



# New Track and Facilities Transit Project Assessment Process

## Final Environmental Project Report – Chapter 4

30-Nov-2020

Prepared by:



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## REVISION HISTORY

Revision	Date	Purpose of Submittal	Comments
00	30-Nov-2020	Final submission to Metrolinx.	N/A

This submission was completed and reviewed in accordance with the Quality Assurance Process for this project.

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APPENDIX C1 - Hydrogeology Baseline Conditions Report

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APPENDIX D2 - Land Use and Socio-Economic Impact Assessment Report

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Volume 1: Baseline Conditions

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Volume 2: Impact Assessment

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APPENDIX H - Preliminary Stormwater Management Assessment Reports

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APPENDIX M1 - Richmond Hill Corridor Operational Noise & Vibration Assessment

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APPENDIX N - Electromagnetic Interference/Electromagnetic Fields (EMI/EMF) Impact Assessment  
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APPENDIX O - Environmental Site Assessment Summary

APPENDIX P - Consultation Record



## 4 Baseline Conditions

### 4.1 Baseline Conditions Overview

In accordance with the Transit Projects and Metrolinx Undertakings O. Reg. 231/08 (the Transit Projects Regulation), an assessment of existing environmental conditions within the Study Area (see Figure 4-1) was conducted as part of the New Track and Facilities Transit Project Assessment Process (TPAP). For information on project design and technical components, refer to Chapter 3.

The purpose of collecting and documenting baseline conditions data is to provide the basis for the subsequent assessment of potential impacts (as detailed in Chapters 5, 6 and 7). Therefore, this chapter consolidates and summarizes the findings of the following baseline conditions studies which were undertaken as part of the TPAP:

- Natural Environment Baseline Conditions Report (**Appendix B1**)
- Hydrogeology Baseline Conditions Report (**Appendix C1**)
- Land Use and Socio-Economic Baseline Conditions Report (**Appendix D1**)
- Visual Baseline Conditions Report (**Appendix E1**)
- Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment - Volume 1: Baseline Conditions (**Appendix F1**)
- Archaeological Baseline Conditions Report (**Appendix G1**)

The following additional reports incorporated the relevant existing conditions information as part of their impact assessment studies:

- Preliminary Stormwater Management Assessment Reports (**Appendix H**)
- Traffic Impact Assessment Reports (**Appendix I**)
- Utilities Impact Assessment Report (**Appendix J**)
- Noise and Vibration Facilities Construction Impact Assessment Report (**Appendix K**)
- Air Quality Facilities Construction Impact Assessment Report (**Appendix L**)
- Richmond Hill Corridor Operational Noise & Vibration Assessment (**Appendix M1**)
- Richmond Hill Corridor Operational Air Quality Assessment (**Appendix M2**)
- Electromagnetic Interference/Electromagnetic Fields (EMI/EMF) Impact Assessment Report (**Appendix N**)
- Environmental Site Assessments (**Appendix O**)
- Consultation Record (**Appendix P**)

Generally, baseline conditions data was collected and summarized through a combination of:

1. Review of background information/reports, and;
2. Field investigations (as required).



## 4.2 Preliminary Study Area

Chapter 2 provides a detailed description of the project study area components.

A conservative study area was established as part of the pre-planning phase of the TPAP in order to collect and document baseline conditions information. Figure 4-1 provides a high-level key map depicting the Project Study Area. Once the conceptual engineering design had progressed, the Study Area was further refined as part of the impact assessment phase of the TPAP in order to more accurately identify potential impacts and develop mitigation measures (refer to Chapter 5).

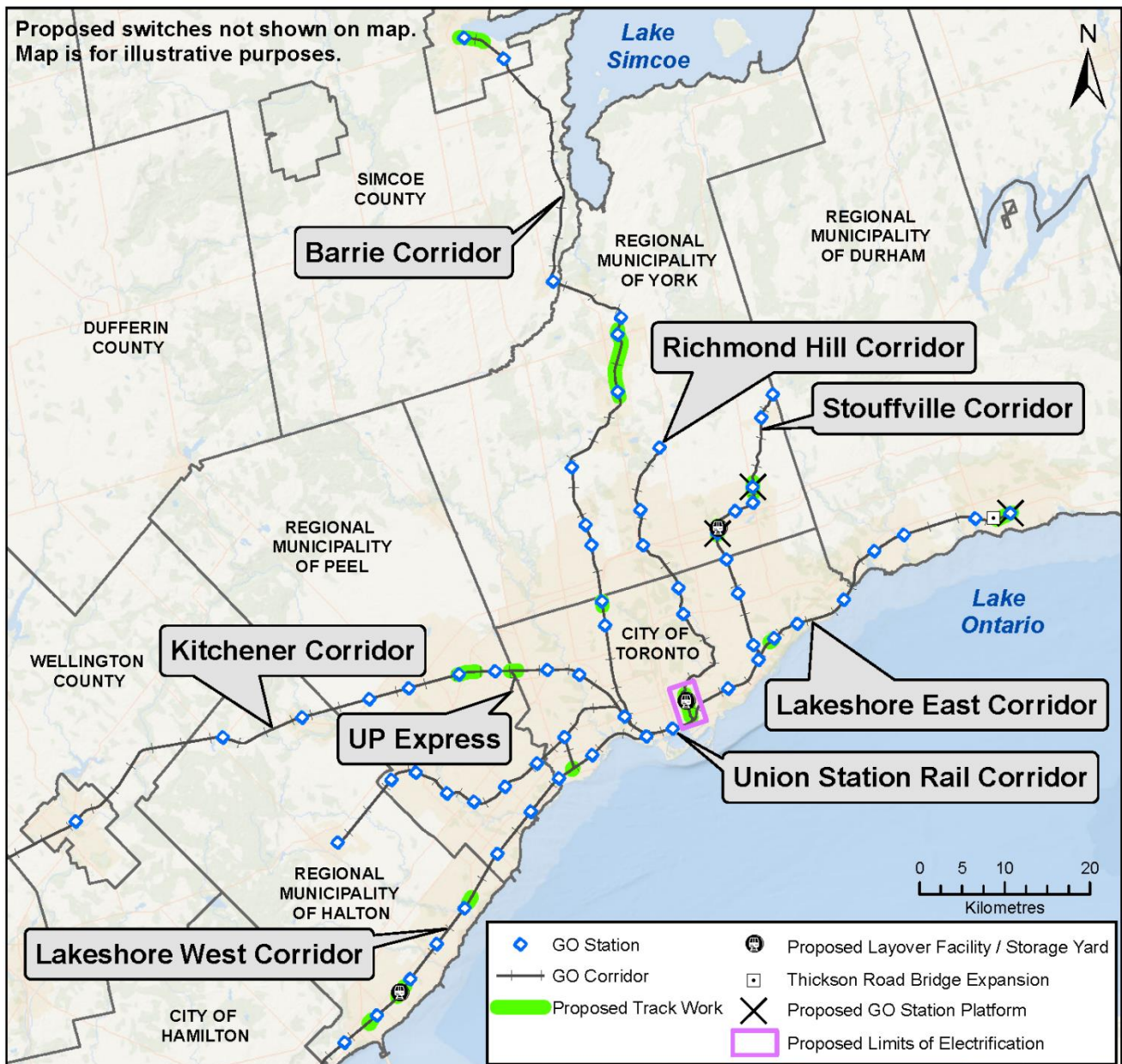


FIGURE 4-1 PROJECT STUDY AREA KEY MAP

In general, for purposes of baseline conditions data collection, a conservative buffer area of approximately 30 metres (m) around the proposed project infrastructure was applied. Refer to Figure 4-2 which provides an example map depicting the buffer zone.

There are some environmental/technical studies, as outlined below, that utilized different buffer zones in order to more appropriately characterize the type of environmental features that may be impacted by the proposed project.

#### 4.2.1 Discipline Specific Study Area Buffer Zones

##### **Archaeology**

- The Stage 1 Archaeological Assessment study considered background reports of previous archaeological assessments conducted within a radius of 50 metres and OASD registered archaeological sites within one (1) kilometre of the study area.

##### **Visual**

- Areas of Low Potential Impacts: residential areas where homes are more than 20 metres from the proposed infrastructure, view not considered of scenic value, and proposed infrastructure located in the vicinity of mixed-use areas.
- Areas of Moderate Potential Impacts: residential areas where homes are between eight (8) and 20 meters from the proposed infrastructure, areas where high-rise buildings in a natural setting are closer than 30 metres from the proposed infrastructure, scenic areas or overpasses, and rural farmland.
- Areas of High Potential Impacts: residential areas where homes are within eight (8) metres from the proposed infrastructure, significant scenic, cultural or historic features/environments adjacent to the proposed infrastructure, and environmentally protected area directly adjacent to the proposed infrastructure.

##### **Hydrogeology**

- The hydrogeology study considered water supply wells and groundwater dependent natural heritage features (i.e., identified waterbodies) identified within 500 m of the railway ROW.

##### **Stormwater Management**

The preliminary stormwater management assessment study considered watershed hydrology (i.e., movement of stormwater through watersheds) at the proposed layover/storage yard facility sites.



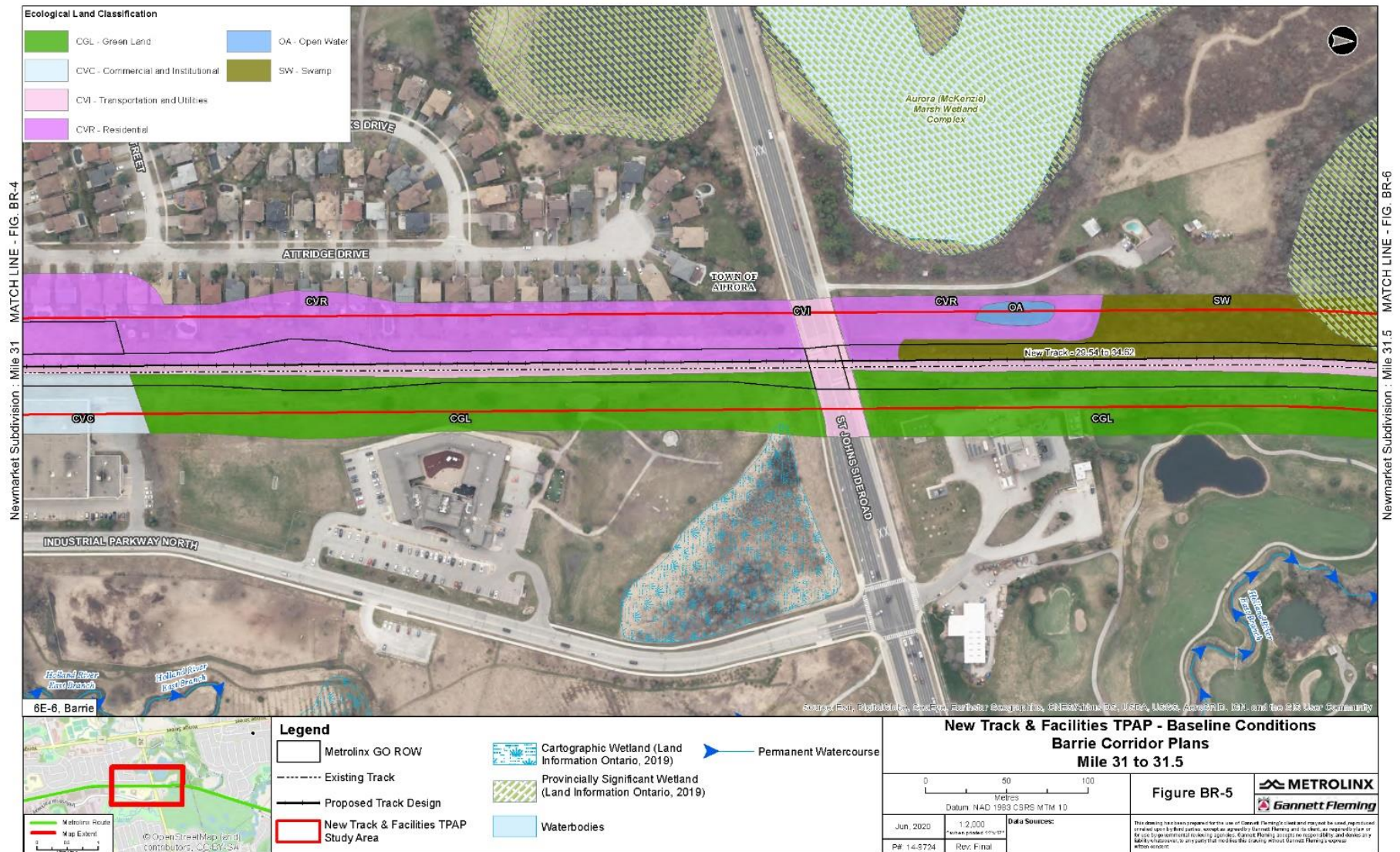


FIGURE 4-2 EXAMPLE 30M BUFFER FOR BASELINE CONDITONA DATA COLLECTION



## 4.3 Methodology

### 4.3.1 Natural Environment

The following provides a summary of the methodology developed to collect and document Natural Environment baseline conditions information within the Project study area. A more detailed overview of this methodology is provided in **Appendix B1**, *Natural Environment Baseline Conditions Report*.

#### 4.3.1.1 Review of Background Information

Available secondary source background information related to the Project study area was collected from appropriate sources including, but not limited to:

- Previously completed EA Studies (e.g. TPAP) in the vicinity of the Project study area;
- Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario (LIO);
- Natural Heritage Information Centre (NHIC);
- Conservation Authorities (CA) e.g. Ecological Land Classification (ELC) polygons;
- Municipal Official Plans;
- Species at Risk Act (SARA) Public Registry;
- Environment and Climate Change Canada (ECCC) Species at Risk (SAR) Recovery Strategies;
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC) SAR Assessment;
- Natural Heritage Reference Manual for Natural Heritage Policy 2.1 of the Provincial Policy Statement;
- Atlas of the Breeding Birds of Ontario (2001-2005);
- Ontario Reptile and Amphibian Atlas;
- VASCAN, the Database of Vascular Plants of Canada;
- Fisheries and Oceans Canada's (DFO) Species at Risk Mapping;
- The Ontario Freshwater Fisheries Life History Database;
- Royal Ontario Museum (ROM) Fish Database;
- First Base Solutions GIS database;
- Aerial photography; and
- Ontario geological survey (OGS) surficial geology maps.

#### 4.3.1.2 Data Gap Analysis

A review of available background information/studies/reports was then undertaken to identify data gaps. The data gap analysis involved identifying information that was either outdated, non-existent, or required augmentation.

Previously completed Metrolinx EA studies were used to inform the extent and type of information and data readily available to characterize each rail improvement area (the individual Project study area segments). Much of the background materials listed above were used as secondary sources to refine and supplement the findings of other recent TPAP studies that were completed by Metrolinx. The GO Rail Network Electrification TPAP Final Natural Environment Baseline Conditions Report and the Barrie Rail Corridor Expansion Project Natural Environment Report, in particular, were relied upon as the

primary and most relevant documents during the data gap analysis due to the extent of overlap between their study areas and this current TPAP.

While the approach to data presentation and discussion varied among these past reports, a great deal of information was applicable, including migratory breeding bird surveys, amphibian surveys, ecological land classifications, botanical inventories and aquatic habitat characterizations. The greatest volume and density of available information was for the Barrie Rail Corridor, as it was assessed in two of the most recently completed Metrolinx TPAPs (The GO Rail Network Electrification TPAP and the Barrie Rail Corridor Expansion Project). While the results of these previous surveys were often useful, a portion of the proposed rail improvements under current study were not previously assessed as part of any recent Metrolinx TPAP.

Once identified, data gaps were screened in the context of macro existing conditions (determined through digital air photo interpretation) and the nature of the proposed rail improvements to assess the potential for impacts beyond the existing rail ballast area, and therefore potentially directly affect surrounding natural features. Using this approach, field surveys were only recommended at select Project segments; primarily at the three layover sites. Property ownership was subsequently identified and Permission to Enter (PTE) requests were submitted for areas where infrastructure is proposed beyond the existing rail ROW, and where field data collection would assist in establishing baseline conditions.

Data requests were also submitted to relevant conservation authorities and the two MNRF District Offices having jurisdiction over the Project. The following four conservation authorities were contacted to request the information related to individual Project segments: Conservation Halton (CH), the Toronto and Region Conservation Authority (TRCA), the Central Lake Ontario Conservation Authority (CLOCA) and the Lake Simcoe Region Conservation Authority (LSRCA).

#### 4.3.1.3 Field Surveys

The following field surveys were undertaken by qualified and experienced biologists (e.g. ELC, Ontario Wetland Evaluation System [OWES], and International Society of Arboriculture [ISA] certified arborists). These assessments were focused on locations where information was unavailable, outdated or insufficient. Field dates and survey conditions for natural environment investigations are provided in Table 4-1, below.

TABLE 4-1 FIELD EVENT SUMMARY

Date	Survey	Survey Conditions <sup>1</sup>
August 19, 2019	Site investigation of RH-1-RH-3	Weather: Beaufort 0-1/ Sunny & Clear / Air Temp: 22 °C

<sup>1</sup> The Beaufort Wind Scale is a tool used to estimate wind conditions. [0] Air calm, smoke rises vertically [1] Light air movement, smoke drifts, [2] Wind felt on face, leaves rustle [3] Leaves and small twigs in

Date	Survey	Survey Conditions <sup>1</sup>
August 22, 2019	Site investigation of ST-6-ST-5 Site investigation of LSE-11	Weather: Beaufort 0-1/ Sunny & Clear / Air Temp: 25 °C
August 30, 2019	Site investigation of BR-11 Site investigation of ST4-ST3	Weather: Beaufort 0-1/ Sunny & Clear / Air Temp: 21 °C
September 16, 2019	Site investigation of RH-4, RH-5 and RH-6	Weather: Beaufort 0-1/ Sunny & Clear / Air Temp: 19 °C

Field surveys, review of field results and orthoimagery were performed by qualified ecologists. Where PTE to conduct field surveys was not obtained, existing conditions were interpreted from orthoimagery, various secondary sources and databases, and/or assessing sites from adjacent lands, where possible. Table 4-2 provides a summary of completed natural environment field surveys.

continual motion, wind extends light flags [4] Wind raises dust, loose paper, moves small branches [5] Small trees begin to sway, white crested wavelets form on inland waters [6] Large branches in motion.

TABLE 4-2 NATURAL ENVIRONMENT SURVEYS

Surveys	Description
Terrestrial Surveys	<ul style="list-style-type: none"> <li>Conducted at the three layover/storage areas due to the absence of prior investigations.</li> <li>Collected information on species at risk (SAR), vegetation communities, Significant Wildlife Habitat (SWH), woodlands, wetland communities (provincially and locally significant), and unevaluated wetlands.</li> <li>Incidental wildlife (direct and indirect), vegetation and habitat notes were recorded.</li> <li>Georeferenced representative photographs were taken, especially for features/resources not previously assessed as part of previously completed TPAP/EA studies.</li> </ul>
Species at Risk and Significant Wildlife Habitat	<ul style="list-style-type: none"> <li>When PTE could not be obtained in time for the appropriate and relatively narrow survey windows, a habitat-based approach was used to evaluate the potential for SAR (e.g., bats) and other SAR wildlife habitat and Significant Wildlife Habitat (SWH).</li> <li>Existing structures were evaluated to determine the presence of affinities for SAR (e.g., Barn Swallow).</li> <li>GPS coordinates were recorded for all SAR observations.</li> </ul>
Aquatic Surveys	<ul style="list-style-type: none"> <li>The background review identified watercourses potentially affected by the proposed works where data was deficient and field surveys would assist in establishing baseline conditions.</li> <li>Where undertaken, fish and fish habitat field studies focused on mapping and characterizing the habitat within the vicinity of the subject structure crossings due to issues in obtaining PTE for adjacent lands.</li> <li>Aquatic habitat within this in-water and land/water zone of detailed study was inventoried, and habitat mapping obtained to determine the function of the subject reach, identify sensitive attributes and critical habitat (e.g. spawning habitat, nursery, seeps, upwellings and wintering habitat use or potential), areas of disturbance (e.g. exacerbated erosion, migratory obstructions, etc.), fish barriers, and enhancement opportunities.</li> </ul>

#### 4.3.1.4 Analysis

##### Species at Risk

Consideration of SAR was limited to those species listed within the Species at Risk in Ontario (SARO) list as Endangered, Threatened or Special Concern (Schedule 1), and those species which are protected by the *Migratory Birds Convention Act* (MBCA).

##### Species at Risk in Ontario List

The SARO list and *Endangered Species Act* (ESA) (2007) is administered by the Ministry of Environment, Conservation and Parks (MECP). The Act was established to prevent wildlife from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened.

For this report, species that are listed under the ESA, 2007 are collectively identified as Species at Risk. Of particular interest to this study are Endangered and Threatened species that are currently protected under the ESA, 2007. Several of these species have Critical Habitat defined by MECP or may have Critical Habitat defined within the next 5 to 10 years. Special Concern species designated by the Committee on the Status of Species at Risk in Ontario (COSSARO) are also included. Species evaluated as Special Concern may be uplisted to a more stringent level of protection in the future and are therefore important to consider.

##### Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) is administered by Environment and Climate Change Canada (ECCC)<sup>2</sup>. The Act was established to implement the Convention by protecting and conserving

<sup>2</sup> Recently (2019) the federal government has begun a review of the MBCA. This seeks to provide better protection to species who have nest site fidelity, modernize the act (update language) address

“migratory birds”<sup>3</sup> as populations and individual birds, as well as their nests. Many bird species are protected under the Act. Species listed follow the American Ornithologists' Union's Checklist of North American Birds. In general, birds not falling under federal jurisdiction within Canada relevant to this locale include grouse, pheasants, hawks, owls, eagles, falcons, cormorants, crows, jays, kingfishers, and some species of blackbirds.

### SAR Screening

The suitability of an area to support habitat preferred by SAR species is based on a combination of factors including, but not limited to, a species' requirements for critical life stages and adaptability, seasonal temperatures, precipitation, soils, vegetation, aquatic conditions, existing disturbances and landform. Given that historical ranges have been reduced, fragmented and in many cases confined to limited ranges or population pockets, the evaluation of SAR and their critical habitat is important when land use changes are being contemplated.

Using information obtained through the secondary source review, the existing SAR list was updated for potential SAR species designated under SARO and regulated under the *Endangered Species Act, 2007*<sup>4</sup>. These species were included when their ranges and habitat, as identified in recently proposed and approved recovery plans and the MNRF LIO database, overlap with the Project study area. The SAR list was refined to fill data gaps and better define SAR habitat affinities relevant to existing conditions at each proposed layover facility location.

The assessment and results of the initial screening are provided in **Appendix B1**.

### Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) was evaluated using Ecoregion Criterion Schedules 7E and 6E and was categorized as either having the potential to occur (i.e. “candidate” habitat) or was “confirmed” within the study area. While some edges of SWH features (e.g. adjacent wetlands, forests) may occur in the vicinity of proposed track and layover facilities, these edges are generally considered to exhibit pre-disturbed conditions due to the influence of landowner activities.

The assessment criteria tables are provided in **Appendix B1**.

#### 4.3.1.5 Mapping

Collected baseline conditions data was captured within a Geographic Information System (GIS) database and detailed mapping was prepared, as presented in **Appendix B1**.

Mapping data sets for the Baseline Conditions Report were compiled from municipal, provincial and third-party data sources. While much of the data was freely available by way of Open Data websites, data services or web mapping services (WMS), formal data sharing agreements were also reached with data providers, such as conservation authorities.

#### 4.3.1.6 Consultation/Communications with Regulatory Authorities

Data requests were sent to the Project's four jurisdictional conservation authorities - Conservation Halton (CH), the Toronto and Region Conservation Authority (TRCA), the Central Lake Ontario Conservation Authority (CLOCA) and the Lake Simcoe Region Conservation Authority (LSRCA), as well as the Aurora and Midhurst District Offices of the MNRF.

<sup>3</sup> “Migratory birds” are defined by Article I of the Convention which names the families and subfamilies of birds protected ([www.canada.ca](http://www.canada.ca)).

<sup>4</sup> Current to June 20, 2019 last amended on December 12, 2017.

Further to these requests, a meeting was held between Metrolinx technical and management staff and consultants with CH and TRCA staff to introduce the project, and exchange information/ knowledge with respect to the Project study area (see Chapter 8 for additional information on these meetings).

#### 4.3.2 Hydrogeology

The following provides an overview of the methodology developed to collect and document existing hydrogeological conditions using available information within the Project study area.

##### 4.3.2.1 Review of Background Information

Available background information was collected and reviewed from the following sources:

- Previously completed EA Studies (e.g. TPAP) in the vicinity of the Study Area;
- Ministry of Natural Resources and Forestry Land Information Ontario;
- Ministry of Environment, Conservation and Parks Well Information System database;
- Conservation Authority for Provincial Groundwater Monitoring Network database;
- Conservation Authority and Ministry of Natural Resources and Forestry watershed monitoring data;
- Oak Ridges Moraine Complex Technical website;
- Municipal Official Plans;
- First Base Solutions GIS database;
- Aerial photography;
- Ministry of Energy, Northern Development and Mines, OGS Earth surficial, quaternary and bedrock geology;
- Topographic maps;
- Previously completed Phase I and II Environmental Site Assessments (ESAs) for each area or adjacent lands;
- Previously completed Permit to Take Water (PTTW) Applications in the subject areas or adjacent lands, including MECP PTTW Registry; and,
- Well Head Protection (Source Water Protection) information from local Municipalities or MECP Data.

##### 4.3.2.2 Gap Analysis

A review of available background information/studies/reports was undertaken to identify data gaps. The data gap analysis involved identifying information that was either outdated, non-existent, or required augmentation.

##### 4.3.2.3 Field Surveys

No field surveys were completed as part of this analysis.

##### 4.3.2.4 Mapping

Site conditions data was captured within a GIS database and detailed mapping was developed for areas within 500 m of proposed works (parallel with the tracks and on each side). Mapping is provided in **Appendix C1**.



#### 4.3.2.5 Consultation/Communications with Regulatory Authorities

Hydrogeological issues were discussed as part of broader consultation with regulatory agencies, municipalities and conservation during the Planning phase of the TPAP. Refer to Chapter 8 for additional information on the nature of these consultations.

#### 4.3.3 Land Use and Socio-Economic

Given the vast geographic area covered by the study area, the analysis of land use and socio-economic factors relied primarily on the availability of existing GIS mapping layers to describe baseline conditions, as well as previous TPAP studies completed along the rail corridors. A more detailed overview of the methodology is provided in **Appendix D1, Land Use and Socio-Economic Baseline Conditions Report**.

##### 4.3.3.1 Review of Background Information

All Ontario municipalities are required to ensure that planning decisions are consistent with provincial planning directive. A Provincial Policy Statement (PPS) was issued under Section 3 of the *Planning Act* and came into effect on May 1, 2020. It replaces the PPS previously issued on April 30, 2014. The purpose of the PPS is to provide policy direction on matters of provincial interest related to land use planning and development.

Municipal planning decisions must also conform to *The Growth Plan for the Greater Golden Horseshoe*, which provides a framework for managing growth in the Greater Golden Horseshoe. The Growth Plan provides:

- Direction of where and how to grow;
- The provision of infrastructure to support growth; and
- Protection of natural system and cultivation of a culture of conservation.

Each municipality has an Official Plan and applicable zoning by-laws to manage growth. Land use conflicts or compatibility are addressed at this level. Many municipalities have also developed Secondary Plans for specific neighbourhoods to provide additional direction to manage and guide growth in these areas. The descriptions under the Planned Land Use section of the Land Use and Socio-economic baseline conditions assessment were focused on the specific policies (e.g., zoning, Secondary Plans) where development is planned within the vicinity of the rail corridor study area (e.g., multi-use paths, development applications). Refer to **Appendix D1** for additional information.

The rail corridor segments assessed in this study traverse several upper-, lower-, and single-tier municipalities, as listed in Table 4-3.

Table 4-3 Municipalities Traversed by Proposed Infrastructure

Corridor	Municipalities Traversed by Proposed Infrastructure	
Lakeshore West	<ul style="list-style-type: none"> <li>▪ Halton Region</li> <li>▪ City of Burlington</li> </ul>	<ul style="list-style-type: none"> <li>▪ City of Toronto</li> <li>▪ Town of Oakville</li> </ul>
Kitchener	<ul style="list-style-type: none"> <li>▪ Region of Peel</li> <li>▪ City of Brampton</li> </ul>	<ul style="list-style-type: none"> <li>▪ City of Mississauga</li> <li>▪ City of Toronto</li> </ul>
Barrie	<ul style="list-style-type: none"> <li>▪ Region of York</li> <li>▪ City of Barrie</li> <li>▪ City of Toronto</li> </ul>	<ul style="list-style-type: none"> <li>▪ Town of Aurora</li> <li>▪ Town of Newmarket</li> </ul>
Stouffville	<ul style="list-style-type: none"> <li>▪ Region of York</li> <li>▪ City of Markham</li> </ul>	

Corridor	Municipalities Traversed by Proposed Infrastructure
Lakeshore East	<ul style="list-style-type: none"> <li>Region of Durham</li> <li>City of Toronto</li> <li>City of Oshawa</li> <li>Town of Whitby</li> </ul>
Richmond Hill	<ul style="list-style-type: none"> <li>City of Toronto</li> </ul>

Available mapping data and other information was collected from the following sources and reviewed to identify existing and planned land uses:

- Previously completed TPAPs in the vicinity of the study area;
- Approved Municipal Official Plans (including zoning by-laws and Secondary Plans);<sup>5</sup>
- Approved Cycling and/or recreational plans;
- Approved Trail/Active Transportation Master Plans;
- Available municipal open data (i.e., publicly available online GIS data created by municipalities pertaining to the location of sensitive facilities, such as schools, hospitals and long-term care facilities);
- Land Information Ontario (LIO); and
- Previously completed TPAPs.

#### 4.3.3.2 Data Gap Analysis

A review of available background information/studies/reports was undertaken within the New Tracks and Facilities TPAP study area to identify data gaps. The data gap analysis involved identifying information that was either outdated, non-existent, or required augmentation.

As a first step, land use and socio-economic data collected for the 2017 GO Rail Network Electrification EPR was retrieved and reviewed. It was determined that several municipalities had updated their Official Plan documents since the data was last collected, rendering it outdated. In addition, some segments had no previous land use information available; including: KT-5, KT-10, RH-1 to RH-4 and LSW-21. Publicly available data was then reviewed to fill any gaps and supplement socio-economic data (i.e., location of trails, parks, sensitive facilities, etc.).

Land use designations were standardized across the various municipalities into eleven categories, based on commonly used designations in Official Plans produced by municipalities across Ontario, to facilitate analysis. These standardized land use designations are defined in Table 4-4 below.

TABLE 4-4 DEFINITIONS OF GENERIC LAND USES

Land Use Designation	Definition
Low Density Residential	Primarily characterized by residential buildings that consist of single detached, semi-detached, duplexes, triplexes, townhouses, row houses, and walk-up apartments that are three storeys or less.
Medium-High Density Residential	Primarily characterized by apartment and condominium buildings that are greater than three storeys in height.

<sup>5</sup> Where municipalities are subject to lower- and upper-tier official plan policies, lower-tier official plans were referenced and incorporated in this Report, since all lower-tier official plans must conform to upper-tier (regional) official plans. Please note that only approved plans at the time of writing this Report were reviewed and incorporated, where relevant.



Land Use Designation	Definition
Mixed Use Area	Characterized by a mix of residential, commercial, institutional, and/or office uses. While density may vary from one location to another, there is a general presumption that these areas seek to encourage density relative to low density residential neighborhoods.
Employment/Industrial	Primarily characterized by office and light-to-heavy industrial uses and other facilities or structures necessary for their operation.
Utilities/Transportation	Currently or planned to be used for the provision of utility or transportation infrastructure, or any ancillary use.
Agricultural/Rural	Primarily characterized by agricultural and farm related uses. This includes structures and facilities that are necessary for the growing and raising of crops and livestock, along with any supportive functions for agricultural operation. Structures devoted to the sale of products produced on the respective properties and other uses required to support a local rural population are also found within these areas.
Parks/Open Space/Recreation Area	Public or private lands where generally little development occurs aside from recreational or cultural facilities. Related land uses may include parks, sports fields, golf courses, cemeteries, open space corridors, and other recreational spaces.
Natural Area	Designated by municipalities as locally significant natural habitats. Generally, no development can occur within natural areas, but some exceptions can include small operational facilities for conservation areas and nature trails. Natural Areas can widely vary and may be characterized by forests, fields, ravines, waterfront spaces, wetlands and marshes.
Environmental Protected	Provincially recognized lands managed for their natural habitats and ecosystem services. These areas include Provincially Significant Wetlands, Provincial Areas of Natural and Scientific Interest (ANSI), and lands subject to the Greenbelt Plan of 2005 or Oak Ridges Moraine Conservation Plan of 2002.
Commercial	Primarily characterized by commercial uses where the majority of the building floor space is devoted to the display and sale of goods and services. Other structures and facilities that are ancillary to commercial functions can also be found on these properties.
Institutional	Primarily characterized by major public uses such as hospitals, civic administration centres, government facilities, schools and post-secondary education institutions, libraries, and community centres. Places of worship can also be found in these areas.
Regeneration Area	Believed to be specific to the City of Toronto. Lands designated as Regeneration Areas in the City of Toronto's Official Plan are defined as "areas with significant vacant lands and/or buildings and in need of revitalization as a means of fostering growth and physical change". Land use can include a mix of commercial, residential, live/work, institutional and light industrial use. Revitalization of these areas is carried out through individual Secondary Plans.

#### 4.3.3.3 Data Collection

The Project Team reviewed aerial photography along each rail corridor and initiated data requests with municipal planners to supplement missing or outdated data, and to collect primary source data as part of describing baseline conditions within the Study Area.

#### 4.3.3.4 Field Work

A field visit to further document existing conditions along the Richmond Hill rail corridor was undertaken as part of the final baseline conditions reporting stage, once conceptual design information for the proposed layover facility was available. The visual assessment field log provided in **Appendix D** includes photographs of existing land use conditions.

#### 4.3.3.5 Mapping

Collected baseline conditions data was captured within a database and mapped. Detailed mapping included existing land uses adjacent to the rail corridors, as well as sensitive features in the vicinity of the rail corridor where proposed infrastructure is located.

#### 4.3.4 Visual/Aesthetics

This section provides an overview of the methodology developed to collect and document visual/aesthetics baseline conditions information within the study area. A more detailed overview of the methodology is provided in **Appendix E1**, *New Track and Facilities TPAP – Visual Baseline Conditions Report*. The methodology included:

1. Collect and review relevant background documentation/reporting/aerial photography (e.g., previous EA studies and related data such as land use information collected for the Project; Google Earth imagery).
2. Review and assess existing land use data and assign potential visual effect categories (i.e., negligible, low, moderate and high) to potential impacts.

Table 4-5 describes the categories used to classify visual baseline conditions within the study area:

TABLE 4-5 VISUAL EFFECT CATEGORIES

Effect Category	Category Description
Negligible Effects	<ul style="list-style-type: none"> <li>Proposed track/layover facility infrastructure located within or in vicinity of industrial/commercial areas, and/or where the proposed track infrastructure is within the existing rail right-of-way.</li> </ul>
Low Effects	<ul style="list-style-type: none"> <li>Proposed track/layover facility infrastructure located in residential areas where homes are more than 20 metres away.</li> <li>Proposed infrastructure located in the vicinity of mixed-use areas.</li> </ul>
Moderate Effects	<ul style="list-style-type: none"> <li>Proposed infrastructure is visible from the following types of surrounding areas: <ul style="list-style-type: none"> <li>Areas where high-rise buildings in a natural setting are closer than 30 metres to the right-of-way;</li> <li>Residential areas where homes are between 8 and 20 metres away from the proposed infrastructure; and</li> <li>Rural farmland.</li> </ul> </li> </ul>
High Effects	<ul style="list-style-type: none"> <li>Proposed infrastructure is visible from the following types of surrounding areas: <ul style="list-style-type: none"> <li>Residential areas where homes are within 8 metres of the proposed infrastructure;</li> <li>Scenic, cultural or historic features/environments directly adjacent to the proposed infrastructure; and</li> <li>Environmental protected and natural areas directly adjacent to the proposed infrastructure.</li> </ul> </li> </ul>

#### 4.3.4.1 Review of Background Information

The following available background information was collected and reviewed:

- New Track and Facilities Land Use and Socio-Economic Baseline Conditions Report.
- New Track and Facilities Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment - Volume 1: Baseline Conditions.
- Visual Baseline Conditions Report from the 2017 Electrification EPR.
- Visual Impact Assessment Report from the 2017 Electrification EPR.
- Municipal Official Plans.

#### 4.3.4.2 Field Work

A field visit to further document existing conditions and take photographs along the Richmond Hill Rail Corridor has been undertaken as part of the final baseline conditions reporting stage. Photos were taken along the Lower Don Trail, from within the Lower Don Parklands, and from overhead bridges/surrounding roadways to document existing visual conditions from various viewpoints. The field data was supplemented by the study of existing aerial photography to verify information and further assess visual conditions.

At the baseline conditions phase of the TPAP, the infrastructure with the highest potential visual impact is proposed along the Richmond Hill Rail Corridor (i.e., electrification infrastructure). Additional field studies may be conducted during the impact assessment phase to gain a more in-depth understanding of the visual impacts and sensitive features such as historic structures, other important cultural resources (i.e., parks and recreation areas), and important scenic views within the vicinity of the Study Area along all rail corridors.

The visual assessment field log provided in **Appendix E1** details photographs of existing visual conditions.

#### 4.3.4.3 Mapping

Baseline conditions data collected was captured within a GIS database and mapping was prepared as presented in **Appendix E1**.

#### 4.3.5 Cultural Heritage

The following provides an overview of the methodology followed to collect and document cultural heritage baseline conditions information within the Study Area. A more detailed overview of the methodology is provided in **Appendix F1**, *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment - Volume 1: Baseline Conditions*.

##### 4.3.5.1 Legislative and Policy Context

Although the *Ontario Heritage Act* (MHSTCI 1990) is the main piece of legislation that determines policies, priorities and programs for the conservation of Ontario's heritage, many other provincial acts, regulations and policies governing land use planning and resource development support heritage conservation including:

- The *Planning Act*, which states that “conservation of features of significant architectural, cultural, historical, archaeological or scientific interest” (cultural heritage resources) is a “matter of provincial interest” (Ministry of Municipal Affairs and Housing 1990). The Provincial Policy Statement, issued under the *Planning Act*, links heritage conservation to long-term economic prosperity and requires municipalities and the Crown to conserve significant cultural heritage resources (Government of Ontario 2020).
- The *Environmental Assessment Act*, which defines “environment” to include cultural conditions that influence the life of humans or a community. Cultural heritage resources, which includes archaeological resources, built heritage resources and cultural heritage landscapes, are important components of those cultural conditions (Ministry of the Environment 1990).

All Ontario government ministries and public bodies prescribed under Ontario Regulation 157/10, which includes Metrolinx, are required to follow the Standards and Guidelines for Conservation of Provincial Heritage Properties, prepared under section 25.2 of the *Ontario Heritage Act*, when making any decisions affecting cultural heritage resources on lands under their control (MHSTCI 2010).

Under the TPAP, the proponent is required to consider whether its proposed transit project could have a potential negative impact on the environment. Under the process, an objection can be submitted to the

MECP about a matter of provincial importance that relates to the natural environment or has cultural heritage value or interest.” The MECP expects a transit project proponent to make reasonable efforts to avoid, prevent, mitigate or protect matters of provincial importance.

The MECP’s Guide to Environmental Assessment Requirements for Transit Projects (Transit Guide) provides guidance to proponents on how to meet the requirements of Ontario Regulation 231/08. The Transit Guide encourages proponents to obtain information and input from appropriate government agency technical representatives before starting the TPAP to assist in meeting the timelines specified in the regulation, including the submission of a draft Environmental Project Report (EPR) for review and comment prior to issuing a Notice of Commencement (Ministry of the Environment 2014).

Among the pre-planning activities outlined in Section 4.1 of the Transit Guide, a proponent is advised to conduct studies to:

- Identify existing baseline environmental conditions;
- Identify project-specific location or alignment (including construction staging, land requirements); and,
- Identify expected environmental impacts and proposed measures to mitigate potential negative impacts.

The MHSTCI has prepared guidance on the preparation of Cultural Heritage Reports within the TPAP process (2019). This guidance is applicable to the current undertaking. The 2019 MHSTCI guidance states that the study will:

1. Identify existing baseline cultural heritage conditions within the study area. The consultants preparing the Cultural Heritage Report will need to define a study area and explain their rationale. MHSTCI recommends that the study area for the report include, at minimum, the project footprint and adjacent properties. Alternatively, the study area may include the project footprint and a study zone that is located immediately beside the footprint and extends a certain distance. The report will include a historical summary of the development of the study area and will identify all known or potential built heritage resources and cultural heritage landscapes in the study area. MHSTCI has developed screening criteria that may assist with this exercise: Criteria for Evaluating for Potential Built Heritage Resources and Cultural Heritage Landscapes.
2. Identify preliminary potential project-specific impacts on the known and potential built heritage resources and cultural heritage landscapes that have been identified. The report should include a description of the anticipated impact to each known or potential built heritage resource or cultural heritage landscape that has been identified.
3. Propose and recommend measures to avoid or mitigate potential negative impacts to known or potential cultural heritage resources. The proposed mitigation measures are to inform the next steps of project planning and design (MHSTCI 2019).

Where a known or potential built heritage resource or cultural heritage landscape may be directly and adversely impacted, and where it has not yet been evaluated for Cultural Heritage Value or Interest (CHVI), completion of a Cultural Heritage Evaluation Report (CHER) is required to fully understand its CHVI and level of significance. The CHER must be completed within the TPAP. If a built heritage resource or cultural heritage landscape is found to be of CHVI, then a Heritage Impact Assessment (HIA) will be undertaken by a qualified person. The HIA will be completed in consultation with MHSTCI and the proponent as early as possible during detail design, following the TPAP.

While some cultural heritage landscapes are contained within individual property boundaries, others span across multiple properties. For certain cultural heritage landscapes, it will be more appropriate for

the CHER and HIA to include multiple properties, in order to reflect the extent of that cultural heritage landscape in its entirety.

#### 4.3.5.2 Data Gap Analysis

A review of available background information/studies/reports was undertaken to identify data gaps. The data gap analysis involved identifying information that was either outdated, non-existent, or required augmentation. A more detailed overview of the data and documents received from municipalities and Metrolinx is provided in **Appendix F1**.

