAL ENVIRONMENT

4.1.1 Physiography

The study area lies within the Iroquois Plain physiographic region (Chapman and Putnam, 1984). The Iroquois Plain is the former lake bottom of glacial Lake Iroquois, a remnant of the last glaciers melting and retreating in Ontario. The Iroquois Plain is characterized by a smooth topographic relief, gently sloping towards Lake Ontario and a thin veneer of glaciolacustrine sand and silty sand deposits.

A well-defined valley characterizes the Credit River corridor and the steep slopes incise the overlaying glacial till and lacustrine deposits, to expose the shale bedrock associated with the Georgian Bay and Queenston Formations.

4.1.2 Designated Areas

There are no Conservation Reserves or Provincial Parks located within the study limits.

Designated natural environmental features present within the study limits are listed below and are mapped in **Exhibit 4-1**.

- *Credit River Marshes Provincially Significant Wetland Complex* - The Provincially Significant Wetland (PSW) complex includes 8 individual wetlands with a combined area of approximately 22 ha (95% marsh and 5% swamp). The wetlands occur within the Credit River floodplain, extending from approximately 1700 m south of the Credit River Bridge to approximately 600 m north of the bridge. Within the immediate vicinity of the Credit River Bridge, the wetland consists of Cattail Shallow marsh, Reed Canary Grass Mineral Meadow Marsh, and a small Pondweed Submerged Shallow Aquatic community. According to MNR (2008) “the Credit River Marshes are noteworthy for sustaining a rare coastal wetland with 20 significant species”.
- *Credit River Marshes Regionally Significant Life Science Area of Natural and Scientific Interest (ANSI)* - This ANSI combines the former Stavebank Woods and Credit River Coastal Marshes Life Science ANSIs, encompasses the Credit River valley slope forests and marsh, and is recognized as important breeding habitat for marsh birds.
- *Stavebank Oak Woods Environmentally Sensitive Area (ESA)* - This municipally-designated ESA overlaps with the *Credit River Marshes ANSI* described above.

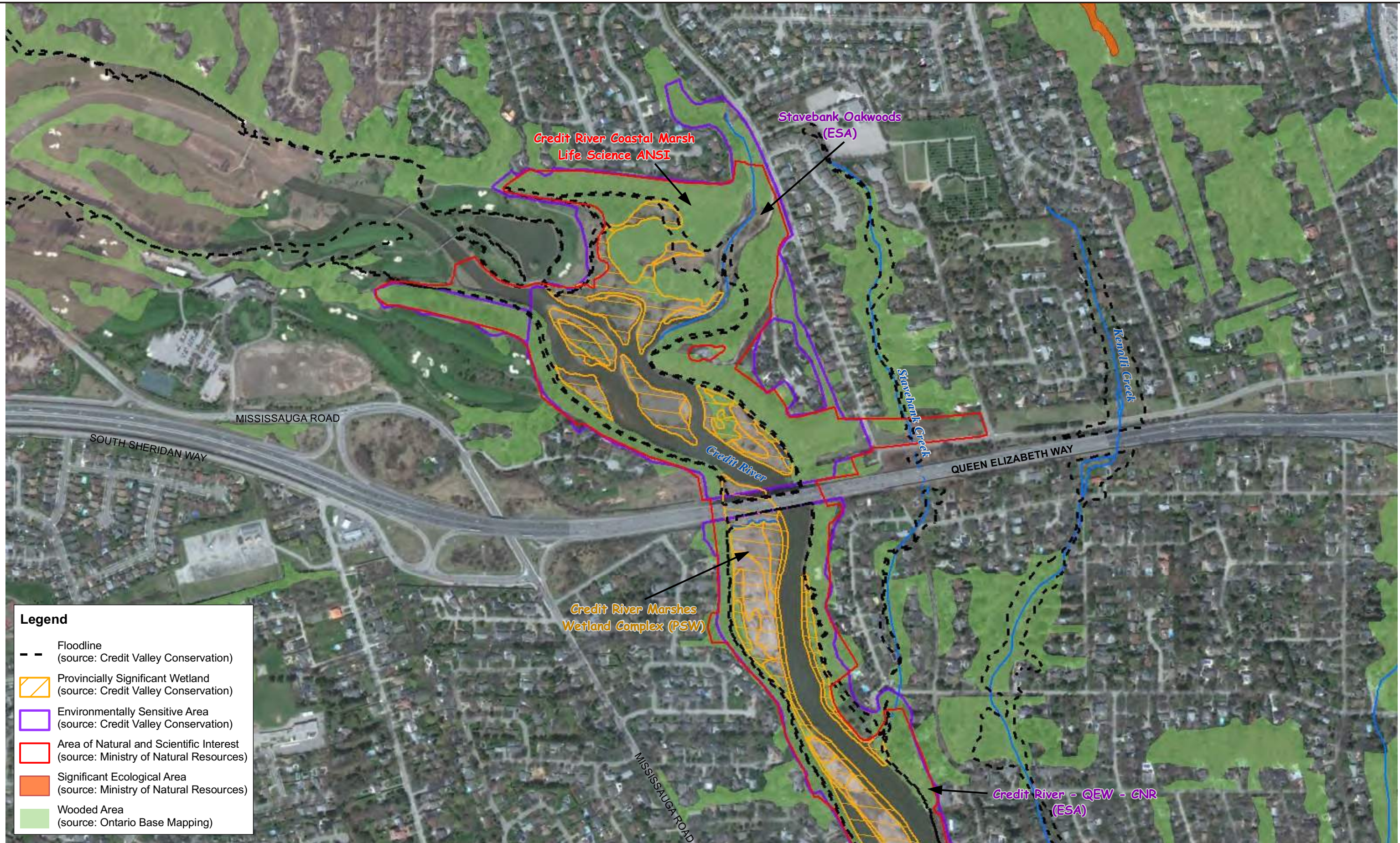
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- *City of Mississauga Natural Areas Survey (NAS) sites “CRR8” (north of the QEW) and “CRR9” (south of the QEW)* - These areas within the Credit River valley are recognized as “Significant Natural Site(s)” in the City of Mississauga NAS due to presence of locally and regionally rare and uncommon plant and animal species.

In addition to the ‘designated’ natural environmental features listed above, *Significant Wildlife Habitat (SWH)* has been identified within the Credit River valley associated with potential hibernacula for several species of turtles, including two Species at Risk: Snapping Turtle (Special Concern) and Northern Map Turtle (Special Concern) , as well as potential SWH for semi-terrestrial crayfish species in Unit 21.. See **Section 4.1.4** for further details.



4.1.3 Vegetation

Vegetation surveys were completed September 1 and 2, 2010 and May 5 and June 22, 2011 to document natural and culturally-derived vegetation communities within the study limits. Street trees and planted landscape features were noted but not specifically assessed during these field visits.

Natural vegetation cover is restricted to the Credit River Valley and the Kenolli Creek and Stavebank Creek riparian corridors. Natural vegetation communities associated with these features include marsh, swamp, thicket, woodland and forest, all with moderate levels of anthropogenic disturbance. Other vegetation communities found in the study area are small, isolated and cultural in nature with high levels of anthropogenic disturbance from the QEW and surrounding urban areas. Vegetation within these areas is dominated by tolerant old-field meadow species, with occasional clusters or rows of trees and shrubs.

A total of 16 Ecological Land Classification (ELC) vegetation community types were identified within four (4) general Vegetation Units as depicted on **Exhibit 4-2**. The broad Vegetation Units are described below and the individual ELC community types are identified on **Exhibit 4-2** and described in detail in **Appendix B**. None of the vegetation communities observed are considered rare in Ontario (per NHIC Biodiversity Explorer website).

Unit 1 is an assemblage of roadside culturally-derived vegetation communities located on the tablelands west of the Credit River Valley.

Photo 4-1 depicts the cultural meadow (1a on **Exhibit 4-2**) located west of the Credit River and north of the QEW. Note: this area is currently occupied by the construction access road for the Credit River Bridge Holding Strategy.

Photo 4-2 depicts the Cultural Woodland (1e) located between the existing QEW on-ramp and Kedleston Way. This woodland originates from highway landscape plantings that have matured, seeded and created a somewhat natural wooded area.



Photo 4-1. View east along hydro corridor, prior to the construction of the access road



Photo 4-2. View of cultural woodland between on-ramp and Kedleston Way

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Unit 2 is comprised of the valley slope forests and floodplain wetlands of the Credit River Valley. The valley slopes are steep and include several residential properties with landscape trees and shrubs (NE quadrant); young cultural woodland dominated by Manitoba Maple (NW and SE quadrants); and young to mid-aged deciduous forest dominated by White Ash and Manitoba Maple (SW quadrant).

A hydro corridor crosses the valley north of the Credit River Bridge. Vegetation communities within the hydro corridor include cultural thicket on the east valley slope and adjacent tableland (dominated by young Manitoba Maple, Black Locust, Norway Maple regeneration and cultural meadow species) and a small, mid-aged Red Oak dominated deciduous forest on the west valley slope.

Wetlands associated with the Credit River Marshes PSW complex occupy the floodplain.

Photos 4-3 to 4-8 illustrate existing conditions and vegetation community types within Vegetation Unit 2 in the NW, NE, SW and SE quadrants.



Photos 4-3 a and b. View east along hydro corridor, early season and mid-season. Vegetation communities of note include: Unit 2c young, Manitoba Maple-dominated cultural woodland in the NW quadrant (foreground) and in the NE quadrant (between the hydro corridor and the bridge); Unit 2e meadow marsh and cultural meadow floodplain vegetation in the NW quadrant (foreground); Unit 2l meadow marsh floodplain vegetation in the NE quadrant, north of the hydro corridor.



Photo 4-4. View north along west river bank in the northwest quadrant. A small patch of submergent vegetation is located within an eddy along the west bank. The community is dominated by the Regionally Rare Flatstem Pondweed; the only submergent vegetation community located within the study area.

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Photo 4-5. View west to the northwest quadrant along the hydro corridor. Note seasonally flooded shallow marsh (Unit 2h) in the NE quadrant (foreground).



Photo 4-6. View of Unit 2h, a seasonally flooded shallow marsh community within the NE quadrant at the base of the valley slope.



Photo 4-7. View west to southwest quadrant – floodplain vegetation (within the PSW boundary) and west valley slope. This valley slope forest is higher quality/less disturbed and therefore considered more sensitive than the valley slope vegetation in the 3 other quadrants.



Photo 4-8 a and b. View east to southeast valley slope cultural woodland located along rear lot line in the SE quadrant.

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Unit 3 is an assemblage of disturbed/culturally-influenced vegetation communities along Stavebank Creek. All ELC communities within Unit 3 are roadside communities surrounded by residential development and are highly disturbed.



Photo 4-9. Units 3a (Sumac dominated Cultural Thicket) and 3c (Cattail Shallow Marsh) along Stavebank Creek, north of Premium Way.

Unit 4 is a narrow strip of cultural meadow and lowland forest along Kenolli Creek north and south of the QEW. This unit also includes two hedgerows adjacent to the Kenolli Creek crossing, north of the QEW.

Photo 4-10. Disturbed lowland forest vegetation and manicured lawn along Kenolli Creek south of the existing QEW ROW (Unit 4b).



Code	ELC Community Name
HR	Hedgerow
RES	Residential
CUM1-1	Dry-Moist Old Field Meadow
CUS1	Mineral Cultural Savannah
CUT1	Mineral Cultural Thicket
CUW1	Mineral Cultural Woodland
CUM1-1/MAM2-2	Mosaic of Dry-Moist Old Field Meadow and Reed Canary Grass Mineral Meadow Marsh
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
SAS1-1	Pondweed Submerged Shallow Aquatic
SWD4-1	Willow Mineral Deciduous Swamp
FOD	Deciduous Forest
FOD1	Dry-Fresh Oak Deciduous Forest
FOD2	Dry-Fresh Oak-Maple-Hickory Deciduous Forest
FOD4	Dry-Fresh Deciduous Forest
FOD5	Dry-Fresh Sugar Maple Deciduous Forest
FOD5-3	Dry-Fresh Sugar Maple-Oak Deciduous Forest
FOD7	Fresh-Moist Lowland Deciduous Forest
BLO1	Mineral Open Bluff
BLS1	Mineral Shrub Bluff



Legend

Butternut Location

Vegetation Community Boundary

4.1.4 Wildlife and Wildlife Habitat

Surveys for wildlife and wildlife habitat assessments were conducted on the following dates: September 3, 2010; May 5, 2011; June 21, 2011; and August 30, 2011. A turtle survey of the cattail marsh in the NE quadrant was conducted on April 13, 2012 and a nesting bird survey on the Credit River Bridge was conducted on May 30, 2012.

Field surveys were conducted in the spring, early summer, late summer and fall seasons to capture hibernation emergence, basking and breeding activity for a variety of species that could potentially be using habitat close to the bridge. The late summer field visits captured the period when many Lepidoptera and Odonata are more active. All direct wildlife observations and wildlife signs (including browse, track/trails, animal scat, bird nesting activity, tree cavities, burrows, excavated holes and vocalizations) were recorded and potential wildlife usage and habitat functions associated with vegetation communities were identified.

Mammals

Direct sightings and indirect evidence (such as tracks) of a number of mammals were recorded in the vicinity of the Credit River Bridge, including: White-tailed Deer (*Odocoileus virginianus*), Beaver (*Castor Canadensis*) (old gnawing of shrubs and tree stumps), Raccoon (*Procyon lotor*), Coyote (*Canis latrans*), Opossum (*Didelphis virginiana*), and mustelid tracks (i.e., skunk, weasel).

Other mammal species most likely present in the study area, but not observed during field surveys, include: Gray Squirrel (*Sciurus carolinensis*), Eastern Chipmunk (*Tamias striatus*), Groundhog (*Marmota monax*), and Red Fox (*Vulpes fulva*), in addition to a number of small mammals that often go undetected such as shrews, voles, mice, and bats. None of these species are considered provincially rare and all are common in urban and riverine environments.

Herpetofauna

Two herpetofauna Species of Conservation Concern were observed during the field surveys: Snapping Turtle (*Chelydra serpentina serpentina*) and Northern Map Turtle (*Graptemys geographica*). Two other species have the potential to inhabit the study area but were not observed: Eastern Milksnake (*Lampropeltis triangulum triangulum*) and Eastern Ribbonsnake (*Thamnophis sauritus septentrionalis*).