#### 4.3.5.3 Data Collection

Potential or known BHRs or CHLs were identified for portions of the study area not previously assessed as part of a previous EA. A desktop data collection was undertaken which included a review of primary and secondary source material within a 30 m buffer on either side of affected portions of the rail corridor. More specifically, known or potential BHRs and CHLs were identified through a review of municipal, provincial and federal heritage inventories, and through consultation with relevant stakeholders. The objective of this exercise was to:

- Present an inventory of known and potential BHRs and CHLs; and
- To provide a preliminary understanding of known and potential BHRs and CHLs located within areas anticipated to be directly or indirectly impacted.

#### Approach to Screening for Cultural Heritage Resources

This CHR addresses BHRs and CHLs over 40 years old. Use of a 40-year-old rule of thumb is a guiding principle when conducting a preliminary identification of BHRs and CHLs (Ministry of Transportation (MTO) 2006; MTO 2007). While identification of a resource that is 40 years old or older does not confer outright heritage significance, this threshold provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly less than 40 years old, this does not preclude the resource from retaining heritage value.

In the course of the cultural heritage report, all potentially affected BHRs and CHLs are subject to inventory. Short form names are usually applied to each resource type. Examples include, but are not limited to: barn, residence, bridge, culvert, and neighbourhood cultural heritage landscape. It should be noted that only bridges and culverts in the rail ROW with potential impacts from the Project were subject to cultural heritage assessment.

Background historical research, which includes consultation of primary and secondary source material and historic mapping, was undertaken to identify early settlement patterns and broad agents or themes of change in the study area. This stage in the data collection process enables the researcher to determine the presence of sensitive heritage areas that correspond to nineteenth- and twentieth-century settlement and development patterns. For the purposes of this study, the following sources were consulted: nineteenth-century mapping; nineteenth-century local historical accounts (Boulton 1805; Robinson 1885; Smith 1846; etc.); twentieth-century mapping; and railroad-specific sources.

Historical background and historic map reviews of the Lakeshore West, Lakeshore East, Kitchener, Barrie, Stouffville and USRC rail corridors is not presented in this CHR. This information was presented in the GO Rail Network Electrification TPAP CHSR (ASI 2017a) and it was determined for the purposes of this assessment, that heritage studies prepared as part of this 2017 TPAP were recent enough, sufficient, relevant and could be relied upon for the purposes of informing baseline data collection for the present undertaking. Historical background and historic map reviews for the Richmond Hill rail corridor has not previously been presented in a Metrolinx TPAP and is therefore included in this CHR.



To augment data collected during this stage of the research process, federal, provincial, and municipal databases and/or agencies were consulted to obtain information about specific properties that have been previously identified and/or designated as retaining cultural heritage value. Typically, resources identified during this stage of the research process are reflective of particular architectural styles, associated with an important person, place, or event, and contribute to the contextual facets of a particular place, neighbourhood, or intersection.

Several investigative criteria were utilized during the data gathering phase to appropriately identify BHRs and CHLs. These investigative criteria are derived from provincial guidelines (including *O.Reg. 9/06* and *O. Reg 10/06* of the OHA), definitions, and past experience.

#### Approach to Screening Bridges and Overhead Structures

The approach to screening bridges and culverts in the study area was scoped to address those bridges/structures that are anticipated to be impacted by the proposed electrification infrastructure (e.g., due to an OCS attachment, clearance issue, etc.). Based on the conceptual design that was developed, a list was assembled of potentially impacted bridges and culverts that require a subsequent cultural heritage screening. In the interest of taking a comprehensive approach to these screenings, any bridges or culverts that are known Provincial Heritage Properties (PHP) and Provincial Heritage Properties of Provincial Significance (PHPPS) were also captured in the screening process, regardless of whether they are expected to be impacted.

##### 4.3.5.4 Field Surveys

Field surveys will allow for a more detailed recording and assessment of existing conditions, assessment of potential impacts to potential or known heritage attributes, and for the identification of appropriate mitigation measures.

##### 4.3.5.5 Consultation/Communications with Regulatory Authorities

Community engagement was undertaken to gather information on known and potential BHRs and CHLs within the Project study area, and to collect any other data related to known or potential cultural heritage value or interest in the Project study area. Requests for information were sent to several stakeholders in the early phases of data collection. Comments were also received following review of the Final Draft CHR from the City of Toronto.

##### 4.3.5.6 Historical Background

**Appendix F1, Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment - Volume 1: Baseline Conditions** provides a brief summary of the Indigenous land use and settlement and the historic Euro-Canadian settlement for the Richmond Hill Corridor Study Area. It is not intended to be an exhaustive history of the area, although the main focus of the text is historical in nature and deals with themes of survey and settlement, early economic activity, industry, agriculture, and transportation.<sup>6</sup>

##### 4.3.6 Archaeology

The following section provides an overview of the methodology followed to collect and document archaeological baseline conditions information within the New Track and Facilities TPAP Study Area. A more detailed overview of the methodology is provided in **Appendix G1 - Archaeology Baseline Conditions Report**.

Existing archaeological conditions within the Study Area were determined through a review of available secondary source information (i.e., previously completed archaeological assessment reports/studies). This was followed by a Data Gap Analysis to identify where previous archaeological assessment work

<sup>6</sup> GO Rail Network Electrification TPAP CHSR (ASI 2017) contains a historic map review and brief overview of the Lakeshore West, Lakeshore East, Kitchener, Barrie, Stouffville and USRC rail corridors.

has not yet been undertaken. For the purposes of the archaeological baseline data collection, a buffer of 30 m was applied to the Project.

All activities carried out during the baseline conditions assessment were completed in accordance with the *Ontario Heritage Act* and the 2011 *Standards and Guidelines for Consultant Archaeologists* (S & G), administered by MHSTCI (2011).

A review of applicable legislation was also undertaken to inform the baseline conditions/gap analysis and future Stage 1 archaeological assessment, including but not limited to:

- Standards and Guidelines for Consultant Archaeologists (S & G), 2011
- Engaging Aboriginal Communities in Archaeology, 2011
- Ontario Heritage Act, 1990 (amended in 2018)
- Funeral, Burial and Cremation Services Act, 2002 (amended in 2017)
- Environmental Assessment Act, 1990 (amended in 2010)
- Ontario Regulation 231/08: Transit Projects and Metrolinx Undertakings

#### 4.3.6.1 Review of Background Information

The S & G, Section 1.1., Standard 1, specifies the information that must be included in the Stage 1 archaeological assessment background study; specifically:

- Up-to-date listing of registered archaeological sites within 1 km from the study area limits from the Ontario Archaeological Sites Database (OASD), which is maintained by the MHSTCI;
- Reports of previous archaeological assessments conducted within a radius of 50 m from the study area;
- Topographic maps at 1:10,000 scale;
- Historic settlement maps, e.g. historical atlas;
- When available, archaeological management plans or other reports with archaeological potential mapping; and
- Commemorative plaques or monuments.

#### Historical Context

The background study discusses the historical context for each study area segment in accordance with the S & G, Section 7.5.7, Standard 1, which includes the past and present land use, the settlement history and any other relevant historical information gathered through the background research. This discussion is organized into brief overviews of the land use and settlement history of the Indigenous and Euro-Canadian occupants.

#### Archaeological Context

The background study also discusses the archaeological context, in accordance with the S & G, Section 7.5.8, Standards 1-7, which includes a listing of the known or registered archaeological sites within 1 km of the Study Area segments, a brief description of the condition of the property as found, including physiographic regions, surficial geology, soils and topography. (see **Appendix G1 - Archaeology Baseline Conditions Report**).

The S & G, Section 1.3.1 lists the following features or characteristics that indicate archaeological potential:

- Previously identified sites; these are typically those listed in the OASD;
- Water sources:
  - Primary water sources (lakes, rivers, streams, creeks).
  - Secondary water sources (intermittent streams and creeks, springs, marshes, swamps).
  - Features indicating past water sources (glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by a clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches).
  - Accessible or inaccessible shoreline (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marshes).
- Elevated topography (eskers, drumlins, large knolls, plateau);
- Pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground;
- Distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indications of their use such as burials, structures, offerings, rock paintings or carvings;
- Resource areas, including:
  - Food or medicinal plants (migratory routes, spawning areas, prairie).
  - Scarce raw materials (quartz, copper, ochre or outcrops of chert).
  - Early Euro-Canadian industry (fur trade, logging, prospecting, mining).
- Areas of early Euro-Canadian settlement. These include places of early military or pioneer settlement (pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches and early cemeteries. There may be commemorative markers of their history, such as local, provincial or federal monuments or heritage parks;
- Early historical transportation routes (trails, passes, roads, railways, portage routes);
- Property listed on a municipal register or designated under the *Ontario Heritage Act* or that is a federal, provincial or municipal historic landmark or site; and
- Property that local histories or informants have identified with possible archaeological sites, historical events, activities or occupations.

Water has been identified as the major determinant of site selection, and the presence of potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in Ontario since 5,000 BP, proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location.

The S & G, Section 1.3.2 also states that archaeological potential is determined to be not present when the property has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. Disturbed lands include:

- Quarry sites;
- Major landscaping involving grading below topsoil;
- Building footprints; and,
- Sewage and infrastructure development



Where complete disturbance cannot be demonstrated during the subsequent Stage 1 background study or property inspection, then a Stage 2 field assessment will be necessary for areas to be impacted by the Project.

#### 4.3.6.2 Data Gap Analysis

A review of available background information/studies/reports was undertaken to identify data gaps. The data gap analysis involved identifying information that was either outdated, non-existent, or required augmentation. The results of this data gap analysis are presented for each segment in **Appendix G1 – Archaeology Baseline Conditions Report**.

#### 4.3.6.3 Field Surveys

A Stage 1 Property Inspection will be undertaken for the Stage 1 Archaeological Assessment report for the Impact Assessment phase.

#### 4.3.6.4 Mapping

Baseline conditions data collected was captured within a Geographic Information System (GIS) database and detailed mapping was prepared.

#### 4.3.6.5 Consultation/Communications with Regulatory Authorities

No consultation, communications and/or meetings were held with regulatory agencies/stakeholders as part of the archaeology baseline conditions phase.

#### 4.3.7 Stormwater Management/Drainage

The following section provides an overview of the methodology followed to collect and document stormwater conditions within the New Track and Facilities TPAP Study Area. A more detailed overview of the methodology is provided in **Appendix H – Preliminary Stormwater Management Assessment Reports**. Each proposed layover/storage facility was the subject of its own report.

Existing stormwater conditions within the Study Area were determined through a review of available secondary source information (i.e., applicable design guidelines and legislation, previously completed studies and aerial photography). This was followed by a Data Gap Analysis and site visit.

##### 4.3.7.1 Review of Background Information

A review of applicable guidelines and legislation by Metrolinx, Municipalities, Ministry of the Environment, Conservation and Parks (MECP), and Conservation Authorities were undertaken in order to contextualize site-specific information that was later obtained and incorporated into the preliminary stormwater management analysis. These sources included but were not limited to:

- *Ontario Water Resources Act* (2019);
- Provincial Policy Statement Under the *Planning Act* (2014);
- GO Transit Design Requirements Manual, Metrolinx (2019);
- AREMA Manual for Railway Engineering (2019);
- Engineering Guidelines for Private Siding Design and Construction, Canadian Pacific Railway (2017);
- GO Transit Track Standards, Metrolinx (2019);
- Ontario Ministry of Transportation Drainage Management Manual (1997);
- Stormwater Management Planning and Design Manual (MECP) (2003);

- Guide to Applying for Environmental Compliance Approval (2019);
- Low Impact Development Stormwater Management Planning and Design Guide, Toronto and Region Conservation Authority and Credit Valley Conservation (2011);
- Draft Low Impact Development Stormwater Management Guidance Manual (MECP) (2017);
- Design Criteria for Sewers and Watermains, City of Toronto (2019);
- Wet Weather Flow Master Plan, City of Toronto (2017);
- Wet Weather Flow Management Guidelines, City of Toronto (2006);
- Toronto Green Standard, City of Toronto (2019);
- Metrolinx Climate Adaptation Strategy, Metrolinx (2018);
- TRCA Stormwater Management Criteria (2012);
- TRCA Planning & Development Procedural Manual (2008);
- TRCA Erosion and Sediment Control Guideline for Urban Construction (2006);
- Capital Works Documents and Drawings, City of Burlington (1988);
- Water and Wastewater Linear Design Manual, Halton Region (2019); and
- Engineering Design Criteria, City of Markham (2019).

Secondary, site-specific information for each of the proposed layover/storage facilities was then reviewed, including:

- Previously completed EA studies in the vicinity of the Project;
- MECP guidelines and permit requirements;
- Municipal Official Plans, including Stormwater Master Plans; and
- Aerial photography.

#### 4.3.7.2 Data Gap Analysis

A review of available background information/studies/reports was undertaken to identify data gaps. The data gap analysis involved identifying information that was either outdated, non-existent, or required augmentation. The results of this data gap analysis are presented for each layover/storage facility in **Appendix H – Preliminary Stormwater Management Assessment Reports**.

#### 4.3.7.3 Field Surveys

Field studies were completed at layover/storage sites where PTE could be obtained, or where the assessment could be completed from publicly accessible lands/ the Metrolinx ROW. The purpose of these site visits was to complete the following:

- Qualitative review of existing site conditions (e.g., upstream and downstream topography and conditions); and,
- Site photos, investigation and documentation of existing drainage patterns, existing drainage features and their conditions to determine outfall locations to discharge the major and the minor storm runoff from the site.

#### 4.3.7.4 Mapping

Baseline conditions data collected was captured within a Geographic Information System (GIS) database and detailed mapping was prepared.

#### 4.3.7.5 Consultation/Communications with Regulatory Authorities

No consultation, communications and/or meetings were held with regulatory agencies/stakeholders as part of the stormwater management baseline conditions phase.

#### 4.3.8 Traffic

Traffic Impact Assessments were completed for each layover/storage facility proposed under the New Track and Facilities TPAP. These reports have been summarized within Chapters 6 and 7.

The methodology for these studies began with a review of documents relevant to understanding existing and future transportation conditions in the vicinity of each layover/storage facility. Nearby roads with the potential to be impacted by the proposed works were identified, and existing traffic counts were obtained. This information was used to generalize the existing capacity of surrounding roadways, based on broad assumptions of typical operations in Canada and the U.S. that were borrowed from standard capacities considered to be acceptable professional practice. Specifically, a maximum practical traffic figure of 1,000 was used based on studies that show residents' level of dissatisfaction with traffic rises when the traffic is over 1,000 trips per day (see: Residential Street Standards & Neighborhood Traffic Control: A Survey of Cities' Practices and Public Officials' Attitudes - Eran Ben-Joseph, Institute of Urban and Regional Planning, University of California at Berkeley).

Nearby intersections were then analyzed using a method known as Critical Movement Analysis (CMA) to obtain a high-level sense of their capacity and operational performance. The only exception to this procedure was at the Walkers Line Layover site, where nearby intersections were analyzed using Synchro software. This methodology also determined which of the intersections requires more in-depth analysis. The results of the CMA/Synchro were applied to data provided by Metrolinx for the anticipated number of employees, visitors, and truck deliveries to each layover/storage site, based on an 8-hour shift, to identify the required number of parking spaces and peak travel patterns, subject to the following assumptions:

1. Typically, employees will arrive within 30 minutes before the beginning of a shift and leave within 30 minutes after the end of the shift.
2. This study presumed that 25% of the total anticipated visitors will arrive within the peak hour and the remainder will arrive over the next seven hours.
3. Delivery truck arrivals should be uniformly distributed throughout the 8-hour shifts.

Finally, proposed driveway spacing was reviewed based on the guidelines of the 2017 Geometric Design Guide for Canadian Roads published by the Transportation Association of Canada (TAC), and recommendations were identified to improve pedestrian and vehicular circulation, loading and delivery operations, and overall traffic circulation in the vicinity of each site.

Refer to **Appendix I** for the Traffic Impact Assessments completed for each layover/storage facility.

#### 4.3.9 Utilities

Assessment of potential utility conflicts included review of railway assets. For the purposes of this project, railway assets are considered utilities owned by Metrolinx or other railway owners, operators, or maintenance companies. Railway assets include signal cables, signal power cables, snow clearing devices, switch machines, and any other infrastructure owned by a Rail Operator. The following owners were identified as railway asset owners: Metrolinx, Canadian National (CN), Bell/360, and Canadian Pacific (CP).

Underground utility conflicts were determined based on the physical location of the new tracks, which must include trackside drainage swales to comply with Metrolinx Design Requirements. As records for underground assets are classified as Quality Level D information, the depths of cover for third-party utility assets were not confirmed. It is conservatively assumed that new trackside swales will cause underground crossing utilities to have insufficient cover.

The Metrolinx Trenchless Utility Works Guidelines were utilized to determine underground parallel asset conflicts with new tracks. The guideline requirements for minimum cover of longitudinal assets are summarized in Table 4-6.

**TABLE 4-6 TRENCHLESS UTILITY WORKS MINIMUM COVER REQUIREMENTS**

Asset Type	Horizontal Separation from C/L of Tracks (m)	Minimum Cover (m)
Pipelines conveying flammable or hazardous gas or liquid (cased or uncased)	0-7.62	Not permitted.
Pipelines conveying flammable or hazardous gas or liquid (cased or uncased)	7.62-15.24	1.83
Pipelines conveying non-flammable substances (cased or uncased)	0-7.62	Not permitted.
Pipelines conveying non-flammable substances (cased or uncased)	7.62-15.24	1.219
Cable duct system	0-7.5	1.2

Buffer zones outside of existing track were then established for each type of underground parallel asset based on industry and municipal standards for minimum cover. Table 4-7 below summarizes the buffers used for this assessment. If an underground parallel asset is located within the buffer zones, the asset is classified as a potential conflict; however, field verification will be required.

**TABLE 4-7 TRACK BUFFER ZONES**

Utility Description	Owner	Assumed Cover (m)	Required Buffer from C/L of New Track (m)
Cable	All	1	7.5
Communication Conduit	All	1	7.5
Communication Duct Bank	All	1	7.5
Communications Cable	All	1	7.5
Conductor	All	1	7.5
Culvert	All	1.2	15.24
Electrical Conduit	All	1	7.5
Electrical Duct Bank	All	1	7.5
Fibre Optic	All	1	7.5
Fuel	All	1.2	15.24
Gas	All	1.7	15.24
Sewer	All	2.75	7.62
Sewer	City of Markham	2.75	7.62

Utility Description	Owner	Assumed Cover (m)	Required Buffer from C/L of New Track (m)
Sewer	City of Toronto	2.75	7.62
Sewer	Durham Region	2.75	7.62
Sewer	Halton Region	2.75	7.62
Sewer	Peel Region	2.5	7.62
Storm	City of Burlington	1.7	7.62
Storm	City of Markham	2.5	7.62
Storm	City of Mississauga	3.2	7.62
Storm	City of Pickering	1.8	7.62
Storm	City of Toronto	1.7	7.62
Storm	Durham Region	1.2	15.24
Storm	Peel Region	1.5	7.62
Storm	Town of Oakville	2.5	7.62
Unknown	All	1.2	15.24
Water	City of Markham	1.75	7.62
Water	City of Toronto	1.8	7.62
Water	Durham Region	1.8	7.62
Water	Halton Region	1.7	7.62
Water	Peel Region	2.1	7.62
Water	York Region	2	7.62

Overhead utilities that cross electrified corridor must maintain the vertical clearances described in the Enabling Works Standard EW-ET-0230. This standard was used to generate a nominal minimum vertical clearance of a crossing utility to Top of Rail of 15.7m, which corresponds to an uninsulated utility wire below 150 kV crossing directly above the highest point of a typical OCS structure, which is 10.7m anticipated height. Using this criterion, an initial list of utility conflicts was generated.

Overhead utilities that run parallel to electrified corridor must maintain the wire-to-wire clearances described in the Enabling Works Standard EW-ET-0232. Cases where these wire clearances are maintained but the nominal minimum horizontal clearance between utility pole and centerline (CL) of nearest electrified track are not maintained (9m as per EW-ET-0232) were flagged as conflicts during the utilities assessment.

Underground utility conflicts were determined based on the physical location of the Electrification RCD OCS pole foundation locations and the utility crossing location, as determined by the best information available on each crossing. All underground crossing utilities within 3.0m of an OCS pole foundation were flagged as conflicts and reviewed.

Lastly, utility impacts with layover structures occur when proposed structures occupy the same space as existing utilities. Until depth/clearance from top of rail and the material of utility is confirmed, the ultimate extent of conflicts cannot be determined. It will be necessary to identify and mitigate conflicts caused by OCS, as required to accommodate their design, during future project phases.

A summary of existing Utilities within the study area along with potential Utility conflicts and proposed Mitigation Measures can be found in EPR Chapters 5 and 7. Refer to **Appendix J** for the complete

Utilities Impact Assessment. The work identified in the utilities assessment was limited to the design team assumptions and reference concept design (RCD) information available.

#### 4.3.10 EMI/EMF

The assessment of electromagnetic interference/electromagnetic field (EMI/EMF) baseline conditions was based on data gathered during the assessment phase of the New Track and Facilities TPAP, as well as earlier during the 2017 (system-wide) Electrification TPAP. For areas other than the Richmond Hill Corridor, baseline conditions data was already collected and evaluated, using the typical components for such a process. Those two components are:

1. Identification, via desktop analysis, of potential EMI sensitive sites within the Study Area; and
2. Establishment of present-day EMF baseline conditions for areas of concern along the GO rail corridors within the Study Area.

It was appropriate to use this previously collected data because the premise of the 2017 TPAP was the establishment of conditions in the corridor before electrification, so that post-electrification changes would be evident. No electrification has occurred in any portion of the corridor, and as such this pre-condition is still relevant. For the Richmond Hill Corridor, the two (2) components listed above were completed essentially simultaneously with the collection of data typically reserved for Impact Assessment. ELF/EMF was measured along the railway right-of-way at various locations. The values measured were catalogued and compared to human exposure limits outlined in ICNIRP Guidelines for Public, Uncontrolled Environments, Limiting Exposure to Time Varying Electric, Magnetic Fields and Static Magnetic Fields.

The EMI setup for data collection along the Richmond Hill rail corridor included:

- Agilent EMI Receiver;
- BiLog Antenna (30 MHz to 1 GHz) (See Figure 4-3 below); and
- Custom-Designed Two-Metre Mast.

The receiver read the energy impinging upon the antenna, as it was deployed in both the vertical and horizontal orientations. The data processing software allowed for the identification of portions of the EMI curves displaying sufficient field strength and capturing of the peak values thereof.



FIGURE 4-3 BILOG ANTENNA (VERTICAL ORIENTATION)

At each measurement location, the antenna was deployed at the top of the two-metre mast used for this data collection, which is essentially a pole with the ability for deploying the antenna at different heights.

The evaluation and graphical analysis of the EMI background scans included:

- Complete Scans;
- Select Frequency Peaks -- Determine Frequency and Amplitude – Generate Frequency Table; and,
- Classify Frequency Peaks Using Known Frequency Allocations.

A minimum of two (2) scans were taken at each site, one with the antenna in the vertical orientation and one in the horizontal orientation. Two orientations were used to assure that the highest possible field strength was measured at each site. An example of one of these charts is shown below in Figure 4-4.

Also shown on the example chart, Figure 4-4 a “limit line” that depicts the Peak Class A Radiated Emission level as per CENELEC standard EN 50121, as a function of frequency, from 30 MHz to 1 GHz. This line was applied in this specific case, as a reference to indicate peaks that were high enough to warrant further analysis, i.e., determination if the peaks could be attributed to known sources.



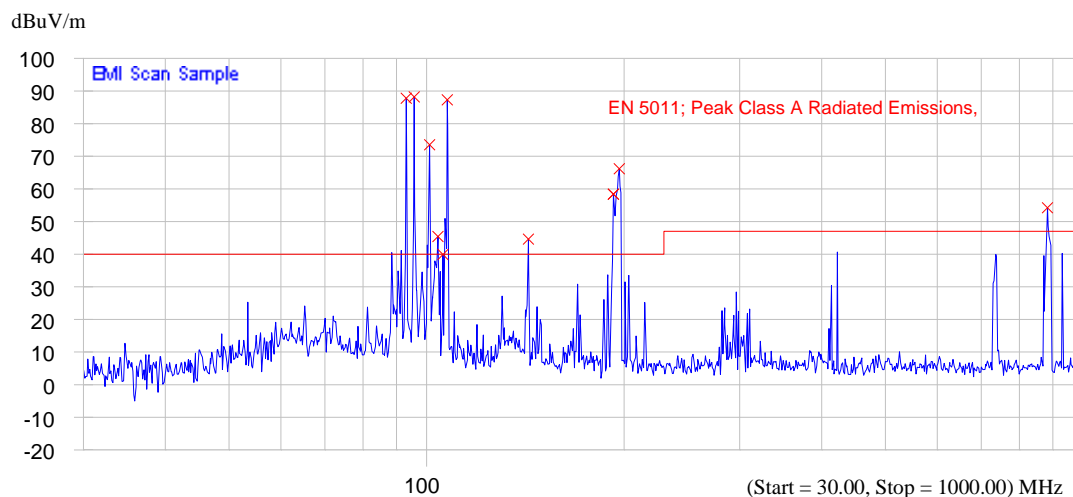


FIGURE 4-4 EXAMPLE OF EMI SCAN

The horizontal axis shows frequency. This is a log scale, with 100 Hz being designated on the chart. For each vertical scale line to the left of 100 Hz the value decreases by 10 Hz, until the lowest value on the chart, 30 Hz, is reached. For each vertical scale line to the right of 100 Hz, the value increases by 100 Hz, until the highest value on the chart, 1000 MHz, or 1 GHz, is reached. The vertical axis runs from minus 20 dBuV/m up to 100 dBuV/m. These units, decibel microvolts per meter, which express the field strength of the broadcast signal measured at a given frequency, are standard for radio frequency measurements.

Software running on the EMI Receiver automatically selects peaks in the data. The result of this selection is depicted by the red "x" shown above various peaks in the example chart in Figure 4-4. Each selected peak was immediately post-processed for frequency and amplitude.

Software running on the EMI Receiver identified both the frequency and amplitude of the selected peaks and output this data to a table, an example of which is shown in Table 4-8. The table initially contained the frequency, in MHz, and the amplitude, in dBuV/m, for each selected peak. This table, for each orientation, was saved for subsequent off-line evaluation.

TABLE 4-8 EXAMPLE OF EMI SCAN PEAK FREQUENCY TABLE

Frequency (MHz)	Peak (dBuV/m)	Trace Name	Allocation
93.087	87.8	EMI Scan Sample	BROADCASTING (76 - 108 MHz)
95.726	88.2	EMI Scan Sample	BROADCASTING (76 - 108 MHz)
101.065	73.5	EMI Scan Sample	BROADCASTING (76 - 108 MHz)
104.064	45.4	EMI Scan Sample	BROADCASTING (76 - 108 MHz)
105.924	39.9	EMI Scan Sample	BROADCASTING (76 - 108 MHz)
107.544	87.3	EMI Scan Sample	BROADCASTING (76 - 108 MHz)
142.936	44.6	EMI Scan Sample	FIXED LAND MOBILE Space Research (space-to-Earth) (138 - 144 MHz)
192.666	58.4	EMI Scan Sample	BROADCASTING (174 - 216 MHz)



Frequency (MHz)	Peak (dBµV/m)	Trace Name	Allocation
192.666	58.4	EMI Scan Sample	BROADCASTING (174 - 216 MHz)
196.565	66.2	EMI Scan Sample	BROADCASTING (174 - 216 MHz)
882.824	54.2	EMI Scan Sample	MOBILE 5.317A C7 FIXED 5.317 5.318 (806 - 890 MHz)

Each frequency listed in the frequency table shown in Table 4-8 Example of EMI Scan Peak Frequency Table was then classified with regard to existing signal distributions in the Toronto area, as per the 2014 edition of *The Canadian Table of Frequency Allocations – Spectrum Management and Telecommunications*, which documents all broadcast frequencies used in Canada. The association of measured frequency peaks to existing frequency allocations was accomplished using a custom-developed application in Microsoft Excel.

For example, the range of 76 MHz to 108 MHz has been allocated to broadcasting which refers generally to FM radio. Starting at the top of Table 4-8 the first six (6) peaks shown reside in this range. This indicates that these signals are from a known source. For each area along the Don Valley rail corridor studied, similar scans were taken and similar analyses performed.

The baseline measurements collected for the Richmond Hill Corridor are presented within **Appendix N**.

## 4.4 Baseline Conditions - Lakeshore West Corridor

### 4.4.1 Natural Environment

The Lakeshore West Corridor is within the urbanized setting of Burlington, Oakville and Long Beach. The majority of the vegetation along the corridor is cultural in nature and comprised of “old field”, typically non-native species representing those which establish in disturbed sites (e.g., Dog-strangling Vine (*Vincetoxicum rossicum*)). A few areas of green space (manicured parks) occur.

SAR “generalists” with habitats that may occur anywhere or may change from year to year include: three species of Bats, Butternut (*Juglans cinerea*), Nine-spotted lady Beetle (*Coccinella novemnotata*) and Monarch Butterfly (*Danaus plexippus*) which may occur throughout the Project study Area. These species are difficult to survey, and the occurrence of their potential habitat cannot be discounted. For these reasons, the following SAR “generalists” are considered to potentially occur within most Project study area segments.

SAR Bats include: Tri-colored Bat (*Perimyotis subflavus*), Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*). Any tree (typically greater than 10 cm diameter at breast height (DBH)) landscaped or naturally occurring as part of forested environments, hedgerows or planted along the track corridor study area, may be utilized as bat day roosts or possibly bat maternity roosts. Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fence lines, or within the tracks due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, the Nine-Spotted Lady Beetle or C9 is also a habitat generalist, typically found in areas with grassland, parkland, riparian areas, agricultural fields and other habitats where aphids (food source) are in abundance. In Ontario, this species of insect is considered overlooked (individuals or small populations) with no occurrences reported after the 1990’s.

SWH is extremely limited within the Lakeshore West Corridor. Similar to SAR bat roost habitat, bat maternity colonies for non-SAR bats may occur where any tree (typically greater than 10 cm DBH)

occurs. This type of habitat is very difficult to evaluate and map although it should not be discounted from potentially occurring within the corridor.

An overview of the baseline conditions for the Lakeshore West corridor is provided below.

#### 4.4.1.1 Walkers Line Layover Facility

The Walkers Line Layover occurs within the urbanized setting of the City of Burlington within Ecoregion 7E-4. Surrounding land use consists primarily of residential, commercial and institutional uses.

##### Wetlands

No wetland features are present within the Walkers Line Layover.

##### Vegetation

The Shoreacres Creek valley is comprised of woodland best characterized as a Fresh Moist Deciduous Lowland Willow Forest community (FOD 7-3). A mix of Crack Willow and willow species (*Salix fragilis*), American Elm (*Ulmus americana*), Manitoba Maple (*Acer negundo*), with understory shrubs of Gray Dogwood (*Cornus racemose*), invasive Honeysuckle (*Lonicera sp.*) and Buckthorn (*Rhamnus cathartica*) were often encountered. Herbaceous vegetation was dominated by invasive Garlic Mustard (*Alliaria petiolata*) and Dames Rocket (*Hesperis matronalis*). Native grasses occur along the banks of Shoreacres Creek and open canopy pockets.

Vegetation communities occurring beyond the Shoreacres Creek valley are dominated by Cultural Thicket (CUT) to the west of Shoreacres Creek and Cultural Meadow (CUM) to the east. Staghorn Sumac (*Rhus typhina*), Buckthorn, Manitoba Maple and smaller shrubs (Raspberry (*Rubus idaeus*), Dog-strangling Vine occur often along the property limits between the commercial properties and rail corridor.

##### Wildlife

The creek corridor provides opportunities and linkages (movement) for urban tolerate wildlife. Species observed included (not limited to) Northern Cardinal (*Cardinalis cardinalis*), American Robin (*Turdus migratorius*), Gray Catbird (*Dumetella carolinensis*), Song Sparrow (*Melospiza melodia*). Raccoon (*Procyon lotor*) tracks and a Coyote (*Canis latrans*) were observed onsite.

##### Aquatic Environment

The Project study area segments that constitute the Walkers Line Layover (LSW-4 and LSW-5) are positioned on the divide between the subwatersheds of Tuck Creek and Shoreacres Creek. The main branch of Shoreacres Creek traverses through the eastern portion of the proposed Layover and passes under the existing tracks through a triple chamber concrete structure.

Shoreacres Creek is part of the Burlington Urban Creek Watershed which originates within the Niagara Escarpment and outlets into Lake Ontario (Conservation Halton, 2020). The valley and floodplain area of Shoreacres Creek is located within the Conservation Halton jurisdiction and is regulated under Ontario Regulation 162/06. The regulatory limits of Tuck Creek do not extend into the proposed Walkers Line Layover.

Shoreacres Creek is a permanent warmwater watercourse with a hardbottom shale bed with very little silt/sand and no organics. No barriers to fish movement were observed within the subject reach. Riparian vegetation consists of native grasses and deciduous woodland species. Fish species previously captured or noted as occurring in Shoreacres Creek within the vicinity of the proposed Layover include: Eastern Blacknose Dace (*Rhinichthys atratulus*), Longnose Dace (*Rhinichthys cataractae*), Bluntnose Minnow (*Pimephales notatus*), Creek Chub (*Semotilus atromaculatus*) and Fathead Minnow (*Pimphales promelas*) (Morrison Hershfield, 2017, SLR, 2018 and Halton Conservation 2010). White Sucker (*Catostomus commersonii*) and Creek Chub were observed in 2020 by SLR.

### Species at Risk

No species at risk were observed within this segment of the Project study area during previous studies (Morrison Hershfield, 2017). The species at risk screening determined two species of avian SAR have the potential to occur within the proposed Walkers Line Layover due to the deciduous woodland associated with Shoreacres Creek. Potential SAR include: Eastern Wood-pewee (*Contopus virens*) (confirmed onsite – SLR 2020), Barn Swallow, Butternut, SAR bats, SAR Insects and SAR Turtles. The Shoreacres Creek corridor would provide movement linkages for SAR Turtles and potential habitat for SAR bats. The general nature of the disturbed vegetation communities within the ROW of the rail corridor provide some potential habitat (albeit low) for SAR generalist insects. Species such as Monarch Butterfly (Special Concern provincially), Lady Beetles (Endangered provincially), and bee species (provincially designated as Threatened and Endangered) may occur given presence of Milkweed (*Asclepias syriaca*) and the Cultural Meadow (CUM) communities. The large triple chamber watercourse crossing structure provides potential habitat for Barn Swallow however none were observed onsite during the 2020 site visits. One male Eastern Wood-peewee was heard within the creek corridor in proximity (50 meters) to the existing creek crossing in June 2020 by SLR Ecologists.

### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Morrison Hershfield, 2017). An updated evaluation determined that candidate SWH may be present due to associated woodland features, cultural thickets, ephemeral and permanent headwater drainage features. Candidate habitats in addition to bat roosts may include: Terrestrial Crayfish, Amphibian Breeding Habitat and Special Concern and Rare Wildlife Species. SWH habitats and criteria identified are outlined in **Appendix B1**.

### Designated Areas

No provincially designated features are present within this segment of the Project study area. The Shoreacres Creek valley forms part of the Burlington Natural Heritage System.

#### 4.4.1.2 Track Segment LSW-1 – Mile 8.10 to Mile 8.60

This segment of the Project study area occurs within the urbanized setting of the City of Toronto within Ecoregion 7E-4. Surrounding land use consists primarily of residential, commercial and institutional uses. See Figure 4-5 for a depiction of the ecological land classification communities within this segment.

### Wetlands

No wetland features are present within this segment of the Project study area.

### Vegetation

A narrow row of deciduous trees and shrubs line the margins of the existing rail corridor through much of this segment of the Project study area.

### Wildlife

No targeted wildlife surveys were performed as part of previous TPAP studies. Vegetation occurring along the existing rail corridor provides foraging and nesting habitat for resident and migratory birds and common urban mammals.

### Aquatic Environment

No aquatic features are present within this segment of the Project study area.

### Species at Risk

No species at risk were observed within this segment of the Project study area during previous studies. An updated evaluation determined that Barn Swallow has the potential to occur within this segment of the Project study area based on availability of suitable nesting habitat.

### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies. An updated evaluation determined that candidate habitat is not expected within this segment of the Project study area.

### Designated Areas

No provincially designated features are present within this Project study area segment. One municipally (City of Toronto) designated feature, Laburnham Park, occurs within this segment. The boundaries of the park are immediately adjacent to the rail corridor.



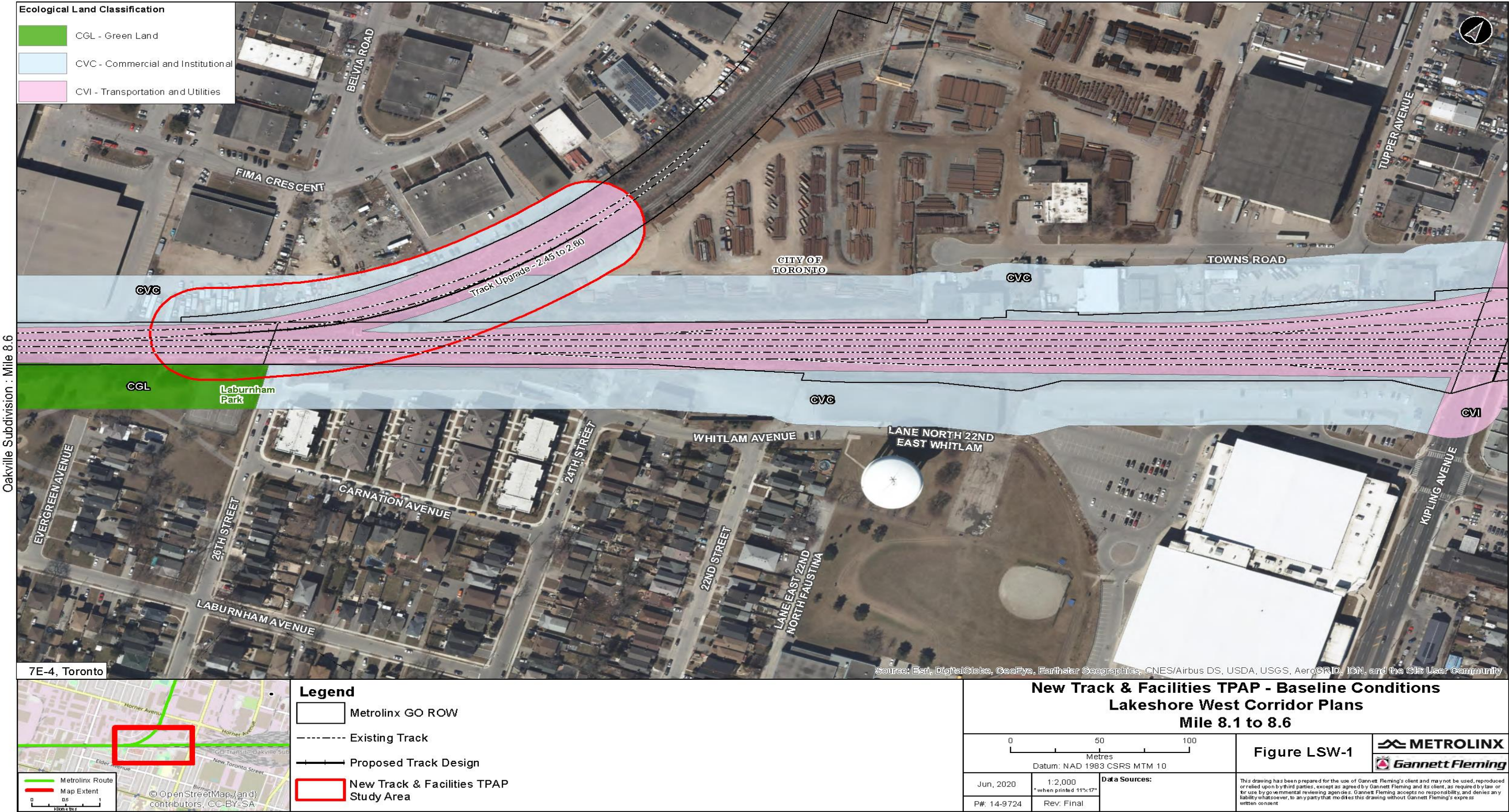


FIGURE 4-5 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT LSW-1 – MILE 8.10 TO MILE 8.60



#### 4.4.1.3 Track Segment LSW-2 – Mile 20.20 to Mile 20.70

This segment of the Project study area occurs within the urbanized setting of the Town of Oakville within Ecoregion 7E-4. Surrounding land use consists of primarily commercial and residential uses. See Figure 4-6 for a depiction of the ecological land classification communities within this segment.

##### Wetlands

No wetland features are present within this segment of the Project study area.

##### Vegetation

Little vegetation occurs within this segment of Project study area. Sporadically occurring deciduous trees and shrubs line the margins of the existing rail corridor through much of this segment.

##### Wildlife

No targeted wildlife surveys were performed as part of previous TPAP studies. Due to the intense use of this segment as an existing rail corridor and the sporadically occurring deciduous trees and shrubs there is limited low value habitat potential for urban tolerant birds and small mammals.

##### Aquatic Environment

One branch of Morrison Creek crosses under the existing rail corridor within this segment of the Project study area. Morrison Creek is a permanent watercourse that has been straightened as a result of urban development. No fish species were observed or captured based on review of previous studies. Morrison Creek has been characterized as a warmwater fish community comprised of White Sucker and cyprinid species, including Creek Chub. Table 4-9 presents a summary of fish and fish habitat at Morrison Creek.

TABLE 4-9 MORRISON CREEK FISH AND FISH HABITAT SUMMARY

Waterbody / Location	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
Morrison Creek – LSW 12/13	Permanent	Warmwater	Directly	Creek Chub, White Sucker	Channel straightened upon approach to and exit from culvert passing through Project study area. Direct connection downstream to Lake Ontario.	None	July 1 to March 31

##### Species at Risk

No species at risk were observed within this segment of the Project study area during previous studies (Morrison Hershfield, 2017). An updated evaluation determined that Snapping Turtle (*Chelydra serpentina*) has the potential to occur within this segment of the Project study area due to the availability of suitable habitat on adjacent lands (Morrison Creek) and attractiveness of exposed sand and gravel within the existing rail corridor for nest building.



Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies. An updated evaluation determined that candidate habitat is not expected within this segment of the Project study area.

Designated Areas

No provincially or municipally designated features are present within this segment of the Project study area.



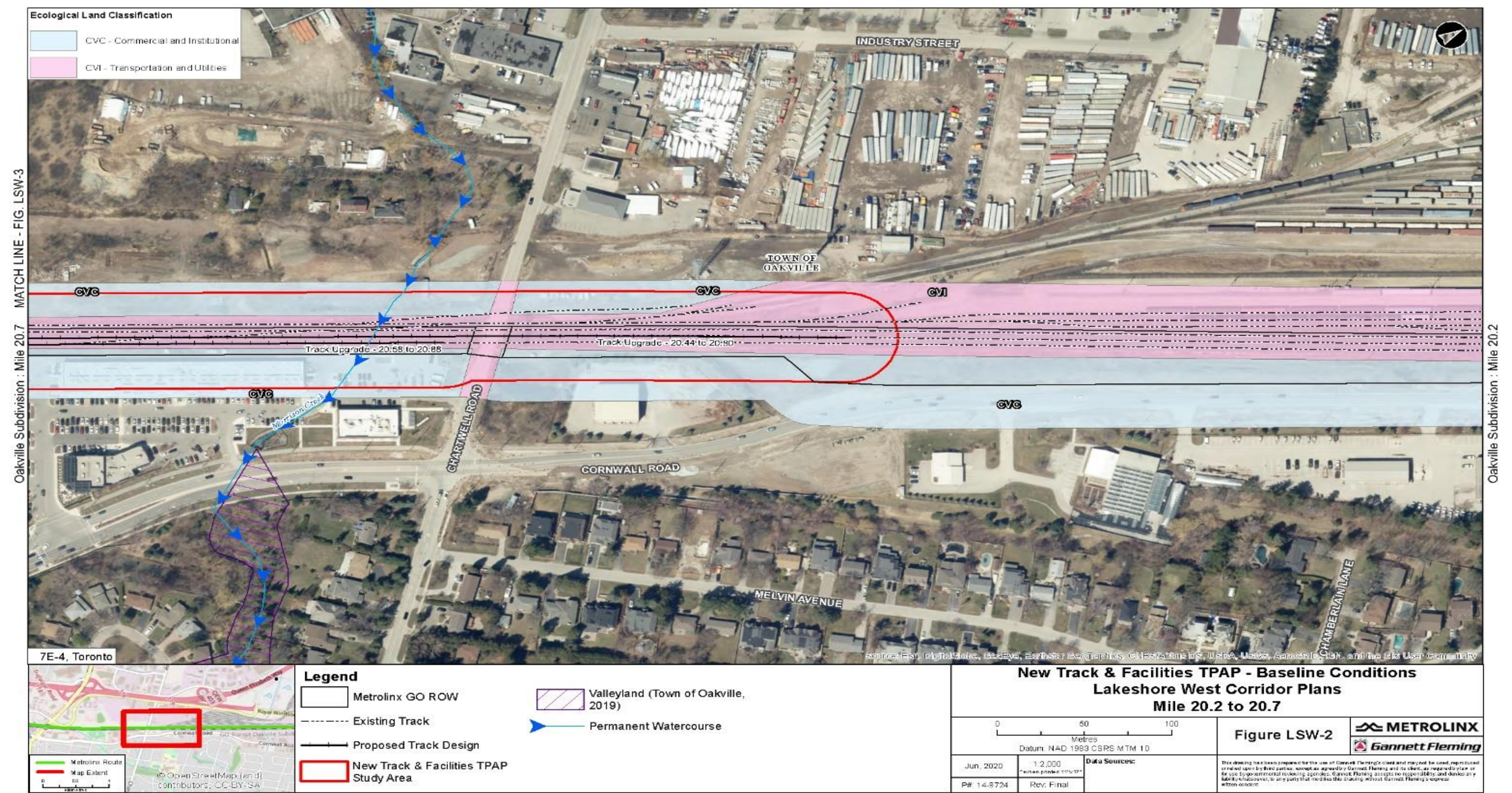


FIGURE 4-6 NATURAL FEATURES WITHIN TRACK SEGMENT LSW-2 – MILE 20.20 TO MILE 20.70



#### 4.4.1.4 Track Segment LSW-3 – Mile 20.70 to Mile 21.20

This segment of the Project study area occurs within the urbanized setting of the Town of Oakville within Ecoregion 7E-4. Surrounding land use consists of primarily commercial and residential uses. See Figure 4-7 for a depiction of the ecological land classification communities within this area

##### Wetlands

No wetlands features are present within this segment of the Project study area.

##### Vegetation

Little vegetation occurs within this segment of Project study area. Sporadically occurring deciduous trees and shrubs line the margins of the existing rail corridor through much of this segment, with some Green Land (CGL) associated with Cornwall Road Park.

##### Wildlife

No targeted wildlife surveys were performed as part of previous TPAP studies. Due to the intense use of this segment as an existing rail corridor and, the sporadically occurring deciduous trees and shrubs provide there is limited low value habitat potential for urban tolerant birds and small mammals.

##### Aquatic Environment

One branch of Morrison Creek crosses under the existing rail corridor within this segment of the Project study area. Morrison Creek is a permanent watercourse that has been straightened as a result of urban development. According to Morrison Hershfield (2017), no fish species were observed or captured based on review of previous studies. SLR (2014) characterized the fish present in Morrison Creek as a warmwater fish community comprised of White Sucker and cyprinid species, including Creek Chub.

##### Species at Risk

No species at risk were observed within this segment of the Project study area during previous studies (Morrison Hershfield, 2017). An updated evaluation determined that Snapping Turtle has the potential to occur within this segment of the Project study area due to the availability of suitable habitat on adjacent lands (Morrison Creek) and attractiveness for nest building of exposed sand and gravel within the existing rail corridor for nest building.

##### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Morrison Hershfield, 2017). An updated evaluation determined that candidate habitat is not expected within this segment of the Project study area.

##### Designated Areas

No provincially designated features are present within this Project study area segment. One municipally designated feature, Cornwall Road Park, occurs within this segment. The boundaries of the park are immediately adjacent to the rail corridor.



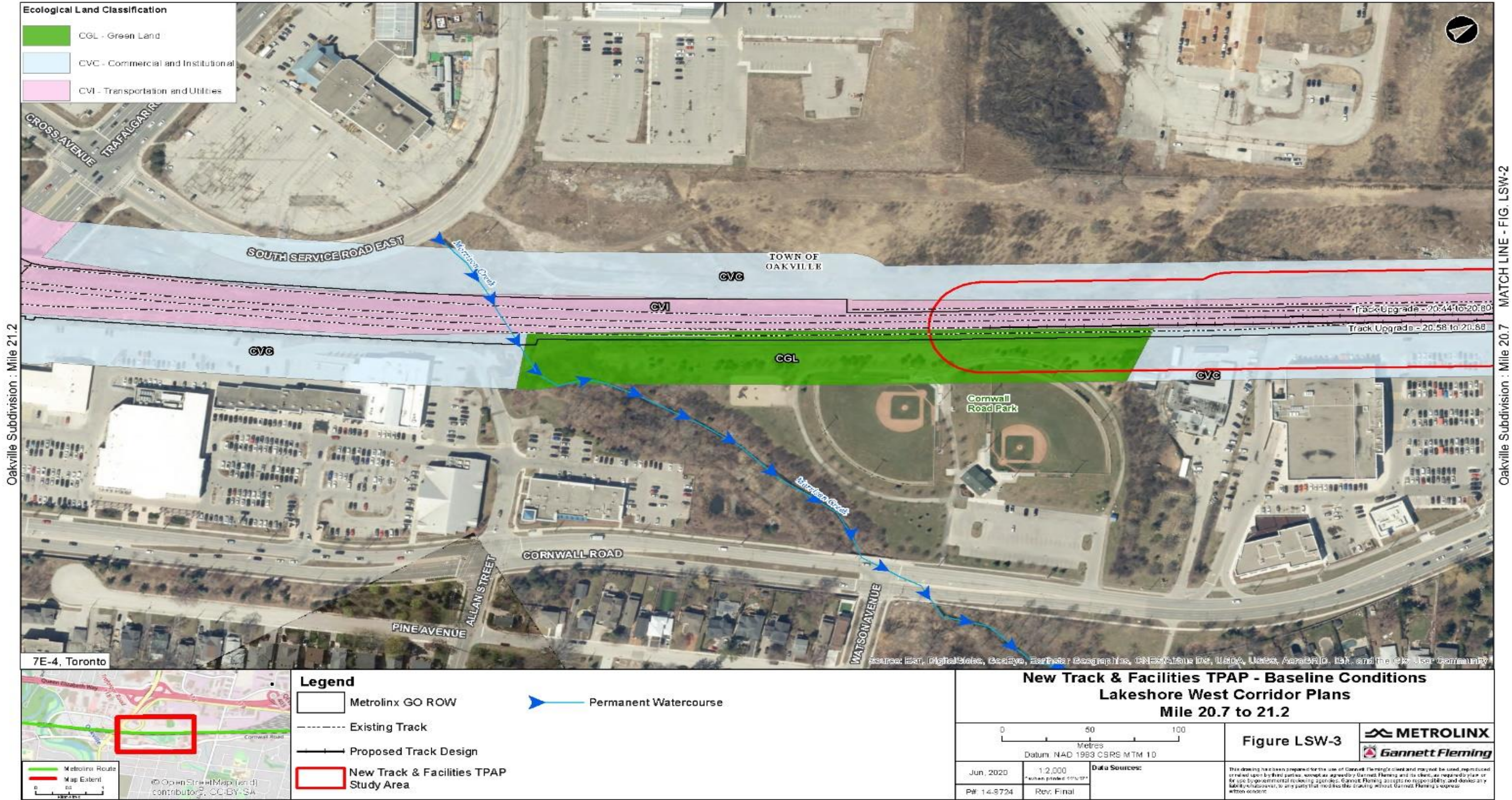


FIGURE 4-7 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT LSW-3 – MILE 20.70 TO MILE 21.20



#### 4.4.1.5 Track Segment LSW- 4 – Mile 28.50 to Mile 29.00

Refer to Section 4.4.1.1 which describes natural environment baseline conditions for the Walkers Line Layover which comprises Segment LSW-4.

#### 4.4.1.6 Track Segment LSW-5 – Mile 29.00 to Mile 29.50

Refer to Section 4.4.1.1 which describes natural environment baseline conditions for the Walkers Line Layover which comprises Segment LSW-5.

#### 4.4.2 Hydrogeology

Three watercourse crossings: Morrison Creek and Shoreacres Creek are located along the Lakeshore West corridor. The creeks flow in a southerly direction towards Lake Ontario and experience constant flow (permanent). All three creeks also provide warmwater fish habitat and are all are afforded protection under the federal *Fisheries Act*.

A summary of the watersheds that exist within the Lakeshore West Corridor is provided below and sections LSW-1 to LSW-5 provide a description of the watersheds within each corridor segment. Additional details can be found in the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1**.

TABLE 4-10 SUMMARY OF WATERSHEDS FOR THE LAKESHORE WEST STUDY AREA SEGMENTS

NTF TPAP Study Area Segment		Watershed
<b>Lakeshore West Corridor (LSW)</b>		
LSW-1	Mile 8.10 to Mile 8.60	Lake Ontario Waterfront
LSW-2	Mile 20.20 to Mile 20.70	Lower Morrison Creek
LSW-3	Mile 20.70 to Mile 21.20	Lower Morrison Creek
LSW-4 (Walkers Line Layover)	Mile 28.50 to Mile 29.00	Shoreacres Creek and Tuck Creek
LSW-5 (Walkers Line Layover)	Mile 29.00 to Mile 29.50	Shoreacres Creek and Tuck Creek

All Projects segments within the Lakeshore West rail corridor are associated with the Iroquois Plain Physiography Region. This feature includes shoreline and lacustrine deposits associated with the flooding of Lake Iroquois during the last glacier retreat. The sediment deposits border the western part of Lake Ontario spanning from the Niagara River to the Trent River. The old Iroquois shoreline can be easily identified by cliffs, bars, beach ridges and boulder pavements. Underlying undulating till planes often host drumlins which extend above the plain features and host localized shoreline deposits. Sediment deposits within the Iroquois plain are comprised of sand, clay, gravel bars, till and shale, and are coarse grained (sand and gravel) near the historic shorelines and fine grained (silt then clay) in an offshore direction.

All Project segments within the Lakeshore West rail corridor are located within an Intake Protection Zone (IPZ). IPZs are intended to protect surface water resources that are relatively sensitive to chemical or pathogen contamination. Although precautionary measures to protect groundwater and surface water must be applied on all projects, additional protection measures and related documentation may be required where Study Areas fall within an IPZ.

Refer to the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1** for MECP water well records for areas adjacent to the Lakeshore West Rail Corridor ROW.

#### 4.4.2.1 Walkers Line Layover Facility

The Walkers Line Layover is located in the Shoreacres Creek and Tuck Creek Sub-Watersheds. The Shoreacres Creek sub-watershed covers an area of about 13.8 km<sup>2</sup> and originates along the south slope of the Niagara Escarpment draining into Lake Ontario. The Tuck Creek sub-watershed is adjacent to the Shoreacres Creek sub-watershed and covers an area of about 10.5 km<sup>2</sup>. The watershed originates along the south slope of the Niagara Escarpment draining into Lake Ontario.

Surficial geology within this segment is primarily composed of Paleozoic bedrock (Blue Mountain Dolostone or Shale) near the surface with little to no overburden soils in the vicinity of the Study Area.

#### 4.4.2.2 Track Segment LSW-1 – Mile 8.10 to Mile 8.60

Segment LSW-1 is located in the Lake Ontario Waterfront. The TRCA manages over 72 km of Lake Ontario waterfront, totaling an area approximately 12.5 km<sup>2</sup>. The area includes about 91% urban cover with the remaining 9% being natural cover. Nine watersheds drain into Lake Ontario across the Lake Ontario Watershed area, including (west to east): Etobicoke and Mimico Creek, Humber River, Don River, Highland Creek, Rouge River, Petticoat Creek, Duffins Creek and Carruthers Creek.

Surficial geology within this segment is predominantly composed of paleozoic bedrock (Blue Mountain Dolostone or Shale) along the GO Rail right-of-way and TPAP Study Area. Glaciolacustrine deposits also occur along the southern portion of the area (fine grained soils).

#### 4.4.2.3 Track Segment LSW-2 – Mile 20.20 to Mile 20.70

Segment LSW-2 is located in the Lower Morrison Creek Sub-watershed. The Lower Morrison Creek Sub-watershed is a small watershed that drains directly into Lake Ontario. The total length of the watershed is approximately 3 km, which is exclusively within the urban area of Oakville adjacent to significant transportation routes. No surface water quality data is available for this watershed.

Surficial geology within this segment is predominantly composed of paleozoic bedrock (Blue Mountain Dolostone or Shale) along the central portion of the TPAP Study Area. Track soils are composed primarily of well drained coarse-textured glaciolacustrine deposits in the eastern and southwestern portions of the study area.

#### 4.4.2.4 Track Segment LSW-3 – Mile 20.70 to Mile 21.20

Refer to Section 4.4.2.3 which describes baseline hydrogeologic conditions for Segment LSW-3.

#### 4.4.2.5 Track Segment LSW-4 – Mile 29.50 to Mile 29.00

Refer to Section 4.4.2.1 which describes baseline conditions for Segment LSW-4 which comprises the Walkers Line Layover.

#### 4.4.2.6 Track Segment LSE-5 – Mile 29.00 to Mile 29.50

Refer to Section 4.4.2.1 which describes baseline conditions for Segment LSW-5 which comprises the Walkers Line Layover.

### 4.4.3 Land Use and Socio-Economic

#### 4.4.3.1 Walkers Line Layover Facility

##### Existing Land Use

Under the City of Burlington Zoning By-law 2020, this section of the rail corridor is zoned as *Utility Services*. The proposed Walker's Line Layover site is zoned *General Employment (GE1)* and *Open Space (OS)*.



Sidewalks extend along Walkers Line and Harvester Road within the employment area surrounding the corridor. A cycling path traverses the rail corridor along Walker's Line. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of Walker's Line Layover site.

#### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to the Walkers Line Layover. It is noted that the City of Burlington is currently undergoing a Mobility Hub Study for the area surrounding the Appleby GO Station. The Walker's Line Layover, however, is located just west (outside) of the Mobility Hub study area, therefore policies within this study do not apply.

Within the vicinity of the Walkers Line Layover is a proposed cycling path along Walker's Line and proposed multi-use path along Harvester Road. It is noted that the City of Burlington currently has a draft Cycling Plan Update (August 2019). Based on information available to date, the proposed pathways are considered short-term (2019-2024) and medium-term (2025-2030) priority projects in terms of implementation in the City of Burlington.

#### 4.4.3.2 Track Segment LSW-1 – Mile 8.10 to Mile 8.60

##### Existing Land Use

There are two large parks in proximity to the rail corridor: Laburnham Park and Don Russel Memorial Park. Don Russell Memorial Park includes sporting amenities such as a baseball field. There are no sensitive facilities within 100 metres of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation under City of Toronto Zoning By-law 569-2013.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to the rail corridor along segment LSW-1. Any future development will comply with land use designations.

There are no planned recreational amenities within this segment of the rail corridor according to the City of Toronto Parks and Recreation Facilities Master Plan.

#### 4.4.3.3 Track Segment LSW-2 – Mile 20.20 to Mile 20.70

##### Existing Land Use

The Cornwall Road Greenhouses and a park are situated to the east of the rail corridor. A cycling route extends along Cornwall Road to Chartwell Road, and there is a north-south public trail extending from the Cornwall Road buffer to the Cornwall Road Greenhouses.

There are no sensitive facilities within 100 metres of the rail corridor within this segment.

This segment of the rail corridor is zoned for Utility under Town of Oakville Zoning By-law 2014-014.

##### Planned Land Use

Town of Oakville council endorsed the overall site master plan for the Former Oakville-Trafalgar Memorial Hospital site on June 27, 2017, which sees a residential area in the north, a community centre and park in the middle and a seniors-oriented housing district in the south, including a civic square in front of the former Oakville Trafalgar High School, and a passive park space along Allan Street. The new Southeast Community Centre is expected to open by the end of 2020 more than 100 m from the rail corridor.

Segment LSW-2 is within Midtown Oakville, a primary growth area and urban center designated by the Province of Ontario. Midtown Oakville is envisioned to be a transit-supportive, mixed-use community, as identified in the Livable Oakville Plan (South of Dundas).

#### 4.4.3.4 Track Segment LSW-3 – Mile 20.70 to Mile 21.20

##### Existing Land Use

Cornwall Sports Park is located directly east of the rail corridor. This sports park includes two baseball diamonds with walkways surrounding the fields.

Segment LSW-3 is also located within Midtown Oakville, a primary growth area and urban center designated by the Province of Ontario.

This segment of the rail corridor is zoned for Utility under Town of Oakville Zoning By-law 2014-014.

##### Planned Land Use

There are two active transportation features planned within and adjacent to this segment of the rail corridor according to the Town of Oakville's Active Transportation Master Plan. An on-road cycling lane and signed cycling route is proposed along Trafalgar Road; and an on-road signed cycling route is proposed between Trafalgar Road and Eighth Line/Chartwell Road.

There are no Secondary Plans affecting the lands adjacent to this segment. Any future development will comply with the land use designations.

#### 4.4.3.5 Track Segment LSW-4 – Mile 28.50 to Mile 29.00

Refer to Section 4.4.3.1 which describes land use baseline conditions for the Walkers Line Layover which comprises Segment LSW-4.

#### 4.4.3.6 Track Segment LSW-5 – Mile 29.00 to Mile 29.50

Refer to Section 4.4.3.1 which describes land use baseline conditions for the Walkers Line Layover which comprises Segment LSW-5.

### 4.4.4 Cultural Heritage

#### 4.4.4.1 Walkers Line Layover Facility

No previously identified BHRs or CHLs are located within the layover location.

#### 4.4.4.2 Track Segment LSW-1 – Mile 8.10 to Mile 8.60

No previously identified BHRs or CHLs are located within the layover location.

#### 4.4.4.3 Track Segment LSW-2 – Mile 20.20 to Mile 20.70

No previously identified BHRs or CHLs are located within the layover location.

#### 4.4.4.4 Track Segment LSW-3 – Mile 20.70 to Mile 21.20

No previously identified BHRs or CHLs are located within the layover location.

#### 4.4.4.5 Track Segment LSW-4 – Mile 28.50 to Mile 29.00

No previously identified BHRs or CHLs are located within the layover location.

#### 4.4.4.6 Track Segment LSW-5 – Mile 29.00 to Mile 29.50

No previously identified BHRs or CHLs are located within the layover location.

#### 4.4.5 Archaeology

For the detailed historical and archaeological context of the Lakeshore West Corridor, please refer to the *Metrolinx NTF TPAP Archaeology – Baseline Conditions Report*, (**Appendix G1**). A summary of the historical and archaeological context for key segments of the Lakeshore West Corridor is provided below.

##### 4.4.5.1 Walkers Line Layover Facility

Walkers Line Layover Location is located east of Walkers Line south of Harvester Road in the City of Burlington. It extends from Mile 28.65 to Mile 29.48.

The Walkers Line Layover Location study area is located in Borden block AiGw. According to the OASD (MHSTCI, 2020) five previously registered archaeological sites are located within 1 km of the study area; however, none are located within 50 m.

The Walkers Line Layover Location meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Shoreacres Creek);
- Early historic transportation routes (Walkers Line); and,
- Proximity to early settlements (Appleby).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance.

##### 4.4.5.2 Track Segment LSW-1 – Mile 8.10 to Mile 8.60

Segment LSW-1 is located between Price Avenue and Kipling Avenue in the City of Toronto. This area corresponds to lands within Treaty 13 and 13a, Etobicoke Township, and AjGv. No previously registered archaeological sites are located within 1 km of this segment according to the OASD. At least one previous report details fieldwork within 50 m of this segment, as detailed in **Appendix G1**.

Segment LSW-1 meets the following criteria indicative of archaeological potential:

- Water sources: primary, secondary, or past water source (Lake Ontario); and
- Early historic transportation routes (Lakeshore Rd., Kipling Ave.).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

##### 4.4.5.3 Track Segment LSW-2 – Mile 20.20 to Mile 20.70

Segment LSW-2 is located between Trafalgar Road, near Oakville GO Station, and east of Chartwell Road in the Town of Oakville. It is also located within Treaty 13a, Trafalgar Township, and Borden block AiGw. At least two previous reports detail fieldwork within 50 m of this segment, as detailed in **Appendix G1**.

Segment LSW-2 meets the following criteria indicative of archaeological potential:

- Water sources: primary, secondary, or past water source (Sixteen Mile Creek);
- Early historic transportation routes (Eighth Line/Chartwell Rd., Trafalgar Rd.); and
- Proximity to early settlements (Oakville).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.4.5.4 Track Segment LSW-3 – Mile 20.70 to Mile 21.20

Segment LSW-3 is located between Trafalgar Road, near Oakville GO Station, and east of Chartwell Road in the Town of Oakville. It is also within Treaty 13a, Trafalgar Township, and Borden block A1Gw. There are no previously registered archaeological sites within 1 km of this segment according to the OASD; however, at least two previous reports describe fieldwork within 50 m (see **Appendix G1**).

Segment LSW-3 meets the following criteria indicative of archaeological potential:

- Water sources: primary, secondary, or past water source (Sixteen Mile Creek);
- Early historic transportation routes (Eighth Line/Chartwell Rd., Trafalgar Rd.); and
- Proximity to early settlements (Oakville).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.4.5.5 Track Segment LSW-4 – Mile 28.50 to Mile 29.00

This segment corresponds to the location of the Walkers Line layover facility. Refer to Section 4.4.5.1 for archaeological conditions within this area.

#### 4.4.5.6 Track Segment LSW-5 – Mile 29.00 to Mile 29.50

This segment corresponds to the location of the Walkers Line layover facility. Refer to Section 4.4.5.1 for archaeological conditions within this area.

### 4.4.6 Visual/Aesthetics

#### 4.4.6.1 Walkers Line Layover Facility

This segment of the corridor passes through an industrial/employment area within the City of Burlington. Large buildings, such as Halton Honda and parking lots are located within 10 to 20 metres of the proposed layover facility. While majority of the proposed layover is located within the existing rail ROW, some proposed structures are located on a vacant lot just north of the rail corridor. The north side of the corridor crosses an area that is mostly industrial. Since the surrounding environment is largely industrial/employment, development of the layover site at this location is not anticipated to significantly modify the views from the surrounding areas; as such, the visual baseline conditions in this portion of the segment are classified as *Negligible*.

The corridor currently crosses over a water feature, known as Shoreacres Creek, which is within Conservation Halton regulated area. A portion of the proposed layover will cross existing Erosion Hazards identified by Conservation Halton; as such, the baseline conditions for this portion of this segment are classified as *High*.

#### 4.4.6.2 Track Segment LSW-1 – Mile 8.10 to Mile 8.60

Segment LSW-1 passes through industrial developments on the north side of the rail right-of-way and a residential neighbourhood with multiple dwelling units to the south. The proposed track upgrades are to occur within the existing Metrolinx rail right-of-way making changes to the existing views minimal, as there is no change to the vertical profile of the existing track bed. Therefore, the visual baseline conditions are classified as *Negligible* due to the minimal disturbance caused by the proposed track work.

#### 4.4.6.3 Track Segment LSW-2 – Mile 20.20 to Mile 20.70

This segment is located entirely within the Town of Oakville and traverses mixed use and commercial developments on both sides of the rail right-of-way. The west end of the proposed track upgrades is near Cornwall Road Sports Park. Since the proposed track upgrades are to occur within the existing Metrolinx rail right-of-way, the existing visual baseline conditions are classified as *Negligible*.

#### 4.4.6.4 Track Segment LSW-3 – Mile 20.70 to Mile 21.20

Refer to Section 4.4.6.3 of this Report.

#### 4.4.6.5 Track Segment LSW-4 – Mile 28.50 to Mile 29.00

Refer to Section 4.4.6.1 which describes visual/aesthetic baseline conditions for the Walker's Line layover, corresponding to this segment.

#### 4.4.6.6 Track Segment LSW-5 – Mile 29.00 to Mile 29.50

Refer to Section 4.4.6.1 which describes visual/aesthetic baseline conditions for the Walker's Line layover, corresponding to this segment.

### 4.4.7 Stormwater Management

#### 4.4.7.1 Walkers Line Layover Facility

The total Layover Assessment Area is approximately 11.59 ha consisting of existing railroad tracks/ballast, industrial areas and undeveloped land. The portion of the property parcel affected by the development of the layover site will be approximately 11.59 ha as shown on the figure. In the subsequent sections of this report, only the area affected by the development is considered for the analysis.

Available topographic information indicates the overall site drains towards Shoreacres Creek from both Appleby Line and Walkers Line. Topographic information is supplemented with elevations from the Town of Oakville contour data where there are data gaps (i.e. to obtain elevations from within the private property). Existing drainage is conveyed by a heavily vegetated swale (approximately 1.0m–1.5m depth, 4.0m-5.0m width with 3:1 slopes) immediately north of the existing tracks. The private property drains to the swale north of the rail right-of-way. Track drainage is captured and conveyed through the local swale. Both swales outlet to Shoreacres Creek. Properties south of the rail corridor are mostly at a lower grade than the tracks. An existing 3 cell culvert (built in 1990) divides the site and conveys flows from north to south under the existing tracks. Data from the Town of Oakville contours suggest that overland drainage in this area flows north to south.

Detailed geotechnical and hydrogeological investigations will be required at detailed design stage to precisely determine the soil type.

For the existing condition, based on the split land use of industrial, track and open space, the runoff coefficient, 'C' is estimated at 0.50 and 0.46 for Catchment 1 and 2 respectively. Runoff coefficients for industrial and open space were taken from the City of Burlington Std Dwg S-3d (June 1988). See Table 4-11 for characteristics of the existing drainage areas.

The proposed Walkers Line Layover site development will include a staff and storage building, parking lot, electrical substation and four (4) railroad car storage tracks enclosed by a chain link fence. The site will drain through two (2) distinct catchments with a mix of industrial impervious surfaces, track and ballast areas and open space. The drainage areas and runoff coefficients for the two catchments are shown in Table 4-11. Runoff coefficients for track and ballast areas were taken from the Colorado DOT report titled, "Modeling Ballasted Tracks for Runoff Coefficient C" (August 2012). It should be noted that the existing and proposed catchment areas are based on preliminary assumptions and need to be reconfirmed during detailed design.

The proposed development areas and their locations are based on conceptual design and may be refined as the design progresses. Therefore, reassessment of the drainage areas will be required at subsequent design stages, as necessary.

The existing and the proposed drainage areas and runoff coefficients are summarized below in Table 4-11. Runoff coefficient for open space will be verified after soil type is determined during detailed design investigation.

TABLE 4-11 WALKERS LINE LAYOVER - EXISTING AND PROPOSED DRAINAGE AREAS

Existing Condition Catchment 1			Proposed Condition Catchment 1		
Area Type	Drainage Area (ha)	Runoff Coefficient	Area Type	Drainage Area (ha)	Runoff Coefficient
Industrial Impervious	3.40	0.85	Industrial Impervious	3.40	0.85
Track/Ballast	0.84	0.84	Track and Ballast	3.08	0.84
Open Space	4.10	0.30	Open Space	1.86	0.30
Total/Composite	8.34	0.58 (0.50)		8.34	0.72
Existing Condition Catchment 1			Existing Condition Catchment 2		
Area Type	Drainage Area (ha)	Runoff Coefficient	Area Type	Drainage Area (ha)	Runoff Coefficient
Industrial Impervious	0.00	0.85	Industrial Impervious	0.00	0.85
Track/Ballast	0.94	0.84	Track/Ballast	2.60	0.84
Open Space	2.31	0.30	Open Space	0.65	0.30
Total/Composite	3.25	0.46		3.25	0.73

The Walkers Line Layover is partially within the area regulated by Conservation Halton under O. Reg. 166/06. It situated within the Shoreacres Creek Watershed.

## 4.5 Baseline Conditions - Kitchener Corridor

### 4.5.1 Natural Environment

The Kitchener Corridor portion of the Project study area is within an urbanized setting stretching from Etobicoke North to Bramalea. Most of the vegetation along the corridor is cultural in nature and comprised primarily of cultural meadow often containing typically non-native species that commonly become established in disturbed sites. European Common Reed (*Phragmites australis*) *Phragmites* dominated ditches and some occurrence of meadow marshes are also present. The Mimico Creek valley and its minor tributary are the only natural area in the vicinity of the Project study area.

SAR “generalists” with habitats that may occur anywhere or may change from year to year include: three species of Bats, Butternut, Nine-spotted lady Beetle and Monarch Butterfly which may occur throughout the Project study area. These species are difficult to survey, and the occurrence of their potential habitat cannot be discounted. For these reasons, the following SAR “generalists” are considered to potentially occur within most Project study area segments.



SAR Bats include: Tri-colored Bat, Little Brown Myotis, and Northern Myotis. Any tree (typically greater than 10 cm DBH) landscaped or naturally occurring as part of forested environments, hedgerows or planted along the rail corridor study area may be utilized as bat day roosts or possibly bat maternity roosts. Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fence lines, or within the tracks due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, the Nine-Spotted Lady Beetle or C9 is also a habitat generalist, typically found in areas with grassland, parkland, riparian areas, agricultural fields and other habitats where aphids (food source) are in abundance. In Ontario this species of insects is considered overlooked (individuals or small populations) with no occurrences reported after the 1990's.

SWH is limited with candidate habitats occurring in association with Mimico Creek (edges only) and extend beyond the Project study area. Similar to SAR bat roost habitat, bat maternity colonies for non-SAR bats may occur where any tree (typically greater than 10 cm DBH) occurs. This type of habitat is very difficult to evaluate and map and should not be discounted from potentially occurring within the corridor.

An overview of the baseline conditions for the Kitchener Corridor is provided below.

#### 4.5.1.1 Track Segment KT-1 – Mile 12.90 to Mile 13.40

This segment of the Project study area occurs within the urbanized setting of the City of Toronto within Ecoregion 7E-4. Surrounding land use consists primarily of commercial and institutional uses, including Woodbine Racetrack. See Figure 4-8 for a depiction of the ecological land classification communities within this area.

##### Wetlands

No wetlands features are present within this segment of the Project study area. Larger unevaluated wetlands are present in the adjacent Mimico Creek valley and riparian area.

##### Vegetation

A discontinuous narrow row of deciduous trees and shrubs lines the margins of the existing rail track through this Project study area segment. Cultural Meadow (CUM) communities border the existing rail line beyond the active track portion of the corridor. Cultural Meadow (CUM) communities are abundant in Southern Ontario and are derived from or maintained by recent human disturbance.

##### Wildlife

No targeted wildlife surveys were performed as part of previous TPAP studies. Sporadically occurring trees and shrubs along the active rail line together with the adjacent cultural vegetation communities provide marginal foraging and nesting habitat for common urban tolerant resident and migratory birds and common urban mammals.

##### Aquatic Environment

No aquatic features are present within this segment of the Project study area.

##### Species at Risk

No species at risk were observed within these segments of the Project study area during previous studies (Morrison Hershfield, 2017). An updated evaluation confirmed that the potential for SAR habitat in this Project study area segment is very low based on existing adjacent land uses.

### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within these segments of the Project study area during previous studies (Morrison Hershfield, 2017). An updated evaluation confirmed that the potential for SAR habitat in this Project study area segment is very low based on existing adjacent land uses. SWH habitats and criteria identified are outlined in **Appendix B1**.

### Designated Areas

No provincially designated features are present within this segment of the Project study area.



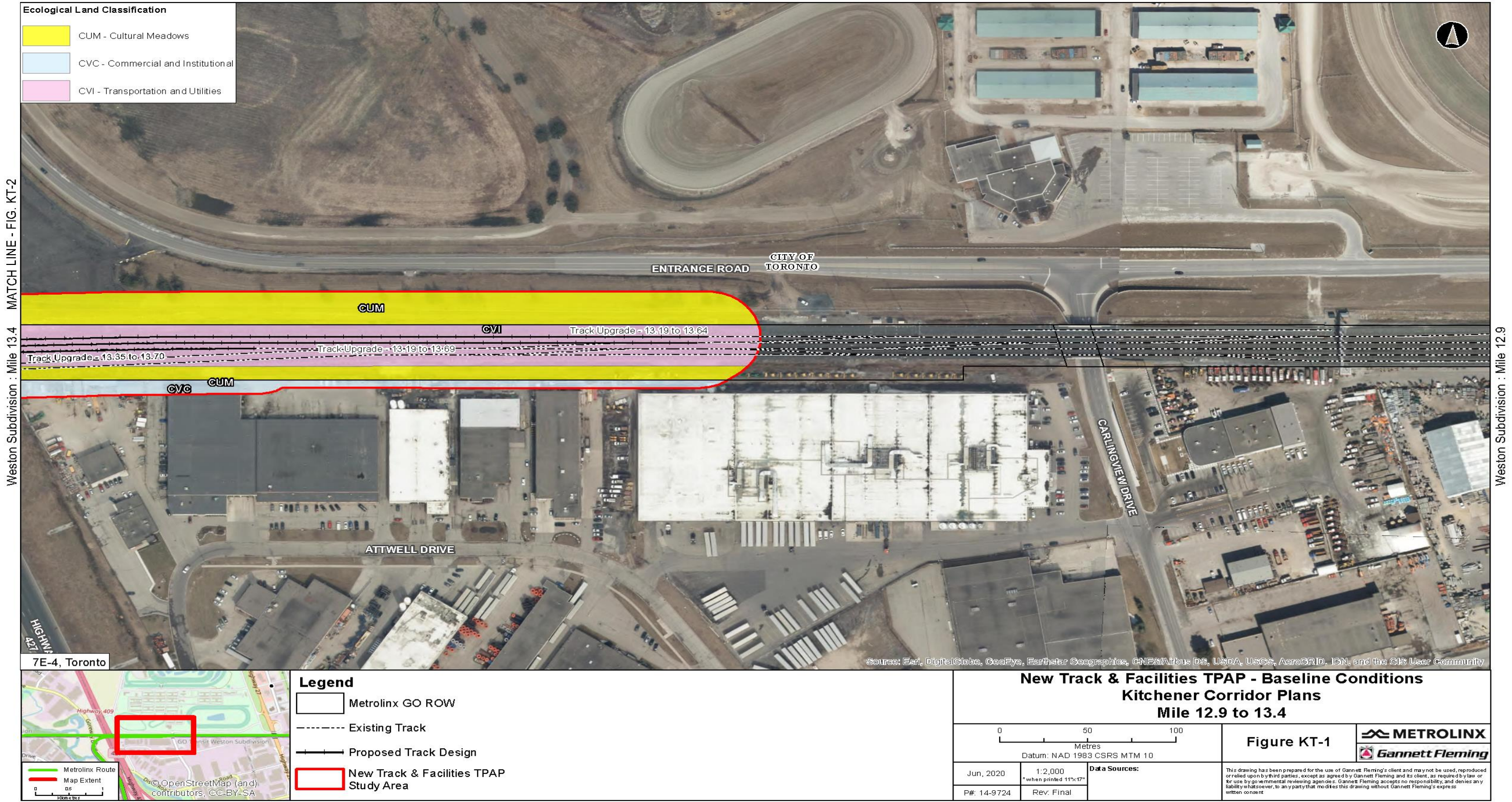


FIGURE 4-8 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT KT-1 - MILE 12.90 TO MILE 13.40



#### 4.5.1.2 Track Segment KT-2 – Mile 13.40 to Mile 13.90

This segment of the Project study area occurs within the urbanized setting of the City of Toronto within Ecoregion 7E-4. Surrounding land use consists primarily of a transportation corridor (Highway 27), commercial and institutional uses, and the Mimico Creek valley. See Figure 4-9 for a depiction of the ecological land classification communities within this area.

##### Wetlands

No wetlands features are present within this segment of the Project study area. An unevaluated wetland occurs near the western boundary of this Project study area segment. Larger unevaluated wetlands are present in the adjacent Mimico Creek valley and riparian area in vicinity of the western terminus of this segment.

##### Vegetation

A discontinuous narrow row of deciduous trees and shrubs lines the margins of the existing rail corridor through this segment. The western end of this Project study area segment is positioned over the Mimico Creek valley and riparian corridor. Vegetation communities associated within this valley in proximity to the rail corridor include Cultural Mixed Meadow (MEM), Cultural Savannah (CUS) and Cultural Meadow (CUM). The cultural communities are abundant in Southern Ontario and are derived from or maintained by recent human disturbance.

##### Wildlife

No targeted wildlife surveys were performed as part of previous TPAP studies. Sporadically occurring trees and shrubs along the active rail line together with the adjacent cultural vegetation communities provide foraging and nesting habitat for common urban tolerant resident and migratory birds and common urban mammals. The broad Mimico Creek Valley provides a wildlife corridor and offers habitat for larger urban tolerant animals such as deer and coyote.

##### Aquatic Environment

The Mimico Creek valley and riparian area occurs in the vicinity of the western terminus of this Project study area segment and passes under the rail corridor through a bridge structure. Mimico Creek is an urban watercourse that has been significantly affected over time by increased development and encroachment. The reach of Mimico Creek passing under this Project study area segment exhibits moderate levels of channel sinuosity within its valley confines. Stream morphology follows a general riffle-pool sequence with low gradient areas that display homogeneous flat and slow run habitats.

Mimico Creek provides cool-warm water habitat for several fish common and tolerant fish species. Historical data provided by MNR and TRCA as part of a previous GO Corridor study (GLL, 2008) suggests the presence of Creek Chub, Bluntnose Minnow, Fathead Minnow, Common Shiner (*Luxilus cornutus*), White Sucker, Brook Stickleback (*Culaea inconstans*), Eastern Blacknose Dace and Longnose Dace within Mimico Creek.

##### Species at Risk

No species at risk were observed within this segment of the Project study area during previous studies (Morrison Hershfield, 2017). An updated evaluation determined that Barn Swallow, Eastern Wood-Pewee, and Snapping Turtle have the potential to occur in the vicinity of Mimico Creek valley based on availability of suitable habitat.

### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Morrison Hershfield, 2017). An updated evaluation determined that candidate SWH may be present in association within Mimico Creek and its riparian corridor. If present, they would not be directly associated with the Project study area segment, occurring on adjacent lands and considered edge habitats only. Candidate SWH, in addition to bat roosts may include: Amphibian Movement Corridors, Turtles Nesting Habitat, Shrub/Early Successional Bird Breeding Habitat and Special Concern and Rare Wildlife Species. SWH habitats and criteria identified are outlined in Appendix B1.

### Designated Areas

No provincially designated features are present within this segment of the Project study area. The Mimico Creek valley near the western terminus of this segment is included as part of the Mississauga Urban Greenlands System, Natural Heritage System - Significant Natural Areas and Natural Green Spaces, and Parks and Open Spaces - Public and Private Open Spaces.