Other herpetofauna observed during field surveys include American Toad (*Bufo americanus*), Eastern Red-backed Salamander (*Plethodon cinereus*), Eastern Gartersnake (*Thamnophis sirtalis*), Dekay's Brownsnake (*Storeria dekayi*), and Midland Painted Turtle (*Chrysemys picta*). Other



Photo 4-10 a and b. American Toad and Eastern Red-backed Salamander.

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amphibian and reptile species most likely present in the study area, but not observed during field surveys, include: Spring Peeper (*Pseudacris crucifer*), Northern Leopard Frog (*Rana pipiens*), Green Frog (*Rana clamitans*), Gray Treefrog (*Hyla versicolor*) and Western Chorus Frog (*Pseudacris maculata*). None of these species are considered provincially rare and all are generally common in urban and riverine environments.

Avifauna

Four avian Species of Conservation Concern were observed during field surveys: Great Egret (*Ardea alba*), Black-crowned Night-heron (*Nycticorax nycticorax*), Chimney Swift (*Chaetura pelagica*) and Barn Swallow (*Hirundo rustica*).

An additional 44 bird species were recorded during field surveys conducted in 2010-2012. None of these species are considered provincially rare and are common in urban and riverine environments.

Birds observed nesting or attempting to nest under the Credit River Bridge in 2011 and 2012 included: House Sparrow, Northern Rough-winged Swallow, Cliff Swallow, and European Starling. Eastern Phoebe was observed close to the bridge and exhibited territorial and nesting behaviour that would suggest nesting sites may be present either adjacent to the bridge or on the bridge itself; however, no confirmed evidence of nesting on the bridge was observed during field surveys.



Photo 4-11. Cliff Swallow nests on the Credit River Bridge.

Insects

Two insects of Species of Conservation Concern were observed during field surveys: Monarch (*Danaus plexippus*), and River Bluet (*Enallagma anna*). As well the following Odonata were observed during field surveys: Skimming Bluet (*Enallagma geminatum*), Eastern Forktail (*Ischnura verticalis*), Common Whitetail (*Plathemis lydia*), Stream Bluet (*Enallagma exsulans*), Common Green Darner (*Anax junius*), Twelve-spotted Skimmer (*Libellula pulchella*), Lance-tipped Darner (*Aeshna constricta*), Black Saddlebags (*Tramea lacerata*), Wandering Glider (*Pantala flavescens*), Stylurus Clubtail Sp., Eastern Amberwing (*Perithemis tenera*), American Rubyspot (*Hetaerina americana*), Northern Spreadwing (*Lestes disjunctus*), White-faced Meadowhawk (*Sympetrum obtrusum*), Ruby Meadowhawk (*Sympetrum rubicundulum*), Band-winged Meadowhawk (*Sympetrum semicinctum*), Slender Spreadwing (*Lestes rectangularis*) and Hagen's Bluet (*Enallagma hageni*).

The following Lepidoptera were also found: Common Buckeye (*Junonia coenia*), Cabbage White (*Pieris rapae*), Least Skipper (*Ancyloxypha numitor*), Clouded Sulphur (*Colias philodice*), Orange Sulphur (*Colias eurytheme*), Eastern Tailed-Blue (*Cupido comyntas*), Eastern Tiger Swallowtail (*Papilio glaucus*), Red Admiral (*Vanessa atalanta*), Eastern Comma (*Polygonia comma*), Question Mark (*Polygonia interrogationis*), Common Ringlet (*Coenonympha tullia*) and Little Wood-Satyr (*Megisto cymela*).

None of the insect species listed above is considered provincially rare and all are common in urban and riverine environments.

Crustaceans

The presence of mud “chimneys” created by semi-terrestrial crayfish (species unknown) were observed during early spring surveys in 2011 and 2012 in the Reed Canary Grass mineral shallow marsh (Unit 2h) located at the base of the valley slope in the NE quadrant of the study area. The preferred habitat of chimney crayfish (meadows and edges of shallow marshes) is common in the broader area (i.e., habitat is not limited to the areas within the study limits. Further discussion is provided in **Section 4.1.4.1**.



Photo 4-12. Mud chimney observed in Unit 2h, in the NE quadrant.

4.1.4.1 Significant Wildlife Habitat

Significant wildlife habitat is identified by MNR (Significant Wildlife Habitat Technical Guide, 2000), as:

- Seasonal concentration areas (e.g., conifer forests for deer wintering);
- Rare vegetation communities or specialized habitats for wildlife;
- Habitats of species of conservation concern, excluding the habitats of endangered and threatened species; and
- Animal movement corridors.

Based on suitable habitat features present (such as wetlands with fine or organic substrates), turtle hibernacula habitat for Midland Painted Turtle, Snapping Turtle (Special Concern), and Northern Map Turtle (Special Concern) is presumed present within the Credit River valley generally, and possibly within the study limits.

The small shallow marsh (Unit 2h on **Exhibit 4-2**, Photo 4-6) located in the NE quadrant may be used by Snapping Turtles as hibernaculum. This shallow marsh sits in a depression along the base of the valley slope and appears to seasonally flood in spring. The substrate is organic with woody debris present. Three adult Snapping Turtles were observed during field surveys in the spring of 2011 and 2012 basking/foraging (Photo 4-13) in this area, which would suggest possible hibernation emergence from this location. The turtles were not



Photo 4-13. Snapping Turtle basking in the shallow marsh (Unit 2h) in the NE quadrant.

observed during other field visits once the water levels in this local depressional area receded. As noted above, potential turtle hibernacula habitat is not limited to this feature and

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is likely to be present in other areas within the valley/floodplain that provide suitable conditions.

Ten Northern Map Turtles were observed during field surveys. The majority of the observations occurred in early spring when the turtles were basking along the exposed sandy east bank approximately 160 m, adjacent to the island north of the Credit River bridge (Photo 4-14). This is a good indication that Northern Map Turtles utilize areas upstream of the bridge where suitable hibernation and nesting habitat appears to be present. Preferred hibernation habitat for this species includes river depressions of sand and gravel substrate with scattered logs and rocks; preferred nesting habitat includes unshaded sandy or loamy soils (Ernst & Lovich, 2009; Harding, 1997).



Photo 4-14. Northern Map Turtles basking on the east river bank, north of the Credit River Bridge, adjacent to the island.

As noted above, the presence of mud “chimneys” created by semi-terrestrial crayfish (species unknown) were observed during early spring surveys in 2011-2012 in the Reed Canary Grass mineral meadow marsh (Unit 2l) located at the base of the valley slope in the NE quadrant. In March 2012, the MNR’s Significant Wildlife Habitat Guide (2000) updated their Significant Wildlife Habitat Eco-regional Criteria Schedules which present the significance criteria for identifying candidate significant wildlife habitat in an eco-region. These changes included the addition of terrestrial crayfish (Chimney or Digger Crayfish) as “Habitat for Species of Conservation Concern (not including Endangered or Threatened Species)”. While no species of crayfish in Ontario are protected under the ESA, 2007, MNR considers the presence of chimney or digger crayfish species habitat as “significant”, provided that studies confirm the presence of one or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites.



Photo 4-15. White-tailed Deer walking up the Credit River, north of the Credit River Bridge.

Field staff confirmed the presence of more than one crayfish burrow during field studies in Unit 2l, therefore this habitat unit may be considered SWH under MNR’s definition.

The Credit River valley is one of the most prominent natural habitat corridors in the west GTA. The mosaic of floodplain, valley slope and tableland vegetation communities are an important habitat refuge within a densely-populated urban area. The valley forms a

prominent regional-scale animal movement corridor, from Lake Ontario to the Oak Ridges Moraine.

White-tailed Deer are abundant in this area, however no deer wintering areas (i.e., dense conifer stands, large woodland tracts) have been identified within or adjacent to the study limits.

4.1.5 Fish and Fish Habitat

The QEW crosses three watercourses within the study limits: the Credit River, Stavebank Creek and Kenolli Creek. An unnamed, small tributary of the Credit River is located in the southwest quadrant, originating from a storm sewer outfall at the base of the west valley slope. The tributary outlets to the Credit River and is not crossed by the QEW.

Secondary source information was compiled from a variety of sources to obtain relevant background fisheries and aquatic habitat information. Topographic maps, aerial photography, drainage maps and existing plans were also reviewed to provide context and document the connectivity of the watercourses within the surrounding landscape.

Aquatic habitat field surveys were conducted August 31, 2010 and June 21, 2011. A follow-up survey to assess habitat potential for Northern Pike spawning was conducted on April 13, 2012.

A fish community inventory was not conducted given the abundance of information and data available from MNR and CVC. This approach is consistent with the guidance provided in MTO's (2009) *Environmental Guide for Fish and Fish Habitat*.

A general description of each watercourse and its fishery is provided below. A summary schematic and representative site photos are provided in **Appendix C**.

Credit River

General Aquatic Habitat

- The bridge crossing is located at a bend in the Credit River. Through the crossing reach, the river channel ranges from 60 m to 70 m in bankfull width while further upstream and downstream the river ranges from 50 m to 55 m in bankfull width. Approximately 205 m upstream of the bridge the river splits around a large island. The existing bridge has a mid-channel pier and the west pier encroaches slightly into the channel.
- Channel morphology through the crossing reach is dominated by a 'flat'. Nearshore substrate along the west bank is largely fine (silty sand). In areas subject to higher flows, substrates are coarser and comprised of gravel, rubble, cobbles (shards of the local shale bedrock) with the occasional boulder. The east bank, under the bridge, is armoured with a gabion basket and rip rap.

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Photos 4-16 a and b. Credit River Bridge crossing location characterized by “flat” morphology, fine substrates along the west bank and armouring/erosion control along the east bank. Instream cover includes occasional boulders, woody debris and small patches of submergent vegetation. 5-16 a captures the view from upstream of the bridge. 5-16 b captures the view immediately downstream of the bridge.

- Adjacent to the bridge in the NE quadrant, the manicured yard of a private residence extends down to the river’s edge. A Corrugated Steel Pipe (CSP) drainage pipe outlet is located between the residential property and the bridge.
- Depth of flow at the time of the survey ranged from 10 cm along the banks to over 1.5 m mid-channel.
- Channel bank height ranges from 0.8 m to 1.35 m, however in the SW quadrant the steep, wooded valley wall rises up approximately 15 m from the floodplain. A steep valley wall (approximately 25 m in height) was also observed along the river channel in the NW quadrant.
- Erosion was observed along the steep valley wall in the NW and SE quadrants. Bank undercutting was observed along the east bank in the NE quadrant approximately 40 m upstream of the bridge (Photo 4-14).
- Instream cover includes rubble, the occasional boulder, undercut banks and woody debris, and small patches of instream vegetation (e.g., cattail, Reed Canary Grass, sedge *spp.*, and pondweed *sp.*).



Photo 4-17: Armouring along the east bank, under the bridge, and nearby drainage pipe outlet.

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Fishery

- The Credit River supports a variety of warmwater sport/top predator species such as Northern Pike (*Esox lucius*), Smallmouth Bass (*Micropterus dolomieu*) and Largemouth Bass (*Micropterus salmoides*); a variety of bait and forage fish species; and migratory Coho Salmon (*Oncorhynchus kisutch*), Chinook Salmon, Rainbow Trout (*Oncorhynchus mykiss*) and Brown Trout (*Salmo trutta*); no suitable spawning habitat is present within the crossing reach.
- A detailed list of species found in vicinity of the Credit River crossing is found in Appendix D of the *Fish and Fish Habitat Impact Assessment Report (July 2012)*. The Credit River has been targeted for Atlantic Salmon (*Salmo salar*) restoration.
- The DFO SAR mapping indicates that the reach of the Credit River downstream of the QEW potentially support Shortnose Cisco, a species designated as *Endangered* under the Federal Species At Risk Act (SARA) and under the Provincial Endangered Species Act (ESA). However DFO indicated that the Shortnose Cisco is a lake species and is not found in the Credit River. DFO also noted that there are records of American Eel (*Anguilla rostrata*) in the lower Credit River, however, MNR has indicated that there are no aquatic Species at Risk within the project limits.
- The Credit River reaches in the vicinity of the QEW are classified as part of the “Large Warmwater Community” management zone in the Credit River Fisheries Management Plan (CVC 2002). MNR did not provide a preliminary fish and fish habitat sensitivity rating for this system.

Unnamed Tributary to the Credit River

Aquatic Habitat

- The tributary originates at a concrete box culvert storm sewer outfall (1.75 m height x 1.3 m width) located at the toe of the west valley slope (Photo 4-18).
- The channel cuts through the cattail marsh in the floodplain and outlets to the Credit River just downstream of the Credit River Bridge.
- The bankfull width of the upstream section of the channel ranges from 2 m to 2.5 m. In the downstream section, bankfull width ranges from 3 m and 3.5 m. Bank heights range from 0.6 to 0.8 m. Flow depth ranged from 3 cm to 10 cm in the upstream section and between 10 cm and 30 cm in the downstream section.



Photo 4-18: A storm sewer outlet at the base of the west valley slope is the origin of the Credit River tributary in the SW quadrant.

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- Morphology is predominantly flat with a small riffle and shallow pool at the upstream end, near the storm sewer outlet. Substrate in the upstream section is comprised of sand, shale, gravel and rubble. Substrates along the downstream section are finer and dominated by sand and silt. With the exception of some local scouring at the storm sewer outlet, there is very little erosion along the channel.
- Instream cover includes bank undercutting as well as some instream vegetation (e.g., cattail, Reed Canary Grass).
- Riparian vegetation in the upstream section is dominated by goldenrod (old field species) with some cattail and Reed Canary Grass. Further downstream cattail becomes dominant with Jewelweed and Purple Loosestrife.



Photo 4-19: Tributary near the outlet at the Credit River.

Fishery

- Baitfish (Creek Chub) were observed near the tributary outlet during the August 2010 survey. There is no barrier to fish movement between the river and the storm sewer. This tributary provide refuge or nursery habitat for Credit River baitfish species.
- MNR did not provide a preliminary fish and fish habitat sensitivity rating for this system.

Stavebank Creek

Aquatic Habitat

- Stavebank Creek is a tributary of the Credit River that originates from a storm sewer outfall approximately 700 m north of the Premium Way. The creek flows from north to south under Premium Way and the QEW, through separate concrete box culverts, approximately 245 m east of the Credit River Bridge. The Premium Way culvert outlet is perched 0.65 m above the invert of the creek, posing a barrier to fish movement. Downstream of the QEW the Stavebank Creek flows through a residential area before it outlets to the Credit River approximately 660 m downstream of the QEW. Upstream of the QEW, has a bankfull width of 2 m that widens to approximately 2.5 m downstream of the QEW. Upstream of Premium Way the channel is narrower (width ranges from 0.5 m to 0.7 m), 'U shaped', and cuts through a cattail marsh area.

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- The wetted width ranged from 0.5 m to 2 m at the time of the surveys. Bank heights range from 1 m upstream of QEW to Premium Way to 3 m downstream of the QEW. Flow depth of the watercourse ranged from 5 cm to 50 cm upstream of the QEW and between 5 cm and 15 cm downstream. Evidence of minor groundwater seepage (iron staining) was observed in the open channel section between QEW and Premium Way.
- Stream morphology just upstream of QEW is comprised of a pool at the outlet of the Premium Way culvert, which is followed by a series of small riffles and flats. Upstream of Premium Way the morphology is flat. Downstream of the QEW the morphology is mostly flat with a few small riffles.
- Substrate between the QEW and to Premium Way is comprised of sand and gravel with an abundance of larger shale pieces strewn throughout the channel. Substrates north of Premium Way and downstream of the QEW are similar but tend to be finer (i.e., less gravel and more fine sand/silt). Minor bank erosion was observed at a small bend in the channel just upstream of QEW. More severe bank undercutting and erosion was observed downstream of the QEW and armouring (gabion) has been installed along a section of the channel in an effort to reduce erosion.
- Instream cover includes some pool habitat, woody debris and instream marsh vegetation (e.g., cattail) upstream of Premium Way.
- Riparian vegetation between the QEW and Premium Way is comprised of grasses and meadow species (goldenrod, aster spp., and dense Poison Ivy), trees, and shrubs (White Elm, White Ash, White Pine, Trembling Aspen, Sumac, Manitoba Maple, elderberry). Jewelweed, Bracken Fern and horsetail are present along the east bank closer to the QEW. Upstream of Premium Way, through the marsh, riparian vegetation is comprised of cattail, Jewelweed, Spotted Joe-pye Weed and Sensitive Fern and patches of Sumac. Downstream of QEW there is a mix of woody species (e.g., Manitoba Maple, White Ash, Honeysuckle, Sugar Maple a few Red and White Pines) and manicured lawns of residential backyards.

Fishery

- Stavebank Creek does not appear to support direct fish use at the QEW crossing. No fish were captured in this area during recent CVC surveys (February 2010) or previous Ecotec surveys (1999). No fish were observed during the 2010 and 2011 field work.
- Local fish movement is hindered by the perched culvert Premium Way/ Fish movement between the QEW crossing and the outlet at the Credit River is assumed to be hindered by steep gradients and piped sections of the watercourse. MNR did not provide a preliminary fish and fish habitat sensitivity rating for this system.

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Photos 4-20 a and b. Stavebank Creek at the QEW culvert inlet (left) and outlet (right).

Kenolli Creek

Aquatic Habitat

- Kenolli Creek is a tributary of the Credit River that originates approximately 435 m north of Premium Way. The creek flows from north to south under both Premium Way and the QEW through a single concrete open bottom culvert, approximately 660 m east of the Credit River Bridge. Downstream of the QEW the creek bends 90 degrees and flows parallel to the QEW (along residential backyards) for approximately 85 m before flowing south. Kenolli Creek outlets to the Credit River approximately 2 km downstream of the QEW.
- The channel reach up and downstream of the QEW has a bankfull width of 2.5 m. Further downstream the channel becomes more 'U shaped' and ranges in width from 0.75 m to 1 m before it widens again near Pineway Road. The wetted width of the channel ranged from 0.5 m and 1.5 m. Bank heights range from 1 m to 1.5 m upstream of the QEW and Premium Way to 0.5 m to 0.75 m downstream of the



Photos 4-21 a and b. Stavebank Creek at the QEW culvert inlet (top) and outlet (bottom).

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QEW. Flow depth range from 5 cm to 15 cm upstream of the QEW to between 5 cm and 25 cm downstream.

- The morphology upstream and downstream of the QEW is predominantly flat with a few small riffles and pools. Substrate upstream is comprised of silt and clay, sand, gravel, and rubble. Substrate downstream is finer and comprised of a mix of silt, sand, clay and gravel. There is some erosion in the form of bank slumping both upstream and downstream of the QEW. Gabion basket lines the bend immediately downstream of the culvert.
- Instream cover includes some pool habitat, woody debris and instream vegetation (e.g., rush sp., and a few patches of watercress).
- Upstream of the QEW the watercourse flows through the hydro corridor and has a narrow riparian corridor. Riparian vegetation along the banks is comprised of Reed Canary Grass, Jewelweed, Spotted Joe-pye Weed, horsetail, Wild Grape and occasional small woody shrub and tree species (e.g., White Ash, Walnut and Red-osier Dogwood). Downstream of QEW within the ROW there is a mix of woody riparian vegetation (e.g., Manitoba Maple, White Ash), old field grasses, and herbs. Further downstream the riparian vegetation consists of manicured lawn with sections of dense Common Reed and some Crack Willow.

Fishery

- CVC captured Three-spined Stickleback (*Gasterosteus aculeatus*) at the QEW culvert outlet in 2005. Stickleback *sp.* (likely Three-spined) were observed in the same location during MRC field investigations in 2010.
- The system is classified as warmwater fish habitat by CVC. MNR did not provide a preliminary fish and fish habitat sensitivity rating for this system.

4.1.6 Species of Conservation Concern

The term “species of conservation concern” encompasses species that are;

- “designated” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or listed under the Species at Risk Act (SARA);
- “designated” by the Committee on the Status of Species at Risk in Ontario (COSSARO), including those (Endangered and Threatened) listed and regulated under Ontario's Endangered Species Act (ESA);
- provincially rare species (MNR S-Rank of S1 to S3, NHIC S-rank of S1 to S3); and
- species identified by Conservation Authorities, MNR or municipalities as having regional/local conservation interest.

Information was collected from the MNR Natural Heritage Information Centre (NHIC) database, MNR Aurora District and Credit Valley Conservation (CVC) staff, and observations during the field surveys. In total, 12 Species of Conservation have been identified in the lower Credit River. These include ten wildlife species (Snapping Turtle, Northern Map Turtle, Eastern Milksnake, Eastern Ribbonsnake, Great Egret, Black-crowned Night-heron, Chimney Swift, Barn Swallow, Monarch, River Bluet) and two plant species (Virginia Lungwort, Butternut). As noted in the preceding sections, some of these species have been observed as present or utilizing habitat at various times within the study limits (Snapping Turtle, Northern Map Turtle, Great Egret, Black-crowned Night-Heron, Barn Swallow, Monarch, River Bluet).

Three wildlife Species of Conservation Concern are known to be historically present in the lower Credit River: Redside Dace (*Clinostomus elongatus*), Blanding's Turtle (*Emydoidea blandingii*) and Eastern Musk Turtle (*Sternotherus odoratus*). However, these species are no longer found in the area (MNR and CVC, 2009-2010, pers. comm.). An additional three plant Species of Conservation Concern known to historically occur in the area per NHIC's database (Field Sedge (*Carex conoidea*), Schreber's Wood Aster (*Eurybia schreberi*), and Clinton's Clubrush (*Trichophorum clintonii*)) are considered extirpated from Peel Region and/or the GTA (Varga et. al., 2000).

4.1.7 Surface Water and Drainage

Overland flows, generally, drain in a southerly direction towards Lake Ontario. The QEW crosses three watercourses within the study limits: the Credit River, Stavebank Creek and Kenolli Creek. These watercourses are also discussed in **Section 4.1.5, Fish and Fish Habitat**.

The existing roadway drainage system consists primarily of open ditches, culverts, ditch inlets, catch basins and storm sewers. Four watercourses receiving highway and/or external area drainage, include Tecumseh Creek, the Credit River, Stavebank Creek and Kenolli Creek (Tecumseh Creek is not crossed by the QEW within the project limits).

Exhibit 4-3 illustrate the highway drainage areas and culvert locations within the study area.

There are eight locations within the study limits where watercourses and/or municipal sewer systems are intercepted at the north limit of the QEW right-of-way (ROW) and conveyed south beneath the QEW. The watercourses have been altered significantly, including realignment to accommodate urban development in the City of Mississauga and the construction of the QEW. A brief description of these drainage outlets is provided below and a more detailed discussion can be found in the Drainage and Stormwater Management Report (MRC, 2012).

Tecumseh Creek

Overland flows captured from Catchments 100, 102, 105 and 200 drains to Culvert C1. Culvert C1 drains directly into a municipal storm sewer which ultimately discharges to Tecumseh Creek, downstream of the QEW. The original 1220 x 910 mm concrete box culvert at the QEW was extended using 900 mm diameter CSP on the upstream side. Flow in excess of the capacity of the CSP culvert is spilled along the highway ditch and conveyed eastward to Culvert C2.

Credit River

On the west side of the Credit River four culverts (Culverts C2 to C5) cross the QEW with outflow from these culverts eventually discharging into the Credit River.

Culvert C2 (1050 mm diameter concrete pipe) receives flows from Catchments 100, 102, 105, 110, 210. Culvert C2 drains to the QEW storm sewer system.

Flows from Catchment 220 drain via Culvert C3 which discharges to an open ditch in Catchment 112. Flows from Catchments 112, 114 and 115 drain to ditch inlets and catch basins in their respective catchments, which eventually discharge to the QEW storm sewer system. Flows from Catchment 125 drain via ditches to the Credit River.

Flows from Catchments 225, 230, 235, 240 and 242 drain via ditch inlets and catch basins to the Mississauga Road storm sewer system. The Mississauga Road storm sewer runs southerly collecting the flows from the sag in the underpass and then easterly on the south side of QEW. This sewer system connects to the QEW storm sewer system prior to discharging into the Credit River.

Culvert C4 receives flows from Catchments 120, 130 and 245. Culvert C4 discharges into the QEW storm sewer system.

The major system flows from Catchments 120 and 245 drains overland in an easterly direction to the Credit River, north of the QEW. The major system flows from Catchment 130 drains to the Credit River Bridge and it is discharged to the Credit River via 18 existing deck drains.

Flows from Catchment 135 drain via a storm sewer to Culvert C5, which also discharges to the QEW storm sewer system and eventually to the Credit River.

QEW Credit River Bridge

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Flows Credit River Bridge deck drain directly to the Credit River via 18 deck drains.

On the east side of the Credit River, only minor flows from Catchment 140 drain to the Credit River. The major flows drain eastward, bypassing Culvert C6 to discharge to Culvert C7.

Flows from Catchment 170 drain westward via ditches to the Credit River.

Stavebank Creek

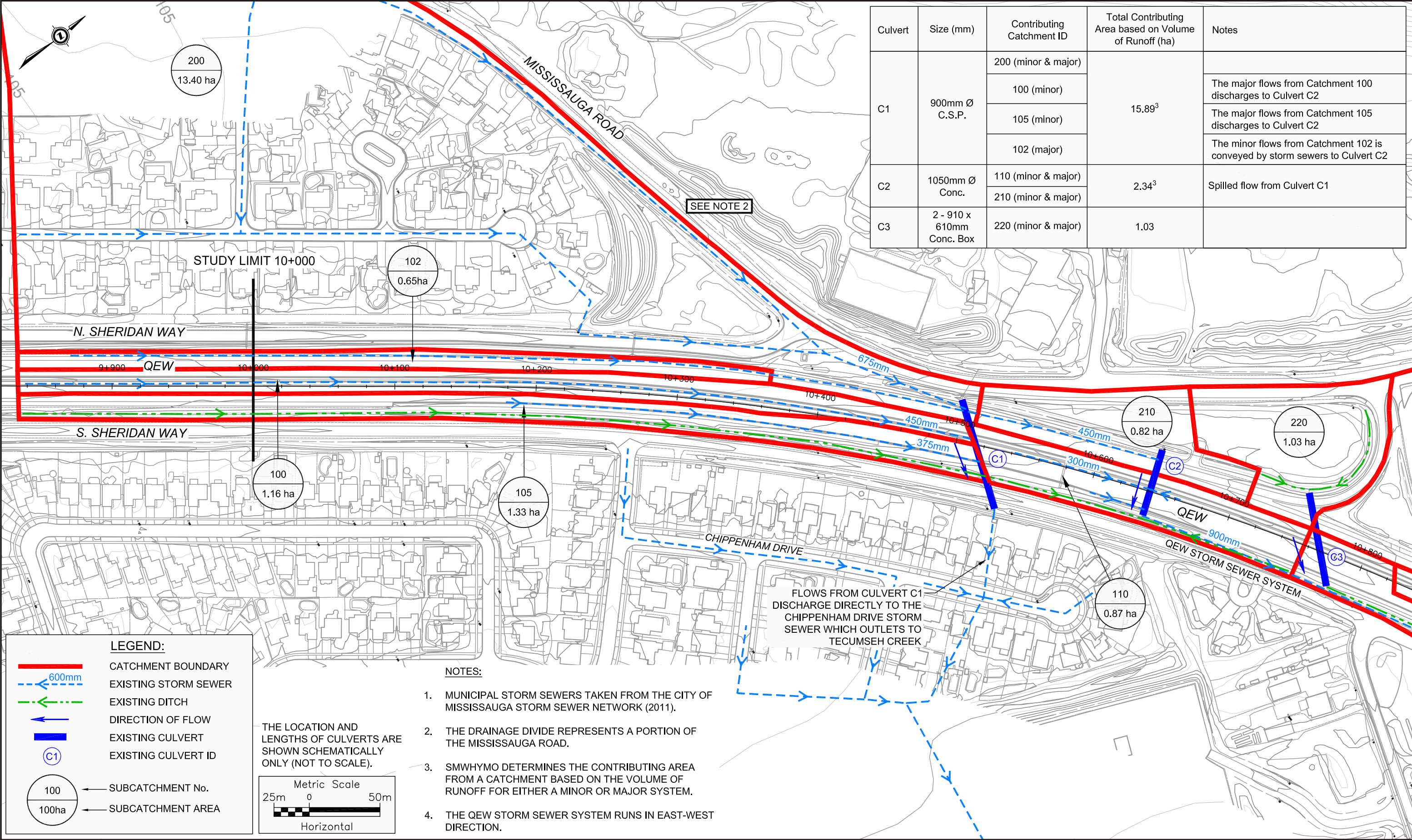
Flows from Catchment 250 drain via Stavebank Creek which crosses the QEW as Culvert C6 – a 1220 mm x 1220 mm concrete box culvert. Stavebank Creek does not receive flows from the QEW.