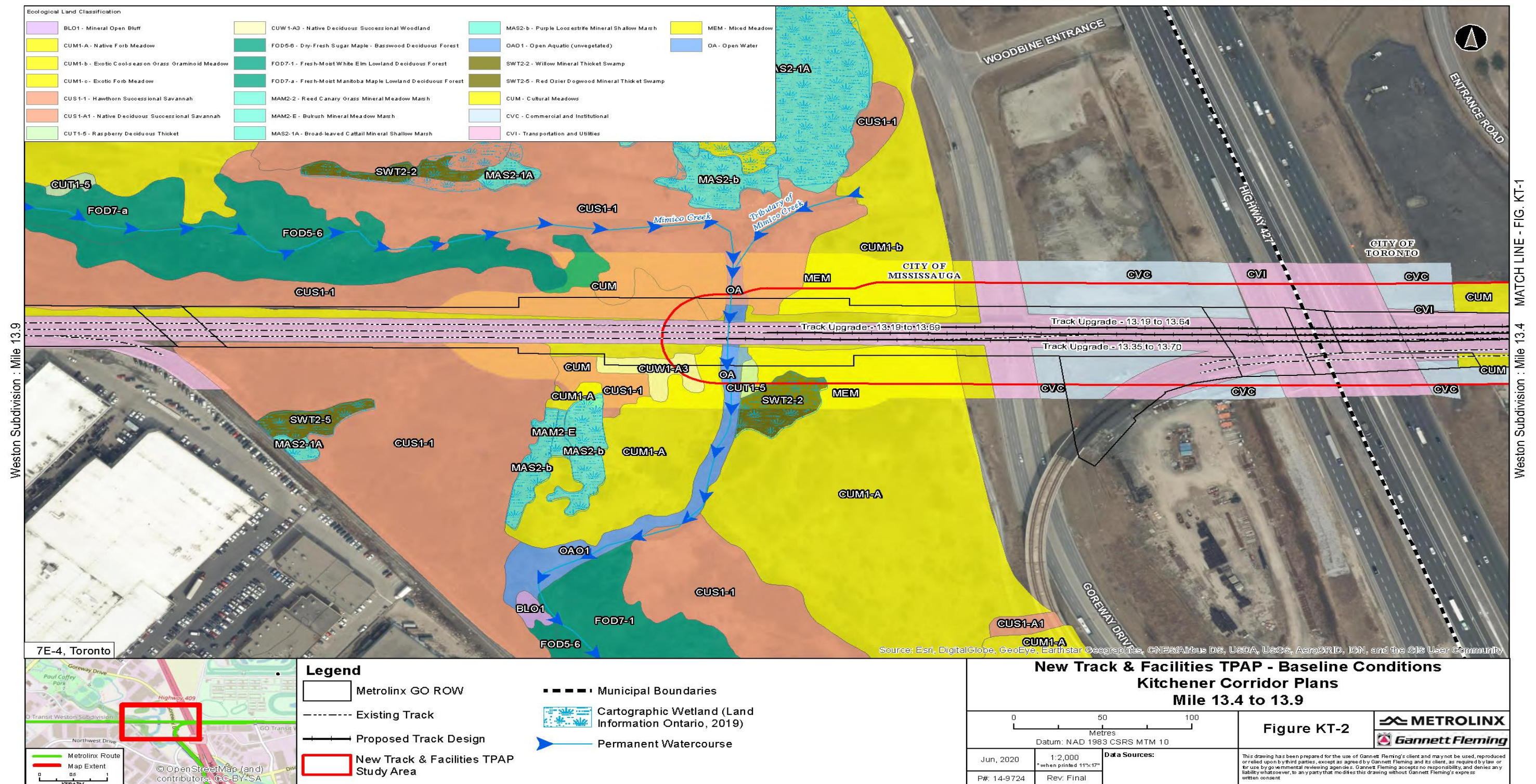


FIGURE 4-9 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT KT-2 – MILE 13.40 TO MILE 13.90



#### 4.5.1.3 Track Segment KT-3 – Mile 16.10 to 16.60

This segment of the Project study area occurs within Ecoregion 7E-4 and the densely urbanized settings of the City of Mississauga and the City of Brampton within Ecoregion 7E-4. Surrounding land use consists of heavy commercial and industrial uses in association with a Hydro corridor within an open space area associated with a Mimico Creek tributary. See Figure 4-10 for a depiction of the ecological land classification communities within this area.

##### Wetlands

No wetland features are present within this Project segment. A Meadow Marsh (MAM) community is present along the northwest border of this segment within the broad corridor of a Mimico Creek tributary.

##### Vegetation

Sporadically occurring deciduous trees and shrubs occur within the Cultural Meadow (CUM) dominated landscape adjacent to the existing rail corridor. A Meadow Marsh (MAM) community is present along the northwest border of this segment within the broad corridor of a Mimico Creek tributary.

##### Wildlife

No targeted wildlife surveys were performed as part of previous TPAP studies. CUM and MAM vegetation occurring along the existing rail corridor provide marginal foraging and nesting habitat for common urban tolerant resident and migratory birds and common urban mammals.

##### Aquatic Environment

A small tributary of Mimico Creek occurs within this segment. This surface water feature conveys stormwater from a constructed stormwater facility positioned adjacent to the western portion the segment and flows eastward, joining similar conveyance features along its path toward the eastern limit of the segment. The channel then passes through the easterly terminus and under the existing rail bed. While no fisheries information has been obtained from agencies or through prior TPAP studies, proposed activities are not anticipated to affect this small tributary. Fish and fish habitat conditions for this tributary of Mimico Creek are presented in Table 4-12, below.

TABLE 4-12 EXISTING FISH AND FISH HABITAT SUMMARY – SEGMENT KT-3

Waterbody	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
Minor Tributary of Mimico Creek– KT-3-4	Intermittent	Warmwater	Unknown	Unknown	Conveys stormwater from adjacent SWM facility to the western portion of the Project study area and flows eastward, joining similar conveyance features toward the eastern limit of the Project study area.	None	July 1 to March 31 due to contributions to downstream warmwater habitat



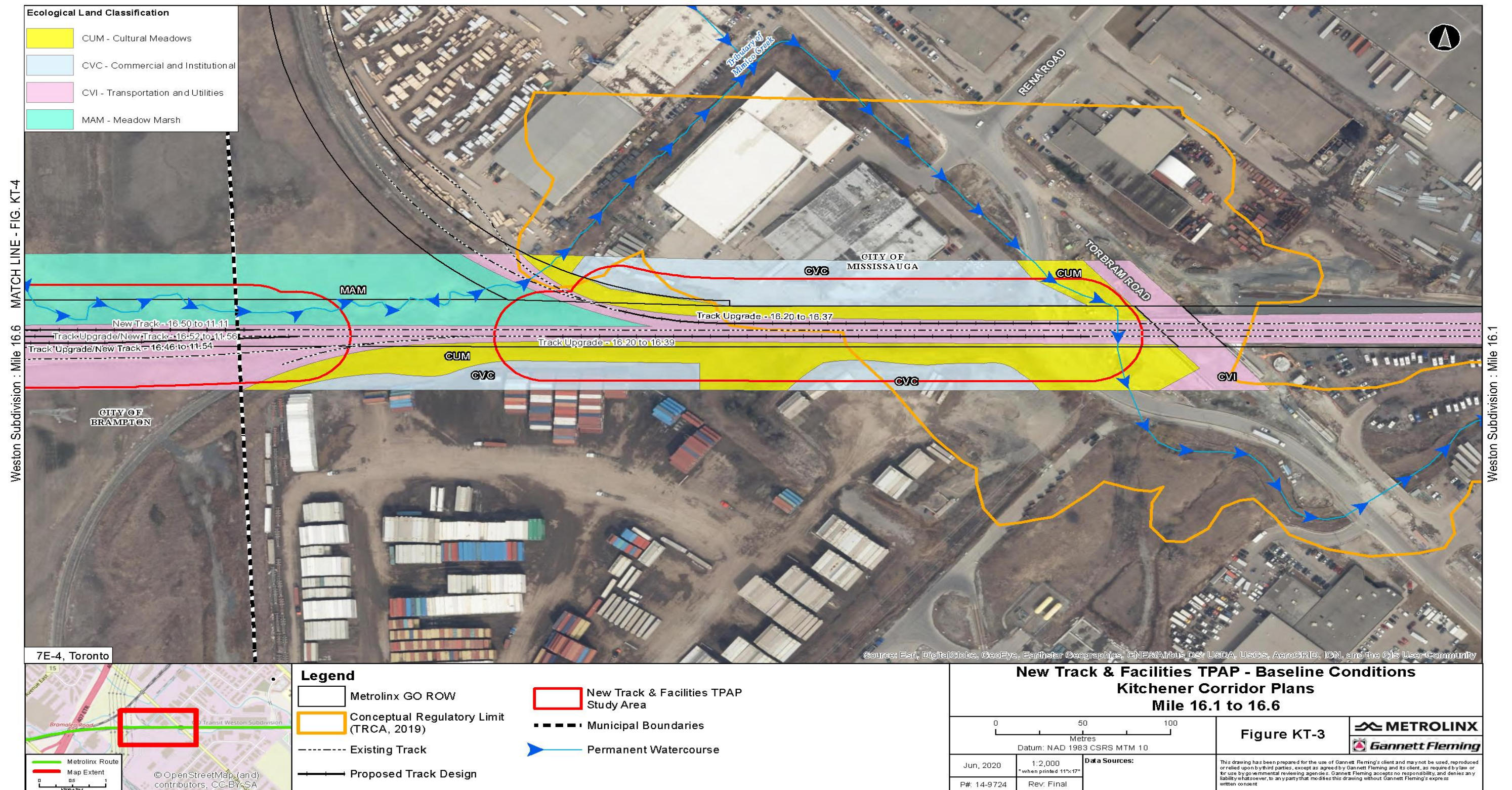


FIGURE 4-10 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT KT-3 – MILE 16.10 TO 16.60



### Species at Risk

No targeted wildlife surveys were performed as part of previous TPAP studies. An updated evaluation determined that Barn Swallow and Snapping Turtle have potential to occur based on the availability of suitable nesting habitat (bridges).

### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment during previous studies. An updated evaluation determined that candidate SWH is extremely limited. If present, Terrestrial Crayfish habitat may occur anywhere hydric soils are present (e.g., fallow, agricultural wet areas, cultural fields and wet meadows).

### Designated Areas

No provincially or municipally designated features are present within this segment of the Project study area. A portion of the segment KT-3 is within the TRCA Regulatory Limit (Conceptual).

#### 4.5.1.4 Track Segment KT-4 – Mile 16.60 to 11.20

Ecological conditions within this segment are a continuation of those found in segment KT-3. Refer to Section 4.3.1.3 for further details. See Figure 4-11 for a depiction of the ecological land classification communities within this segment.

#### 4.5.1.5 Track Segment KT-5 - Mile 11.20 to Mile 11.80

Ecological conditions within this segment are a continuation of those found in segment KT-3. Refer to Section 4.3.1.3 for further details. See Figure 4-12 for a depiction of the ecological land classification communities within this segment.



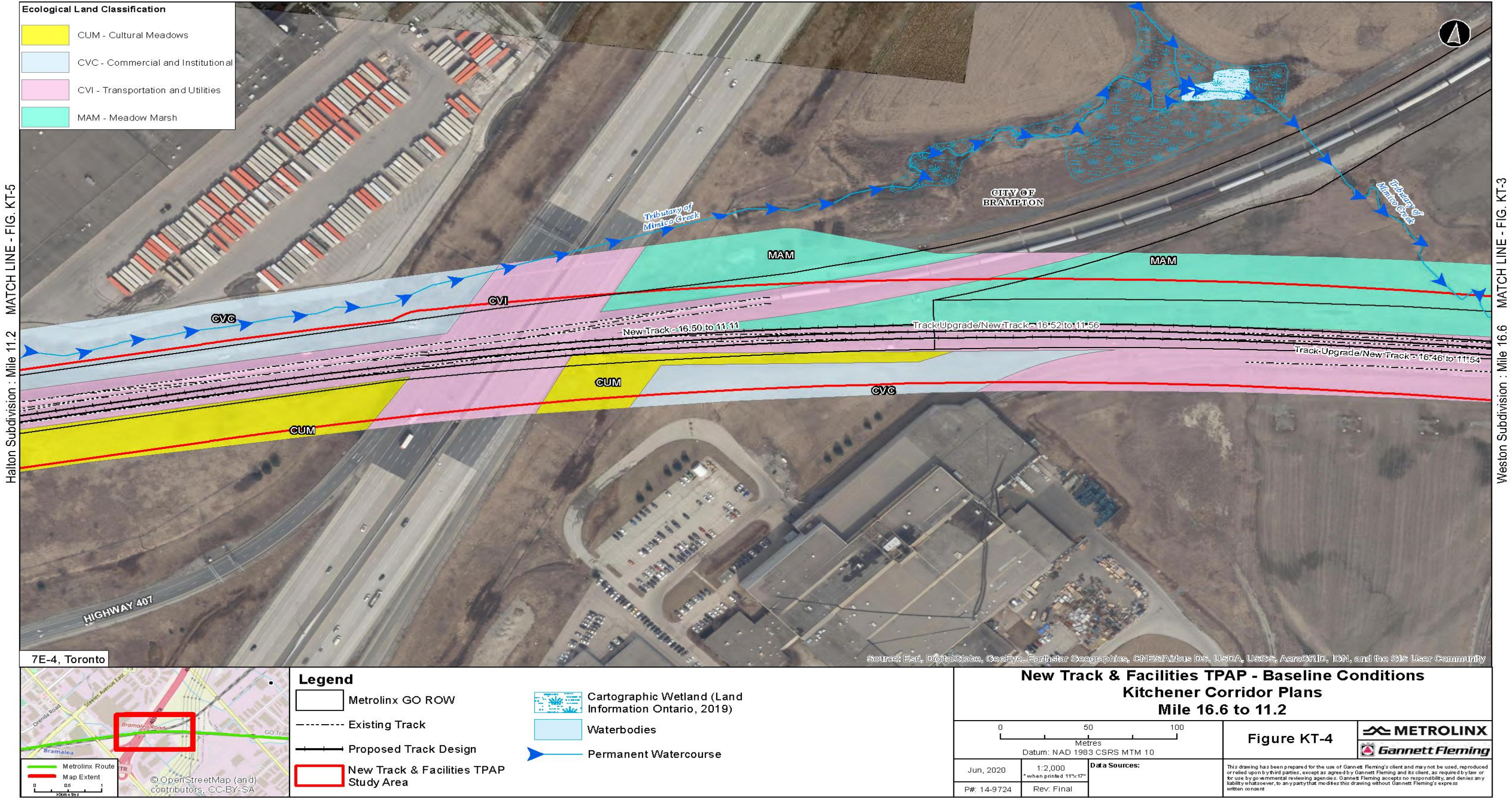


FIGURE 4-11 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT KT-4 – MILE 16.60 TO 11.20



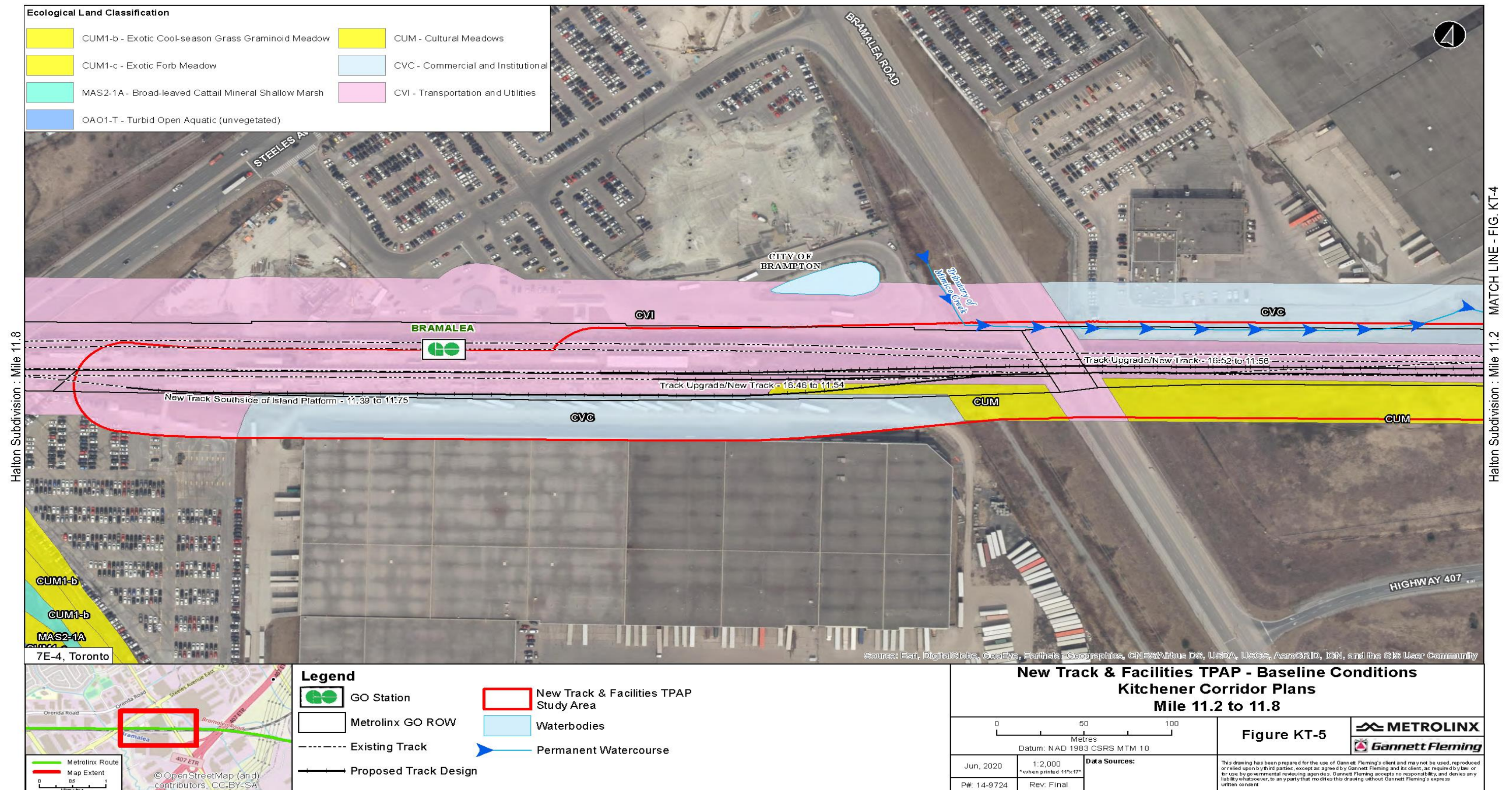


FIGURE 4-12 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT KT-5 - MILE 11.20 TO MILE 11.80



#### 4.5.2 Hydrogeology

Three study area segments, KT-2, KT-3 and KT-4 have watercourse crossings and unevaluated wetlands associated with the Mimico Creek riparian valley. The main branch of Mimico Creek, located within KT-2, has an east-southeast flow direction with permanent flow. A minor tributary of Mimico Creek is located within KT-3 and KT-4 with intermittent flow in easterly, northerly and southerly directions, depending on the tributary section. Mimico Creek and its tributaries are CRA fisheries, providing warmwater habitat.

Watersheds within the Kitchener corridor are summarized in Table 4-13, and a detailed description of them are provided in the sections that follow.

TABLE 4-13 SUMMARY OF WATERSHEDS FOR THE KITCHENER STUDY AREA SEGMENTS

NTF TPAP Study Area Segment		Watershed
<b>Kitchener Corridor (KT)</b>		
KT-1	Mile 12.90 to Mile 13.40	Mimico Creek
KT-2	Mile 13.40 to Mile 13.90	Mimico Creek
KT-3	Mile 16.10 to Mile 16.60	Mimico Creek
KT-4	Mile 16.60 to Mile 11.20 (Weston/Halton Subdivision)	Mimico Creek
KT-5	Mile 11.20 to Mile 11.80	Mimico Creek

All Projects segments within the Lakeshore West rail corridor are associated with the Peel Plain Physiography Region, which covers 300 square miles across the Regional Municipalities of York, Peel, and Halton. The plain consists of the underlying till with shale and limestone at depth, and deep beds of stone free clay at surface. The clay is assumed to be brought on by meltwater flowing to the east and north and by a temporary lake that formed between the ice lobe in the Ontario basin and higher elevation lands.

No segments within the Kitchener corridor are located in wellhead protection areas or intake protection zones, meaning groundwater and surface water resources in these areas are not as sensitive to chemical or pathogen contamination.

Refer to the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1** for MECP water well records for areas adjacent to the Kitchener rail corridor ROW.

##### 4.5.2.1 Track Segment KT-1 – Mile 12.90 to Mile 13.40

This segment is located in the Mimico Creek sub-watershed. Water within the Mimico Creek sub-watershed originates from the south slopes of the Oak Ridges Moraine (ORM) and flows to Lake Ontario. The drainage area covers approximately 77 km<sup>2</sup> and is essentially fully developed, with 30% of the land either commercial or industrial land uses. Mimico Creek is the primary water body within the watershed, with mean stream flows of approximately 25 Mm<sup>3</sup>/yr. However, unlike other watersheds in the area, the Mimico Creek Watershed is not highly supported by baseflow from the ORM, primarily due to the low permeability glacial till soils it crosses. The TRCA has indicated that “a general conclusion regarding water quality in the Etobicoke and Mimico Creeks watersheds is that water quality issues are correlated to the amount of urbanization within a watershed”. Surface water quality has remained consistent over the past few years, with metals and conventional parameter concentrations generally meeting guideline targets. As with most watersheds, chloride is the exception with a trend of increasing concentrations.

Additional details are found in the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1**.

#### 4.5.2.2 Track Segment KT-2 – Mile 13.40 to Mile 13.90

Refer to Section 4.3.2.1 which describes baseline hydrogeologic conditions for Segment KT-2.

#### 4.5.2.3 Track Segment KT-3 – Mile 16.10 to Mile 16.60

Refer to Section 4.3.2.1 which describes baseline hydrogeologic conditions for Segment KT-3.

#### 4.5.2.4 Track Segment KT-4 – Mile 16.60 to Mile 11.20

Refer to Section 4.3.2.1 which describes baseline hydrogeologic conditions for Segment KT-4.

#### 4.5.2.5 Track Segment KT-5 – Mile 11.20 to Mile 11.80

Refer to Section 4.3.2.1 which describes baseline hydrogeologic conditions for Segment KT-5.

### 4.5.3 Land Use and Socio-Economic

#### 4.5.3.1 Track Segment KT-1 – Mile 12.90 to Mile 13.40

##### Existing Land Use

There are no trails, large parks or other recreational amenities along this segment of the rail corridor. There are also no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation under City of Toronto Zoning By-law 569-2013.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this section of the rail corridor. There is a draft plan of subdivision approximately 250 metres north of the rail corridor, which is intended to be used as an entertainment complex. Any future development will comply with the land use designations. There are no further recreational amenities planned in the vicinity of the rail corridor at this location.

#### 4.5.3.2 Track Segment KT-2 – Mile 13.40 to Mile 13.90

##### Existing Land Use

There are no trails, large parks or other recreational amenities along this segment of the rail corridor. There are also no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

The rail corridor at this location does not have any zoning designation under City of Mississauga Zoning By-law 0225-2007.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent this segment of the rail corridor. Any future development will comply with the land use designations. There are also no planned recreational amenities in the vicinity of the rail corridor.

#### 4.5.3.3 Track Segment KT-3 – Mile 16.10 to Mile 16.60

##### Existing Land Use

This is an industrial area and there are no trails, large parks or other recreational amenities along this segment of the rail corridor. There are similarly no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This section of the rail corridor is zoned for Public Ownership and Utilities under City of Brampton Zoning By-law 270-2004. There is no zoning designation for the rail corridor within the City of Mississauga.

#### Planned Land Use

All lands located within the City of Brampton are classified under Secondary Plans. Segment KT-3 passes through the Parkway Belt West Industrial Area Secondary Plan, which envisions the area as a high quality and efficient industrial/commercial sector, with a portion of the lands to maintain its multi-purpose utility and transportation uses.

There are no Secondary Plans affecting City of Mississauga lands adjacent to the rail corridor. Any future development within Mississauga will comply with the land use designations.

There are no planned recreational amenities in the vicinity of the rail corridor (both in Brampton and in Mississauga).

#### 4.5.3.4 Track Segment KT-4 – Mile 16.60 to Mile 11.20

#### Existing Land Use

This is an industrial area and there are no trails, large parks or other recreational amenities along this segment of the rail corridor. There are also no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Public Ownership and Utilities under City of Brampton Zoning By-law 270-2004.

#### Planned Land Use

All lands located within the City of Brampton are classified under Secondary Plans. Segment KT-13 passes through the Parkway Belt Industrial Secondary Plan area and the Highway 410 and Steeles Secondary Plan area. The primary goal of the Highway 410 and Steeles Secondary Plan policy guidelines are to promote the industrial, commercial and institutional development of the subject lands.

There are no proposed recreational amenities in the vicinity of the rail corridor according to the City of Brampton's Parks and Recreation Master Plan. The City has recommended that additional studies be undertaken to determine the need for potential upgrades at existing community centres.

#### 4.5.3.5 Track Segment KT-5 – Mile 11.20 to Mile 11.80

#### Existing Land Use

A pedestrian walkway/sidewalk and cycling lane run along Steeles Avenue East, north of the rail corridor. No additional recreational amenities exist along this segment of the rail corridor. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Public Ownership and Utilities under City of Brampton Zoning By-law 270-2004.

#### Planned Land Use

Segment KT-5, like segment KT-4, passes through the Parkway Belt Industrial Secondary Plan area and the Highway 410 and Steeles Secondary Plan area. There are no planned recreational amenities within 100 metres of the rail corridor.

#### 4.5.4 Cultural Heritage

##### 4.5.4.1 Track Segment KT-1 – Mile 12.90 to Mile 13.40

The study area within this segment was previously assessed for cultural heritage resources within:

- UP Express Electrification EA Cultural Heritage Assessment Report (Morrison Hershfield 2014)



- Existing Conditions and Impact Assessment Report, Transit Project Assessment Process: Georgetown South Service Expansion and Union-Pearson Rail Link, City of Toronto, City of Mississauga and City of Brampton, Ontario (Unterman McPhail Associates 2009)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.5.4.2 Track Segment KT-2 – Mile 13.40 to Mile 13.90

The study area within this segment was previously assessed for cultural heritage resources within:

- UP Express Electrification EA Cultural Heritage Assessment Report (Morrison Hershfield 2014)
- Existing Conditions and Impact Assessment Report, Transit Project Assessment Process: Georgetown South Service Expansion and Union-Pearson Rail Link, City of Toronto, City of Mississauga and City of Brampton, Ontario (Unterman McPhail Associates 2009)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.5.4.3 Track Segment KT-3 – Mile 16.10 to Mile 16.60

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.5.4.4 Track Segment KT-4 – Mile 16.60 to Mile 11.20

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.5.4.5 Track Segment KT-5 – Mile 11.20 to Mile 11.80

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.5.5 Archaeology

For the detailed historical and archaeological context of the Kitchener Corridor, please refer to the *Metrolinx NTF TPAP Archaeology – Baseline Conditions Report*, (**Appendix G1**). A summary of the historical and archaeological context for affected segments of the Kitchener Corridor is provided below.

##### 4.5.5.1 Track Segment KT-1 – Mile 12.90 to Mile 13.40

Segment KT-1 is located between Highway 427 and Carlingview Drive in the City of Toronto. This area corresponds to lands within Treaty 13 and 13a, Etobicoke Township, and Borden block AkGv. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, and at least one previous report details fieldwork within 50 m of this segment, as described in **Appendix G1**.

Segment KT-1 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Humber River, Mimico Creek); and
- Early historic transportation routes (Martin Grove Road, Highway 27).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.5.5.2 Track Segment KT-2 – Mile 13.40 to Mile 13.90

Segment KT-2 is located between Goreway Drive and Highway 427 in the City of Mississauga. This area corresponds to lands within Treaty 13a, Toronto Gore Township, and Borden block AkGv. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, and at least one previous report details fieldwork within 50 m of this segment, as described in **Appendix G1**.

Segment KT-2 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Mimico Creek); and
- Early historic transportation routes (Goreway Dr.).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.5.5.3 Track Segment KT-3 – Mile 16.10 to Mile 16.60

Segment KT-3 is located between Highway 407 and Torbram Road in the City of Mississauga. This area corresponds to lands within Treaty 13a, Toronto Township, and Borden blocks AkGw and AkGv. Five previously registered archaeological sites are located within 1 km of the study area according to the OASD, and at least three previous reports detail fieldwork within 50 m of this segment, as described in **Appendix G1**.

Segment KT-3 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Mimico Creek);
- Early historic transportation routes (Torbram Road); and
- Proximity to early settlements (Malton).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.5.5.4 Track Segment KT-4 – Mile 16.60 to Mile 11.20

Segment KT-4 is located between Bramalea Road and Torbram Road the City of Mississauga. The area corresponds to lands within Treaty 13a, Toronto Township, and Borden block AkGw. Four previously registered archaeological sites are located within 1 km of the study area according to the OASD, and at least two previous reports detail fieldwork within 50 m of this segment, as described in **Appendix G1**.

Segment KT-4 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Etobicoke Creek, Mimico Creek);
- Early historic transportation routes (Steeles Ave. W., Bramalea Rd., Torbram Rd.); and
- Proximity to early settlements (Fraser's Corners).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.5.5.5 Track Segment KT-5 – Mile 11.20 to Mile 11.80

Segment KT-14 is located between Steeles Avenue East and east of Bramalea Road. This area corresponds to lands within Treaty 13a, Toronto Township, and Borden block AkGw. There are five previously registered archaeological sites within 1 km of the study area according to the OASD, and at least two previous reports detail fieldwork within 50 m of this segment. See **Appendix G1 – Archaeology Baseline Conditions Report** for additional information on this past fieldwork.

Segment KT-5 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Etobicoke Creek, Mimico Creek);
- Early historic transportation routes (Steeles Avenue West, Bramalea Road, Torbram Road); and
- Proximity to early settlements (Fraser's Corners).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.5.6 Visual/Aesthetics

##### 4.5.6.1 Track Segment KT-1 – Mile 12.90 to Mile 13.40

Segment KT-1 is located in Mississauga, traversing a primarily employment and industrial zone. The proposed tracks extend over Highway 427. There are two existing rail overpasses: one over Goreway Drive and another over a small creek that runs through Wildwood Park to the west. These rail structures are located in undeveloped, natural areas. The proposed track upgrades are to occur within the existing Metrolinx rail right-of-way, resulting in no vertical profile disturbance to the existing track bed. For these reasons, the visual baseline conditions are classified as *Negligible*. Figure 4-13 presents an aerial view of the proposed infrastructure in the vicinity of Goreway Drive.



FIGURE 4-13 AERIAL VIEW OF PROPOSED INFRASTRUCTURE NEAR GOREWAY DRIVE

#### 4.5.6.2 Track Segment KT-2 – Mile 13.40 to Mile 13.90

Refer to Section 4.3.6.1 above as baseline conditions are similar.

#### 4.5.6.3 Track Segment KT-3 – Mile 16.10 to Mile 16.60

This segment is located within the City of Brampton and consists primarily of industrial properties, with one small park/open space area on both sides of the rail corridor. A small waterway/ditch with wooded banks affords visual protection for the surrounding areas on the north side of the rail right-of-way. The proposed track upgrades lead to Bramalea GO Station, passing under Highway 407 and Bramalea Road. Bramalea GO Station has a large parking lot that abuts the rail corridor to the north. Passengers utilizing the station are not expected to experience any different views, as the track upgrades are proposed within the existing GO rail right-of-way, resulting in the existing visual baseline conditions to be classified as *Negligible*.

#### 4.5.6.4 Track Segment KT-4 – Mile 16.60 to Mile 11.20

Refer to Section 4.3.6.3 above as baseline conditions are similar.

#### 4.5.6.5 Track Segment KT-5 – Mile 11.20 to Mile 11.80

Refer to Section 4.3.6.3 above as baseline conditions are similar.

## 4.6 Baseline Conditions - Barrie Corridor

### 4.6.1 Natural Environment

The Barrie Corridor portion of the Project is in an urban and rural setting extending from York University to the rural landscape of Aurora, and then into Barrie ending within a residential area. A portion of the



Barrie Corridor is uniform in composition (agricultural) and cultivated fields dominate the landscape. Where natural features occur, they are generally associated with naturalized plantations, adjacent conservation areas, golf courses and riparian areas of the East Branch of the Holland River. These natural environments provide wildlife opportunities (e.g., habitat for songbirds) and have potential to support SAR. Several segments along the Barrie Corridor occur within the designated floodplain are associated with the Holland River.

SAR “generalists” with habitats that may occur anywhere or may change from year to year include: three species of Bats, Butternut, Nine-spotted lady Beetle and Monarch Butterfly which may occur throughout the Project study Area. These species are difficult to survey, and the occurrence of their potential habitat cannot be discounted. For these reasons, the following SAR “generalists” are considered to potentially occur within most Project study area segments.

SAR Bats include: Tri-colored Bat, Little Brown Myotis and Northern Myotis. Any tree (typically greater than 10 cm DBH) landscaped or naturally occurring as part of forested environments, hedgerows or planted along the rail corridor may be utilized as bat day roosts or possibly bat maternity roosts. Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fencelines, or grow within the tracks due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, the Nine-Spotted Lady Beetle or C9 is also a habitat generalist, typically found in areas with grassland, parkland, riparian areas, agricultural fields and other habitats where aphids (food source) is in abundance. In Ontario this species of insects is considered overlooked (individuals or small populations) with no occurrences reported after the 1990’s.

Candidate SWH occur across the Barrie Corridor portion of the Project study area. They are concentrated in areas where adjacent natural features (Conservation Areas) and the East Branch of the Holland River occur. Candidate habitats occur (edges only) and extend well beyond the Barrie Corridor portion of the Project study area. SWH candidate areas were identified within the Project study area during previous studies (Hatch, 2017).

Similar to SAR bat roost habitat, bat maternity colonies for non-SAR bats may occur where any tree (typically greater than 10 cm DBH) occur. This type of habitat is very difficult to evaluate and map and should not be discounted from potentially occurring within the corridor.

An overview of the baseline conditions for the Barrie Corridor is provided below.

#### 4.6.1.1 Track Segment BR-1 – Mile 12.10 to Mile 12.60

This segment of the Project study area occurs within the urbanized setting of the City of Toronto within Ecoregion 7E-4. Surrounding land use consists primarily of commercial and institutional uses. See Figure 4-14 for a depiction of the ecological land classification communities within this segment.

##### Wetlands

No wetland features are present within this segment of the Project study area.

##### Vegetation

A community of deciduous trees line the margins of the existing rail corridor through much of this segment. Hatch Ltd. describes this community as cultural woodland (CUW) in 2017.

### Wildlife

Hatch Ltd. performed targeted wildlife surveys for amphibians and breeding birds in June 2015. No amphibians were heard during any of the three rounds of surveying. The cultural woodland community along the existing rail corridor provides foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals.

No evidence of bat candidate maternity colonies or MNRF Area Sensitive bird species were identified.

### Aquatic Environment

No aquatic features are present within this segment of the Project study area.

### Species at Risk

No species at risk were observed within this segment of the Project study area during previous studies. An updated evaluation determined that SAR habitat is very limited within this segment of the Project study area (limited to SAR generalists, only).

### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies. An updated evaluation determined that candidate habitat is not expected within this segment of the Project study area.

### Designated Areas

No provincially or municipally designated features are present within this segment of the Project study area.



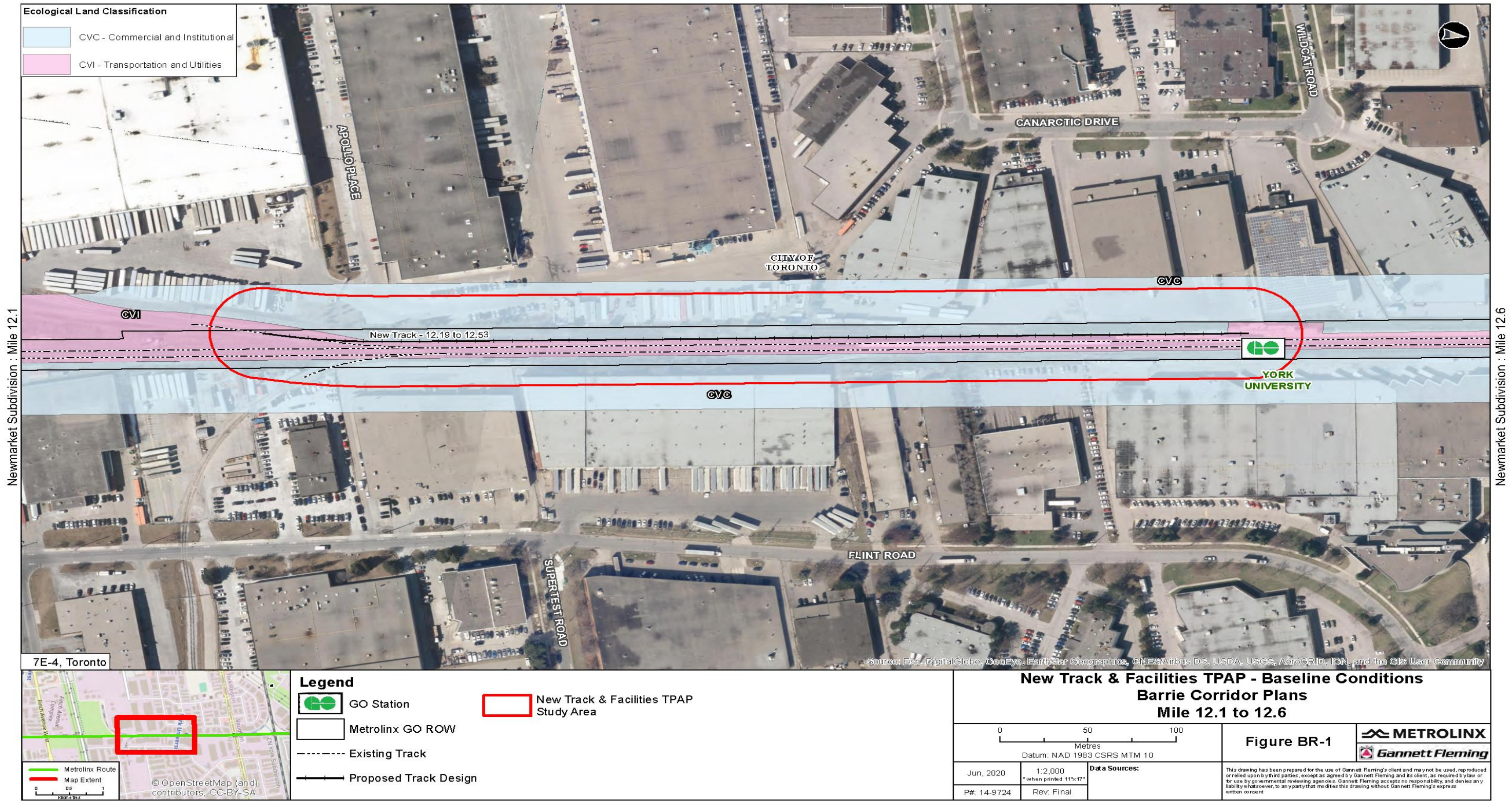


FIGURE 4-14 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-1 – MILE 12.10 TO MILE 12.60



#### 4.6.1.2 Track Segment BR-2 – Mile 29.50 to Mile 30.00

Segments BR-2 through BR-12 were assessed as a single unit because this area was subject to previous investigation during the Barrie Corridor Rail Expansion Project (which did not divide the rail corridor into discrete segments). Hence, these segments of the Project study area (Segments BR-2 – BR 12) occur within the urbanized setting of the Town of Aurora and the Town of Newmarket, within Ecoregion 6E-6. Surrounding land use is comprised of residential, recreational, open space, commercial and institutional uses. See Figure 4-15 through Figure 4-25 for a depiction of the ecological land classification communities within these segments.

##### Wetlands

Both Provincially Significant and unevaluated wetlands occur within these segments of the Project. The Mackenzie Marsh Wetland Complex is positioned in the mid-central portion of these segments. Several other wetland communities occur northward from this Provincially Significant Wetlands, including swamp (SW), shallow marsh (MAS), and meadow marsh (MAM), which are often associated with the riparian areas of the East Holland River tributaries.

##### Vegetation

Deciduous trees and shrubs line the margins of the existing rail corridor through much of these segments of the Project study area. North of St. John's Sideroad, many of these trees and shrubs are associated with larger natural features such as the Mackenzie Marsh Wetland Complex, Tannery Creek, and the East Holland River. Wesley Brooks and Mabel Davis Conservation Areas are associated with deciduous forests (FOD). In addition to the wetland communities discussed above, other commonly occurring vegetation communities include cultural meadow (CUM), cultural thicket (CUT) and cultural plantation (CUP).

##### Wildlife

Hatch Ltd. performed targeted wildlife surveys for amphibians and breeding birds throughout these segments of the Project study area in June 2015. Wood Frog, Green Tree Frog, and Green Frog were heard adjacent to the Mackenzie Marsh Wetland Complex. No frogs were recorded at the other 14 sampling stations throughout these segments of the Project. The breeding bird survey recorded American Redstart, Barn Swallow, and Savannah Sparrow in habitats suitable for these species.

The deciduous trees and shrubs along the existing rail corridor together with the variety of cultural vegetation communities, mature woodlands and riparian corridors, provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals.

##### Aquatic Environment

Tannery Creek, the East Holland River and two smaller tributaries of the East Holland River (Wesley Creek and Western Creek) occur within these segments of the Project study area. The East Holland River flows adjacent to the rail corridor along the entire northern portion of these segments, meandering in and out of the surrounding area several times and crossing the rail corridor twice.

The East Holland River system contains a diverse fish community ranging from cold headwater communities of Brook Trout and Mottled Sculpin, to warm water large order watercourses containing species such as Largemouth Bass (*Micropterus salmoides*) and Brown Bullhead. Occupied or recovery reaches for Redside Dace have been identified several kilometers downstream and well outside the Project study area in the area of Mile 24.84 and Mile 24.98.

According to the East Holland River Subwatershed Plan, Tannery Creek and two smaller tributaries of the East Holland River are permanently flowing watercourses with impaired water quality. Though no fish were reported through the subject reaches by Hatch, these three creeks likely provides direct fish habitat

for a variety of tolerant warmwater fish species. Table 4-14 provides a summary of existing fish and fish habitat conditions within segments BR-2 – BR-12.

TABLE 4-14 EXISTING FISH AND FISH HABITAT SUMMARY – SEGMENTS BR-2 – BR-12

Waterbody	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
Tannery Creek – BR-6	Permanent	Warmwater	Direct	Creek Chub, Brook stickleback, Fathead Minnow	Defined channel; flows alongside rail line upstream for ~170 m, barrier to fish movement upstream of culvert; flows to golf course.	None	July 1 to March 31
East Holland River – BR-8	Permanent	Warmwater	Direct	Diverse community including several cyprinids, Large Mouth Bass, Brown Bullhead, Pumpkinseed, and White Sucker	Highly channelized and hardened, flows subterranean upstream; gabion baskets along banks.	None	July 1 to March 31
Small Tributary of East Holland River (Wesley Creek) – BR-8	Permanent	Warmwater	Direct	Creek Chub, Brook stickleback, Fathead Minnow	Defined channel; evidence of erosion and high flows; flows from golf course to meadow and forest.	None	July 1 to March 31
East Holland River – BR-10	Permanent	Warmwater	Direct	Diverse community including several cyprinids, Large Mouth Bass, Brown Bullhead, Pumpkinseed, and White Sucker	Highly channelized and hardened, flows subterranean upstream; gabion baskets along banks.	None	July 1 to March 31
Small Tributary of East Holland River (Western Creek) – BR-11	Permanent	Warmwater	Direct	Common Shiner, Goldfish, Creek Chub and White Sucker	Defined channel; channelized and hardened downstream; stormwater runoff component; water quality appears poor; weir ~9 m downstream	None	July 1 to March 31

### Species at Risk

Barn Swallow was observed nesting in East Holland River culvert in the central portion of these segments of the Project study area by Hatch. No other SAR were identified through previous TPAP studies. An updated evaluation determined that Grasshopper Sparrow, Red-headed Woodpecker, Eastern Wood-pewee, Wood Thrush and Snapping Turtle have potential to occur based availability of suitable habitat. The proximity of the Holland River within these segments provide habitat for Snapping Turtles; whereby they could utilize the south slope embankments and/or gravel surfaces of the track bed for nesting. Woodland environments and parklands may provide affinities for avian SAR, especially near the main stem of the East Holland River, Mackenzie Marsh Wetland Complex, Baily Ecological Park Wesley Brook Conservation Area, and Mable Davis Conservation Area.