Kenolli Creek

Flows from Catchment 260 drain via Kenolli Creek. The creek crosses Premium Way and the QEW via Culvert C7 which is a 2500 mm x 1860 mm concrete box culvert. In addition flows from Catchments 145, 148, 150 and 155, and some minor flows from the Hurontario Street storm sewer system are conveyed by storm sewers to Culvert C7.

The City of Mississauga Storm Sewer Network book and the sewer network plan received for the QEW Hurontario Street Interchange Improvement Project were reviewed. The 1200 mm diameter storm sewer along the north side of QEW extends from approximately 600 m north of Paisley Boulevard West to Culvert C7. It receives flows from a small portion of the QEW Hurontario Street Interchange and a large drainage area along Hurontario Street extending from Paisley Boulevard West approximately 600 m to the north.

Flow from Catchments 160 and 165 discharges to the downstream side of Culvert C7.



Culvert	Size (mm)	Contributing Catchment ID	Total Contributing Area based on Volume of Runoff (ha)	Notes
C4	910 x 610mm Conc. Box	120 (minor)	3.22 ²	The major flows from Catchment 120 drains as overland flow to the Credit River
		130 (minor)		The major flows from Catchment 130 drains as overland flow to the Credit River Bridge
		245 (minor)		The major flows from Catchment 245 drains as overland flow to the Credit River
C5	900 x 900mm Conc. Box	135 (minor)	0.30	The major flows from Catchment 135 drains as overland flow to the Credit River

NOTES:

1.

MUNICIPAL STORM SEWERS TAKEN FROM THE CITY OF MISSISSAUGA STORM SEWER NETWORK (2011).
2.

SMWHYMO DETERMINES THE CONTRIBUTING AREA FROM A CATCHMENT BASED ON THE VOLUME OF RUNOFF FOR EITHER A MINOR OR MAJOR SYSTEM.
3.

RUNOFF FROM CATCHMENTS 112, 114, 115, 125 & 136 ARE CONVEYED BY DITCHES TO DITCH INLETS (DI), WHICH DISCHARGE TO THE QEW STORM SEWER SYSTEM.
4.

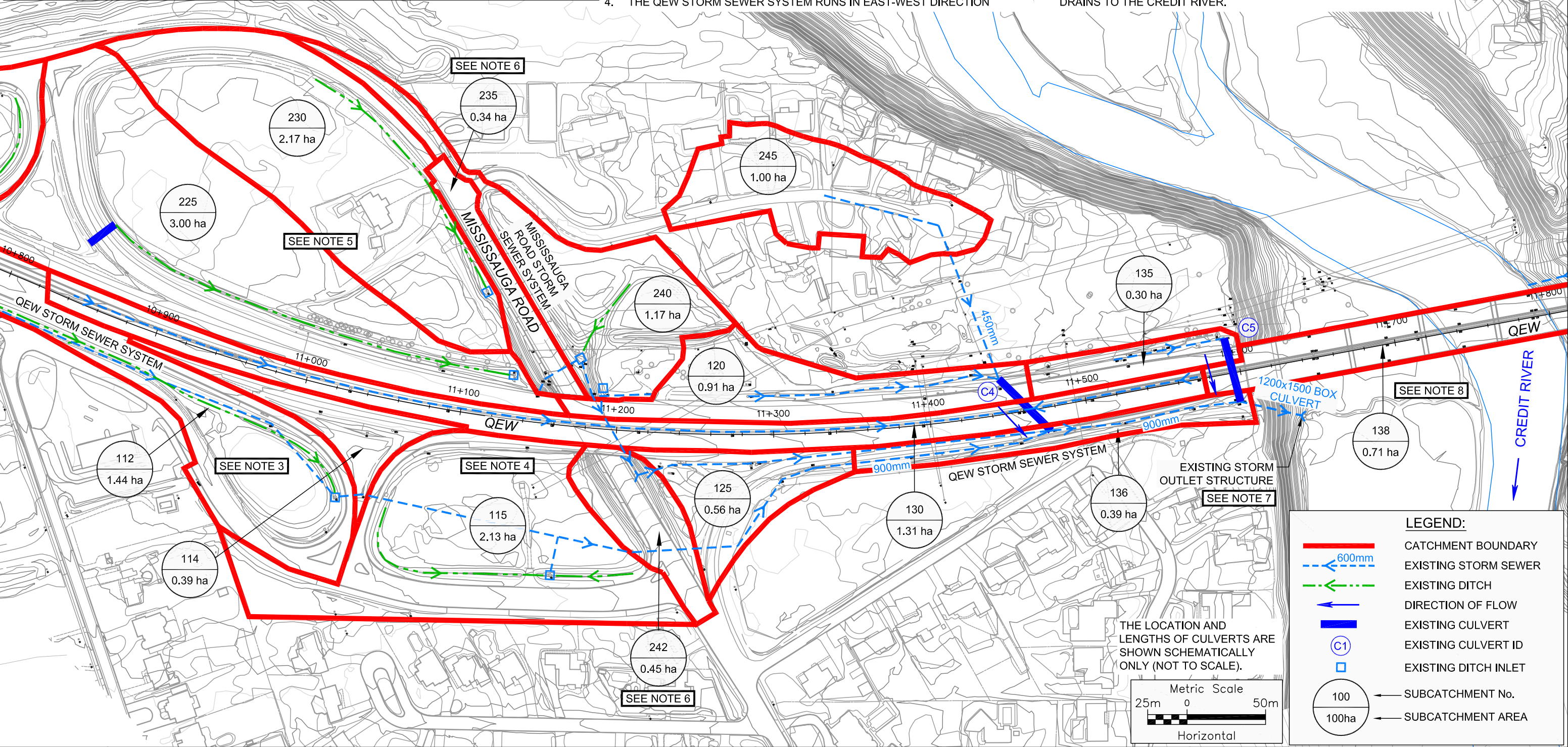
THE QEW STORM SEWER SYSTEM RUNS IN EAST-WEST DIRECTION
5.

RUNOFF FROM CATCHMENTS 225, 230, & 240 CONVEYED BY DITCHES TO DI's, WHICH DISCHARGES TO THE MISSISSAUGA ROAD STORM SEWER SYSTEM.
6.

RUNOFF FROM CATCHMENTS 235 & 242 CONVEYED BY THE MISSISSAUGA ROAD STORM SEWER SYSTEM.
7.

THE MISSISSAUGA ROAD STORM SEWER SYSTEM DISCHARGES TO THE QEW STORM SEWER SYSTEM WHICH DISCHARGES TO THE CREDIT RIVER.
8.

RUNOFF FROM THE BRIDGE (CATCHMENT 138) IS CONVEYED BY DECK DRAINS TO THE CREDIT RIVER.



4.2 SOCIO-ECONOMIC ENVIRONMENT

4.2.1 Project Location

The study area is located within the City of Mississauga, in the Regional Municipality of Peel. The study limits were shown previously in **Exhibit 1-1**. The City of Mississauga has a population of 713,443 (2011 Census) and the Regional Municipality of Peel has a population of 1,296,814 (2011 Census).

This project is located within the Central Region of the Ontario Ministry of Transportation (MTO).

4.2.2 Provincial Planning Context

Provincial policy documents provide direction on land use, growth, infrastructure planning, trade, tourism and recreation, and environmental protection, and help dictate municipal planning policy. The following Provincial Plans were found to be applicable to the project.

Growth Plan for the Greater Golden Horseshoe

In July 2006, the Province released the *Growth Plan for the Greater Golden Horseshoe (GGH)*. The *Growth Plan* outlines a set of policies for managing growth, development and guiding planning decisions in the Greater Golden Horseshoe to 2031. This broad based plan represents a planning vision for the Province of Ontario. The plan outlines a strategy for “Where and How to Grow”, “Infrastructure to Support Growth”, “Protecting What is Valuable”, “Sub-Area Growth Strategies” and “Implementation”. The *Growth Plan* requires that planning decisions made by the Province, municipalities, and other authorities conform to the policies contained in the Plan.

MTO is working to provide for the efficient movement of people and goods within the context of the province’s *Growth Plan*.

Metrolinx Regional Transportation Plan

Metrolinx is a provincial crown agency established by the Ontario government in 2006 to develop and implement an integrated multi-modal transportation plan for the Greater Toronto and Hamilton Area (GTHA). Its mandate includes providing seamless, coordinated transportation throughout the region. In November 2008, Metrolinx published the *Regional Transportation Plan (RTP): The Big Move*. The RTP projects 25 years into the future and envisions a regional transportation system that provides connectivity among modes encourages the most financially and environmentally appropriate modes of travel, as well as offers multi-modal access and shapes growth by supporting intensification.

The study area lies within the area covered by the RTP. Initiatives such as Express Rail service along the Lakeshore GO line (from Hamilton to Oshawa) and Regional GO service extensions to Niagara Region are proposed adjacent / through the study area.

GO Transit Strategic Plan – GO 2020

GO Transit is now the province's operating arm of Metrolinx, overseeing inter-regional public transportation services provided by trains and buses in the GTHA. GO Transit's Strategic Plan – GO 2020, presents its direction to 2020 including its vision, objectives, goals, and service strategy. Alongside the Metrolinx RTP, this document provides the basis for GO Transit's capital, operation and annual business plans.

As indicated above, Express Rail service along the Lakeshore GO line (from Hamilton to Oshawa) and Regional GO service extensions to Niagara Region are proposed adjacent / through the study area.

4.2.3 Municipal Planning Context and Existing and Future Land Use

Current and Future Land Use

Existing land uses within the study area consist of: residential areas (primarily low density residential) along the north and south sides of the QEW, recreational facilities (Mississauga Golf and Country Club) and 'open space' and 'greenbelt' largely associated with the Credit River Valley. Since lands surrounding the QEW are designated low-density development and are 'built out', future land use will remain similar to the present use with minor infill where possible.

A commercial and mix-use area is located to the east of the study area along Hurontario Street. **Exhibit 4-4** provides an overview of the current and designated land uses within the study area and the City of Mississauga's Official Plan (2003).

Peel Region's Official Plan

The Region of Peel's Official Plan (OP) outlines a long-term regional strategic policy framework for guiding growth and development. Section 5.6.3 of the Region's OP titled "The Provincial Freeway Network", encourages continuing improvement and integration of provincial freeways into the local road network to allow for the efficient and effective movement of people and goods in the future.

The study area is located in the urban system defined by Peel Region. The Credit River Valley within the study area is designated Core Area of the Greenlands System within the Region. There are no Regional Roads located within the study area.

City of Mississauga's Official Plan

The City of Mississauga's Official Plan (OP) provides policies and direction for the City to 2031. The OP directs growth towards redevelopment and intensification, and will position the City to meet the growth challenges of building a city for the 21st century.

The City of Mississauga Residential Districts bordering the QEW within the study limits are: Erindale, Sheridan, Clarkson-Lorne, Mineola and Cooksville. As previously noted, these neighbourhoods are primarily designated as residential low-density development.

The Credit River Valley at the QEW is designated Greenbelt in the City's OP and other municipally designated environmental features are discussed in **Section 4.1.2**. Mississauga Road, the only major north-south road within the study limits intersecting with the QEW, is a City of Mississauga road and is designated a Major Collector (Scenic Route).

4.2.3.1 *Cycling Facilities / Recreational Trails*

The City of Mississauga's Cycling Master Plan (September 2010) outlines a strategy to develop over 900 km of on and off-road cycling routes over the next 20 years. The plan focuses on fostering cycling as a 'way of life' in the city by building an integrated network of cycling routes and aims to adopt a safety-first approach to cycling.

When fully implemented, the plan will provide an integrated multi-modal approach to transportation throughout the city, connecting destinations and placing 95 per cent of the City's population within 1 km of a primary cycling route.

Existing cycling facilities included in the City of Mississauga Cycling Master Plan (September 2010) are shown in **Exhibit 4-4**, and include:

On-Road Bike Lanes

- Mississauga Road, from north of South Sheridan Way to north of Dundas Street West

On-Road Shared Use Lanes

- Indian Grove
- Indian Road, between Lorne Park Road and Mississauga Road
- Stavebank Road North
- Stillmeadow Road/ Lynchmere Avenue
- Gordon Drive
- Premium Way

Boulevard Trail

- South Sheridan Way, between Mississauga Road and Indian Grove

Off-Road Multi-use Trail

- Hydro Corridor, between South Sheridan Way and Indian Grove
- Queensway West

The Cycling Master Plan also identifies future possible cycling / pedestrian crossings of the Credit River at both Queensway and the north side of the QEW, as well as a cycling / pedestrian crossing of the QEW at Stavebank Road.



Source: City of Mississauga
Official Plan (Draft - March 2010)

City staff have been working with the MTO to explore opportunities for cycling and pedestrian connections within the study area and are in the early stages of assessing the feasibility of various options. These crossings are not within the scope of this Class EA Study, but the MTO has committed to and is working with City staff to not preclude any proposed crossing initiatives within the study area that the City may undertake.

MTO understands that the City of Mississauga has commenced a review to examine the technical feasibility of a number of different options to achieve the City's objective of providing a cycling/pedestrian crossing of the Credit River in this area. The feasibility review is specifically being undertaken in response to comments from the public and to ensure that any opportunities to combine a cycling/pedestrian crossing at or near the QEW Credit River Bridge are not lost. The intent of the feasibility review is to provide the City with a range of options that could be implemented in the future, subject to additional design and approvals.

Pedestrian and cycling issues have been one of the top concerns noted by residents in the study area. For further details on the project's consultation and coordination with the City of Mississauga regarding cycling / pedestrian issues, please see **Section 3.2.1**.

4.2.4 Contaminated Properties

A Contaminant Overview Study (COS) was undertaken to determine the presence and significance of any actual or potential contamination within the study area that may impact future highway design and construction activities. The COS was based on the current and former land uses and activities within and surrounding the corridor. The study involved a records review (including review of a previous Site Contamination Study Report and MOE / EcoLog ERIS records) and study area inspection.

Based on an evaluation of the data collected from the records review and study area inspection, no actual site contamination was identified within the study area. However, the areas summarized below were determined to have high and medium potential for site contamination.

High Potential for Contamination (*highlighted in red on **Exhibit 4-5***)

- Gas station located southwest of the QEW Mississauga Road Interchange.

There is the potential for soil and/or groundwater contamination from fuel storage and dispensing, and oil/lubricant storage and dispensing associated with the servicing of automobiles.

Moderate Potential for Contamination (*highlighted in yellow on **Exhibit 4-5***)

- QEW Right-of-way (ROW) and interchanges – potential for shallow soil contamination from vehicle exhaust (e.g., lead and other metals), general wear and tear (e.g., heavy metals, oils and lubricants), spills and winter road maintenance activities (e.g., salt staining).