### Significant Wildlife Habitat

Several SWH candidate areas were identified within these segments of the Project study area during previous studies. An updated evaluation refined these SWH habitats to the current Project study area. The candidate SWH identified are associated with the Conservation Areas of Shepard's Bush, Aurora McKenzie Marsh Wetland Complex, Wesley Brook and Mable Davis, including riparian areas of the East Branch of the Holland River. It is important to note that all candidate areas identified are directly associated with these features due to the proximity of their boundary limits to the Project study area; thus, they are "edges only". In addition to bat roosts, candidate SWH include: Reptile Hibernaculum; Seeps and Springs; Terrestrial Crayfish; Amphibian Movement Corridors; Raptor Wintering Area (i.e., used for feeding and/or roosting); Turtle Wintering Areas; Provincially Rare S1, S2 and S3 vegetation communities; Waterfowl Nesting Area; 6E Raptor Nesting - Woodland Habitat 7E Raptor Nesting - Woodland Habitat; Turtles Nesting Habitat; Amphibian Breeding Habitat (Woodland); Woodland Area-Sensitive Bird Breeding Habitat; Marsh Bird Breeding Habitat; Open Country Bird Breeding Habitat; Shrub/Early Successional Bird Breeding Habitat and Special Concern and Rare Wildlife Species.

### Designated Areas

These segments of the Project study area (particularly the northern half) discontinuously passes through one provincially designated feature and several municipally designated features and conservation authority lands that abut the rail corridor. These features are also within designated Parks and Open Spaces.

- BR-2 - Sheppard's Bush Conservation Area and significant forest (southern terminus on the east side);
- BR-5 and BR-6 – Aurora [McKenzie] Marsh Wetland Complex and significant forests north of St. John's Sideroad. This same area is also within the municipally designated Town of Newmarket's Natural Heritage System.
- BR-8, BR-9 and BR-10 - Wesley Brooks Conservation Area (Mulock Drive to Water Street).

BR-11 and BR-12– Mabel Davis Conservation Area. This feature is located on the east side of the rail corridor, just outside the 30 m buffer that was utilized for natural environment assessment.



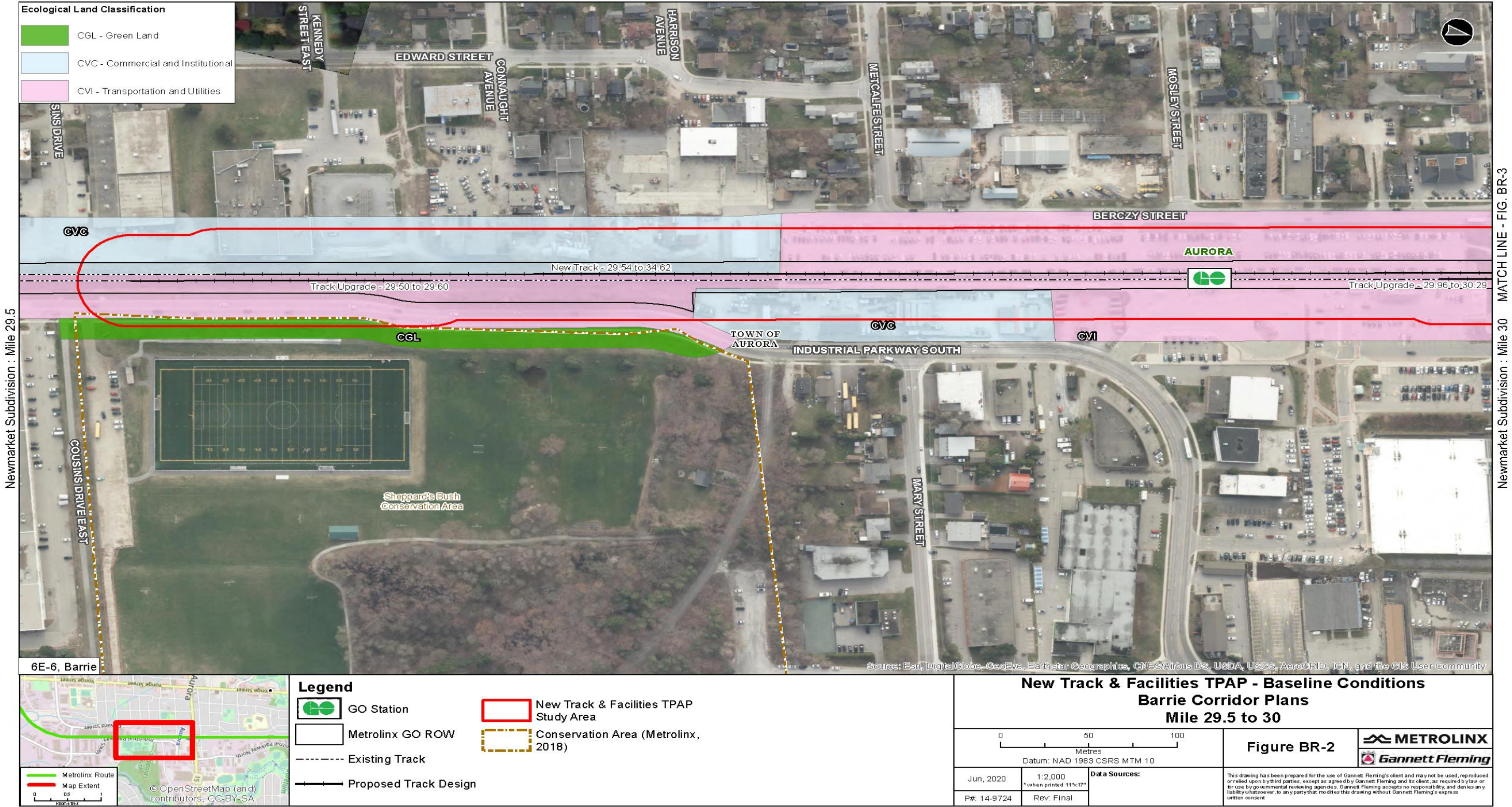


FIGURE 4-15 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-2 – MILE 29.50 TO MILE 30.00



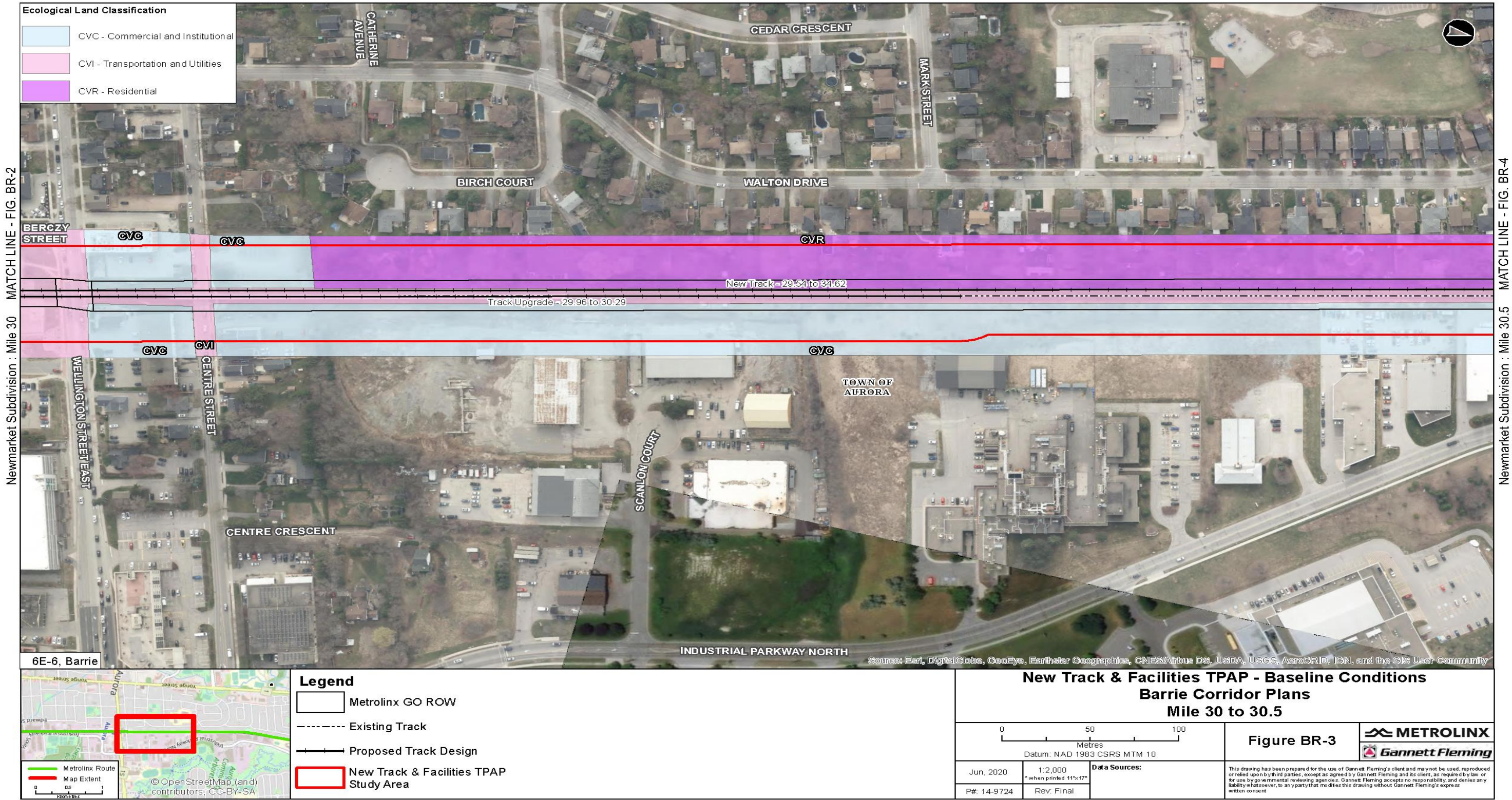


FIGURE 4-16 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-3 – MILE 30.00 TO MILE 30.50



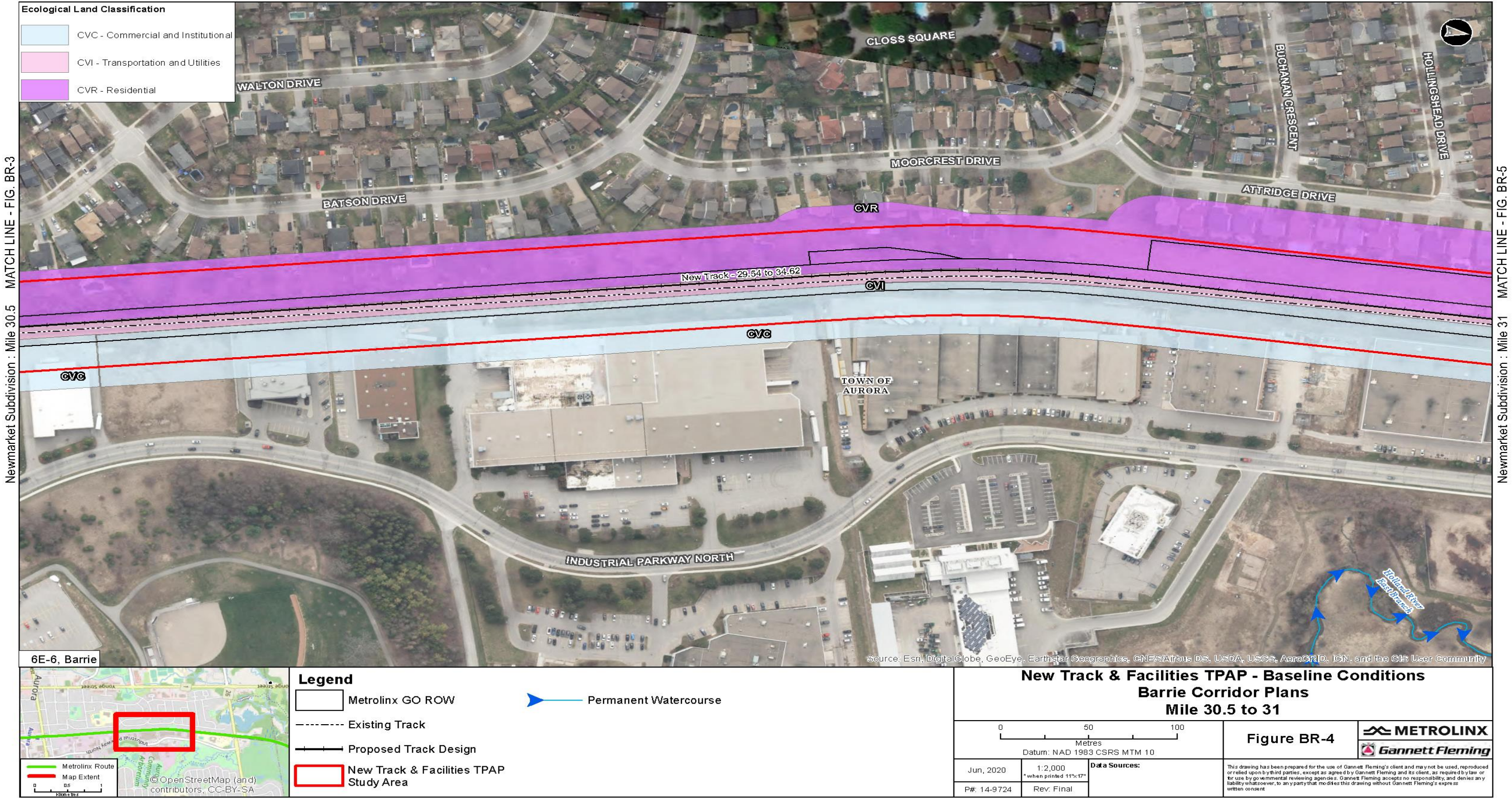


FIGURE 4-17 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-4 – MILE 30.50 TO MILE 31.00



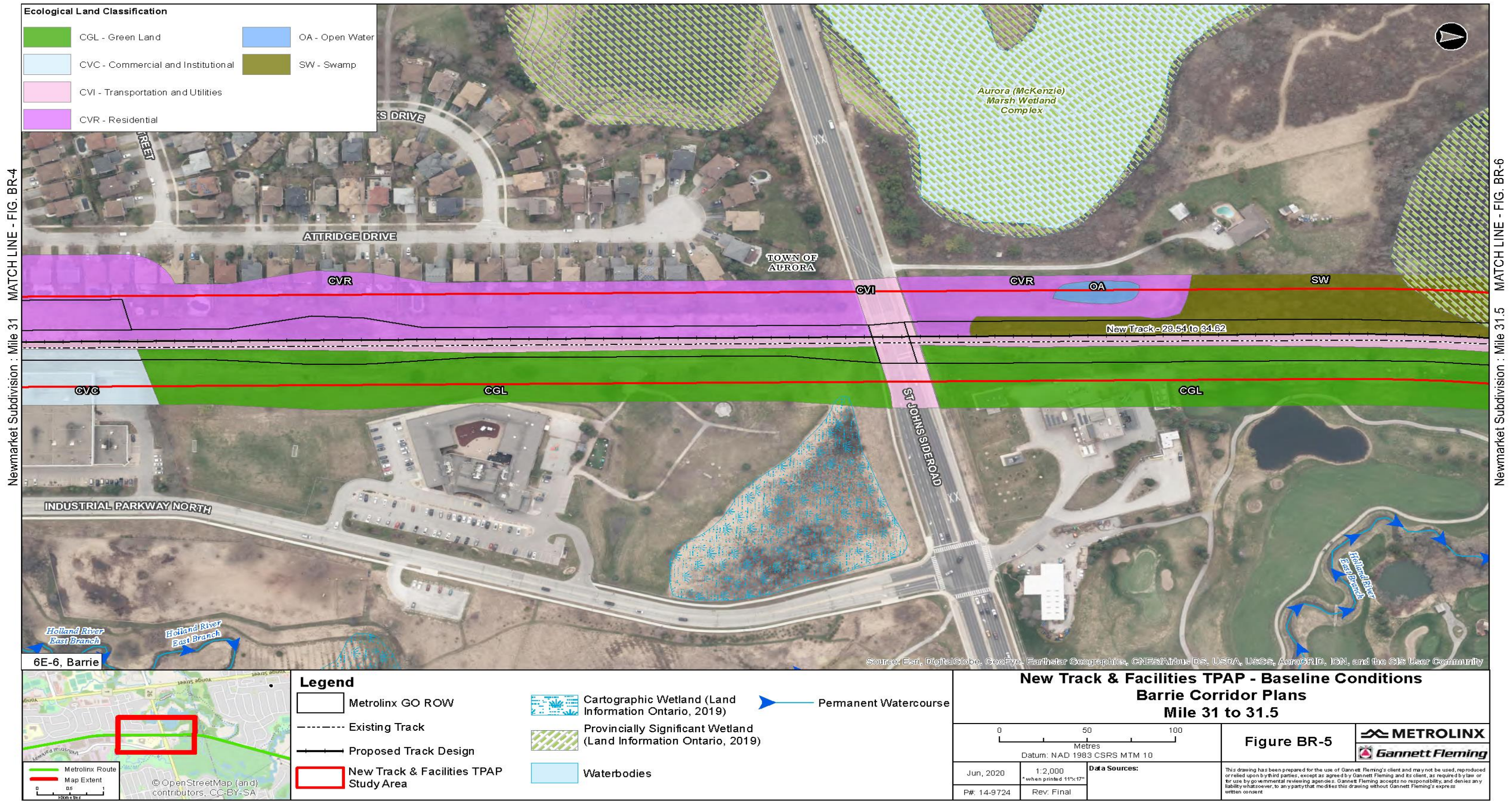


FIGURE 4-18 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-5 – MILE 31.00 TO MILE 31.50



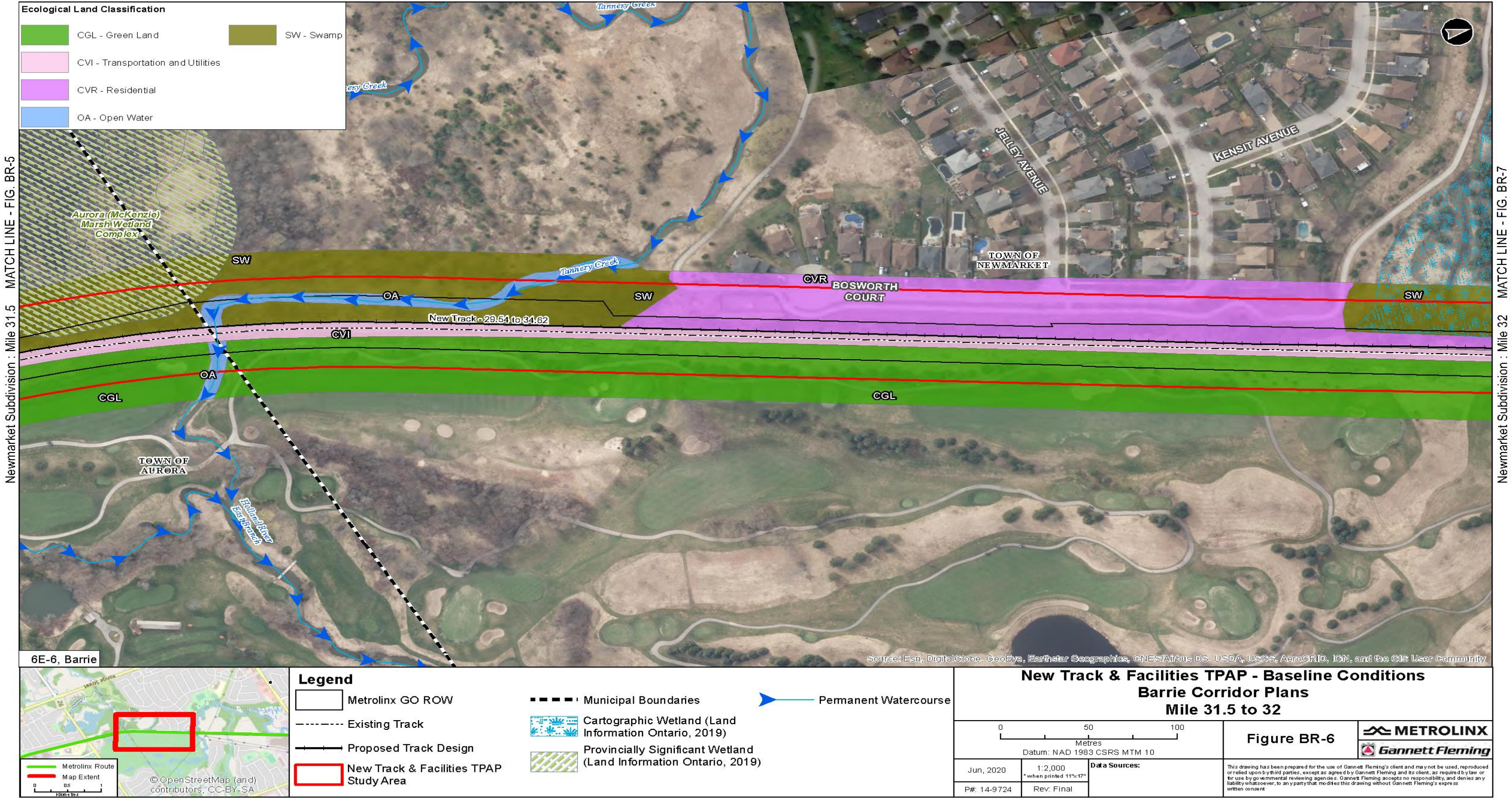


FIGURE 4-19 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-6 – MILE 31.50 TO MILE 32.00



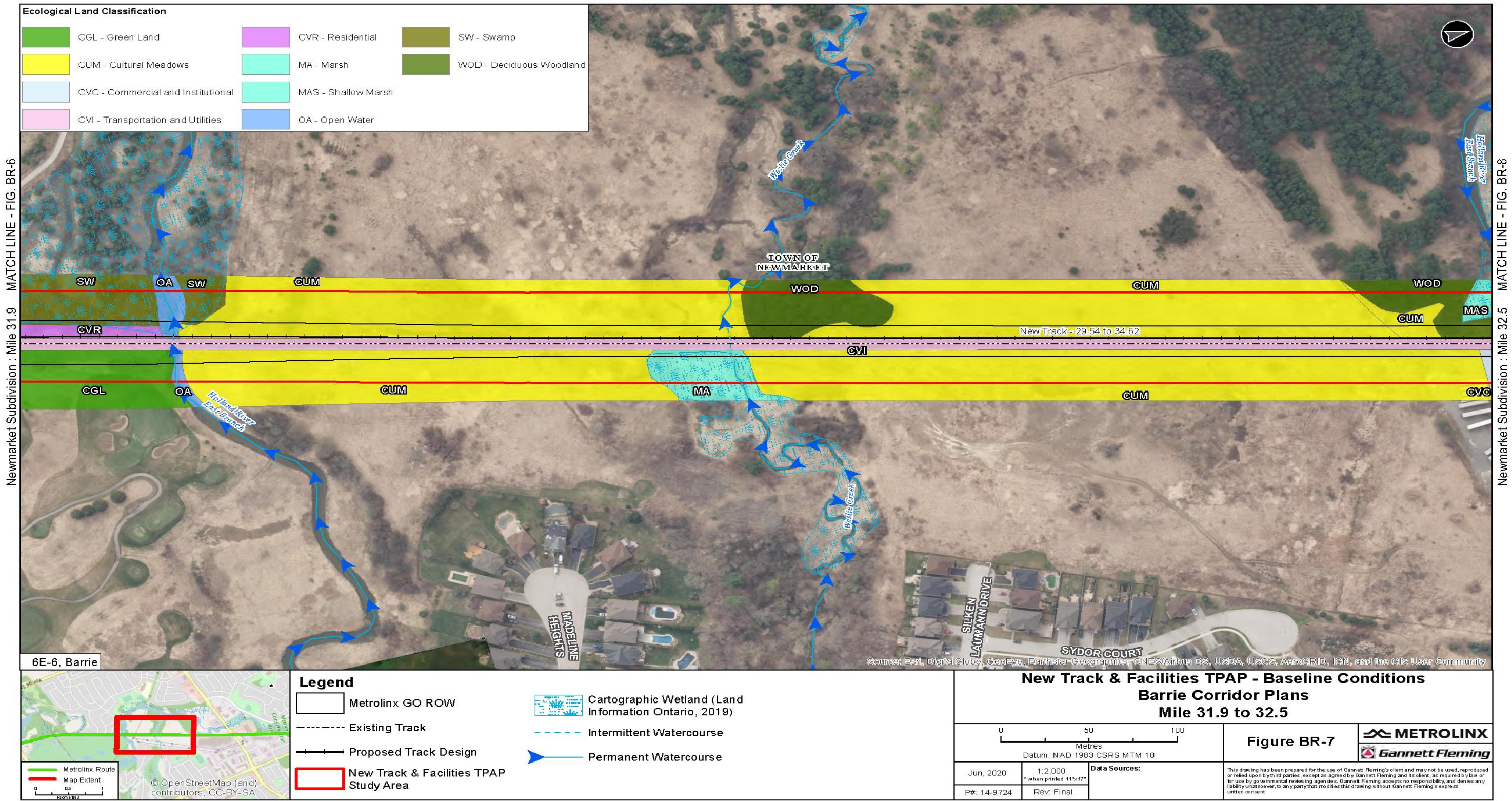


FIGURE 4-20 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-7 – MILE 31.90 TO MILE 32.50



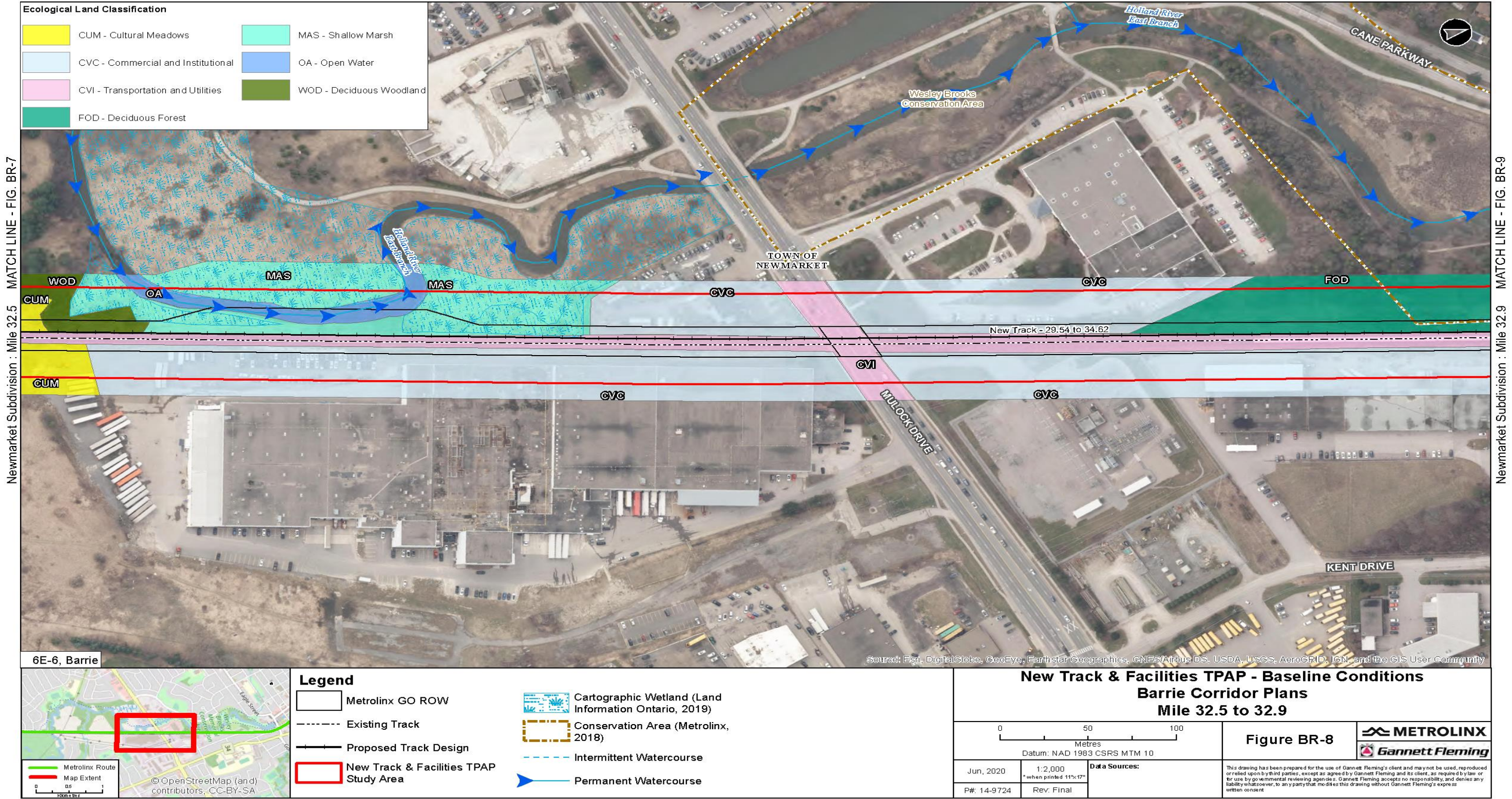


FIGURE 4-21 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-8 – MILE 32.50 TO MILE 32.90



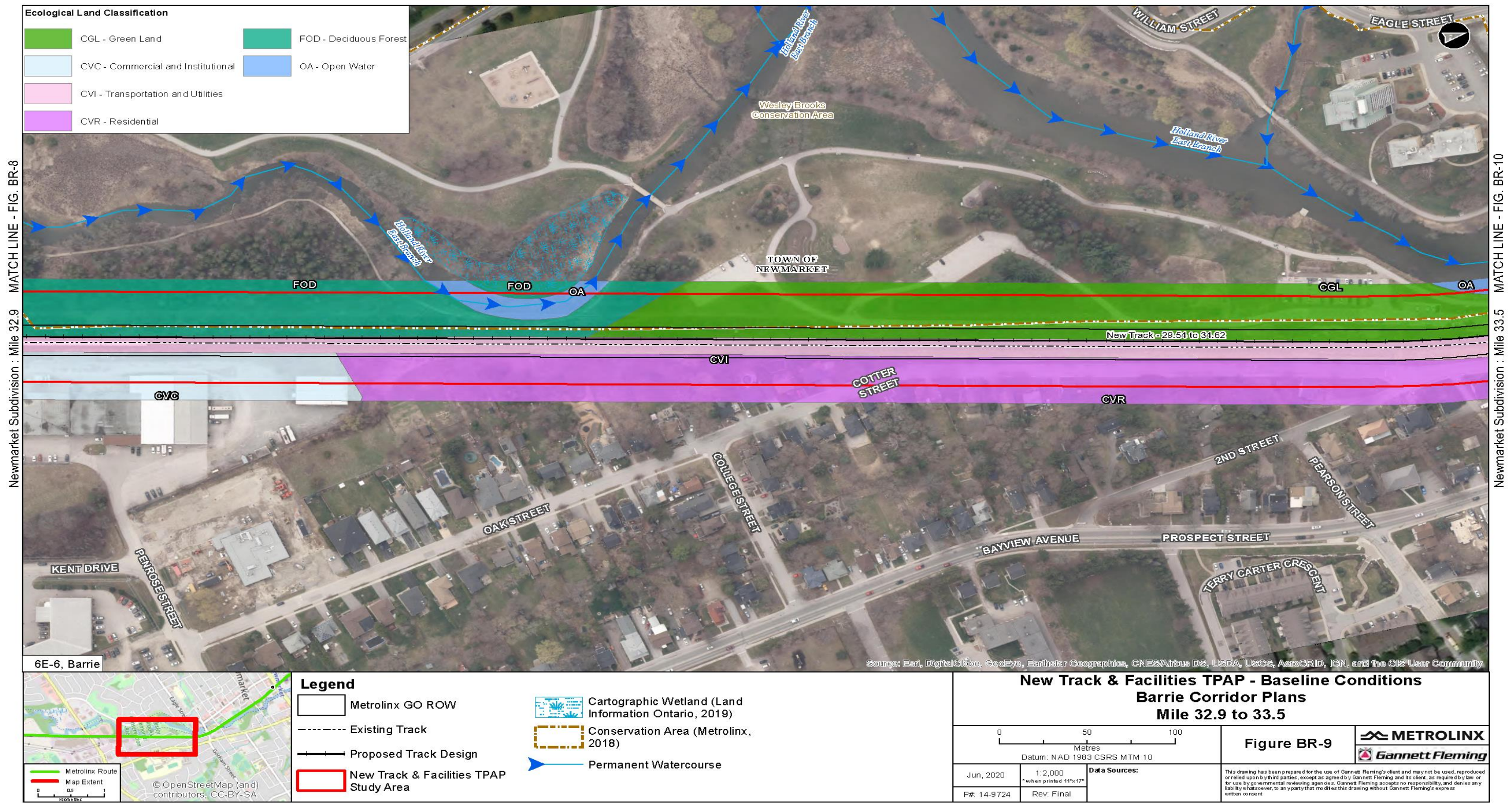


FIGURE 4-22 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-9 – MILE 32.90 TO MILE 33.50



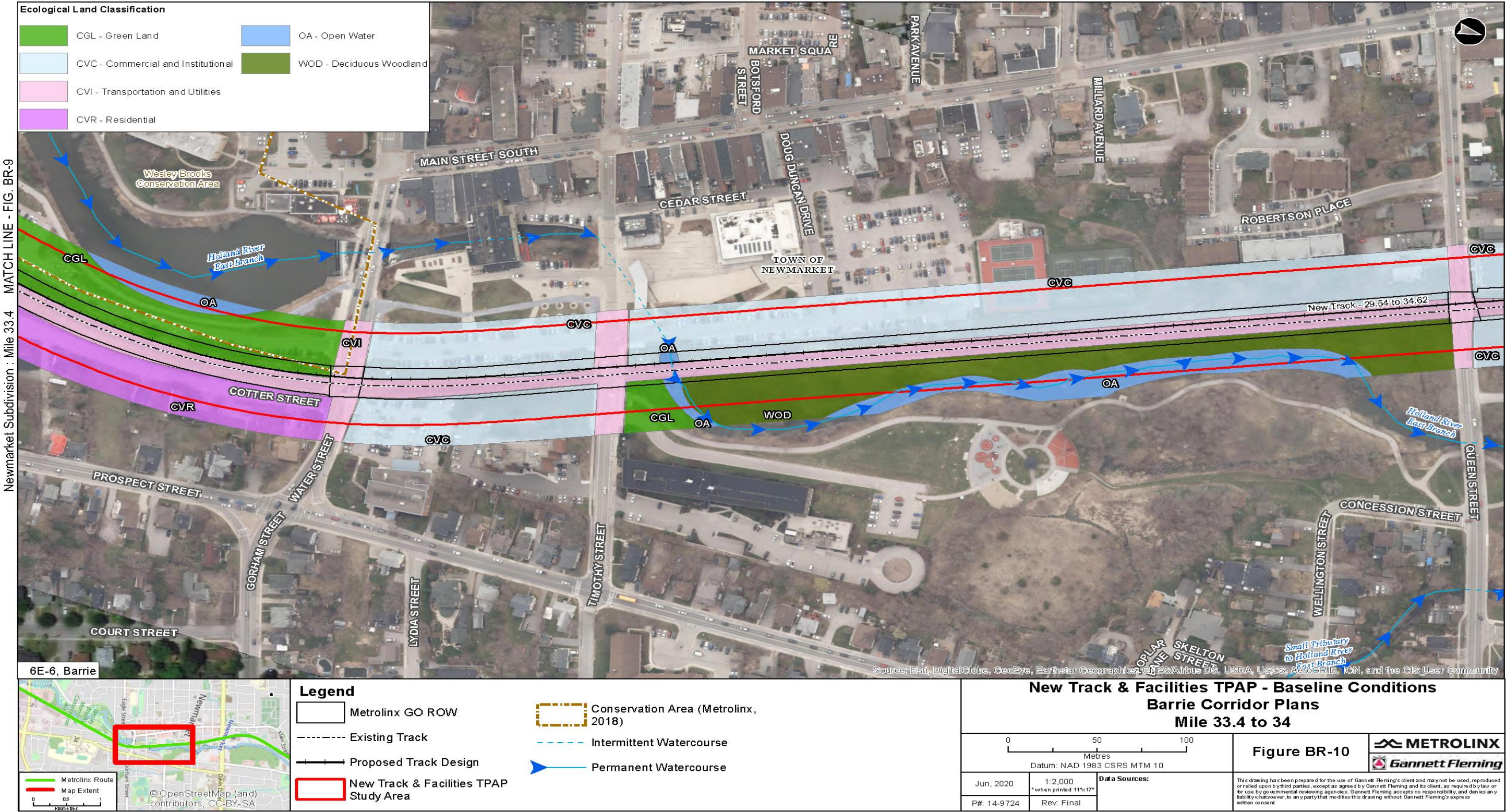


FIGURE 4-23 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-10 – MILE 33.40 TO MILE 34.00



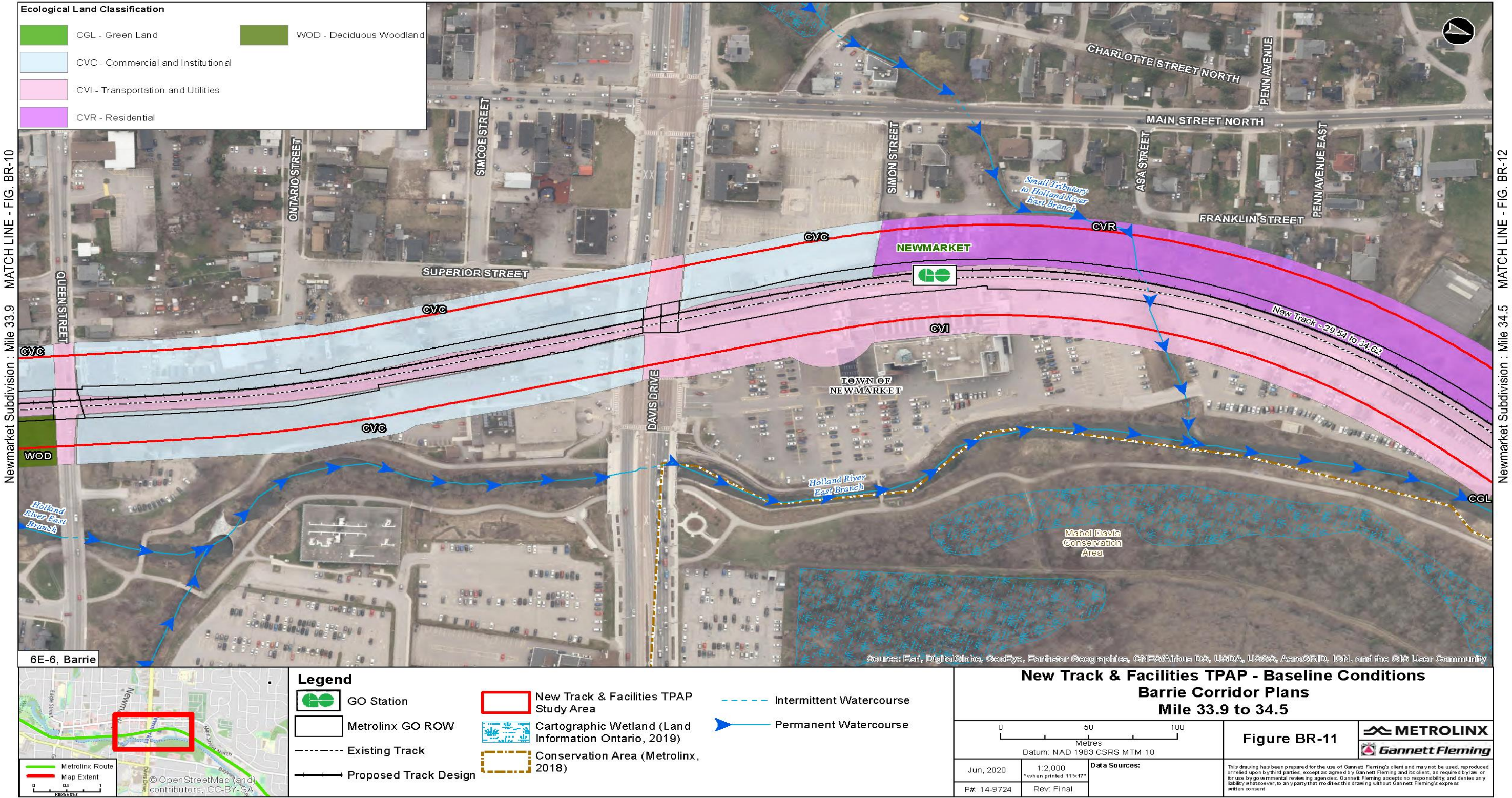


FIGURE 4-24 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-11 – MILE 33.90 TO MILE 34.50



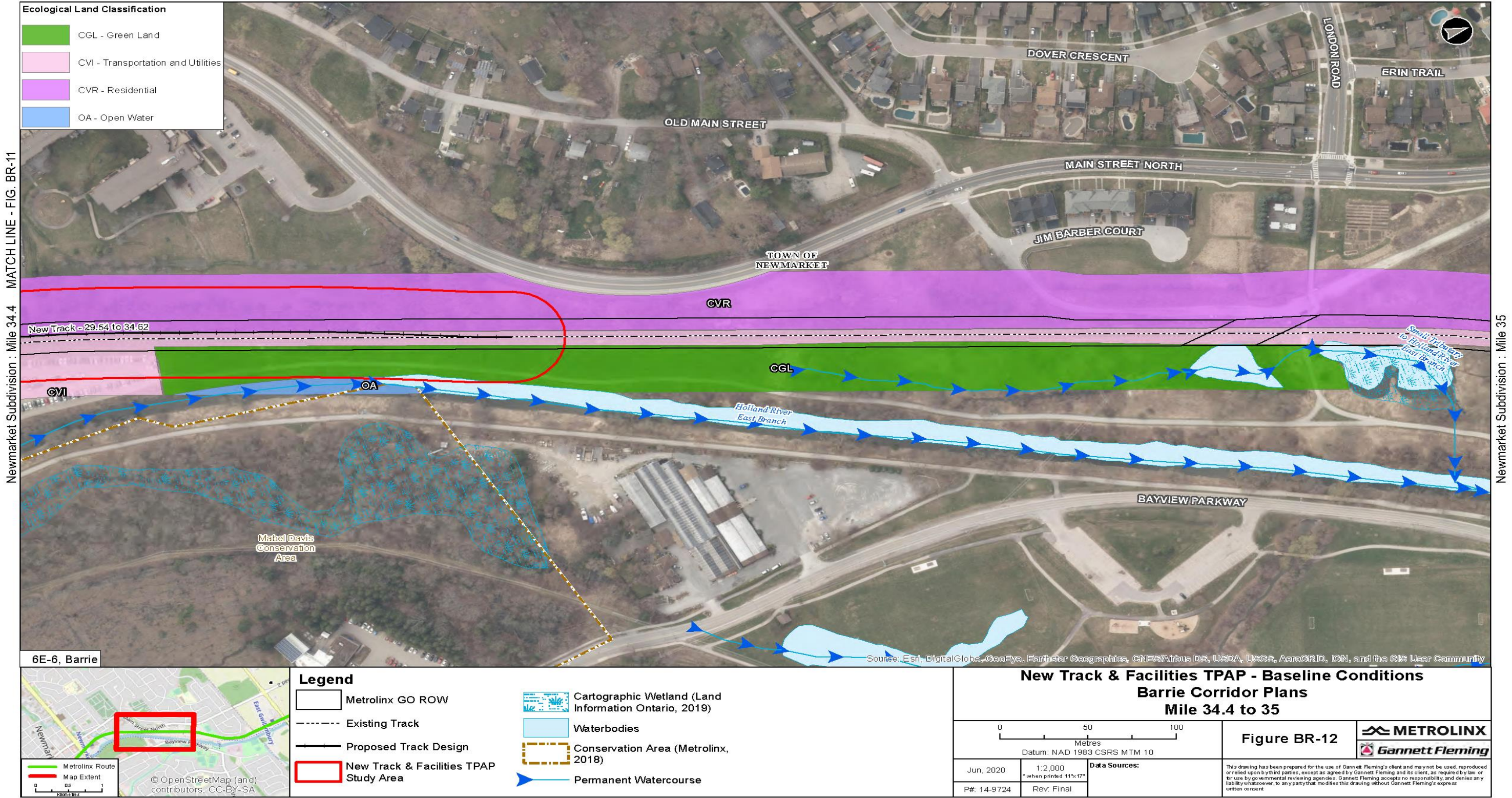


FIGURE 4-25 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-12 – MILE 34.50 TO MILE 35.00.