- Hydro corridor – potential for shallow soil contamination from historical spraying of vegetation with pesticides within the corridor. In addition, corrosion of the galvanized steel towers which support the electrical transmission lines can cause zinc contamination of the soil.

The recommendations of the COS are highlighted in **Section 8.1.4**.

4.2.5 Noise

Based on the MTO Environmental Guide for Noise, a Noise Sensitive Area (NSA) is defined as a noise sensitive land use (urban or rural) with an Outdoor Living Area (OLA) associated with the land use. NSAs include:

- Private homes, such as single family residences;
- Townhouses
- Multiple unit buildings, such as apartments with OLAs for use by all occupants;
- Schools; and,
- Hospitals and nursing homes which are OLAs for the patients.

The Noise Sensitive Areas (NSAs) identified in the study limits are mainly single-unit homes, located on both sides of the QEW. Existing noise barriers are located along both sides of the QEW along the entire project limits with a break at the Credit River Bridge crossing and the Mississauga Road interchange.

A noise assessment, following the MTO Environmental Guide for Noise, was undertaken to assess the potential noise impact of the proposed improvements. The findings of the noise assessment are highlighted in **Section 8.2.3**. The noise report is provided in **Appendix D**.



- Legend**
- Area of Moderate Concern
 - Area of High Concern
 - Study Area - 250m Buffer

0 100 200 400 Meters
Scale: 1:7,500

Source: 2010 Microsost Corporation and its data suppliers. <http://www.bing.com/maps>

4.3 CULTURAL ENVIRONMENT

4.3.1 Archaeology

Stage 1, 2 and 3 Archaeological Assessments were carried out to identify and assess the archaeological heritage resources within the study area. Assessment activities were performed in accordance with the provisions of the Ontario Heritage Act (R.S.O. 1990, C.O. 18) in compliance with the Standards and Guidelines for Consultant Archaeologists (2011) under an archaeological consulting license (#P108) issued to Philip Woodley of New Directions Archaeology Ltd.

A search of the Ministry of Tourism, Culture and Sport archaeological site registry revealed that 15 registered archaeological sites are located within a one kilometer radius of the study area. The majority of the sites listed were excavated in preparation for the development of residential homes in the area, with one exception; the Hogsback site, located on the north side of the QEW corridor. The Hogsback site was partially excavated in the 1950s by the Royal Ontario Museum (ROM). Given the proximity to the Credit River and several tributaries, as well as the numerous registered sites in the vicinity of the study corridor, the probability of locating cultural materials within the study corridor is considered high.

To assess the potential archaeological impacts of the proposed improvements, Stage 2 and 3 assessments were conducted in the fall of 2010, the summer of 2011, and the spring of 2012. A summary of the findings of the Stage 2 and subsequent Stage 3 work are provided in **Section 8.3.1** and also provides recommended mitigation measures and commitments to future work following the Stage 2 and 3 Archaeological Assessments.


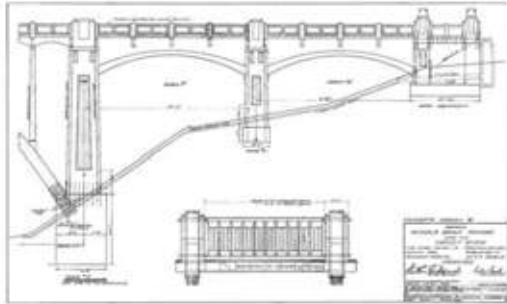
4.3.2 Built Heritage and Cultural Heritage Landscapes

A built heritage and cultural heritage landscape assessment was carried out to identify built heritage resources and cultural heritage landscapes present within the study area. The principal, person-made cultural heritage landscapes (CHL) and built heritage resources (BHR) 40 years and older identified within and/or adjacent to the study area have been identified in **Exhibit 4-6**.

There are no federally recognized properties within or adjacent to the study corridor. The Credit River Bridge has been evaluated under the Ontario Heritage Bridge Guideline (OHBG) (January 2008) and has been determined to be a candidate for inclusion on the Ontario Heritage Bridge List (*Heritage Assessment of the QEW Etobicoke Creek and Credit River Bridges, November 2008, Archaeologix Inc. Historica Research Limited*).

The Canadian Society for Civil Engineering has commemorated the QEW as a National Historic Civil Engineering Site.

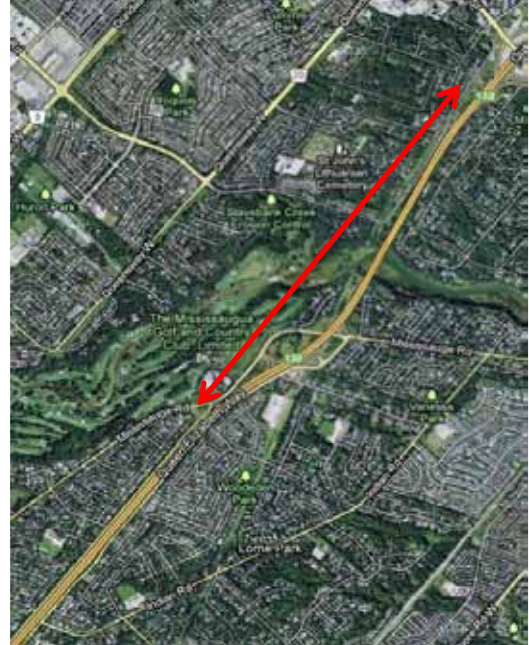
EXHIBIT 4-6: IDENTIFIED BUILT HERITAGE RESOURCES (BHR) AND CULTURAL HERITAGE LANDSCAPES (CHL) WITHIN AND ADJACENT TO THE STUDY AREA

Heritage Resource	Resource Type	Location	Description of Resource and Heritage Recognition	Digital/Aerial/Map Image
BHR	Transportation	Credit River Bridge at the QEW, City of Mississauga	<p><i>Credit River Bridge (MTO Site No. 24-203)</i></p> <ul style="list-style-type: none"> • The original open spandrel concrete arch design bridge was built in 1934. It was widened in 1960 with attention paid to matching the original design and maintaining the four arches. The bridge spanning the Credit River manages to support the natural setting. • Under MTO <i>Ontario Heritage Bridge Guideline</i> the structure achieved a score of 80 making it eligible for inclusion in the Ontario Heritage Bridge list and as a resource of Provincial Heritage Significance. • The Credit River Bridge is identified by the City of Mississauga's <i>Cultural Landscape Inventory</i> as a Special Landscape Feature, F-SLF-2. It is described as follows, <p><i>This precast concrete structure is a prominent feature within the Credit River Valley. The structure itself has architectural merit. Also important are the original lamp standards with their ER (Elizabeth Regina) logo. The entire</i></p>	 <p>[Credit River Bridge looking East.]</p>  <p>[Department of Highways. Proposed Middle Road Bridge over the Credit River The King's Highway No. 10 Toronto-Hamilton, County Peel, Township, Toronto, Lot 5-8, Range 2 (November 21, 1933).]</p>

QEW Credit River Bridge

Preliminary Design and Class Environmental Assessment Study



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Heritage Resource	Resource Type	Location	Description of Resource and Heritage Recognition	Digital/Aerial/Map Image
			<i>structure demonstrates a sensitivity to the design of the first four lane highway, the Queen Elizabeth Way, built in Ontario.</i>	
CHL	Transportation	City of Mississauga	<p><i>Roadscape</i></p> <p>The Queen Elizabeth Way (QEW), Canada's first superhighway from Toronto to Niagara Falls and Fort Erie was built as a four-lane highway to relieve traffic congestion and improve international travel for American tourists. It was dedicated the Queen Elizabeth Way in 1939 and officially opened in 1940. The highway has been widened to six lanes from four lanes.</p> <p>Commemorated by the Canadian Society for Civil Engineering as a National Historic Civil Engineering Site.</p>	 <p>[Google Maps 2010.]</p>

QEW Credit River Bridge

Preliminary Design and Class Environmental Assessment Study



Transportation Environmental Study Report

Heritage Resource	Resource Type	Location	Description of Resource and Heritage Recognition	Digital/Aerial/Map Image
				 <p>[Highway approaches to the Credit River with hydro-electric transmission line and Middle Road, now known as <i>Premium Way</i> in Mississauga, on the north. <i>Source</i>: DHO files.]</p>
CHL	Transportation	Premium Way, City of Mississauga	<i>Roadscape</i> Two lane paved road with no shoulders and a curb on north side. Grass verge located on north side. An east-west roadway that runs parallel to QEW before terminating at Stavenbank Road. Formerly known as Middle Road.	 <p>[Premium Way looking west.]</p>

QEW Credit River Bridge

Preliminary Design and Class Environmental Assessment Study



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Heritage Resource	Resource Type	Location	Description of Resource and Heritage Recognition	Digital/Aerial/Map Image
CHR	Residential	2002 Stavebank Road, City of Mississauga	<i>Residence</i> This one and-a-half storey, frame structure with a side gable roof, is clad in synthetic siding. Central brick chimneys are visible. A garage is attached. Adjacent the hydro transmission right-of-way to the north. This is a good example of a classic revival residence.	 [Front Elevation]
CHL	Transportation	Credit River Valley, City of Mississauga	<i>Waterscape</i> The Credit River was originally named Rivière au Crédit by French traders. A trading post was set up at the mouth of the river, in Port Credit in the early 18th century. The section of the river below the bridge affords wide views to the north and similarly to the south towards Lake Ontario. The Credit River Corridor is identified by the City of Mississauga Cultural Landscape Inventory as a Natural Area Landscape Type L-NA-2.	 [Aerial View of the Credit River Valley. <i>Source:</i> Bing Maps].

QEW Credit River Bridge

Preliminary Design and Class Environmental Assessment Study



Transportation Environmental Study Report

Heritage Resource	Resource Type	Location	Description of Resource and Heritage Recognition	Digital/Aerial/Map Image
BHR	Residential	1564 Mississauga Road, City of Mississauga	<p><i>Rice Residence</i></p> <p>The residence is a large 2 ½ storey, structure with a main hip roof and a centre gable structure over a projecting two storey front entrance bay. An enclosed garage is located on the south side and a shed roof on the north side of the residence covers an extension. The lower section of the main house is covered in Credit River stone and the upper section with stucco.</p> <p>This property is individually “listed” (Inventory # 253) for architectural reasons and as well as listed for its location within the Mississauga Road Scenic Route Cultural Landscape (F-TC-4).</p>	 <p>[View looking west to front elevation.]</p>
BHR	Transportation	QEW at Mississauga Road, City of Mississauga	<p><i>Mississauga Road/QEW Overpass EBL and WBL (MTO Site No. 24-196/1 and 2).</i></p> <p>These overpasses are concrete rigid frame, T-beam, structures built in 1965 as part of a QEW interchange at Mississauga Road.</p> <p>The bridge has not been evaluated under the <i>MTO Ontario Heritage Bridge Guideline</i> evaluation process. MTO screened out the structures for heritage evaluation for this project.</p>	 <p>[View looking to south elevation.]</p>

QEW Credit River Bridge

Preliminary Design and Class Environmental Assessment Study

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Heritage Resource	Resource Type	Location	Description of Resource and Heritage Recognition	Digital/Aerial/Map Image
BHR	Other: Ruins	Northwest quadrant of river bank.	<i>Former Residential Site</i> Brick remnants of a former residential structure. Information provided by Archeoworks Inc.	 [Archeoworks Inc. 2012 Stage Two Report.]
CHL	Industrial	Linear Transmission Corridor	<i>Hydro-Electric Transmission Line</i> Toronto and Niagara transmission line from Niagara Falls formed part of the Hydro Electric Power Commission's (HEPC) earliest corridor service to Toronto.	 [View looking east across the valley.]

4.4 TRANSPORTATION FEATURES

4.4.1 Existing Road Network

QEW Mainline

The section of the QEW within the study area, from west of Mississauga Road to west of Hurontario Street, is currently operating as a 6-lane freeway in an urban setting, with an interchange at Mississauga Road. The posted speed is 100 km/h and the design speed is 120 km/h, which are similar to other 400-series highways.

The roadway cross-section of the QEW through the limits of this study can best be described as an urban design. There are three basic lanes in each direction, each 3.66 m wide. A raised median with mountable curb and gutter and a steel guide rail separates opposing traffic flow from the west study limit to 300 m west of the Mississauga Road Interchange and across the Credit River Bridge and to the east study limit. Through the Mississauga Road Interchange, the median barrier is a concrete tall wall. The median width does not conform to the current design standards of 7.5 m minimum: the median varies from 6.7 m west of Mississauga Road to 3.0 m east of Mississauga Road. There are median shoulders of 2.4 m west of Mississauga Road, narrowing to nothing at the start of the median steel guide rail at the Credit River Bridge. The outside shoulders are generally 3.0 m wide, paved and separated by (non-standard) mountable curb and gutter. Across the Credit River Bridge, the outside shoulders are less than 1.5 m wide.

The Mississauga Road Interchange was reconfigured in 1998. The reconfiguration of the interchange consisted of new N/S-W and E-N/S ramps on the north side of the interchange, extension of the speed change lane for the W-N/S (South Sheridan Way) ramp, installation of traffic signals at Mississauga Road and the N/S-W and E-N/S ramps, a deck replacement for the QEW Mississauga Road structure, and installation of high mast lighting, and installation of the median concrete barrier. When this barrier was installed along the QEW, the eastbound QEW sight distance in Lane 1 (EB left lane) was reduced to approximately 110 m on the 1100 m radius curve. This reduced sight distance is a possible concern at this location since there is limited left shoulder space for emergency refuge.

Parallel Roads

The QEW in the study area passes through an urban residential area with local roads in very close proximity. The North and South Sheridan Way are located immediately adjacent to the QEW west of the Mississauga Road Interchange. North Sheridan Way terminates at Mississauga Road at the west limit of the study area. Premium Way is a local road to the north of the QEW, partially offset by 5 residences, east of the Credit River. Pinetree Way is a local residential street and is offset to the south of the QEW by a single row of houses. The service roads have numerous residential and limited business driveways, with two signalized intersections located at Mississauga Road and South Sheridan Way; and at the Mississauga Road North Ramp Terminal. The service roads are under the jurisdiction of the City of

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Mississauga with a posted speed limit of 50 km/h. In residential areas, a 5 m high noise wall separates the service road from the QEW. Photos 1 to 3 below illustrate the parallel roads within the study area. The service roads do not extend over the Credit River, resulting in discontinuities in the municipal road network. The next adjacent crossings of the Credit River are Dundas Street to the north and Lakeshore Road to the south.



Photo 4-22: South Sheridan Way, Looking East



Photo 4-23: Premium Way, Looking West



Photo 4-24: Pinetree Way, Looking East

Mississauga Road Interchange

Mississauga Road is the only QEW interchange within the study area. Adjacent interchanges are located at Hurontario Street, 2 km to the east, and Erin Mills Parkway, 4 km to the west. Mississauga Road is also the only crossing road within the study area.

The Mississauga Road Interchange is a partial buttonhook configuration with five ramps. This is an unconventional configuration as two of the ramps on the south side (W-N/S off-ramp and N-E onramp) intersect with South Sheridan Way rather than directly with Mississauga Road; both the N-E and S-E on-ramps are metered during the weekday morning peak period.

Even though the north side of the Mississauga Road Interchange was recently reconfigured, many of the interchange elements still do not conform to current design standards due to the significant constraints created by the close proximity of Mississauga Road and the Credit River Bridge. In particular, Mississauga Road, just north of the QEW, runs in an east-west orientation, parallel to the QEW for about 600 m. Mississauga Crescent on the north side of the QEW, and Kedleston Way and Atoka Drive on the south side of the QEW are also in close proximity to the QEW.

4.4.2 Existing Bridges

Within the study limits there are two bridges, the Credit River Bridge and the Mississauga Road Overpass.

Credit River Bridge

The current QEW Credit River Bridge (see **Exhibit 4-7**) was originally constructed as a four-lane bridge in 1934, and was widened to six lanes in 1960. The structure is 256 m long and 28.9 m wide, supporting six traffic lanes (three in each direction). The bridge is a 7-span concrete arch bridge with spandrel walls and a reinforced concrete deck. As geometric standards have evolved over the years, no roadway elements (lane width, shoulder, barrier) on the structure meet current MTO standards. A major rehabilitation was carried out in 1977 which consisted of the replacement of expansion joints and deck repairs. A second rehabilitation of the QEW Credit River Bridge was carried out in 1987. This rehabilitation consisted of expansion joint reconstruction, deck reconstruction and concrete repairs. As discussed in **Section 1.4.1**, the bridge is currently being rehabilitated with the works expected to be complete by the end of 2013.

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EXHIBIT 4-7: QUEEN ELIZABETH WAY – CREDIT RIVER BRIDGE

Mississauga Road Overpass

The Mississauga Road Overpass structure, (see **Exhibit 4-8**) built in 1956, is a single span, rigid frame, concrete T-beam structure carrying six lanes of the QEW over Mississauga Road. The abutments are closed and are not protected by a guiderail system. The bridge spans three vehicle lanes, two bike lanes and two sidewalks. The barriers and all clearances, except the QEW median shoulder width, meet current standards. The bridge was rehabilitated in 1998 at which time the existing deck was replaced along with the barriers.



EXHIBIT 4-8: MISSISSAUGA ROAD OVERPASS

4.4.3 Existing Traffic Conditions

A detailed Traffic Operations Study was undertaken to assess the existing traffic and safety conditions in the study area. The traffic operational analysis for the mainline and ramp terminal intersections was conducted using micro-simulation model (VISSIM). A collision analysis was conducted to identify any safety-related concerns within the study area through a review and summary of the recent mainline collision history for the study area. A separate comprehensive ‘Highway Safety Review’ was conducted to undertake a more in-depth safety and human factors review.

For the traffic operational analysis, the future travel demand was estimated using the *Greater Golden Horseshoe and Hamilton (GGH)* model. The GGH model was developed by the Ministry based on the EMME2/3 platform based on 2001 Transportation Tomorrow Survey (TTS) data and updated with the 2006 TTS data.

Historical Traffic Growth

A review of historic annual average daily traffic (AADT) volume shows that traffic volumes on the QEW in the study area have been increasing steadily. **Exhibit 4-9A** illustrates the AADT and SADT (summer average daily traffic) volumes reported by MTO at the Erin Mills Parkway Interchange, Mississauga Road Interchange and Hurontario Street Interchange. MTO’s data shows that the historical growth rate in AADT volume is about 1.5 percent per annum in the study area.

As indicated in **Exhibit 5-11A**, the summer average daily traffic (SADT) volume was generally recorded higher by 10 to 12 percent than AADT volume at Mississauga Road Interchange.

EXHIBIT 4-9A: HISTORICAL MAINLINE TRAFFIC GROWTH TRENDS

Year	Erin Mills Parkway		Mississauga Road		Hurontario Street	
	AADT	SADT	AADT	SADT	AADT	SADT
1988	95,800	106,300	114,000	126,500	122,500	128,600
1989	99,050	109,900	118,000	130,900	126,800	133,100
1990	102,000	113,200	121,550	134,900	130,850	140,000
1991	101,000	111,100	120,100	132,100	128,900	136,600
1992	101,700	109,800	120,900	130,500	129,800	137,500
1993	104,800	113,200	123,300	133,100	137,900	146,200
1994	105,400	114,900	125,800	137,100	143,700	152,300

QEW Credit River Bridge

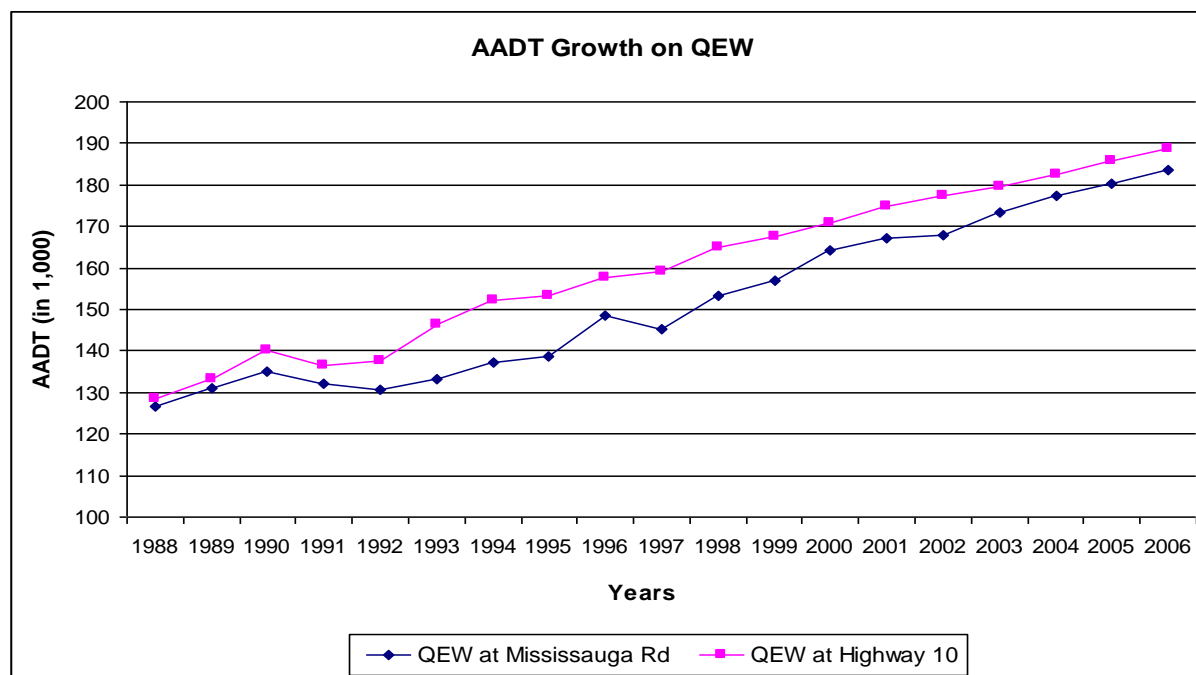
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Year	Erin Mills Parkway		Mississauga Road		Hurontario Street	
	AADT	SADT	AADT	SADT	AADT	SADT
1995	106,800	115,300	128,300	138,600	144,600	153,300
1996	108,100	121,600	131,900	148,400	148,100	157,600
1997	109,500	115,000	138,200	145,100	151,600	159,200
1998	110,800	117,900	144,100	153,300	155,100	165,000
1999	117,100	124,600	147,600	157,000	157,600	167,700
2000	122,800	138,200	146,000	164,300	160,500	170,800
2001	125,600	141,900	148,000	167,200	163,500	174,900
2002	118,000	132,200	150,000	168,000	166,500	177,400
2003	120,800	135,300	154,800	173,400	169,500	179,700
2004	126,200	141,000	158,800	177,400	172,500	182,300
2005	126,400	140,700	162,000	180,400	175,400	185,600
2006	129,800	144,200	165,100	183,400	178,400	188,700
Estimated 2006 Volume (Trend)	128,800	143,100	163,700	181,700	179,100	189,100
Annual Growth Trend (%)	1.21%	1.28%	1.48%	1.55%	1.81%	1.77%
Estimated AADT- 2010	136,200	151,700	175,100	195,000	191,700	202,400

Exhibit 4-9B presents the growth in AADT volume on QEW from 1988 to 2006 at Mississauga Road Interchange and Hurontario Street Interchange.

EXHIBIT 4-9B: AADT GROWTH ON QEW (1988-2006)

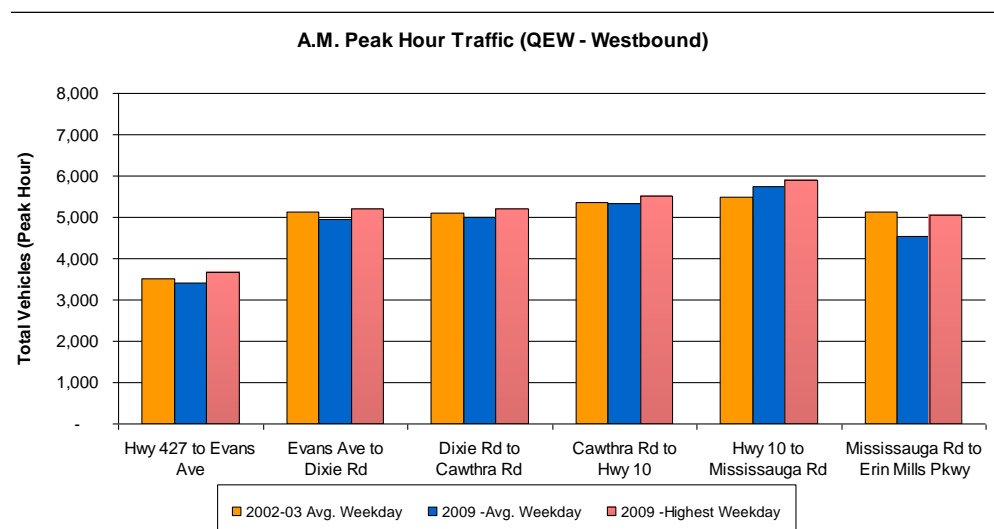
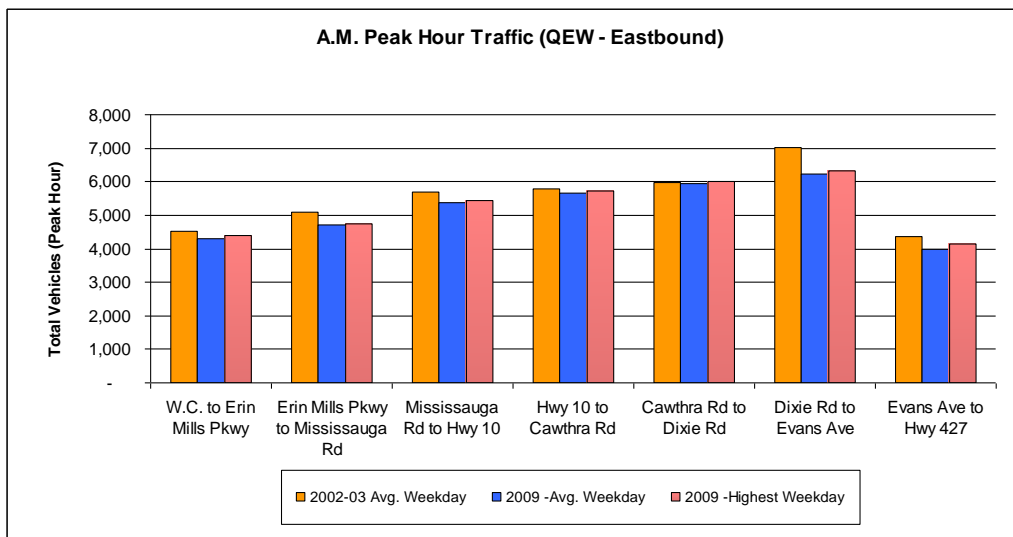


Due to congestion, there has been little to no opportunity for growth in peak period peak direction travel in recent years. **Exhibit 4-10** on the following pages illustrates the historical traffic during the morning peak hour for both eastbound and westbound directions from 2002 to 2009; it shows no significant growth for the eastbound direction and only a minor increase in the westbound direction. At certain locations, peak hour traffic volume was reduced in Year 2009 as compared to Year 2002. The construction activities at Hurontario Street Interchange may be the reason for reduced traffic on the QEW mainline, where speed limit through this area was reduced to 80 km/h during construction.

The AADT growth is primarily due to the growth in the off-peak hours, shoulder hours¹ and counter-peak direction travel.

¹ Shoulder hours are the hours immediately prior to and after the peak hour. For this EA Study the shoulder hours were the 1 hour prior to and the 2 hours following the peak hour.