#### 4.6.1.3 Track Segment BR-3 – Mile 30.00 to Mile 30.50

This segment of the Project study area occurs within the urbanized setting of the Town of Aurora within Ecoregion 6E-6. Surrounding land use is comprised of residential, recreational, open space, commercial and institutional uses. See Figure 4-16 for a depiction of the ecological land classification communities.

##### Wetlands

No wetland features are present within this segment of the Project study area.

##### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area.

##### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds in June 2015. No amphibians or significant avian species were observed. The sporadically occurring deciduous trees along the existing rail corridor provide limited foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. No evidence of bat candidate maternity colonies or MNRF Area Sensitive bird species were identified.

##### Aquatic Environment

No aquatic features are present within this segment of the Project study area.

##### Species at Risk

No species at risk were observed within this segment of the Project study area during previous studies (Hatch Ltd., 2017). An updated evaluation determined that SAR habitat is very limited within this segment of the Project study area (SAR generalists).

##### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017). An updated evaluation determined that candidate habitat is not expected within this segment of the Project study area.

##### Designated Areas

No provincially or municipally designated features are present within this segment of the Project study area.

#### 4.6.1.4 Track Segment BR-4 – Mile 30.50 to Mile 31.00

This segment of the Project study area occurs within the urbanized setting of the Town of Aurora within Ecoregion 6E-6. Surrounding land use is comprised of residential, recreational, open space, commercial and institutional uses. See Figure 4-17 for a depiction of the ecological land classification communities.

##### Wetlands

No wetland features are present within this segment of the Project study area.

##### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area.



### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds in June 2015. No amphibians or significant avian species were observed. The sporadically occurring deciduous trees along the existing rail corridor provide limited foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. No evidence of bat candidate maternity colonies or MNRF Area Sensitive bird species were identified.

### Aquatic Environment

No aquatic features are present within this segment of the Project study area.

### Species at Risk

No species at risk were observed within this segment of the Project study area during previous studies (Hatch Ltd., 2017). An updated evaluation determined that SAR habitat is very limited within this segment of the Project study area (SAR generalists).

### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017). An updated evaluation determined that candidate habitat is not expected within this segment of the Project study area.

### Designated Areas

No provincially or municipally designated features are present within this segment of the Project study area.

#### 4.6.1.5 Track Segment BR-5 – Mile 31.00 to Mile 31.50

This segment of the Project study area occurs within the urbanized setting of the Town of Aurora within Ecoregion 6E-6. Surrounding land use is comprised of residential, recreational, open space, commercial and institutional uses. See Figure 4-18 for a depiction of the ecological land classification communities.

### Wetlands

Both Provincially Significant and unevaluated wetlands occur within this segment of the Project study area. The Mackenzie Marsh Wetland Complex is positioned to the west of this segment and encroaches into the study area limit near the northern terminus of this segment.

### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area.

### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds within this segment of the Project study area in June 2015. Wood Frog (*Lithobates sylvaticus*), Gray Tree Frog (*Hyla versicolor*), and Green Frog (*Lithobates clamitans*) were heard within the Mackenzie Marsh Wetland Complex. The breeding bird survey recorded American Redstart, Barn Swallow, and Savannah Sparrow in adjacent habitats suitable for these species.

The deciduous trees and shrubs along the existing rail corridor provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals.

### Aquatic Environment

No aquatic features are present within this segment of the Project study area.

### Species at Risk

One SAR species (Butternut) was identified within this segment of the Project study area (Burnside, 2017/ Morrison Hershfield, 2019). No other SAR were identified through previous TPAP studies. An updated evaluation determined that Eastern Wood-Pewee and Snapping Turtle have potential to occur based on availability of suitable habitat in Mackenzie Marsh Wetland Complex. The proximity of the Mackenzie Marsh Wetland Complex means the Project study area segment could be used by Snapping Turtles whereby they could utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

### Significant Wildlife Habitat

SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017) within the McKenzie Marsh Wetland Complex. In addition to bat roosts, candidate SWH include: Marsh Bird Breeding Habitat; Seeps and Springs; and Amphibian Movement Corridors. SWH habitats and criteria identified are outlined in **Appendix B1**. It is important to note that all candidate areas identified are directly associated with these features due to the proximity of their boundary limits to the Project study area, thus are “edges only”.

### Designated Areas

The provincially significant Mackenzie Marsh Wetland Complex is positioned to the west of this segment and encroaches into the study area limit near the northern terminus of this segment. This same area is also within the municipally designated Town of Newmarket's Natural Heritage System.

#### 4.6.1.6 Track Segment BR-6 – Mile 31.50 to Mile 32.00

This segment of the Project study area occurs within the urbanized setting of the Town of Aurora and the Town of Newmarket within Ecoregion 6E-6. Surrounding land use is comprised of residential, recreational and open space and includes a golf course and the Mackenzie Marsh Wetland Complex. See Figure 4-19 for a depiction of the ecological land classification communities.

### Wetlands

Both Provincially Significant and unevaluated wetlands occur within this segment of the Project study area. The Mackenzie Marsh Wetland Complex is positioned to the west of this segment and encroaches into the study area limit near the southern terminus of this segment.

### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area. Aside from the marsh communities of the Mackenzie Marsh Wetland Complex adjacent vegetation consists of treed swamp and thicket communities along the north central portion of this segment while manicured lawn of the golf course occurs along the mid-southern boundary.

### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds within this segment of the Project study area in June 2015. Wood Frog, Gray Tree Frog, and Green Frog were heard within the Mackenzie Marsh Wetland Complex. The breeding bird survey recorded American Redstart, Barn Swallow, and Savannah Sparrow in adjacent habitats suitable for these species.

The deciduous trees and shrubs along the existing rail corridor provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. More diverse habitat opportunities are afforded in the Mackenzie Marsh Wetland Complex, the Tannery Creek corridor and the swamp and thicket communities along the north central portion.



### Aquatic Environment

Tannery Creek a small tributary of the East Holland River crosses under this Project study area segment. Tannery Creek provides permanent warmwater fish habitat for common fish species including Creek Chub, Brook Stickleback and Fathead Minnow. The defined channel flows alongside rail line for approximately 170 m before passing through a culvert under the rail corridor toward the golf course. Hatch (2017) noted a barrier to fish movement upstream of culvert.

### Species at Risk

No SAR were identified through previous TPAP studies. An updated evaluation determined that Eastern Wood-Pewee and Snapping Turtle have potential to occur based availability of suitable habitat in the Mackenzie Marsh Wetland Complex. The proximity of the Mackenzie Marsh Wetland Complex and Tannery Creek means the Project study area segment could be used by Snapping Turtles whereby they could utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

### Significant Wildlife Habitat

SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017) within the McKenzie Marsh Wetland Complex. In addition to bat roosts, candidate SWH include: Marsh Bird Breeding Habitat; Seeps and Springs; and Amphibian Movement Corridors. SWH habitats and criteria identified are outlined in **Appendix B1**. It is important to note that all candidate areas identified are directly associated with these features due to the proximity of their boundary limits to the Project study area, thus are “edges only”.

### Designated Areas

The provincially significant Mackenzie Marsh Wetland Complex is positioned to the west of this segment and encroaches into the study area limit near the southern terminus of this segment. This same area is also within the municipally designated Town of Newmarket's Natural Heritage System.

#### 4.6.1.7 Track Segment BR-7 – Mile 32.00 to Mile 32.50

This segment of the Project study area occurs within the urbanized setting of the Town of Newmarket within Ecoregion 6E-6. Surrounding land use is comprised of open space and Environmental Protection including portions of a golf course and broad valley lands of the East Holland River. See Figure 4-20 for a depiction of the ecological land classification communities.

### Wetlands

Unevaluated wetlands including swamp (SW), shallow marsh (MA), and Meadow Marsh (MAM) communities occur within this Project study area segment. These features are often associated with the riparian area of the East Holland River its Wesley Creek tributary.

### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area. The dominant vegetation community through this segment is Cultural Meadow (CUM) in association with small portions of deciduous woodland, swamp and marsh communities of the East Holland River valley.

### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds along this Project study area segment in June 2015. No frogs were recorded through this segment. The breeding bird survey recorded American Redstart, Barn Swallow, and Savannah Sparrow in habitats suitable for these species.

The deciduous trees and shrubs along the existing rail corridor provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. More diverse habitat opportunities are afforded in the East Holland River corridor and the swamp, marsh and woodland within this segment.

#### Aquatic Environment

The East Holland River and its small tributary, Wesley Creek, occur within this Project study area segment. Both channels cross under the rail corridor through this segment.

The East Holland River system contains a diverse fish community ranging from cold headwater communities containing Brook Trout (*Salvelinus fontinalis*) and Mottled Sculpin (*Cottus bairdii*) to warmwater, large order watercourses containing species such as Largemouth Bass (*Micropterus salmoides*) and Brown Bullhead (*Ameiurus nebulosus*) (LSRCA 2010a). Occupied or recovery reaches for Redside Dace (*Clinostomus elongatus*) have been identified several kilometers downstream and well outside the Project study area in the area of Mile 24.84 and Mile 24.98 (Hatch, 2017).

According to the East Holland River Subwatershed Plan (LSRCA, 2010a), Wesley Creek is a permanently flowing watercourse with impaired water quality. Though no fish were reported through the subject reach of Wesley Creek by Hatch (2017), this creek likely provides direct fish habitat for a variety of tolerant warmwater fish species.

#### Species at Risk

Hatch (2017) observed Barn Swallows nesting in the East Holland River culverts within this Project study area. No other SAR were identified through previous TPAP studies. An updated evaluation determined that Grasshopper Sparrow (*Ammodramus savannarum*) and Snapping Turtle have potential to occur based on availability of suitable habitat. The proximity of the Holland River means the Project study area segment could be used by Snapping Turtles whereby they could utilize the south slope embankments and or gravel surfaces of the tracks for nesting. Cultural meadow environments and parklands may provide affinities for avian SAR especially near the main branches of the East Holland River.

#### Significant Wildlife Habitat

SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017). In addition to bat roosts, candidate SWH include: Marsh Bird Breeding Habitat; Seeps and Springs; Open Country Bird Breeding Habitat; Shrub/Early Successional Bird Breeding Habitat; Raptor Wintering Area (i.e., used for feeding and/or roosting); and Amphibian Movement Corridors. SWH habitats and criteria identified are outlined in **Appendix B1**. It is important to note that all candidate areas identified are directly associated with these features due to the proximity of their boundary limits to the Project study area, thus are “edges only”.

#### Designated Areas

No provincially or municipally designated features are present within this segment of the Project study area.

##### 4.6.1.8 Track Segment BR-8 – Mile 32.50 to Mile 32.90

This segment of the Project study area occurs within the urbanized setting of the Town of Newmarket within Ecoregion 6E-6. Surrounding land use is comprised of commercial and institutional and open space and Environmental Protection including the broad valley land of the East Holland River. See Figure 4-21 for a depiction of the ecological land classification communities.

#### Wetlands

Unevaluated wetlands including a riparian Shallow Marsh (MAS) community along the East Holland River occur within this Project study area segment.



### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area. The dominant vegetation community through this segment is MAS with small areas comprised of Cultural Meadow (CUM) and Deciduous Forest (FOD).

### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds along this Project study area segment in June 2015. No frogs were recorded through this segment. The breeding bird survey recorded American Redstart, Barn Swallow, and Savannah Sparrow in habitats suitable for these species.

The deciduous trees and shrubs along the existing rail corridor provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. More diverse habitat opportunities are afforded in the East Holland River corridor and the marsh and woodland within this segment.

### Aquatic Environment

The East Holland River flows adjacent to the existing rail corridor along the western boundary of this Project study area segment. No watercourse crossings exist in this segment.

The East Holland River system contains a diverse fish community ranging from cold headwater communities containing Brook Trout and Mottled Sculpin to warmwater, large order watercourses containing species such as Largemouth Bass and Brown Bullhead (LSRCA 2010a). Occupied or recovery reaches for Redside Dace have been identified several kilometers downstream and well outside the Project study area in the area of Mile 24.84 and Mile 24.98 (Hatch, 2017).

### Species at Risk

No SAR were identified through previous TPAP studies. An updated evaluation determined that Snapping Turtle has the potential to occur based on availability of suitable habitat. The proximity of the Holland River means the Project study area segment could be used by Snapping Turtles whereby they utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

### Significant Wildlife Habitat

SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017). In addition to bat roosts, candidate SWH include: Marsh Bird Breeding Habitat; Seeps and Springs; and Amphibian Movement Corridors. SWH habitats and criteria identified are outlined in **Appendix B1**. It is important to note that all candidate areas identified are directly associated with these features due to the proximity of their boundary limits to the Project study area, thus are “edges only”.

### Designated Areas

This Project study area segment occurs adjacent to the Deciduous Forest (FOD) community of the Wesley Brooks Conservation Area (Mulock Drive to Water Street) (See Figure 4-21).

#### 4.6.1.9 Track Segment BR-9 – Mile 32.90 to Mile 33.50

This segment of the Project study area occurs within the urbanized setting of the Town of Newmarket within Ecoregion 6E-6. Surrounding land use is comprised of commercial and institutional, residential and open space and Environmental Protection including the broad valley land of the East Holland River along the western boundary. See Figure 4-22 for a depiction of the ecological land classification communities.

### Wetlands

Unevaluated wetlands occur along the East Holland River occur within this Project study area segment.

### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area. The dominant vegetation community through this segment is Deciduous Forest (FOD) and open space Green Land (CGL) associated with the Wesley Brooks Conservation Area.

### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds along this Project study area segment in June 2015. No frogs were recorded through this segment. The breeding bird survey recorded American Redstart, Barn Swallow, and Savannah Sparrow in habitats suitable for these species.

The deciduous trees and shrubs along the existing rail corridor provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. More diverse habitat opportunities are afforded in the East Holland River corridor and the marsh and woodland within this segment.

### Aquatic Environment

The East Holland River flows adjacent to the existing rail corridor along the western boundary of this Project study area segment. No watercourse crossings exist in this segment.

The East Holland River system contains a diverse fish community ranging from cold headwater communities containing Brook Trout and Mottled Sculpin to warm water, large order watercourses containing species such as Largemouth Bass and Brown Bullhead (LSRCA 2010a). Occupied or recovery reaches for Redside Dace have been identified several kilometers downstream and well outside the Project study area in the area of Mile 24.84 and Mile 24.98 (Hatch, 2017).

### Species at Risk

No SAR were identified through previous TPAP studies. An updated evaluation determined that Red-headed Woodpecker, Eastern Wood-Pewee, Wood Thrush and Snapping Turtle have potential to occur based availability of suitable habitat. Snapping Turtle has potential to occur based on availability of suitable habitat. The proximity of the Holland River means the Project study area segment could be used by Snapping Turtles whereby they utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

### Significant Wildlife Habitat

SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017). In addition to bat roosts, candidate SWH include: Seeps and Springs; and Amphibian Movement Corridors. SWH habitats and criteria identified are outlined in **Appendix B1**. It is important to note that all candidate areas identified are directly associated with these features due to the proximity of their boundary limits to the Project study area, thus are “edges only”.

### Designated Areas

This Project study area segment occurs adjacent to the Deciduous Forest (FOD) community of the Wesley Brooks Conservation Area (see Figure 4-22).

#### 4.6.1.10 Track Segment BR-10 – Mile 33.50 to Mile 34.00

This segment of the Project study area occurs within the urbanized setting of the Town of Newmarket within Ecoregion 6E-6. Surrounding land use is comprised of commercial and institutional, residential



and Environmental Protection including the broad valley land of the East Holland River boarding both sides of the segment. See Figure 4-23 for a depiction of the ecological land classification communities.

### Wetlands

No wetland features are present within this segment of the Project study area.

### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area. The dominant vegetation community through this segment is Deciduous Forest (FOD) and open space Green Land (CGL) associated with the East Holland River Valley and the Wesley Brooks Conservation Area.

### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds along this Project study area segment in June 2015. No frogs were recorded through this segment. The breeding bird survey recorded American Redstart, Barn Swallow, and Savannah Sparrow in habitats suitable for these species.

The deciduous trees and shrubs along the existing rail corridor provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. More diverse habitat opportunities are afforded in the East Holland River corridor and the marsh and woodland within this segment.

### Aquatic Environment

The East Holland River flows adjacent to the existing rail corridor along the eastern and western boundary of this of Project study area segment. One watercourse crossing is present in the central portion of this segment.

The East Holland River system contains a diverse fish community ranging from cold headwater communities containing Brook Trout and Mottled Sculpin to warm water, large order watercourses containing species such as Largemouth Bass and Brown Bullhead (LSRCA 2010a). Occupied or recovery reaches for Redside Dace have been identified several kilometers downstream and well outside the Project study area in the area of Mile 24.84 and Mile 24.98 (Hatch, 2017).

### Species at Risk

No SAR were identified through previous TPAP studies. An updated evaluation determined that Red-headed Woodpecker, Eastern Wood-Pewee and Snapping Turtle have potential to occur based on availability of suitable habitat. The proximity of the Holland River means the Project study area segment could be used by Snapping Turtles whereby they utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

### Significant Wildlife Habitat

SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017). In addition to bat roosts, candidate SWH include: Seeps and Springs; and Amphibian Movement Corridors. SWH habitats and criteria identified are outlined in **Appendix B1**. It is important to note that all candidate areas identified are directly associated with these features due to the proximity of their boundary limits to the Project study area, thus are “edges only”.

### Designated Areas

This Project study area segment occurs adjacent to the Deciduous Forest (FOD) community of the Wesley Brooks Conservation Area (see Figure 4-23).

#### 4.6.1.11 Track Segment BR-11 – Mile 34.00 to Mile 34.50

This segment of the Project study area occurs within the urbanized setting of the Town of Newmarket within Ecoregion 6E-6. Surrounding land use is comprised of commercial and institutional and residential. See Figure 4-24 for a depiction of the ecological land classification communities.

##### Wetlands

No wetland features are present within this segment of the Project study area.

##### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area. Only a small portion of Deciduous Woodland (WOD) of the East Holland River valley occurs in the most southern portion of this segment.

##### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds along this Project study area segment in June 2015. No frogs were recorded through this segment. Suitable habitat for notable breeding birds observed during the survey do not exist in this Project study area segment.

The deciduous trees and shrubs along the existing rail corridor provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. More diverse habitat opportunities are afforded in the East Holland River corridor to the east of the Project study area segment.

##### Aquatic Environment

The East Holland River flows adjacent to the existing rail corridor along the eastern boundary of this Project study area segment. A small tributary to the East Holland River crossed under the existing rail corridor through this segment. This tributary provides permanent warmwater habitat for common urban tolerant fish species including Common Shiner, Goldfish, Creek Chub and White Sucker.

The East Holland River system contains a diverse fish community ranging from cold headwater communities containing Brook Trout and Mottled Sculpin to warmwater, large order watercourses containing species such as Largemouth Bass and Brown Bullhead (LSRCA 2010a). Occupied or recovery reaches for Redside Dace have been identified several kilometers downstream and well outside the Project study area in the area of Mile 24.84 and Mile 24.98 (Hatch, 2017).

##### Species at Risk

No SAR were identified through previous TPAP studies. An updated evaluation confirmed there is no suitable habitat for SAR in this Project study area segment, aside from the potential occurrence of Snapping Turtle. The proximity of the Holland River means the Project study area segment could be used by Snapping Turtles whereby they utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

##### Significant Wildlife Habitat

No candidate SWH areas were identified within these segments of the Project study area during previous studies (Hatch Ltd., 2017). An updated evaluation confirmed this, given the intense urbanized setting of this Project study area segment.

##### Designated Areas

No provincially designated features are present within this segment of the Project study area. The Mabel Davis Conservation Area occurs on the east side of the rail corridor just outside of the 30 m Project study area limits.



#### 4.6.1.12 Track Segment BR-12 – Mile 34.50 to Mile 34.90

This segment of the Project study area occurs within the urbanized setting of the Town of Newmarket within Ecoregion 6E-6. Surrounding land use is comprised of residential and open green lands and Environmental Protection associated with the East Holland River. See Figure 4-25 for a depiction of the ecological land classification communities.

##### Wetlands

No Provincially Significant Wetlands occur within this Project study area segment. One unevaluated wetland/pond occurs near the northern terminus of this segment in proximity to the East Holland River.

##### Vegetation

Sporadically occurring deciduous trees line the margins of the existing rail corridor through much of this segment of the Project study area. Riparian green land associated with the East Holland River valley occurs along the eastern boundary of this segment.

##### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds along this Project study area segment in June 2015. No frogs were recorded through this segment. Suitable habitat for notable breeding birds observed during the survey do not exist in this Project study area segment.

The deciduous trees and shrubs along the existing rail corridor provide foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals. More diverse habitat opportunities are afforded in the East Holland River corridor to the east of the Project study area segment.

##### Aquatic Environment

The East Holland River flows adjacent to the existing rail corridor along the eastern boundary of this Project study area segment. No watercourse crossings exist in this segment.

The East Holland River system contains a diverse fish community ranging from cold headwater communities containing Brook Trout and Mottled Sculpin to warm water, large order watercourses containing species such as Largemouth Bass and Brown Bullhead (LSRCA 2010a). Occupied or recovery reaches for Redside Dace have been identified several kilometers downstream and well outside the Project study area in the area of Mile 24.84 and Mile 24.98 (Hatch, 2017).

##### Species at Risk

No SAR were identified through previous TPAP studies. An updated evaluation determined that Eastern Wood-Pewee and Snapping Turtle have potential to occur based on availability of suitable habitat. The proximity of the Holland River means the Project study area segment could be used by Snapping Turtles whereby they utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

##### Significant Wildlife Habitat

SWH candidate or confirmed areas were identified within this segment of the Project study area during previous studies (Hatch Ltd., 2017). In addition to bat roosts, candidate SWH include: Seeps and Springs; and Amphibian Movement Corridors. SWH habitats and criteria identified are outlined in **Appendix B1**. It is important to note that all candidate areas identified are directly associated with these features due to the proximity of their boundary limits to the Project study area, thus are “edges only”.

### Designated Areas

No provincially designated features are present within this segment of the Project study area. The Mabel Davis Conservation Area occurs on the east side of the rail corridor just outside of the 30 metre Project study area limits.

#### 4.6.1.13 Track Segment BR-13 – Mile 61.30 to Mile 61.80

This segment of the Project study area occurs within the urban setting of the City of Barrie within Ecoregion 6E-6. Surrounding land use is comprised of low and medium rise residential, commercial and recreational waterfront uses. See Figure 4-26 for a depiction of the ecological land classification communities.

### Wetlands

No wetland features are present within this segment of the Project study area.

### Vegetation

Deciduous trees and shrubs line the margins of the rail corridor through the southern half of these segments, while few occur along the northerly third of the segments. Many of these trees and shrubs are associated with adjacent cultural vegetation communities including deciduous forests (FOD), cultural woodlands (CUW) and cultural thickets (CUT).

### Wildlife

Hatch Ltd. performed targeted wildlife surveys for amphibians and breeding birds throughout these segments of the Project study area in June 2015. No amphibians were recorded. Similarly, no avian species at risk or MNRF area sensitive species were recorded.

### Aquatic Environment

These segments of the Project study area traverse two primary watersheds of the Lake Simcoe Region Conservation Authority, including Lover's Creek and Barrie Creeks. Within these watersheds, the rail corridor crosses Whiskey Creek. No tributaries of Lover's creek are crossed within these segments of the Project study area.

Whiskey Creek is a permanent watercourse and is crossed by the rail corridor near the northernmost extent of segment BR-43. Morphology is a shallow riffle upstream before flowing subterranean for approximately 60 metres through the Project study area.

Whiskey Creek is an important coldwater contributor and migratory route to Lake Simcoe. Resident fish species identified in background sources by Hatch (2017) include Brook Trout, Mottled Sculpin, common dace species, White Sucker, Yellow Perch, and Black Crappie. Hatch also observed a permanent concrete barrier to fish movement in the upstream section beyond the rail corridor, restricting fish access to upstream habitat year-round. Table 4-15 provides a summary of existing fish and fish habitat within segments BR-42 – BR-45.



TABLE 4-15 EXISTING FISH AND FISH HABITAT SUMMARY – SEGMENTS BR-42 – BR-45

Waterbody	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
Whiskey Creek – BR-14	Permanent	Warmwater	Direct	Several cyprinids including Northern Redbelly Dace, Bluntnose Minnow, Eastern Blacknose Dace, Longnose Dace, and Central Mudminnow, Rock Bass, White Sucker	Wide, defined channel; very slow flow; shallow riffle upstream; barrier upstream; subterranean flow for 60 m through this segment of the Project study area.	None	July 1 to March 31

#### Species at Risk

No species at risk were observed within these segments of the Project study area during previous studies. An updated evaluation determined that Barn Swallow and Snapping Turtle have the potential to occur. Barn Swallow has the potential to be associated with anthropogenic structures (bridges/culverts buildings) within these segments of the Project study area. While this species was not observed in 2017, it may occur in the future based on availability of suitable habitat. Snapping Turtles may occur as suitable habitats are present within the general Project study area (creeks, SWM facilities), whereby they could utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

#### Significant Wildlife Habitat

SWH candidate areas were identified within these segments of the Project study area during previous studies. An updated evaluation determined that candidate SWH are extremely limited. There are no candidate habitats aside from potential bat roosts.

#### Designated Areas

There are no provincially or municipally designated features within this Project study area segment. The Deciduous Woodland Woodlands (WOD) adjacent to the rail corridor is within the municipally designated City of Barrie Natural Heritage System and Open Space.

##### 4.6.1.14 Track Segment BR-14 – Mile 61.80 to Mile 62.30

This segment of the Project study area occurs within the urban setting of the City of Barrie within Ecoregion 6E-6. Surrounding land use is comprised primarily of low rise residential, CVC, treed agriculture and some CVI. See Figure 4-27 for a depiction of the ecological land classification communities.

#### Wetlands

No Provincially Significant Wetlands occur within this segment of the Project study area. One unevaluated Shallow Marsh (MAS) wetland occurs adjacent to the corridor in the north portion of the segment. This feature appears to be a constructed stormwater management facility.

### Vegetation

Deciduous trees and shrubs line the margins of the existing rail corridor through this segment of the Project study area. Many of these trees and shrubs are associated with adjacent cultural vegetation communities including Treed Agriculture (TAG) communities and trees and shrubs associated with adjacent residential and commercial and institutional land uses. The rail corridor vegetation community is dominated by non-native grasses and common urban tolerant herbaceous plants.

### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds throughout Barrie Corridor within the Project study area in June 2015. No amphibians were recorded within segment BR-14. Similarly, no avian species at risk or MNRF area sensitive species were recorded within this segment of the Project study area.

### Aquatic Environment

Project study area segment BR-14 occurs within the Lake Simcoe subwatershed of Whiskey Creek. A main branch of Whiskey Creek crosses under the central portion of this Project study area segment. Channel morphology is a shallow riffle upstream before flowing subterranean for approximately 60 meters through the Project study area. Whiskey Creek is an important coldwater contributor and migratory route to Lake Simcoe. Resident fish species identified in background sources by Hatch (2017) include Brook Trout, Mottled Sculpin, common dace species, White Sucker, Yellow Perch (*Perca flavescens*), and Black Crappie (*Pomoxis nigromaculatus*). Hatch (2017) observed a permanent concrete barrier to fish movement in the upstream section beyond the rail corridor, restricting fish access to upstream habitat year-round.

### Species at Risk

No species at risk or MNRF area sensitive species were observed within this segment of the Project study area during previous studies (Hatch Ltd., 2017). An updated evaluation determined that Eastern Wood-Pewee and Red-headed Woodpecker have the potential to occur within the wooded ravine of Whiskey Creek and Barn Swallow and Snapping Turtle have the potential to occur in association with anthropogenic structures (bridges/culverts buildings and the rail ballast, respectively). Snapping Turtles may occur as suitable habitats are present within the general Project study area in proximity to creek corridors or SWM facilities whereby they could utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

SAR generalists with habitats that may occur anywhere, including three (3) species of bats, Butternut, and Monarch Butterfly, all may occur within this Project study area segment.

SAR bats (Tri-colored Bat, Little Brown Myotis and Northern Myotis) may use any tree (typically greater than 10 cm DBH) along the rail corridor as a bat day roost or possibly bat maternity roost. Butternut may occur within open edges, hedgerows and fencelines due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs including disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized.

### Significant Wildlife Habitat

Candidate SWH was evaluated along the Barrie Corridor, including this Project study area segment during previous studies (Hatch Ltd., 2017). An updated evaluation as part of this study determined that candidate SWH are extremely limited, primarily due to the proximity to the urbanized land uses within the City of Barrie. Candidate SWH is limited to potential bat roosts. SWH habitats and criteria identified are outlined in **Appendix B1**.



### Designated Areas

There are no provincially or municipally designated features within this Project study area segment. The wooded ravine of Whiskey Creek is within the municipally designated City of Barrie Natural Heritage System and Open Space.

#### 4.6.1.15 Track Segment BR-15 – Mile 62.30 to Mile 62.80

This segment of the Project study area occurs within the urban setting of the City of Barrie within Ecoregion 6E-6. Surrounding land use is comprised primarily of residential and CVI lands with some CVC and shallow marsh. See Figure 4-28 for a depiction of the ecological land classification communities.

### Terrestrial Environment

#### Wetlands

No Provincially Significant Wetlands occur within this segment of the Project study area. One unevaluated shallow marsh (MAS) wetland occurs adjacent to the corridor in the north portion of the segment. This feature appears to be a constructed stormwater management facility.

#### Vegetation

Deciduous trees and shrubs line the margins of the existing rail corridor through this segment of the Project study area. Many of these trees and shrubs are associated with adjacent cultural vegetation communities including trees and shrubs associated with adjacent residential and commercial and institutional land uses. The rail corridor vegetation community is dominated by non-native grasses and common urban tolerant herbaceous plants.

#### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds throughout Barrie Corridor within the Project study area in June 2015. No amphibians were recorded within segment BR-15. Similarly, no avian species at risk or MNRF area sensitive species were recorded within this segment of the Project study area.

### Aquatic Environment

Project study area segment BR-14 occurs within the Lake Simcoe sub-watersheds of Whiskey Creek and the collective Barrie Creeks. No tributaries of either of these sub-watersheds are crossed within this Project study area segment.

#### Species at Risk

No species at risk or MNRF area sensitive species were observed within this segment of the Project study area during previous studies (Hatch Ltd., 2017). An updated evaluation determined that Barn Swallow has the potential to occur in association with anthropogenic structures (bridges/culverts buildings) within this segment. While this species was not observed in 2017, it may occur in the future based on availability of suitable habitat.

SAR generalists with habitats that may occur anywhere, including three (3) species of bats, Butternut, and Monarch Butterfly, all may occur within this Project study area segment.

SAR bats (Tri-colored Bat, Little Brown Myotis and Northern Myotis) may use any tree (typically greater than 10 cm DBH) along the rail corridor as a bat day roost or possibly bat maternity roost. Butternut may occur within open edges, hedgerows and fence lines due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs including disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized.

### Significant Wildlife Habitat

Candidate SWH was evaluated along the Barrie Corridor, including this Project study area segment during previous studies (Hatch Ltd., 2017). An updated evaluation as part of this study determined that candidate SWH are extremely limited, primarily due to the proximity to the urbanized land uses within the City of Barrie. Candidate SWH is limited to potential bat roosts. SWH habitats and criteria identified are outlined in **Appendix B1**.

### Designated Areas

There are no provincially or municipally designated features within this Project study area segment. The Lake Simcoe waterfront park positioned east of this segment is part of the municipally designated City of Barrie Natural Heritage System and Open Space.

#### 4.6.1.16 Track Segment BR-16 – Mile 62.80 to Mile 63.40

This segment of the Project study area occurs within the urban setting of the City of Barrie within Ecoregion 6E-6. Surrounding land use is comprised of residential areas, CVI and CVC lands. See Figure 4-29 for a depiction of the ecological land classification communities.

### Wetlands

No Provincially Significant Wetlands occur within these segments of the Project study area.

### Vegetation

Deciduous trees and shrubs line the margins of the existing rail corridor through this segment of the Project study area. Many of these trees and shrubs are associated with adjacent cultural vegetation communities including trees and shrubs associated with adjacent residential and commercial and institutional land uses. The rail corridor vegetation community is dominated by non-native grasses and common urban tolerant herbaceous plants although these occur less than in the contiguous Project study area segments to the south due to the presence and operation of the Allandale Waterfront GO station. A small deciduous hedgerow occurs at the northern terminus of this segment.

### Wildlife

Hatch Ltd. (2017) performed targeted wildlife surveys for amphibians and breeding birds throughout Barrie Corridor within the Project study area in June 2015. No amphibians were recorded within segment BR-15. Similarly, no avian species at risk or MNRF area sensitive species were recorded within this segment of the Project study area.

### Aquatic Environment

Project study area segment BR-14 occurs within the Lake Simcoe sub-watershed of Barrie Creeks. No tributaries of either of this sub-watershed are crossed within this Project study area segment.

### Species at Risk

No species at risk or MNRF area sensitive species were observed within this segment of the Project study area during previous studies (Hatch Ltd., 2017). An updated evaluation determined that Barn Swallow has the potential to occur in association with anthropogenic structures (bridges/culverts buildings) within this segment. While this species was not observed in 2017, it may occur in the future based on availability of suitable habitat.

SAR generalists with habitats that may occur anywhere, including three (3) species of bats, Butternut, and Monarch Butterfly, all may occur within this Project study area segment.

SAR bats (Tri-colored Bat, Little Brown Myotis and Northern Myotis) may use any tree (typically greater than 10 cm DBH) along the rail corridor as a bat day roost or possibly bat maternity roost. Butternut may



occur within open edges, hedgerows and fence lines due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs including disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized.

#### Significant Wildlife Habitat

Candidate SWH was evaluated along the Barrie Corridor, including this Project study area segment during previous studies (Hatch Ltd., 2017). An updated evaluation as part of this study determined that candidate SWH are extremely limited, primarily due to the proximity to the urbanized land uses within the City of Barrie. Candidate SWH is limited to potential bat roosts. SWH habitats and criteria identified are outlined in **Appendix B1**.

#### Designated Areas

There are no provincially or municipally designated features within this Project study area segment. The Lake Simcoe waterfront park positioned east of this segment is part of the municipally designated City of Barrie Natural Heritage System and Open Space.