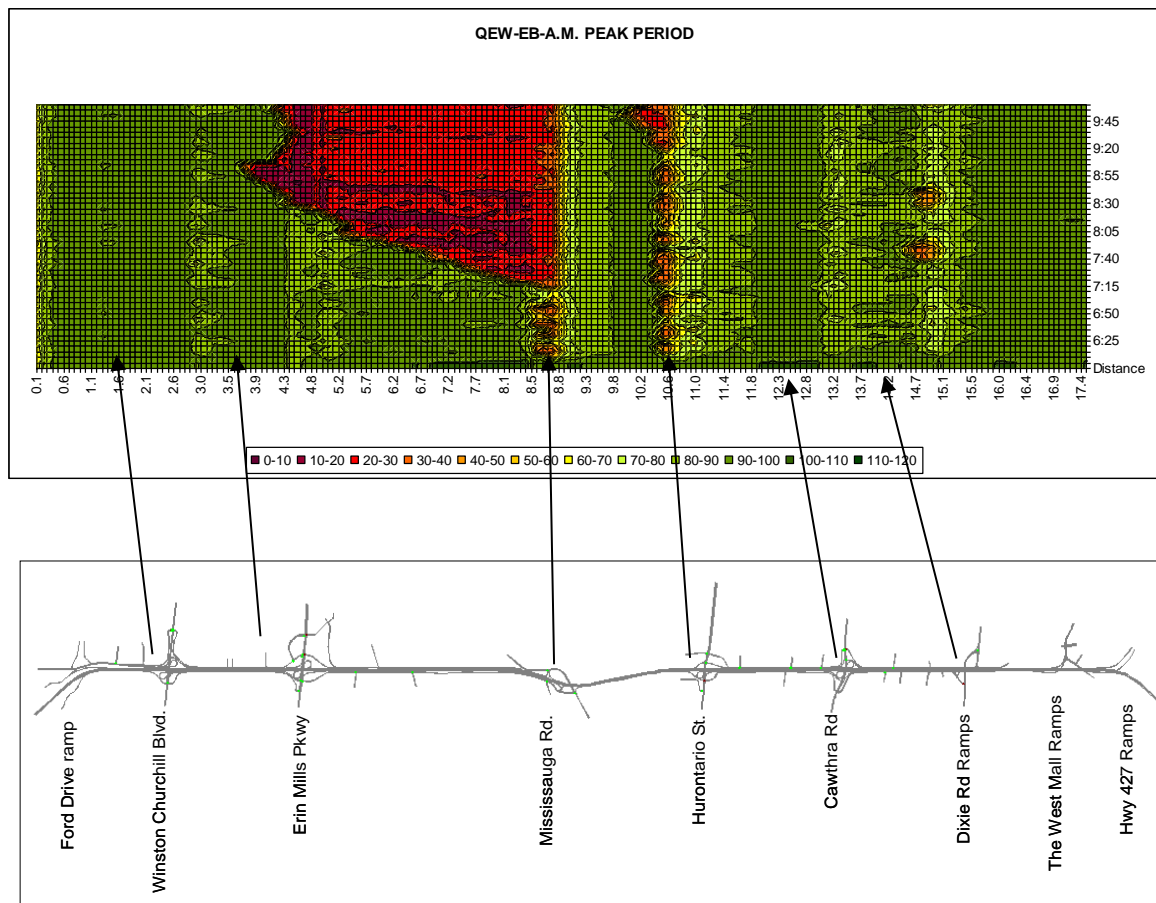
EXHIBIT 4-10: TRAFFIC GROWTH IN PEAK PERIOD (2002-2009)



Existing Mainline Operations

The mainline traffic operational analysis was undertaken for the existing (2009) travel demand using a micro-simulation model. Output from the micro-simulation model includes speed profiles which present the modelled average travel speed for each 100 m road section along the mainline freeway lanes, at five-minute intervals throughout the peak period. This illustration provides a network-wide view of the expected mainline traffic operation along the QEW corridor and very clearly identifies the location and time periods when travel speeds drop and queuing impacts result from congestion (i.e., areas coloured 'red'). The existing speed profile for the eastbound direction for the morning peak period (4 hours) is presented in **Exhibit 4-11**.

EXHIBIT 4-11: EXISTING EASTBOUND QEW AM PEAK PERIOD OPERATING SPEEDS



As presented in **Exhibit 4-11**, the eastbound traffic during the morning peak period is very congested and in a ‘stop and go’ condition, especially immediately west of Mississauga Road. The following three issues were noted at the QEW Mississauga Road Interchange, which results in poor levels-of-service in the eastbound direction and at the interchange ramp terminals:

- The two eastbound on-ramps both have very short speed change (merge) lanes, which are constrained by the close proximity of the Credit River Bridge. The first speed change lane for the N-E Ramp is only 105 m + 60 m taper (165 m total) and the second speed change lane for the S-E Ramp is 165 m + 75 m taper (240 m total) compared to the standard required length of 410 m + 90 m taper (500 m total). During periods of heavy traffic, even with the existing ramp metering for eastbound on-ramp traffic in the morning peak period, these two short speed change lanes create disturbance and ‘shockwaves’ to mainline traffic, which reduces speed on the mainline.

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- The congestion and low speed on the mainline in morning peak period results in poor level-of-service at the ramp terminal intersections with long queues on local streets, particularly on South Sheridan Way and Mississauga Road.
- The north and south service roads are parallel to the QEW through much of Mississauga but are discontinuous between the Mississauga Road and Hurontario Street Interchanges, adding to QEW traffic between the Mississauga Road and Hurontario Street Interchanges and at the Mississauga Road ramp terminals.

Existing Intersection Operations

As noted above, the north and south service roads are discontinuous between the Mississauga Road and Hurontario Street Interchanges. Hence, the traffic from the service road shifts to the QEW between the Mississauga Road and Hurontario Street Interchanges which increases traffic at the Mississauga Road Interchange ramp terminals and also on the Credit River Bridge segment of the QEW. The study area existing intersections were analyzed using VISSIM model. This analysis considered the current road network, lane configurations and traffic signal system. The intersection analysis results (delays and resulting level-of-service) for the study area intersections are presented in **Exhibit 4-12**.

EXHIBIT 4-12: EXISTING INTERSECTION CAPACITY ANALYSIS

Intersection/Movement	AM Peak Hour		PM Peak Hour	
	Delay (seconds)	LOS	Delay (seconds)	LOS
QEW EB on/off-ramp at South Sheridan Rd	55.8	F	33.4	D
Mississauga Rd at South Sheridan Rd	17.1	B	12.0	B
QEW WB on/off-ramp at Mississauga Rd	16.5	B	13.3	B
Mississauga Rd at North Sheridan Way	1.3	A	0.2	A

The level of service for the eastbound ramp terminals at South Sheridan Way and Mississauga Road during the morning peak period largely depends upon the ramp meter signal timings. The ramp meter signal timings during morning peak period at both of these locations varies from 5 to 15 seconds depending upon mainline traffic congestion.

As presented in **Exhibit 4-12**, the South Sheridan Way and eastbound on/off-ramp intersection operates at LOS (level-of-service) 'F' in morning peak hour and LOS 'D' in the afternoon peak hour. This intersection experiences delays and long queues primarily due to

the traffic congestion and low speeds on the QEW mainline. This increases the ramp meter timing, further contributing to lower service on South Sheridan Way.

The Mississauga Road and eastbound on-ramp intersection is controlled by traffic signals and operates at LOS 'B' during both peak hours. However, during the morning peak period, the northbound right turn movement (i.e., eastbound on-ramp for the mainline) is controlled by the ramp meter and results in longer queues (upwards of 400 m) and higher delays.

The QEW Westbound on/off ramp at the Mississauga Road intersection is controlled by traffic signals. This intersection operates at LOS 'B' during both peak hours.

Review of Collision Data

The Ministry provided vehicle collision data for the QEW mainline and for the interchange ramps from Erin Mills Parkway to Dixie Road for the period between January 2002 and July 2008. Collision summaries were prepared for each of the mainline segments. These summaries address each of the following categories of vehicle collision characteristics:

- Lighting Condition
- Collision Type
- Severity of Collision
- Road Condition
- Environmental Condition

The total number of collisions on the mainline during this period, the estimated annual average daily traffic volumes and the motor vehicle collision rates are summarized in **Exhibit 4-13**.

The average motor vehicle collision rate reported by MTO for freeways (excluding collisions on ramps) throughout the Province of Ontario was 0.6 collisions from 2002 to 2005 and the average collision rate was 0.5 for 2006.

EXHIBIT 4-13: QEW MAINLINE COLLISION RATES (2002 - 2008)

Location	Collision ² / million vehicle km	# of Collisions		
		Eastbound	Westbound	Total
Erin Mills Pkwy to Mississauga Rd	0.38	343	176	519
Mississauga Road to Hurontario Street	0.77	417	237	654
Hurontario Street to Cawthra Road	0.80	436	340	776
Cawthra Road to Dixie Road	0.19	76	65	141
Total		1,272	818	2,090

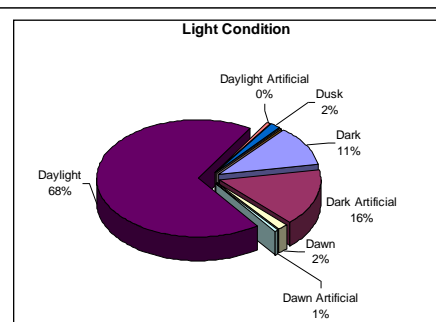
The collision frequency in the project limits lies above the provincial average. The historical collision trend (**Exhibit 4-14**) indicates that the collision rates dropped within the study area over the period from January 2002 to July 2008.

EXHIBIT 4-14: HISTORICAL COLLISION RATES

Year	Eastbound	Westbound	Total	Collision Rate
2002	80	40	120	0.98
2003	74	35	109	0.86
2004	62	45	107	0.83
2005	57	40	97	0.74
2006	61	36	97	0.72
2007	65	30	95	0.69

A review of the mainline collision data for the segment between Mississauga Road and Hurontario Street indicates the following key observations.

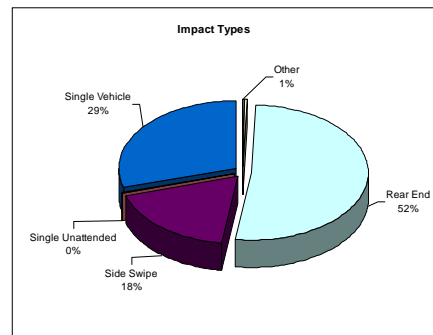
- The proportion of collisions occurring under daylight conditions is 68%. The corresponding proportion of collisions occurring under dark conditions is 11% and dark artificial is 15%. These comparisons suggest that the proportion of collisions occurring under conditions other than



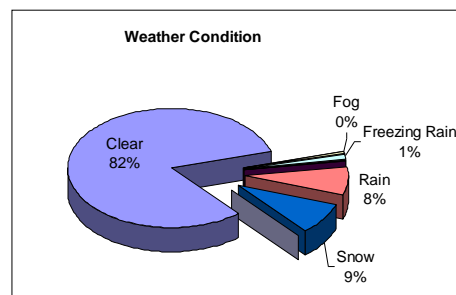
² - Includes mainline collision only

daylight is not over-represented and that illumination is not likely a critical issue.

- Rear-end collisions account for 52% of motor vehicle collisions occurring in the project corridor mainline segments. Sideswipe collisions in the study area account for 18% of the total collisions. Rear-end and sideswipe collisions are the most common impact types on congested urban freeways and account for approximately 70% of the total collisions within the study area.



- Property-Damage-Only and Personal-Injury collisions accounted for 84% and 15% of the total mainline collisions in freeway segment, which reflects slightly less severity than the comparison freeway sections mainly due to a congested highway where average speed is very low. There was one fatal mainline collision in the study corridor between 2002 and 2008.
- 83% of the total collisions occurred during clear weather. Collisions for rain, snow and freezing rain weather conditions accounted for 8%, 9% and 1% respectively.
- All the above observations represent collisions that are expected for a congested urban freeway.



Review of Future Travel Demand

Future travel demand for the 2021 planning horizon was estimated using the Greater Golden Horseshoe (GGH) model. The GGH model assumes the proposed land use (population & employment targets) provided by *Places to Grow*; and transit improvement assumptions are consistent with “The Big Move”.

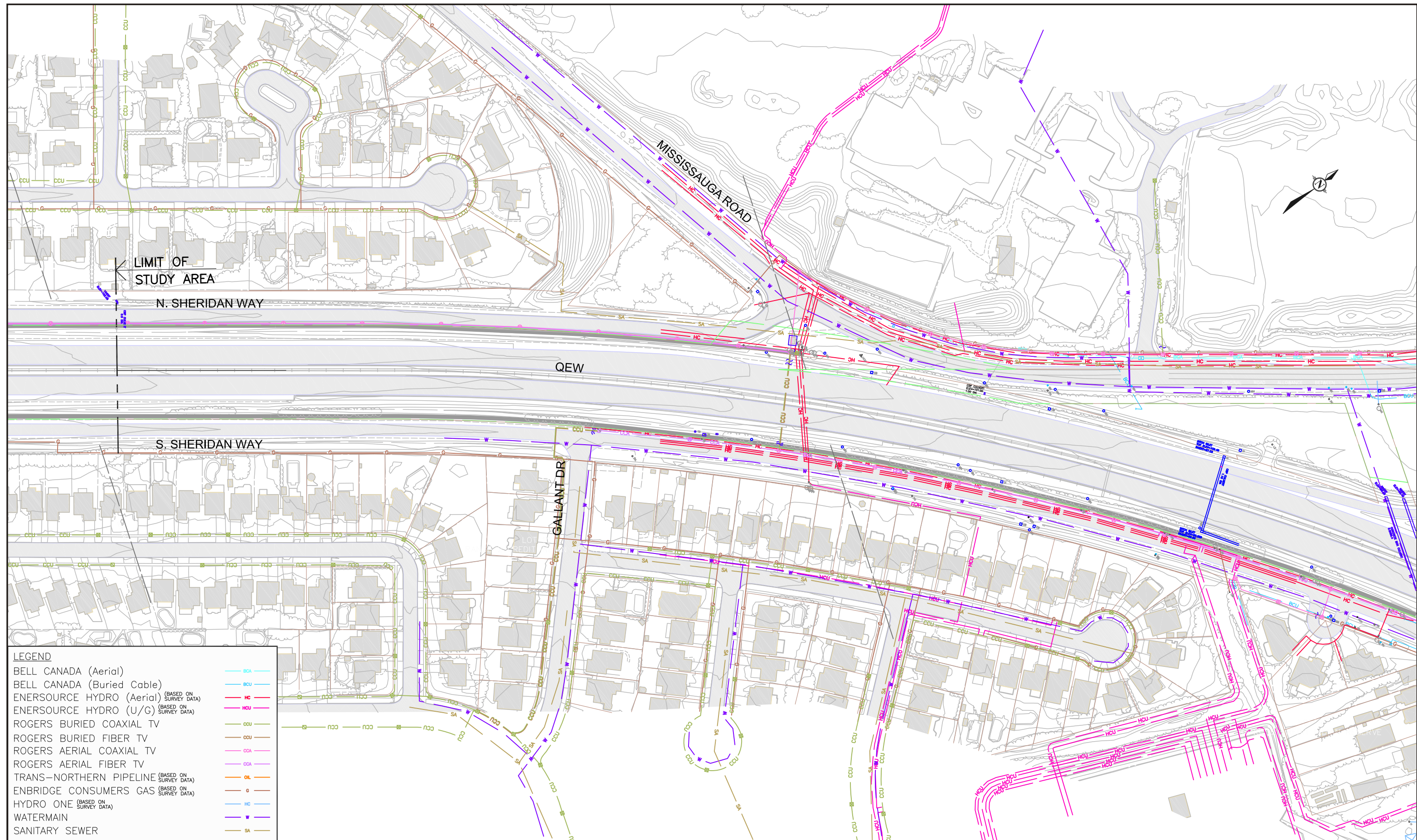
QEW through Mississauga is currently operating at capacity during peak hour peak direction. Based on the results of the 2021 travel demand model, the QEW will continue to operate at capacity with improvements implemented within the study area.