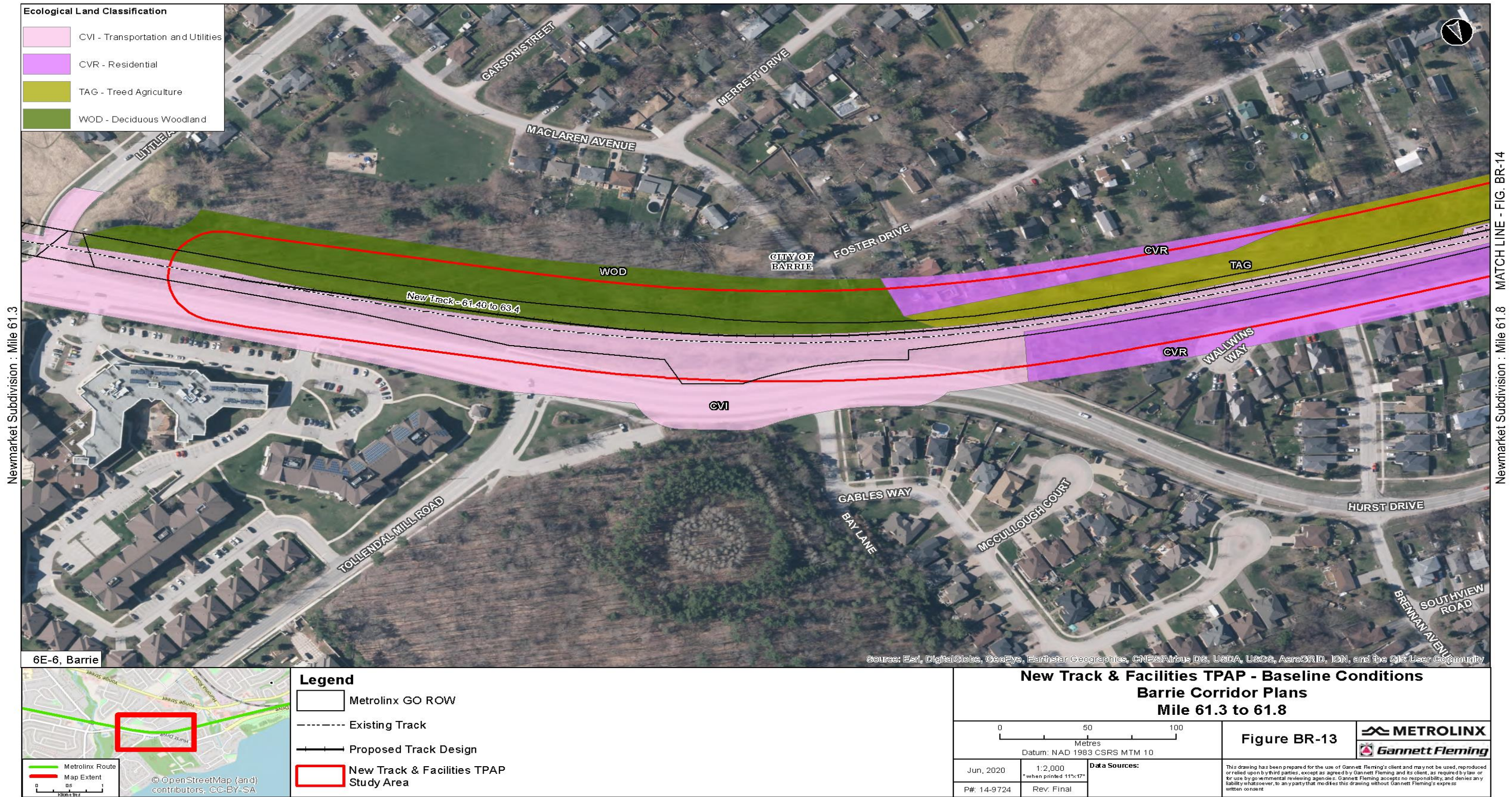


FIGURE 4-26 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-13 – MILE 61.30 TO MILE 61.80



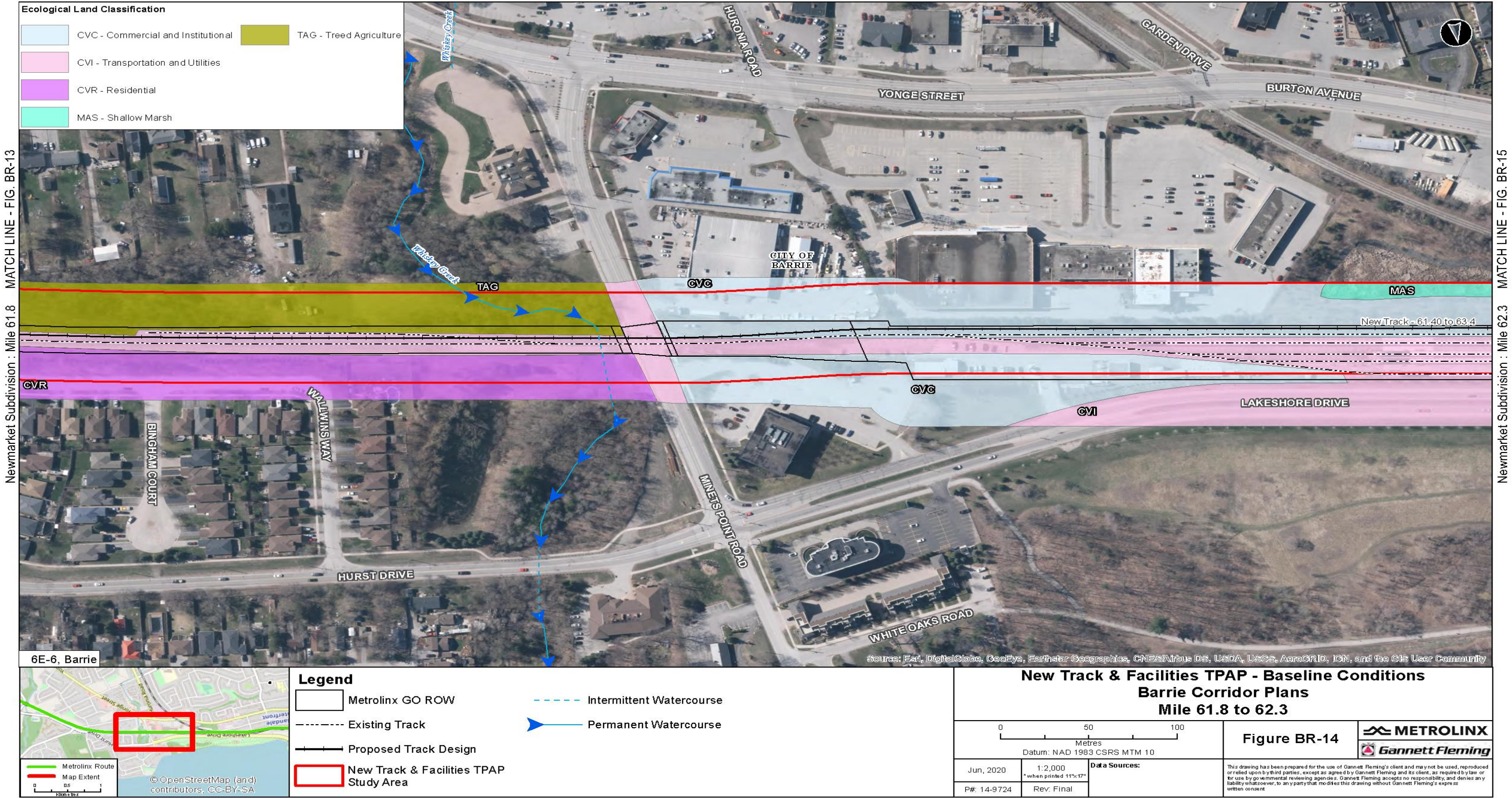


FIGURE 4-27 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-14 – MILE 61.80 TO MILE 62.30



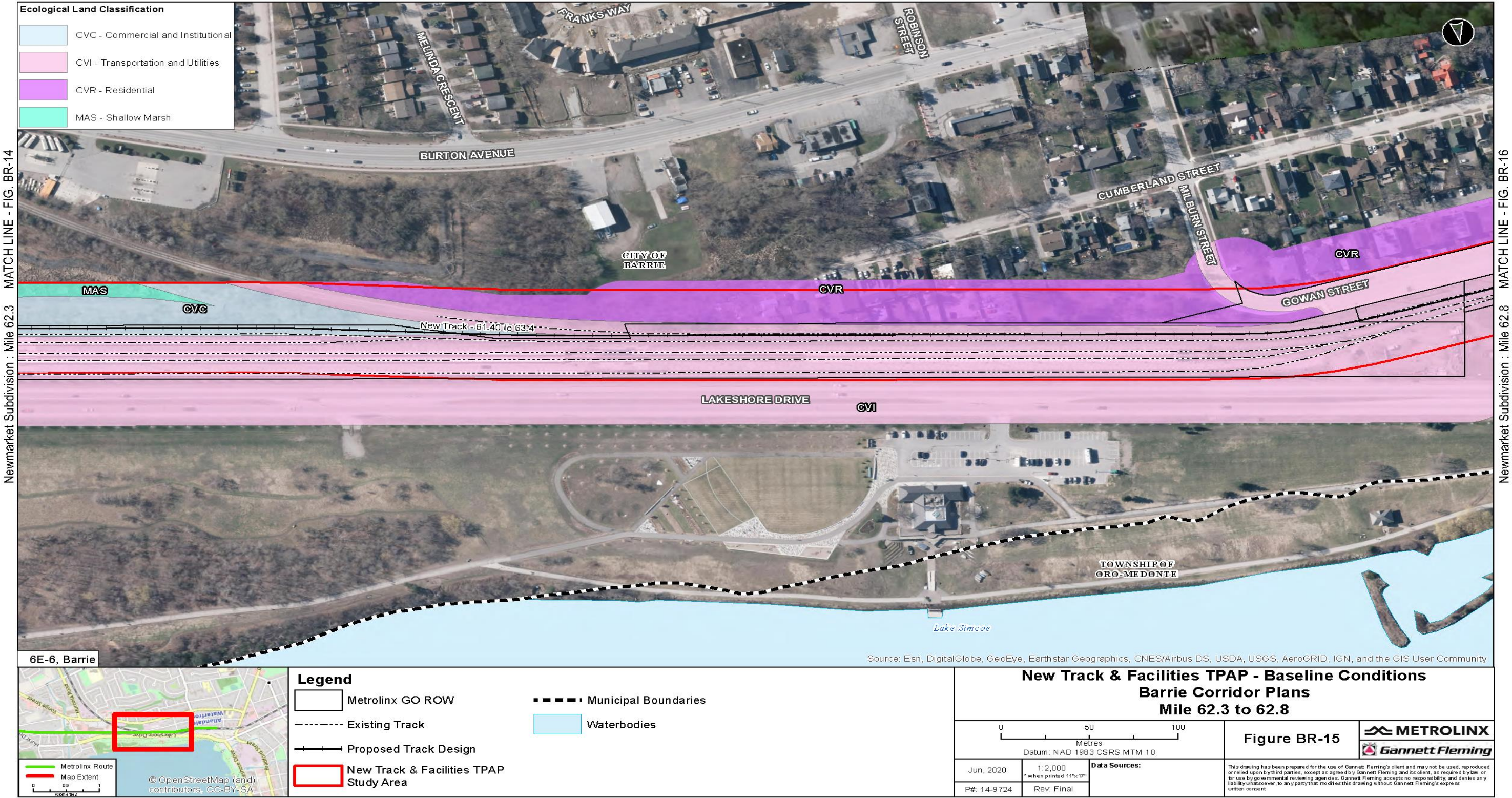


FIGURE 4-28 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-15 – MILE 62.30 TO MILE 62.80



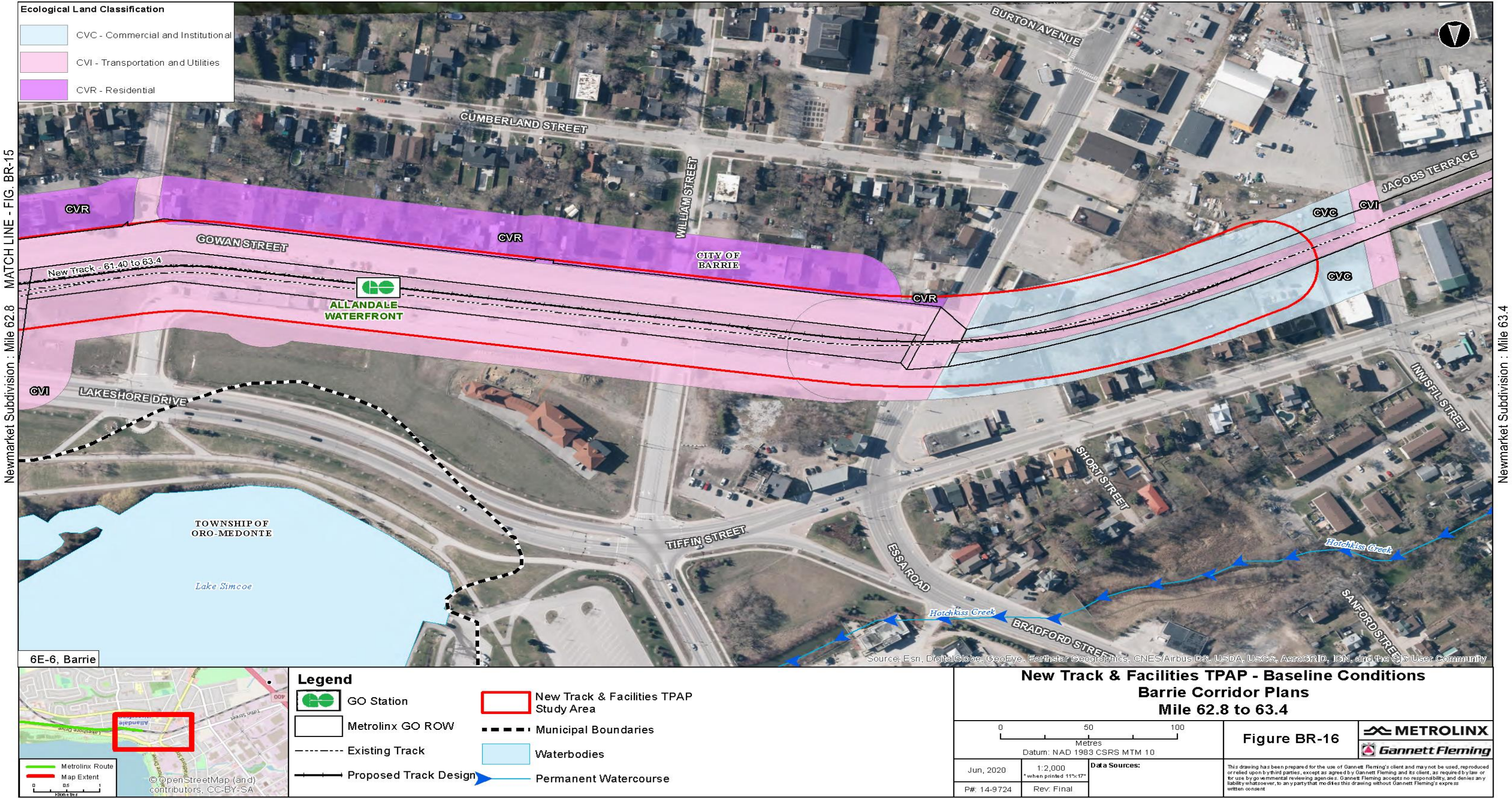


FIGURE 4-29 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT BR-16 – MILE 62.80 TO MILE 63.40



#### 4.6.2 Hydrogeology

Six watercourse crossings were identified in the Barrie Corridor. The crossings are CRA fisheries that provide warmwater habitat (in segments BR-6, BR-7, BR-8, BR-10, BR-11 and BR-12), except for Whiskey Creek (BR-14), which is a cold-water habitat. Features include:

- BR-6 – Tannery Creek includes permanent flow towards the north, east and west depending on the creek area. Channels are defined along the rail line.
- BR-7 – The East Holland River comprises permanent flow towards the north and west. The river is highly channelized and hardened with subterranean flows upstream and gabion baskets along banks in select areas. There is also a small tributary of the East Holland (Wesley Creek) which has permanent flow, defined channels, and evidence of erosion and high flows.
- BR-8, BR-10 to BR-12 – East Holland River includes permanent flow primarily to the north. The river is highly channelized and hardened with subterranean flows upstream and gabion baskets along banks in select areas.
- BR-14 – Whiskey Creek includes permanent flow towards the north. The creek is a wider defined channel with slow flow.

Segment BR-1 is located within the Peel Plain physiographical region, which covers 300 square miles across the Regional Municipalities of York, Peel, and Halton. The plain consists of the underlying till with shale and limestone at depth, and deep beds of stone free clay at surface. The clay is assumed to be brought on by meltwater flowing to the east and north and by a temporary lake that formed between the ice lobe in the Ontario basin and higher elevation lands.

Segments BR-2 through BR-12 are located within the Schomberg Clay Plains physiographical region, which corresponds to lands located on the northern slope of the Oak Ridges Moraine. The plain contains topographic basins with deep stratified clay and silt deposits overlying drumlinized till plains, suggesting glaciolacustrine depositional environments. The plain is located north of Lake Scugog, near Schomberg and Newmarket, and covers 475 square miles.

Segments BR-13 through BR-16 are located within the Simcoe Lowlands physiographical region, which includes the lands bordering Georgian Bay and Lake Simcoe and, when combined, cover an area of approximately 1,100 square miles. The area was flooded by Lake Algonquin and is next to shore cliffs, beaches, and bolder terraces. Deposits within the Simcoe lowlands consist of sand, silt, and clay associated with a glaciolacustrine environment.

Segments BR-1, BR-2 through BR-12, and BR-13 through BR-16 are located in wellhead protection areas and intake protection zones, as indicated in Table 4-16. These zones are associated with Source Protection Plans, which have been implemented throughout the region to protect drinking water resources, as mandated by the *Ontario Clean Water Act*. The groundwater or surface water resources within these areas are relatively sensitive to chemical or pathogen contamination. Although precautionary measures to protect groundwater and surface water must be applied on all projects, additional protection measures and related documentation may be required where Study Areas fall within WHPAs or IPZs.

TABLE 4-16 BARRIE RAIL CORRIDOR SEGMENTS WITHIN A WHPA OR IPZ

Study Area	WHPA or IPZ ID	WHPA or IPZ Name
BR-1	IPZ-3	N/A
BR-2 to BR-12	WHPA-B	Aurora Well No. 5 WHPA-B
		Aurora Wells No. 1, 2, 3 & 4 WHPA-B
	WHPA-C	Newmarket/Aurora WHPA-C



Study Area	WHPA or IPZ ID	WHPA or IPZ Name
	WHPA-D	Newmarket/Aurora WHPA-D
BR-13 to BR-16	IPZ-2	Lakes Simcoe and Couchiching/Black River
	WHPA - B	Wellhead Protection Area B
	WHPA - C	Wellhead Protection Area C
	WHPA - D	Lakes Simcoe and Couchiching/Black River
		Wellhead Protection Area D

A summary of the watersheds that exist within the Barrie rail corridor is provided below and the sections that follow provide a description of the watersheds within each corridor segment. Additional details can be found in the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1**.

TABLE 4-17 SUMMARY OF WATERSHEDS FOR THE BARRIE STUDY AREA SEGMENTS

NTF TPAP Study Area Segment		Watershed
<b>Barrie Corridor (BR)</b>		
BR-1	Mile 12.10 to Mile 12.60	Don River
BR-2 to BR-12	Mile 29.50 to Mile 34.90	East Holland
BR-13 to BR-16	Mile 61.30 to Mile 63.40	Barrie Creek

Refer to the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1** for MECP water well records for areas adjacent to the Barrie Rail Corridor ROW.

#### 4.6.2.1 Track Segment BR-1 – Mile 12.10 to Mile 12.60

The Don River sub-watershed covers an area of approximately 360 km<sup>2</sup>, stretching roughly 38 km from the headwaters of the ORM to the outflow in Lake Ontario. The major groundwater discharges in the sub-watershed occur on the south slope of the ORM, where flow occurs from the ORM Aquifer Complex and along the south glacial Lake Iroquois shoreline (close to Eglinton Avenue). Stream flows average approximately 4.0 m<sup>3</sup>/sec, with a mean annual discharge of almost 125 mm<sup>3</sup>/yr. The sub-watershed is one of most urbanized in the country - nearly 80% of the drainage area is urbanized

The Don River's surface water quality is considered poor and highly reflective of urbanization and lack of control of stormwater drainage. Concentrations of total suspended solids, turbidity, chloride, ammonia and nutrients are typically elevated throughout the watershed.

Surficial geology within this segment is predominantly classified as stone-poor, carbonate derived silty to sandy till; typically, very dense and of low permeability.

Additional details can be found in the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1**.

#### 4.6.2.2 Track Segment BR-2 – Mile 29.50 to Mile 30.00

The Humber River Sub-watershed encompasses a drainage area of approximately 910 km<sup>2</sup> and is the largest sub-watershed within TRCA jurisdiction. Like the Don River, flows within the Humber River watershed originate within the ORM and drain south to Lake Ontario. Land cover is generally evenly divided between urban, rural and natural land cover. Mean annual flow ranges from 2.4 to 63 mm<sup>3</sup>/yr within the major streams of the watershed. In the upper reaches of the watershed, groundwater discharge accounts for the majority of the baseflow in the system. Closer to Lake Ontario, runoff is the

primary contributor to the streamflow resulting from greater amounts of urbanization and long reaches of the river.

The water quality in the Humber River watershed has generally remained consistent over the last decade, with no significant issues identified in the latest Water Quality Check-Up. However, chloride is becoming a concern within the watershed, with concentrations generally exceeding the recommended guidelines in over 50% of the surface water quality samples collected in the watershed.

Surficial geology within this segment is predominantly classified as massive, well laminated fine-grained soils, with channels of alluvial deposits resulting from watercourse valleys.

Segments BR-13 through BR-23 are associated with wellhead protection areas (see Table 4-18); meaning these areas are relatively sensitive to chemical or pathogen groundwater contamination. Although precautionary measures to protect groundwater and surface water must be applied on all projects, additional protection measures and related documentation may be required in these areas.

TABLE 4-18 WELLHEAD PROTECTION AREAS WITHIN SEGMENTS BR-13 TO BR-23

Study Area	WHPA or IPZ ID	WHPA or IPZ Name
BR-2 to BR-12	WHPA-B	Aurora Well No. 5 WHPA-B
		Aurora Wells No. 1, 2, 3 & 4 WHPA-B
	WHPA-C	Newmarket/Aurora WHPA-C
	WHPA-D	Newmarket/Aurora WHPA-D

Additional details can be found in the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1**.

#### 4.6.2.3 Track Segment BR-3 – Mile 30.00 to Mile 30.50

Refer to Section 4.6.2.2 – Segment BR-2.

#### 4.6.2.4 Track Segment BR-4 – Mile 30.50 to Mile 31.00

Refer to Section 4.6.2.2 – Segment BR-2.

#### 4.6.2.5 Track Segment BR-5 – Mile 31.00 to Mile 31.50

Refer to Section 4.6.2.2 – Segment BR-2.

#### 4.6.2.6 Track Segment BR-6 – Mile 31.50 to Mile 32.00

Refer to Section 4.6.2.2 – Segment BR-2.

#### 4.6.2.7 Track Segment BR-7 – Mile 31.90 to Mile 32.50

Refer to Section 4.6.2.2 – Segment BR-2.

#### 4.6.2.8 Track Segment BR-8 – Mile 32.50 to Mile 32.90

Refer to Section 4.6.2.2 – Segment BR-2.

#### 4.6.2.9 Track Segment BR-9 – Mile 32.90 to Mile 33.50

Refer to Section 4.6.2.2 Segment BR-2.

#### 4.6.2.10 Track Segment BR-10 – Mile 33.40 to Mile 34.00

Refer to Section 4.6.2.2 – Segment BR-2.



#### 4.6.2.11 Track Segment BR-11 – Mile 33.90 to Mile 34.50

Refer to Section 4.6.2.2 – Segment BR-2.

#### 4.6.2.12 Track Segment BR-12 – Mile 34.40 to Mile 34.90

Refer to Section 4.6.2.2 – Segment BR-2.

#### 4.6.2.13 Track Segment BR-13 – Mile 61.30 to Mile 61.80

This segment is located in the Barrie Creek Sub-watershed. Innisfil Creek, Hewitt's Creek, Lovers Creek and Barrie Creek Sub-watersheds are located along the southwestern shore of Lake Simcoe. Drainage areas are 107km<sup>2</sup> and 17.5 km<sup>2</sup> for Innisfil Creek and Hewitt's Creek, and 60 km<sup>2</sup> and 37.5 km<sup>2</sup> for Lovers Creek and Barrie Creek, respectively. Streams within the Innisfil Creek watershed originate within agricultural lands and flow from west to east into Lake Simcoe at either Cooks Bay, the main basin, or Kempenfelt Bay. No streamflow monitoring stations are present within the watershed; therefore, flow values are not readily available. Studies completed by the Lake Simcoe Region Conservation Authority in 2005 indicate that groundwater discharge is not a significant contributor to overall streamflow.

The LSCRA has included the Hewitt's Creek, Lovers Creek and Barrie Creek sub-watersheds together for the purposes of sub-watershed planning. The combined drainage area for these watersheds is approximately 115 km<sup>2</sup>. The watersheds drain from west to east and empty into Lake Simcoe, flowing primarily through developed urban areas. Flow measurements for Lovers Creek and Hewitt's Creek indicate values of approximately 31.5 mm<sup>3</sup>/yr and 5.1 mm<sup>3</sup>/yr. Studies completed by LSRCA in 2005 indicated that groundwater discharge was a significant contributor to overall streamflow in the watersheds, with over 60% of the total flow attributed to groundwater discharge in Lovers Creek.

Within these watersheds, concentrations of most parameters are below relevant quality guidelines.

However, chloride, phosphorus, TSS, iron, zinc and copper levels are exhibiting increasing rates. Nitrate levels, however, are decreasing.

The eastern portion of BR-42 is classified as stone-poor, carbonate-derived silty to sandy till deposits; while the western portion is classified as littoral-foreshore deposits. Alluvial deposits exist east of the Study Area in a channel valley associated with Whisky Creek.

Segments BR-42 through BR-45 are associated with wellhead protection areas and intake protection zones (see Table 4-19); meaning these areas are relatively sensitive to chemical or pathogen contamination (both ground and surface water). Although precautionary measures to protect groundwater and surface water must be applied on all projects, additional protection measures and related documentation may be required in these areas.

TABLE 4-19 WELLHEAD PROTECTION AREAS AND INTAKE PROTECTION ZONES WITHIN SEGMENTS BR-42 TO BR-45

Study Area	WHPA or IPZ ID	WHPA or IPZ Name
BR-13 to BR-16	IPZ-2	Lakes Simcoe and Couchiching/Black River
	WHPA - B	Wellhead Protection Area B
	WHPA - C	Wellhead Protection Area C
	WHPA - D	Lakes Simcoe and Couchiching/Black River
		Wellhead Protection Area D

Additional details are found in the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1**.

#### 4.6.2.14 Track Segment BR-14 – Mile 61.80 to Mile 62.30

Refer to Section 4.6.2.13 – Segment BR-13.

#### 4.6.2.15 Track Segment BR-15 – Mile 62.30 to Mile 62.80

Refer to Section 4.6.2.13 – Segment BR-13.

#### 4.6.2.16 Track Segment BR-16 – Mile 62.80 to Mile 63.40

Refer to Section 4.6.2.13 – Segment BR-13.

### 4.6.3 Land Use and Socio-Economic

#### 4.6.3.1 Track Segment BR-1 – Mile 12.10 to Mile 12.60

##### Existing Land Use

There are no trails, large parks or other recreational amenities within this employment/industrial area. There are also no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation under City of Toronto Zoning By-law 569-2013.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with the land use designations. There are also no planned recreational amenities according to the City of Toronto's Parks and Recreation Facilities Master Plan.

#### 4.6.3.2 Track Segment BR-2 – Mile 29.50 to Mile 30.00

##### Existing Land Use

The Sheppard's Bush Conservation Area is located adjacent to the west side of the rail corridor. Within these conservation lands lie two recreational trails: The Oak Ridges Trail and the Sheppard's Bush trail. Located adjacent to the conservation area is a cycling route that traverses along Industrial Parkway South (see Figure 4-30). There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of this segment.

This segment of the rail corridor is zoned for *Employment* under Town of Aurora Zoning By-law 6000-17.



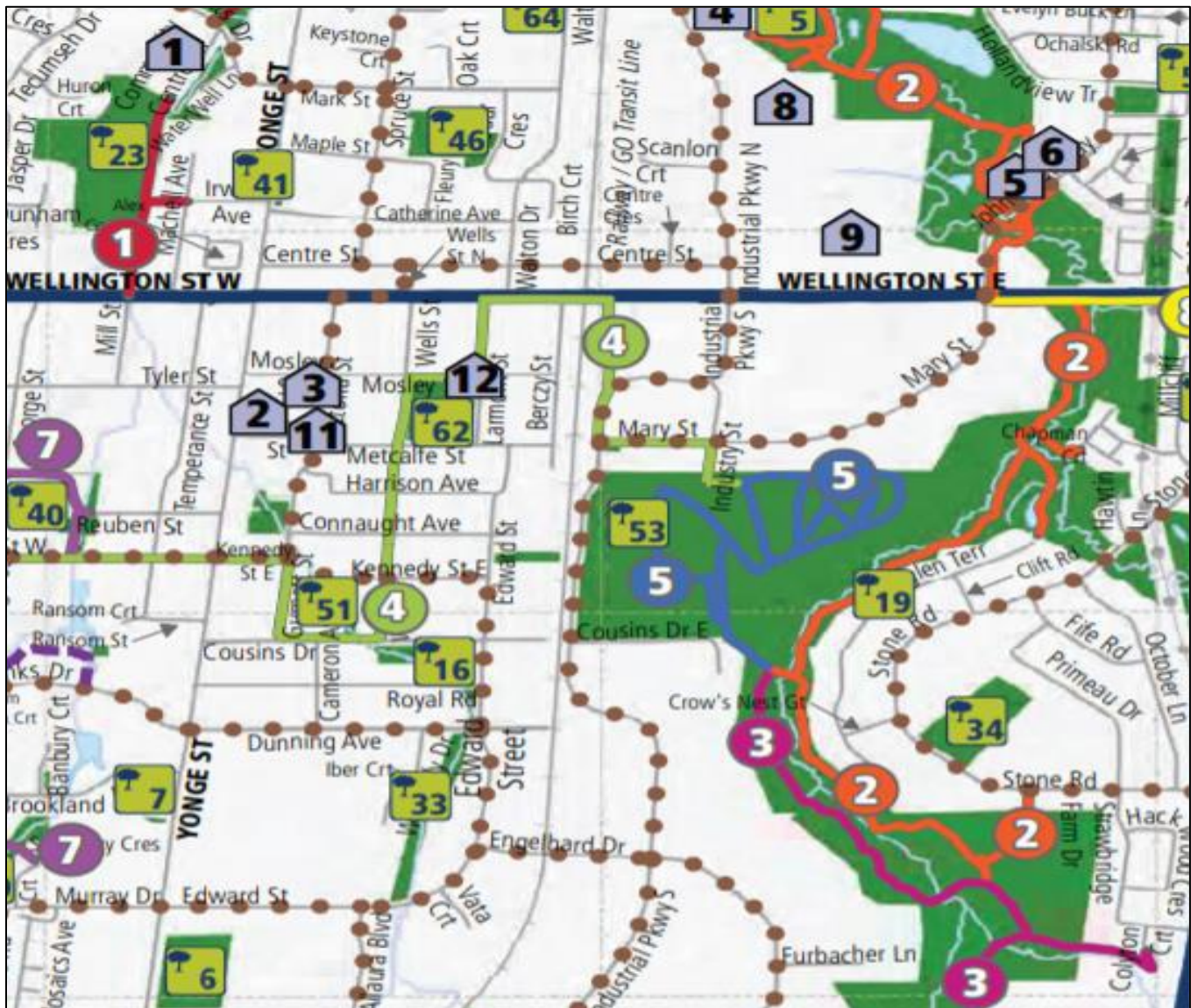


FIGURE 4-30 EXCERPT FROM TOWN OF AURORA STREETS, PARKS & TRAILS MAP (2018)

#### Planned Land Use

There are no Secondary Plans affecting the lands adjacent this segment of the rail corridor. Any future development will comply with the land use designations. According to available information, no recreational amenities are planned within this segment of the rail corridor.

#### 4.6.3.3 Track Segment BR-3 – Mile 30.00 to Mile 30.50

#### Existing Land Use

No large parks exist within 100 metres of the rail corridor. Cycling routes are located along Industrial Parkway North that run parallel to the rail corridor and Centre Street. The Aurora Early Learning Centre and École élémentaire catholique Saint-Jean are located within 100 metres of the rail corridor. There are no hospitals, places of worship, or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for *Employment, Commercial and Promenade* under Town of Aurora Zoning By-law 6000-17.

#### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with the land use designations. Similarly, no recreational amenities are planned within this segment of the rail corridor.

#### 4.6.3.4 Track Segment BR-4 – Mile 30.50 to Mile 31.00

#### Existing Land Use

Valhalla Park is located immediately west of the rail corridor. A cycling route runs nearly parallel to the east side of the rail corridor along Industrial Parkway North. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for *Employment* under Town of Aurora Zoning By-law 6000-17.

#### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with the land use designations. Similarly, no recreational amenities are planned within this segment of the rail corridor.

#### 4.6.3.5 Track Segment BR-5 – Mile 31.00 to Mile 31.50

#### Existing Land Use

Allenvale Park is a large park located more than 100 m from the rail corridor, behind a residential subdivision to the west. St. Andrew's Valley Golf Club is located directly on the east side of the rail corridor, extending into the Town of Newmarket. The Tim Jones Trail, also referred to as the Nokkidaa Trail and the In-Boulevard Multi-Use Trail, crosses the rail corridor along St. John's Sideroad. Aurora Montessori School is located directly adjacent to the rail corridor within this segment.

This segment of the rail corridor is zoned for *Employment, Environmental Protection and Rural* under Town of Aurora Zoning By-law 6000-17.

#### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with the land use designations. There are no planned recreational amenities within this segment of the rail corridor according to the Town of Aurora's Parks & Trails Map.

#### 4.6.3.6 Track Segment BR-6 – Mile 31.50 to Mile 32.00

#### Existing Land Use

Two large open spaces lie directly west of the rail corridor: Foxtail Ridge and Bailey Ecological Park. Within Foxtail Ridge is the meandering Holland River and the Tom Taylor Trail. The Nokkidaa cycling trail runs along Foxtail Ridge and Bailey Ecological Park. St. Andrew's Valley Golf Club is located on the east side of the rail corridor. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor within this segment.

This segment of the rail corridor is zoned Open Space and Mature Neighbourhoods under Town of Newmarket Zoning By-law 2010-40.



#### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with the land use designations. There are no proposed recreational amenities in this segment of the rail corridor according to the Town of Newmarket's Active Transportation Implementation Plan.

#### 4.6.3.7 Track Segment BR-7 – Mile 31.90 to Mile 32.50

#### Existing Land Use

Bailey Ecological Park and St. Andrew's Valley Golf Club extend into this segment, and the Humber River and unnamed cycling routes are located within Bailey Ecological Park. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned Open Space under Town of Newmarket Zoning By-law 2010-40.

#### Planned Land Use

According to the Town of Newmarket's Active Developments Online Mapping, the Gault Grove residential subdivision is planned to be developed on the east side of the rail corridor. This active proposal includes 28 townhome dwelling units, which is currently under review by the Ontario Municipal Board. There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will be in accordance with the land use designations.

A signed cycling route is planned along Silken Laumann Drive according to the Town of Newmarket's Active Transportation Implementation Plan, as well as a cycling lane along McBean Avenue. Both cycling improvements will be located east of the rail corridor.

#### 4.6.3.8 Track Segment BR-8 – Mile 32.50 to Mile 32.90

#### Existing Land Use

Bailey Ecological Park transitions to Fairy Lake at Mulock Drive, with the Tom Taylor Trail and Nokiidaa Cycling Trail meandering throughout the parks/open space. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned Open Space and Employment under Town of Newmarket Zoning By-law 2010-40.

#### Planned Land Use

The City of Newmarket has initiated a Secondary Plan to provide policy framework that will support transit-oriented development surrounding the future Mulock GO Station. The Mulock Station Area Secondary Plan is set to be completed in spring 2021.

There are no planned recreational amenities within this segment of the rail corridor.

#### 4.6.3.9 Track Segment BR-9 – Mile 32.90 to Mile 33.50

#### Existing Land Use

Fairy Lake Park, Tom Taylor Trail and the Nokiidaa Cycling Trail extend west along the rail corridor. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned Open Space, Employment, Mature Neighbourhood and Residential under Town of Newmarket Zoning By-law 2010-40.

### Planned Land Use

According to the Town of Newmarket's Active Developments Online Mapping, Pickering College is in the process of developing Phase Two of its campus master plan. Pickering College is located more than 100 metres east of the rail corridor. This segment of the rail corridor is partially within the Mulock Station Area Secondary Plan (currently underway). Any future development will comply with the land use designations. There are no planned recreational amenities within this segment of the rail corridor.

#### 4.6.3.10 Track Segment BR-10 – Mile 33.40 to Mile 34.00

### Existing Land Use

Fairy Lake Park terminates at Water Street. Two smaller parks and a tennis centre surround the rail corridor, including: Riverwalk Commons, Keith Davis Tennis Centre, and All Our Kids Playpark. The Nokiidaa Cycling Trail crosses the rail corridor along Timothy Street before extending north through All Our Kids Playpark. The Newmarket Community Centre and Lions Hall is located directly west of the rail corridor. There are no hospitals, schools, places of worship, child-care centres or long-term care centres along this segment of the rail corridor.

This segment of the rail corridor is zoned Open Space, Institutional, Urban Centre, Mature Neighbourhood and Residential under the Town of Newmarket Zoning By-law 2010-40.

### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with the land use designations. A cycling route is planned along Water Street according to the Town of Newmarket's Active Transportation Implementation Plan.

#### 4.6.3.11 Track Segment BR-11 – Mile 33.90 to Mile 34.50

### Existing Land Use

There are two relatively large parks/open spaces within this segment of the rail corridor: the Mabel David Conservation Area and Bayview Parkway. The Tom Taylor Trail and Nokiidaa Bike Trail extend from the All Our Kids Playpark in the south to the Mabel Conservation Area to the north. The Newmarket Recreation Youth Centre & Sk8 Park is located within 100 metres of the rail corridor. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned Open Space, Commercial, and Urban Centre under Town of Newmarket Zoning By-law 2010-40.

### Planned Land Use

This section of the rail corridor passes through the Urban Centres Secondary Plan, which comprises a diverse mix of commercial, residential, institutional and employment uses (see Figure 4-32). It is intended to develop unique identities, highlighted by architecture, public spaces, art and commerce. The rail corridor traverses the Davis Drive Character Area, which is envisioned as a low to mid-rise residential area with opportunities for commercial uses on the ground floor. This character area is planned to comprise a mix of residential, commercial and employment uses. There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with the land use designations.



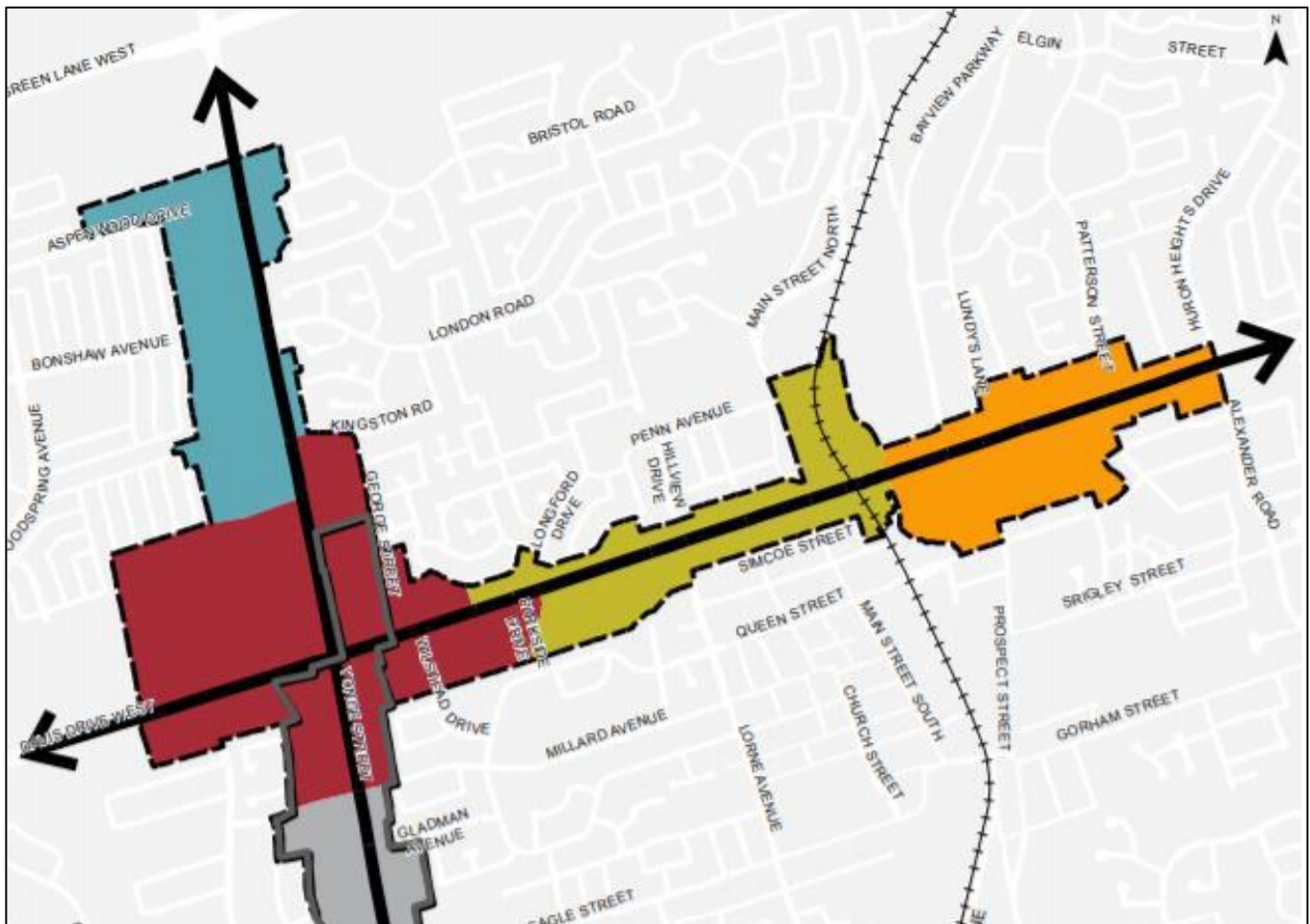


FIGURE 4-31 EXCERPT FROM TOWN OF NEWMARKET URBAN CENTRES SECONDARY PLAN

According to the Town of Newmarket's Active Transportation Implementation Plan, a cycling lane is planned to cross the rail corridor at Queen Street. The Town has also proposed a new signed cycling route along Main Street South, and a buffered cycling lane along Main Street North.

#### 4.6.3.12 Track Segment BR-12 – Mile 34.40 to Mile 34.90

##### Existing Land Use

The Mabel Davis Conservation Area and Bayview Parkway extend along the eastern side of the rail corridor toward the Town of East Gwillimbury. The Tom Taylor Trail and Nokiidaa Cycling Trail also traverse these open spaces. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned Open Space and Urban Centre under Town of Newmarket Zoning By-law 2010-40.

##### Planned Land Use

A cycling lane is planned to extend along Main Street North. There are no other known planned recreational amenities within this segment of the rail corridor.

#### 4.6.3.13 Track Segment BR-13 – Mile 61.30 to Mile 61.80

##### Existing Land Use

The Gables is a large park located to the north of the rail corridor, extending to Barrie's waterfront. Wallins Natural Area is a small Open Space located along Hurst Drive and adjacent to the rail corridor. Pedestrian trails run throughout Gables Park both west and south of the rail corridor. A designated cycling lane runs along Hurst Drive adjacent to the rail corridor. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

The rail corridor does not have zoning designation under City of Barrie Zoning By-law 2009-141.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent this segment of the rail corridor. Any future development in the surrounding area will comply with existing land use designations. There are also no known planned recreational amenities within this segment of the rail corridor.

#### 4.6.3.14 Track Segment BR-14 – Mile 61.80 to Mile 62.30

##### Existing Land Use

Allandale Station Park is located directly north of the rail corridor. Within this park is large wooded area, open fields and pedestrian trails/walkways. Minet's Point Natural Area is located just west of Minet's Point Road. The Great Trail traverses the rail corridor at Minet's Point Road and extends north towards Allandale Station Park.

There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

The rail corridor does not have zoning designation under City of Barrie Zoning By-law 2009-141.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development in the surrounding area will comply with existing land use designations. There are no known planned recreational amenities within this segment of the rail corridor.

#### 4.6.3.15 Track Segment BR-15 – Mile 62.30 to Mile 62.80

##### Existing Land Use

This segment includes portions of Allandale Station Park and the Great/Waterfront Trail, as well as other pedestrian walkways. Cumberland Natural Area also lies directly south of the rail corridor. The Southshore Community Centre, situated within Allandale Station Park, is located within 100 metres of the rail corridor- north of Lakeshore Drive. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

The rail corridor does not have zoning designation under City of Barrie Zoning By-law 2009-141.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development in the surrounding area will comply with existing land use designations. There are also no known planned recreational amenities within this segment of the rail corridor.



#### 4.6.3.16 Track Segment BR-16 – Mile 62.80 to Mile 63.40

##### Existing Land Use

Centennial Park and the Great Tail wraps around Kempenfelt Bay within this segment of the Barrie rail corridor, providing residents with lakefront recreational amenities such as a park space, paved walkways and a sandy beach. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

The rail corridor does not have a zoning designation under City of Barrie Zoning By-law 2009-141.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development in the surrounding area will comply with existing land use designations. There are no known planned recreational amenities within this segment of the rail corridor.

#### 4.6.4 Cultural Heritage

##### 4.6.4.1 Track Segment BR-1 – Mile 12.10 to Mile 12.60

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

##### 4.6.4.2 Track Segment BR-2 – Mile 29.50 to Mile 30.00

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

One previously identified BHR (BR-01) is located within the 30 m buffer along this segment.

##### 4.6.4.3 Track Segment BR-3 – Mile 30.00 to Mile 30.50

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

Four previously identified BHRs (BR-01 to BR-04) are located within the 30 m buffer along this segment.

##### 4.6.4.4 Track Segment BR-4 – Mile 30.50 to Mile 31.00

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.5 Track Segment BR-5 – Mile 31.00 to Mile 31.50

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.6 Track Segment BR-6 – Mile 31.50 to Mile 32.00

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.7 Track Segment BR-7 – Mile 31.90 to Mile 32.50

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.8 Track Segment BR-8 – Mile 32.50 to Mile 32.90

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.9 Track Segment BR-9 – Mile 32.90 to Mile 33.50

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

One previously identified BHR (BR-05) is located within the 30 m buffer along this segment.

#### 4.6.4.10 Track Segment BR-10 – Mile 33.40 to Mile 34.00

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)



One previously identified BHR (BR-06) is located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.11 Track Segment BR-11 – Mile 33.90 to Mile 34.50

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

Three previously identified BHRs (BR-07, BR-08, and BR-09) is located within the 30 m buffer along this segment.