4.5 UTILITIES

The following major utilities are located within the study area:

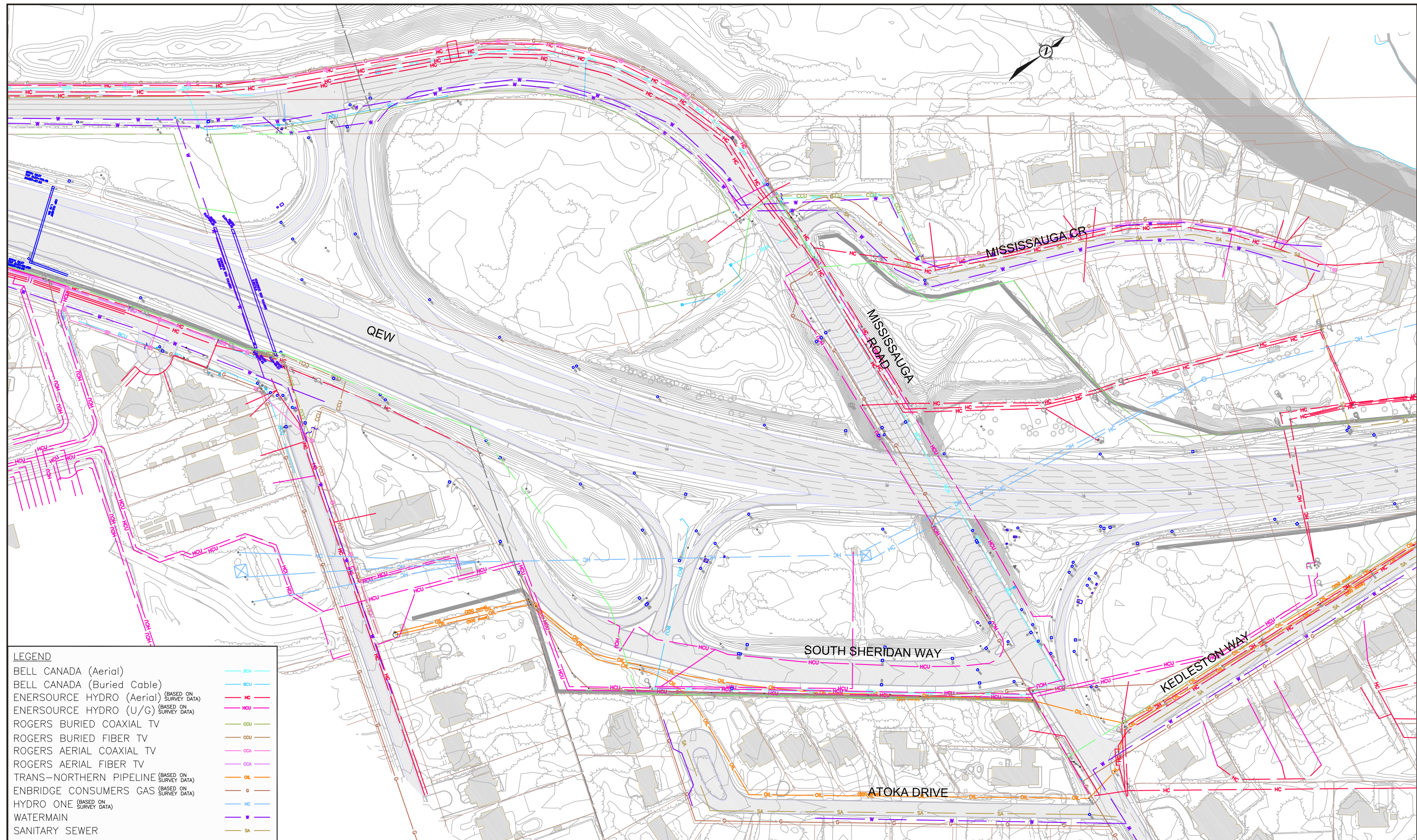
- Bell Canada
- Enbridge Consumers Gas
- Enersource Hydro Mississauga
- Hydro One
- Rogers Cable
- Trans-Northern Pipelines Inc.

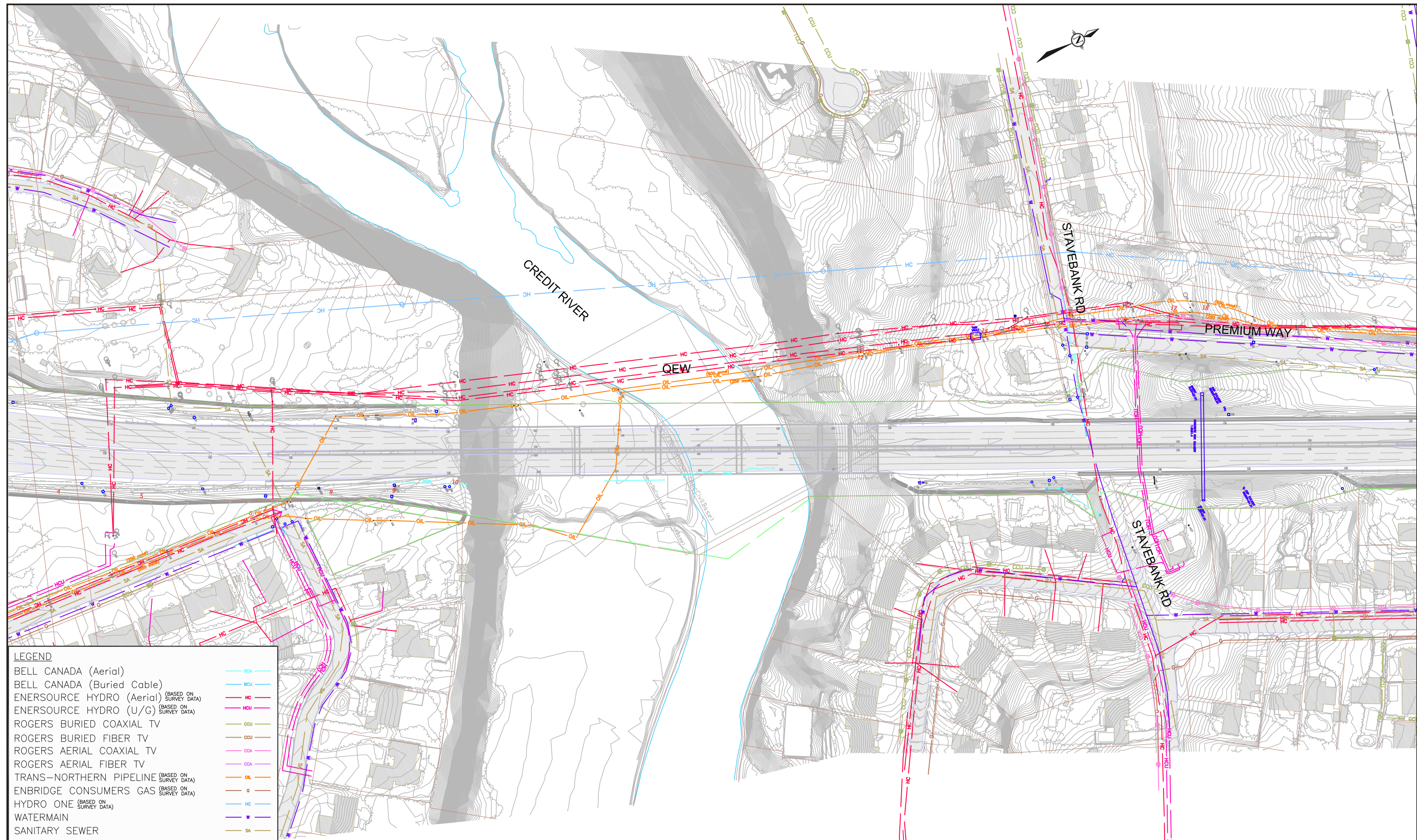
In addition, there are existing municipal utilities, watermains and sanitary sewers along local roads. See **Exhibit 4-15** for a plan of the existing utilities in the study area.



LEGEND

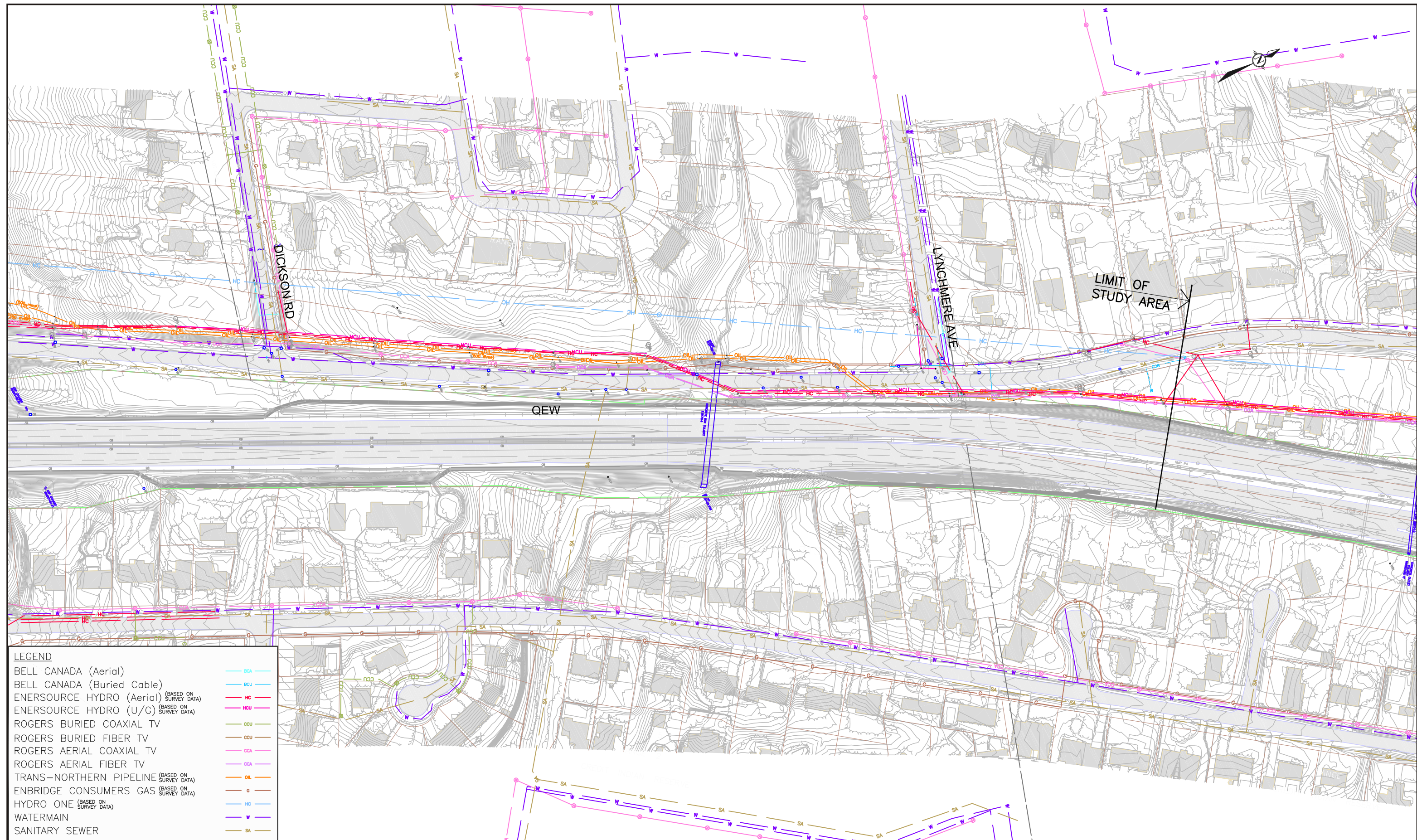
BELL CANADA (Aerial)	— BSCA
BELL CANADA (Buried Cable)	— BCU
ENERSOURCE HYDRO (Aerial) (BASED ON SURVEY DATA)	— HC
ENERSOURCE HYDRO (U/G) (BASED ON SURVEY DATA)	— HCU
ROGERS BURIED COAXIAL TV	— CCU
ROGERS BURIED FIBER TV	— CCA
ROGERS AERIAL COAXIAL TV	— CCA
ROGERS AERIAL FIBER TV	— CCA
TRANS-NORTHERN PIPELINE (BASED ON SURVEY DATA)	— OIL
ENBRIDGE CONSUMERS GAS (BASED ON SURVEY DATA)	— G
HYDRO ONE (BASED ON SURVEY DATA)	— W
WATERMAIN	— W
SANITARY SEWER	— SA





LEGEND

BELL CANADA (Aerial)	— SCA
BELL CANADA (Buried Cable)	— BCU
ENERSOURCE HYDRO (Aerial)	— HC
ENERSOURCE HYDRO (U/G)	— HCU
ROGERS BURIED COAXIAL TV	— CCU
ROGERS BURIED FIBER TV	— CCU
ROGERS AERIAL COAXIAL TV	— CCA
ROGERS AERIAL FIBER TV	— CCA
TRANS-NORTHERN PIPELINE (BASED ON SURVEY DATA)	— OIL
ENBRIDGE CONSUMERS GAS (BASED ON SURVEY DATA)	— G
HYDRO ONE (BASED ON SURVEY DATA)	— HC
WATERMAIN	— W
SANITARY SEWER	— SA



LEGEND

BELL CANADA (Aerial)	BSCA
BELL CANADA (Buried Cable)	BCU
ENERSOURCE HYDRO (Aerial) (BASED ON SURVEY DATA)	HC
ENERSOURCE HYDRO (U/G) (BASED ON SURVEY DATA)	HCU
ROGERS BURIED COAXIAL TV	CCU
ROGERS BURIED FIBER TV	CCA
ROGERS AERIAL COAXIAL TV	CCA
ROGERS AERIAL FIBER TV	CCA
TRANS-NORTHERN PIPELINE (BASED ON SURVEY DATA)	OIL
ENBRIDGE CONSUMERS GAS (BASED ON SURVEY DATA)	G
HYDRO ONE (BASED ON SURVEY DATA)	HC
WATERMAIN	W
SANITARY SEWER	SA