#### 4.6.4.12 Track Segment BR-12 – Mile 34.40 to Mile 34.90

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.13 Track Segment BR-13 – Mile 61.30 to Mile 61.80

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.14 Track Segment BR-14 – Mile 61.80 to Mile 62.30

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.15 Track Segment BR-15 – Mile 62.30 to Mile 62.80

The Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b)

The segment is within the Allandale Historic Neighbourhood Defined Policy Area according to the City of Barrie Official Plan.

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.6.4.16 Track Segment BR-16 – Mile 62.80 to Mile 63.40

A portion of the Study Area within this segment was previously assessed by:

- Cultural Heritage Screening Report Built Heritage Resources and Cultural Heritage Landscapes, Metrolinx Barrie Rail Corridor Expansion Newmarket Subdivision Mile 3.00 to Mile 63.00 Transit Project Assessment Process (ASI 2017b) [Mile 62.80 – 63.00]

One previously identified BHR (BR-10) is located within the rail corridor or the 30 m buffer in this segment.

The segment is within the Allandale Historic Neighbourhood Defined Policy Area according to the City of Barrie Official Plan.

#### 4.6.5 Archaeology

For the detailed historical and archaeological context of the Barrie Corridor, please refer to the *Metrolinx NTF TPAP Archaeology – Baseline Conditions Report*, (**Appendix G1**). A summary of the historical and archaeological context for key segments of the Barrie Corridor is provided below.

##### 4.6.5.1 Track Segment BR-1 – Mile 12.10 to Mile 12.60

Segment BR-1 is located south of York University GO Station in the City of Toronto. This area corresponds to lands within Treaty 13, York Township, and Borden block AkGu. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least three previous reports detail fieldwork within 50 m of segment BR-1, as detailed in **Appendix G1 - Archaeology Baselines Conditions Report**.

Segment BR-1 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites (AkGu-85); and
- Water sources: primary, secondary, or past water source (Don River).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

##### 4.6.5.2 Track Segment BR-2 – Mile 29.50 to Mile 30.00

Segment BR-2 is located between Cousins Drive East through Aurora GO Station to Wellington Street East. This area corresponds to lands within Treaty 13, Whitchurch Township and Borden blocks AlGu and BaGu. Three previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-2, as detailed in **Appendix G1 - Archaeology Baselines Conditions Report**.

Segment BR-2 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).



These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.3 Track Segment BR-3 – Mile 30.00 to Mile 30.50

Segment BR-3 is located between Wellington Street East to south of St. John's Sideroad. This area corresponds to lands within Treaty 13, Whitchurch Township, and Borden block BaGu. Two previously registered archaeological sites are located within 1 km of the study area according to the OASD, neither of which are located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-3, as detailed in **Appendix G1 - Archaeology Baselines Conditions Report**.

Segment BR-3 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.4 Track Segment BR-4 – Mile 30.50 to Mile 31.00

Segment BR-4 is located north of Centre Street to south of St. John's Sideroad. This area corresponds to lands within Treaty 13, Whitchurch Township, and Borden block BaGu. Six previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-4, as detailed in **Appendix G1 - Archaeology Baselines Conditions Report**.

Segment BR-4 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.5 Track Segment BR-5 – Mile 31.00 to Mile 31.50

Segment BR-5 is located from south of St. John's Sideroad to north of St. John's Sideroad. This area corresponds to lands within Treaty 13, Whitchurch Township, and Borden block BaGu. Eight previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of

which are located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-5, as detailed in **Appendix G1 - Archaeology Baselines Conditions Report**.

Segment BR-5 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.6 Track Segment BR-6 – Mile 31.50 to Mile 32.00

Segment BR-6 is located from St. John's Sideroad north into Newmarket. This area corresponds to lands within Treaty 13, Whitchurch Township, and Borden block BaGu. Ten previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-6, as detailed in **Appendix G1 - Archaeology Baselines Conditions Report**.

Segment BR-6 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.7 Track Segment BR-7 – Mile 31.90 to Mile 32.50

Segment BR-7 is located between north of St. John's Sideroad and south of Mulock Drive. This area corresponds to lands within Treaty 13, Whitchurch Township, and Borden block BaGu. Eight previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-7, as detailed in **Appendix G1 - Archaeology Baselines Conditions Report**.

Segment BR-7 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);



- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.8 Track Segment BR-8 – Mile 32.50 to Mile 32.90

Segment BR-8 is located south of Mulock Drive to Penrose Street. This area corresponds to lands within Treaty 13, Whitchurch Township, and Borden block BaGu. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-8, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-8 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.9 Track Segment BR-9 – Mile 32.90 to Mile 33.50

Segment BR-9 is located between Penrose Street and south of Water Street. This area corresponds to lands within Treaty 13, Whitchurch Township and Borden block BaGu. No previously registered archaeological sites are located within 1 km of the Study Area according to the OASD. At least seven previous reports detail fieldwork within 50 m of segment BR-9, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-9 meets the following criteria indicative of archaeological potential:

- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.10 Track Segment BR-10 – Mile 33.40 to Mile 34.00

Segment BR-10 is located south of Water Street to Queen Street. This area corresponds to lands within 13, Whitchurch Township, and Borden block BaGu. One previously registered archaeological site is

located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-10, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-10 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.11 Track Segment BR-11 – Mile 33.90 to Mile 34.50

Segment BR-11 is located south of Queen Street to north of Davis Drive. This area corresponds to lands within Treaty 13, Whitchurch and East Gwillimbury Township, and Borden block BaGu. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-11, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-11 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);
- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.12 Track Segment BR-12 – Mile 34.40 to Mile 34.90

Segment BR-12 is located north of Davis Drive to south of Green Lane East. This area corresponds to lands within Treaty 13, East Gwillimbury Township, and Borden block BaGu. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment BR-12, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-12 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (East Holland River);



- Early historic transportation routes (Wellington Street, St. John's Sideroad, Mulock Drive, Davis Drive, Main Street West, Gorham Street);
- Proximity to early settlements (Aurora and Town of Newmarket); and
- Well drained soils (Schomberg silt loam and clay loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.13 Track Segment BR-13 – Mile 61.30 to Mile 61.80

Segment BR-13 is located between northwest of Little Avenue to south of Minets Point Road in the City of Barrie. This area corresponds to lands within Treaty 18, Innisfil Township, and Borden block BcGv. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least five previous reports detail fieldwork within 50 m of segment BR-13, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-13 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Innisfil Creek, Hewitt's Creek, Lover's Creek, Lake Simcoe);
- Early historic transportation routes (Bridge Street, Dissette Street);
- Proximity to early settlements (Nantyr, Bramley, Craigvale, Stroud, Painswick); and
- Well drained soils (Tioga loamy sand, Sargent gravelly sandy loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.14 Track Segment BR-14 – Mile 61.80 to Mile 62.30

Segment BR-14 is located between west of Minets Point Road to east of Melinda Crescent in the City of Barrie. This area corresponds to lands within Treaty 18, Innisfil Township, and Borden blocks BcGw and BcGv. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least five previous reports detail fieldwork within 50 m of segment BR-14, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-14 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Innisfil Creeks, Hewitt's Creek, Lover's Creek, Lake Simcoe);
- Early historic transportation routes (Bridge Street, Dissette Street);
- Proximity to early settlements (Nantyr, Bramley, Craigvale, Stroud, Painswick); and
- Well drained soils (Tioga loamy sand, Sargent gravelly sandy loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.15 Track Segment BR-15 – Mile 62.30 to Mile 62.80

Segment BR-15 is located between west of Minets Point Road to east of Melinda Crescent in the City of Barrie. This area corresponds to lands within Treaty 18, Innisfil Township, and Borden block BcGw. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least five previous reports detail fieldwork within 50 m of segment BR-15, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-15 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Innisfil Creeks, Hewitt's Creek, Lover's Creek, Lake Simcoe);
- Early historic transportation routes (Bridge Street, Dissette Street);
- Proximity to early settlements (Nantyr, Bramley, Craigvale, Stroud, Painswick); and
- Well drained soils (Tioga loamy sand, Sargent gravelly sandy loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.6.5.16 Track Segment BR-16 – Mile 62.80 to Mile 63.40

Segment BR-16 is located between east of Bayview Drive to east of Innisfil Street in the City of Barrie. This area corresponds to lands within Treaty 18, Innisfil Township, and Borden block BcGw. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is also located within 50 m. At least five previous reports detail fieldwork within 50 m of segment BR-16, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment BR-16 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Innisfil Creek, Hewitt's Creek, Lover's Creek, Lake Simcoe);
- Early historic transportation routes (Bridge Street, Dissette Street);
- Proximity to early settlements (Nantyr, Bramley, Craigvale, Stroud, Painswick); and
- Well drained soils (Tioga loamy sand, Sargent gravelly sandy loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

### 4.6.6 Visual/Aesthetics

#### 4.6.6.1 Track Segment BR-1 – Mile 12.10 to Mile 12.60

Segment BR-1 is located within the City of Toronto, traversing a dense employment/industrial zone. The proposed track extends within the existing rail right-of-way, south of Apollo Place to the York University GO Station. The proposed track upgrades are to occur within the existing Metrolinx rail right-of-way; therefore, the visual baseline conditions are classified as *Negligible*. See Figure 4-32 for an aerial view of proposed infrastructure proposed within segment BR-1.





FIGURE 4-32 PROPOSED INFRASTRUCTURE WITHIN SEGMENT BR-3

#### 4.6.6.2 Track Segment BR-2 – Mile 29.50 to Mile 30.00

This segment is located entirely within the Town of Aurora and is primarily designated as mixed use and residential. The proposed new track passes through employment and residential lands that abut the rail ROW on the west, and open space/parkland and Aurora GO Station building on the east (see Figure 4-33). The proposed track upgrades will occur within the existing Metrolinx rail ROW, thus the visual baseline conditions are classified as *Negligible*.



FIGURE 4-33 AURORA GO STATION

4.6.6.3 Track Segment BR-3 – Mile 30.00 to Mile 30.50

Refer to Section 4.6.6.2 above as baseline conditions are similar.

4.6.6.4 Track Segment BR-4 – Mile 30.50 to Mile 31.00

The proposed infrastructure continues north in the Town of Aurora, running nearly parallel to the Aurora Community Arboretum and beyond. The proposed track from Mile 29.54 to Mile 32.62 passes through low density residential areas that abut the rail right-of-way to the west, employment/industrial areas, and many large parks and open space areas. The proposed track upgrades will occur within the existing Metrolinx rail right-of-way, thus the visual baseline conditions are classified as *Negligible*.

4.6.6.5 Track Segment BR-5 – Mile 31.00 to Mile 31.50

Refer to Section 4.6.6.4 above as baseline conditions are similar.

4.6.6.6 Track Segment BR-6 – Mile 31.50 to Mile 32.00

Entering the Town of Newmarket, the areas surrounding the rail corridor are largely residential, natural, and parks and open space, with recreational amenities, such as the St. Andrews Valley Golf Course located on the east side of the rail corridor. The potential change to views from the golf course are minimal, as existing vegetation provides screening and golfers are typically not close to the rail right-of-way.

Single-family homes line the open spaces along the creek through much of this area. In some cases homes are adjacent to the rail right-of-way, while others are farther back. The proposed track upgrades will occur within the existing Metrolinx rail right-of-way, resulting in *Negligible* visual baseline conditions.

4.6.6.7 Track Segment BR-7 – Mile 31.90 to Mile 32.50

Refer to Section 4.6.6.6 above as baseline conditions are similar.



#### 4.6.6.8 Track Segment BR-8 – Mile 32.50 to Mile 32.90

The proposed track from Mile 29.54 to Mile 34.62 continues north in the Town of Newmarket through employment/industrial areas and low-density residential areas that are situated more than 100 metres to the east and west of the rail corridor. The proposed track upgrades will occur within the existing Metrolinx rail right-of-way; therefore, there are no vertical disturbance to the existing track bed. The visual baseline conditions are classified as *Negligible*.

#### 4.6.6.9 Track Segment BR-9 – Mile 32.90 to Mile 33.50

Refer to Section 4.6.6.8 above as baseline conditions are similar.

#### 4.6.6.10 Track Segment BR-10 – Mile 33.40 to Mile 34.00

Refer to Section 4.6.6.8 above as baseline conditions are similar.

#### 4.6.6.11 Track Segment BR-11 – Mile 33.90 to Mile 34.50

Segment BR-11 passes through the Newmarket GO Station (see Figure 4-34). The station is located behind a retail complex, which was converted from an industrial building and is surrounded by other residential and commercial uses adjacent to the rail right-of-way. The proposed track upgrades are to occur within the existing Metrolinx rail right-of-way. Passenger views from the station, as well as the views from the surrounding area, are not anticipated to be altered; therefore, the visual baseline conditions are classified as *Negligible*.



FIGURE 4-34 AERIAL VIEW OF INFRASTRUCTURE PROPOSED WITHIN SEGMENT BR-11

#### 4.6.6.12 Track Segment BR-12 – Mile 34.40 to Mile 34.90

North of Davis Drive is the Mabel Davis Conservation Area. Residential neighbourhoods are located to the west that back onto the rail right-of-way. The conservation area is heavily treed, while the neighbourhood is set back from the right-of-way, with an abundance of trees to screen passing trains. The proposed track upgrades are to occur within the existing Metrolinx rail right-of-way; therefore, the visual baseline conditions are classified as *Negligible*.

#### 4.6.6.13 Track Segment BR-13 – Mile 61.30 to Mile 61.80

This segment of the rail corridor is located in close proximity to Kempenfelt Bay in Barrie, which lies on the western edge of Lake Simcoe. The rail corridor is lined on both sides with single-family residential development that is screened with vegetation along both sides of the corridor, and large parks and open spaces are present along the waterfront. At the closest point, a residential dwelling is located approximately 20 metres from the rail right-of-way. Since the proposed track upgrades are to occur within the existing Metrolinx rail right-of-way, the visual baseline conditions are classified as *Negligible*.

#### 4.6.6.14 Track Segment BR-14 – Mile 61.80 to Mile 62.30

Segment BR-43 is located primarily in a residential area; however, residential dwellings are more than 20 metres from the right-of-way. The proposed track upgrades are to occur within the existing Metrolinx rail right-of-way, suggesting the existing conditions will be minimally impacted. Based on this, the visual baseline conditions are classified as *Negligible*.

#### 4.6.6.15 Track Segment BR-15 – Mile 62.30 to Mile 62.80

Further north at the Allandale GO Station, the lakefront and parkland continue around Kempenfelt Bay. The Allandale Station Park (also known as Southshore Park) includes a tourist/community centre and waterfront trail. Users of this park have a clear view of the rail corridor and Allandale GO Station, including the existing storage yard. The views from the park towards Allandale GO Station are not anticipated to change, as the proposed track upgrades are to occur within the existing Metrolinx rail right-of-way, resulting in no vertical disturbances. Thus, the visual baseline conditions are classified as *Negligible*.

#### 4.6.6.16 Track Segment BR-16 – Mile 62.80 to Mile 63.40

The Allandale Waterfront GO Station is Barrie Corridor's terminus station (see Figure 4-35). There is a small parking lot, as well as drop-off and pick-up areas for both buses and cars immediately in front of the station. On the opposite side of the station driveway is Allandale Station building, a heritage easement designated under the *Heritage Railway Stations Protection Act*. This is an area of significance due to its early use as an activity hub for the Grand Trunk Railway. Although the site is recognized for its cultural relevance, the track upgrades are proposed within the existing Metrolinx rail right-of-way. Views to and from the old station building and surrounding areas are not anticipated to change; therefore, the visual baseline conditions are classified as *Negligible*.





FIGURE 4-35 ORIGINAL AND CURRENT ALLANDALE STATIONS

## 4.7 Baseline Conditions - Stouffville Corridor

### 4.7.1 Natural Environment

The Stouffville Corridor portion of the Project study area is in a highly urbanized landscape of Unionville, and Mount Joy (Markham). Meadow habitats (fields) dominate the lands directly bordering the rail corridor. Where natural features occur, they are associated with a small portion of the Rouge River Valley and stormwater management facility/restored valley of Mount Joy Creek adjacent to the Project study area. These natural environments provide wildlife habitat opportunities (e.g., habitat for songbirds) and have potential to support SAR.

SAR “generalists” with habitats that may occur anywhere or may change from year to year include: three species of Bats, Butternut, Nine-spotted lady Beetle and Monarch Butterfly which may occur throughout the Project study Area. These species are difficult to survey, and the potential occurrence of their habitat cannot be discounted. For these reasons, the following SAR “generalists” are considered to potentially occur within most Project study area segments.

SAR Bats include: Tri-colored Bat, Little Brown Myotis and Northern Myotis. Any tree (typically greater than 10 cm DBH) landscaped or naturally occurring as part of forested environments, hedgerows or planted along the track corridor study area may be utilized as bat day roosts or possibly bat maternity roosts. Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fence lines, and grow within the tracks due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed

areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, the Nine-Spotted Lady Beetle or C9 is also a habitat generalist, typically found in areas with grassland, parkland, riparian areas, agricultural fields and other habitats where aphids (food source) is in abundance. In Ontario this species of insects is considered overlooked (individuals or small populations) with no occurrences reported after the 1990's.

SWH is limited with candidate habitats occurring in association with Rouge River and Mount Joy Creek (edges only) and extend beyond the Project study area. Similar to SAR bat roost habitat, bat maternity colonies for non-SAR bats may occur where any tree (typically greater than 10 cm DBH) occurs. This type of habitat is very difficult to evaluate and map although it should not be discounted from potentially occurring within the corridor.

An overview of the baseline conditions for the Stouffville Corridor is provided below.

#### 4.7.1.1 Unionville Storage Yard Facility

The Unionville Storage Yard corresponds to segments ST-1 and ST-2.

This segment occurs within the partially urbanized setting of the City of Markham, within Ecoregion 7E-4. Surrounding land uses consist primarily of residential, institutional and planned mixed-use high rise.

##### Wetlands

No wetland features are present within this segment.

##### Vegetation

Vegetation communities adjacent to this Project study area segment is comprised of hedgerows along the margins of the existing rail corridor. A small forest community (naturalized pine plantation; CUP) occurs adjacent to southern limit of proposed Unionville Storage Yard. This community is comprised of matrix of plantation and fresh-moist poplar deciduous forest dominated by Manitoba Maple, and Carolina Poplar (*Populus xcanadensis*), with some Willow sp., Hybrid White Willow (*Salix alba* x *S. fragilis*), Black Walnut (*Juglans nigra*), Black Locust, Scots Pine (*Pinus sylvestris*) and Red Pine (*Pinus resinosa*).

Other dominant vegetation communities occurring within this segment of the Project study area adjacent to the existing rail corridor include Cultural Meadow (CUM), Cultural Thicket (CUT) and woodland (FOD) within the Rouge River valley. Sporadically occurring small marsh (MA) communities dominated by European Common Reed and a naturalized pond (old stormwater management facility) with open water occurs adjacent to this segment.

##### Wildlife

No targeted wildlife surveys were performed as part of previous TPAP studies. Vegetation occurring along the existing rail corridor, together with the adjacent FOD woodland provide foraging and nesting habitat opportunities for resident and migratory birds and common urban mammals including deer and coyote in and along the Rouge River valley corridor.

##### Aquatic Environment

These segments of the Project study area occur within the Middle Rouge River watershed management zone. The Middle Rouge River flows west to east under the rail corridor in these segments of the Project study area. The Rouge valley in this location is well defined and extensively vegetated with a variety of community types including mixed woodlands, CUT and CUM.

The Rouge River Fisheries Management Plan (TRCA, 2010) (RRFMP) cites that the Middle Rouge River is cool-water habitat and becomes warmwater habitat once it joins with the Central Main Rouge River. According to the Draft RRFMP, target fish species include Largemouth Bass, Yellow Perch, Brassy Minnow (*Hybognathus hankinsoni*) and Rainbow Darter (*Etheostoma caeruleum*) while portions of this



management zone provide permanent habitat for as many as 32 fish species including cold-water trout species and Redside Dace, a provincially and nationally endangered species. The desktop review determined that the subject reach within these segments of the Project study area is not regulated habitat for Redside Dace (SLR, 2012).

TABLE 4-20 EXISTING FISH AND FISH HABITAT SUMMARY – SEGMENTS ST-1 – ST-2

Waterbody	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
Rouge River – ST-2	Permanent Large Riverine	Cool-water	Direct	Variety of Cyprinid species, Largemouth Bass, Yellow Perch, Brassy Minnow and Rainbow Darter	Large Riverine habitat through well developed mature riparian corridor	None	July 1 to September 15

#### Species at Risk

No species at risk or MNRF area sensitive species were observed within these segments of the Project study area during previous studies (Morrison Hershfield, 2017). SAR generalists with habitats that may occur anywhere, including three species of bats, Butternut, and Monarch Butterfly may occur within the subject segments. The 2019 (SLR) evaluation determined that habitats for Eastern Meadowlark (*Sturnella magna*), Bobolink (*Dolichonyx oryzivorus*), Grasshopper Sparrow are not suitable (cultivated). However, Eastern Wood-pewee, Red-headed Woodpecker and Snapping Turtle have the potential to occur based availability of suitable habitat. Avian SAR may occur in association with the adjacent meadows and cultural woodland. The proximity of the ponds and wetland habitats within these segments of the Project study area provide habitat for Snapping Turtles whereby they could utilize the south slope embankments and or gravel surfaces of the tracks abutting these features for nesting.

#### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within these segments of the Project study area during previous studies (Morrison Hershfield, 2017). The 2019 (SLR) evaluation determined SWH is limited with candidate habitats occurring in association with the naturalized plantation (woodland) and in the adjacent mixed woodland communities along the Rouge River corridor. Candidate habitats in addition to bat roosts may include: Raptor Nesting - Woodland Habitat (plantation) and Special Concern, and Rare Wildlife Species. SWH habitats and criteria identified are outlined in **Appendix B1**.

#### Designated Areas

The Rouge Valley through this Project study area segment is designated an Urban River Valley Area as part of the provincial Greenbelt Plan. The Rouge River valley corridor is also designated municipally in the City of Markham Official Plan as part of the City's Greenway System.



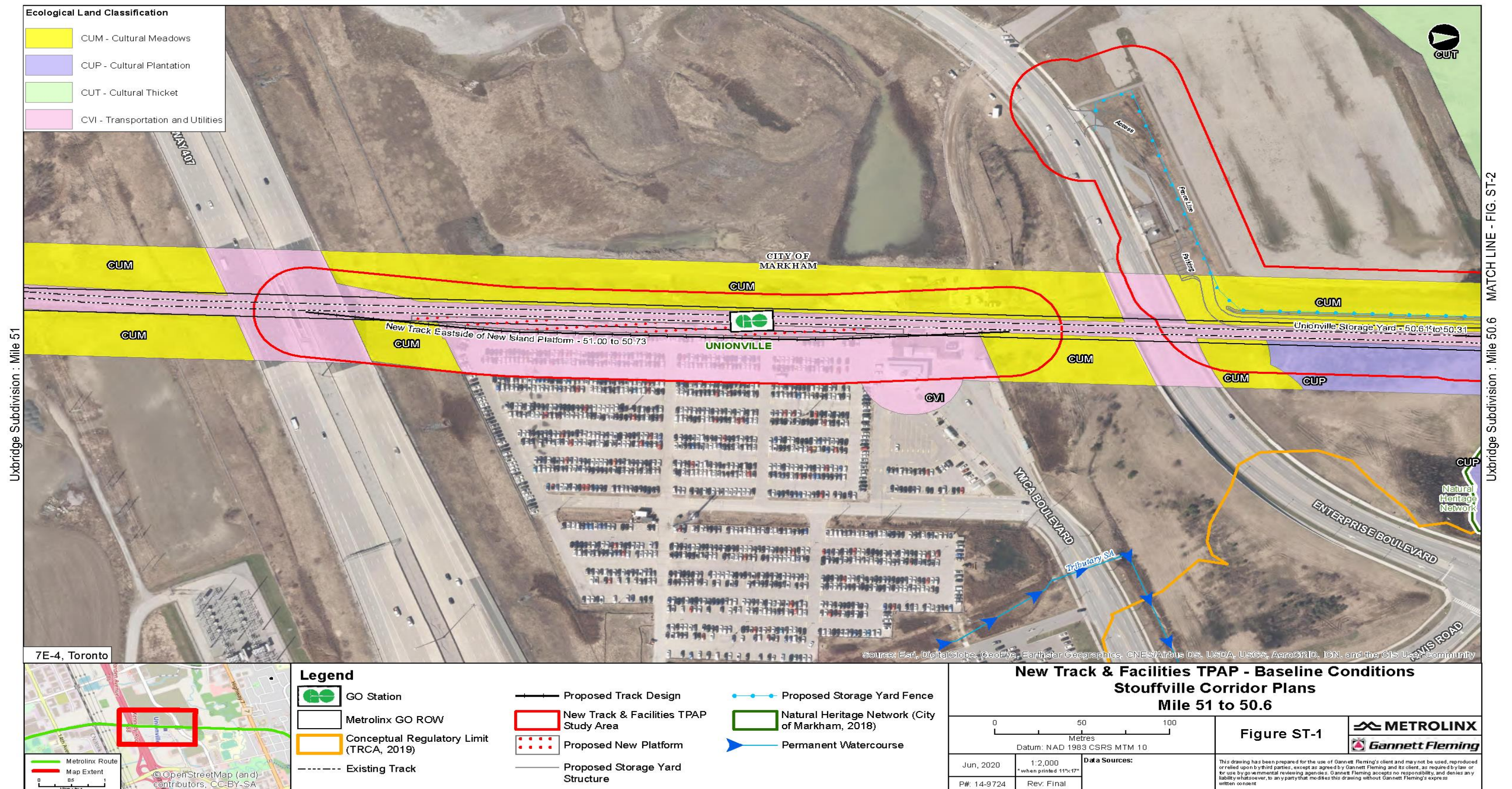


FIGURE 4-36 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT ST-1 – UNIONVILLE STORAGE FACILITY



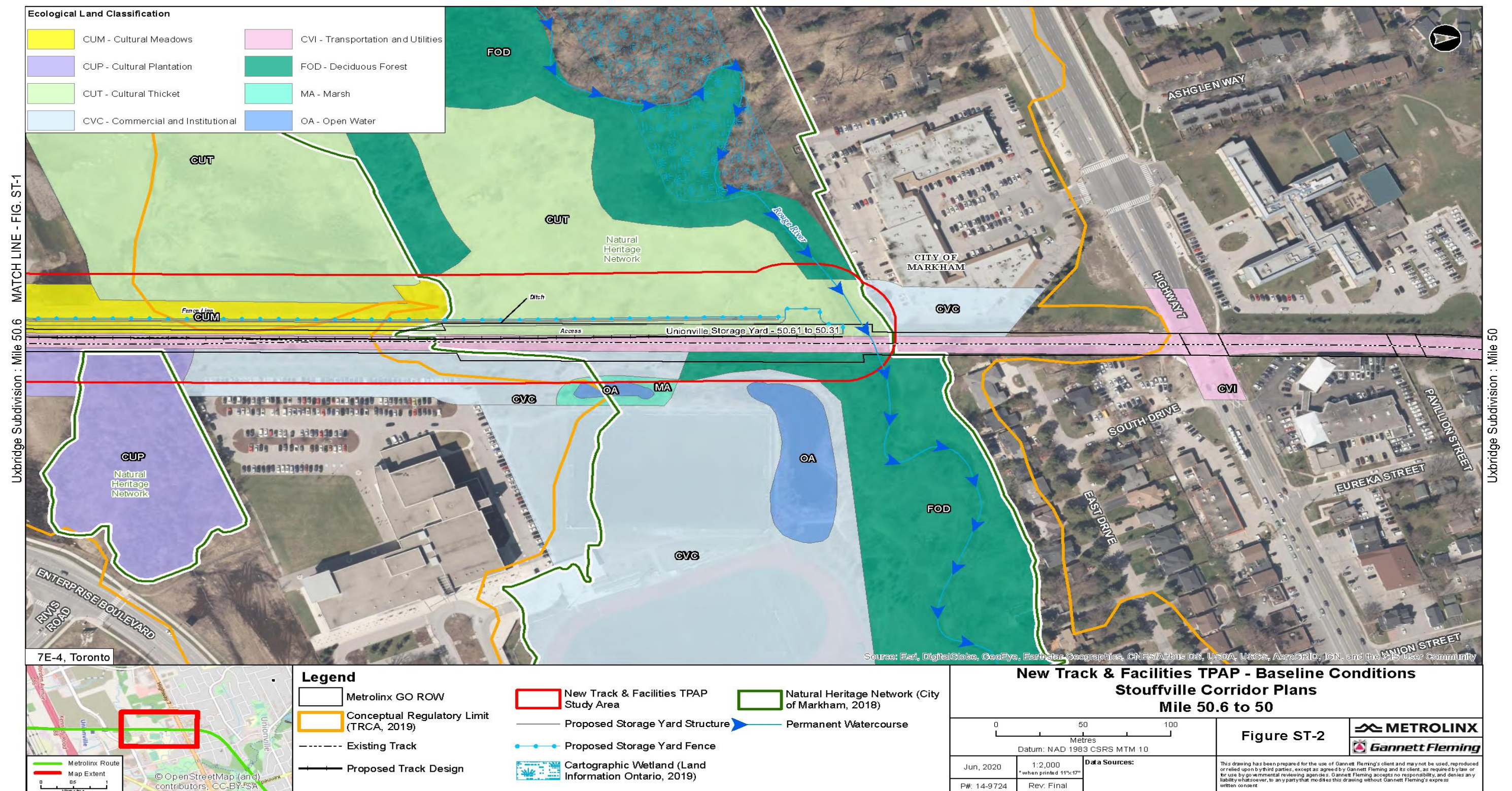


FIGURE 4-37 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT ST-2 – UNIONVILLE STORAGE FACILITY



#### 4.7.1.2 Track Segment ST-1 0 Mile 51.00 to Mile 50.60

Refer to Section 4.7.1.1 – Unionville Storage Facility.

#### 4.7.1.3 Track Segment ST-2 – Mile 50.60 to Mile 50.00

Refer to Section 4.7.1.1 – Unionville Storage Facility.

#### 4.7.1.4 Track Segment ST-3 – Mile 46.30 to Mile 45.80

This segment of the Project study area occurs within the urbanized setting of the City of Markham within Ecoregion 7E-4. Surrounding land uses consist primarily of residential, commercial and institutional uses.

##### Wetlands

No wetland features are present within this segment of the Project study area, although small pockets of Meadow Marsh (MAM) units occur on adjacent lands.

##### Vegetation

Coniferous and deciduous trees and shrubs (hedgerows) line the margins of the existing rail corridor through much of this Project study area segment. Vegetation communities adjacent to the existing corridor include Cultural Meadow (CUM) and marsh communities (European Common Reed dominated) comprising the Mount Joy Creek riparian area. The meadow riparian community edge is dominated by various species including many non-native species. Species present along the rail corridor edge are common meadow species including Smooth Brome, Timothy Grass (*Phleum pratense*), Queen Anne's Lace (*Daucus carota*), Sweet White Clover (*Melilotus alba*), Canada Goldenrod (*Solidago altissima*) and Teasel (*Dipsacus fullonum*).

##### Wildlife

Targeted wildlife investigations were not conducted as part of previous TPAP studies. Vegetation occurring along the existing rail corridor, together with the adjacent CUM provide foraging and nesting habitat for resident and migratory birds and common urban mammals. During the 2019 field visit, several turtle (species unknown) depressions were observed in this segment of the Project study area along the track ballast (gravel) and generally within 100 meters of the small wetland communities.

##### Aquatic Environment

These segments of the Project study area occur within the Mount Joy Creek sub-watershed, the main channel of which flows adjacent and at times parallel to the rail corridor. The Mount Joy Creek sub-watershed lies within the Rouge River Watershed. This sub-watershed is typically a warmwater habitat system that derives the majority of its flow from surface runoff. No fish have been captured in the upper reaches of this system by SLR during prior sampling events. MNR considers the system to contain a CRA fishery. Table 4-21 summarizes fish and fish habitat conditions in segments ST-3 and ST-4.



TABLE 4-21 EXISTING FISH AND FISH HABITAT SUMMARY – SEGMENTS ST-3 – ST-4

Waterbody	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
Mount Joy Creek – ST-3 and ST-4	Intermittent	Warmwater	None Captured – MNRF considers Direct	None	Defined channel; flows originate from a buried system upstream and channel containing Phragmites. Flows alongside rail line	None	July 1 to March 31

#### Species at Risk

No targeted wildlife studies were completed during previous TPAP studies. The 2019 (SLR) evaluation determined that based on the information provided by the DFO Species at Risk mapping, Mount Joy Creek is not a regulated Redside Dace habitat, nor has it been identified for other aquatic SAR (e.g., Eastern Pondmussel). However, due to its proximity of the creek and the SWM pond, the track bed may provide habitat for Snapping Turtle, which may utilize the south facing gravel surfaces of the tracks for nesting.

#### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified within these segments of the Project study area during previous TPAP studies. The 2019 evaluation determined SWH is limited with candidate habitats occurring in association with Mount Joy Creek. Candidate habitats in addition to bat roosts may include: Turtles Nesting Habitat and Amphibian Breeding Habitat (Wetlands).

#### Designated Areas

No provincially designated features are present within this segment. The Mount Joy Creek riparian corridor is municipally designed as part of the City of Markham's Greenway System.

##### 4.7.1.5 Track Segment ST-4 – Mile 45.80 to Mile 45.30

Refer to Section 4.7.1.4 – Segment ST-3.



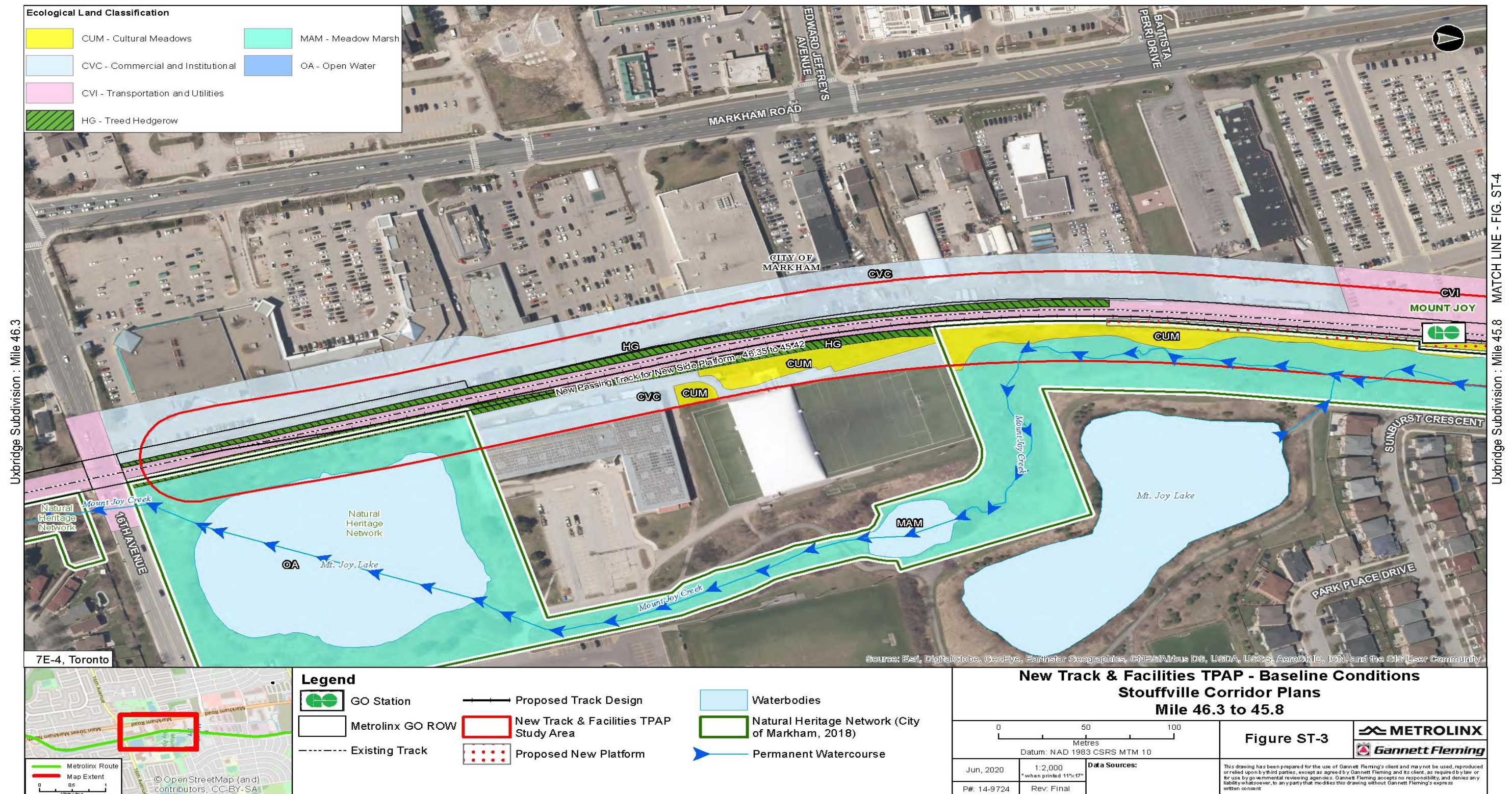


FIGURE 4-38 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT ST-3 – MILE 46.30 TO MILE 45.80



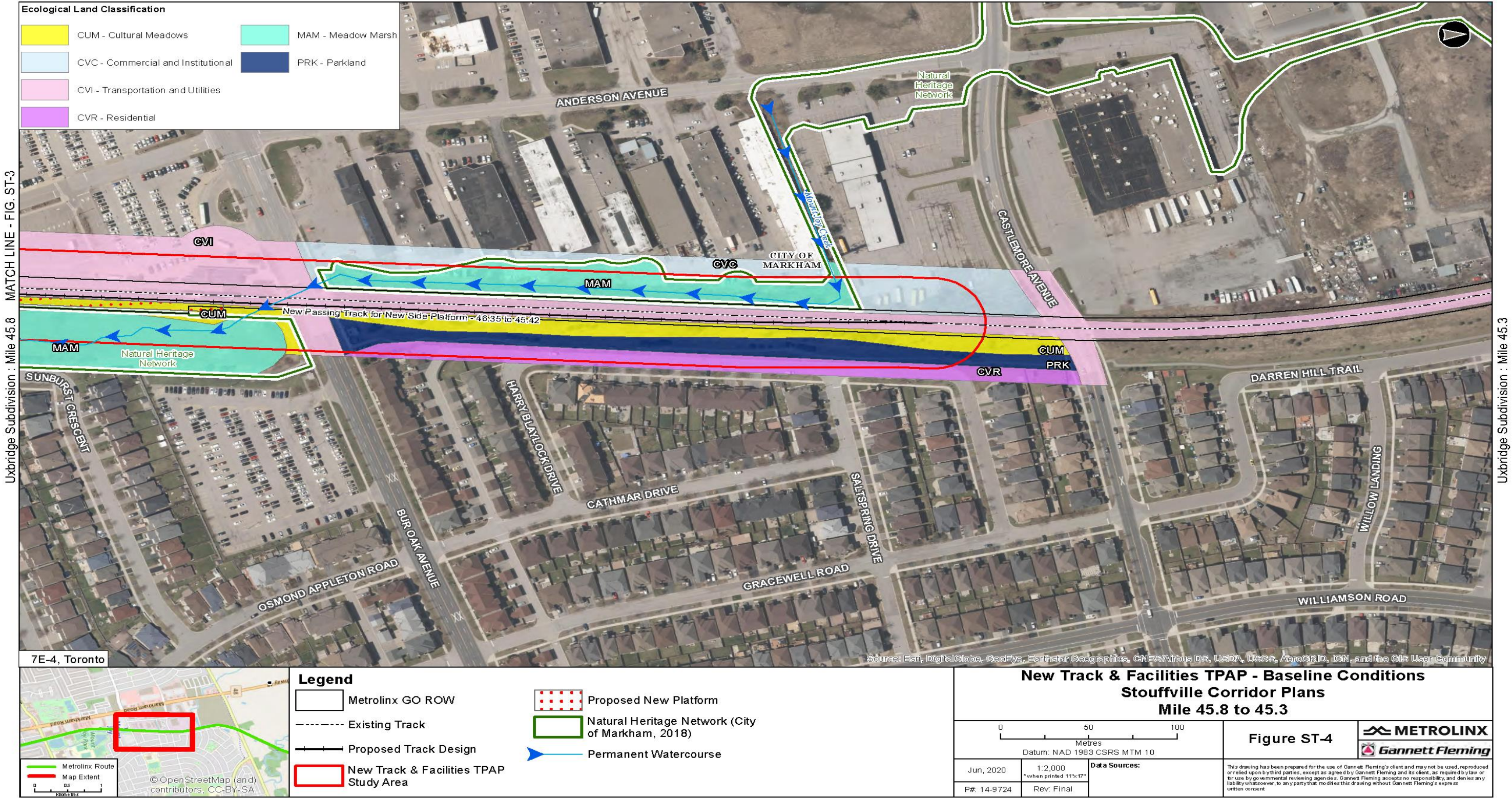


FIGURE 4-39 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT ST-4 – MILE 45.80 TO MILE 45.30



#### 4.7.2 Hydrogeology

There are two watercourse crossings within the Stouffville Corridor: The Rouge River within segment ST-4 and Mount Joy Creek within segments ST-5 and ST-6. The Rouge River is a coldwater creek with permanent flows towards the east, west and south. The Mount Joy Creek has intermittent flow and provides warmwater habitat.

All segments within the Stouffville corridor are located within the Peel Plain physiographic region. The Peel Plan covers 300 square miles across the Regional Municipalities of York, Peel, and Halton. The plain consists of the underlying till with shale and limestone at depth, and deep beds of stone free clay at surface. The clay is assumed to be brought on by meltwater flowing to the east and north and by a temporary lake that formed between the ice lobe in the Ontario basin and higher elevation lands.

The South Slope is located on the southern slope of the Oak Ridges Moraine, extending from the Niagara Escarpment to the Trent River, and covering 940 square miles. The south slope is generally comprised of drumlinized till plains that are sandier to the east and clayey to the west. Streams originating in the ORM flow within sharp cut valleys run directly down the slope towards Lake Ontario. Substantial buried sands in the tills are regional in nature. The south slope overlies limestone and shales, and the material in the till is directly related, suggesting it was deposited from glacial ice advancing and retreating.

No segments within the Stouffville corridor are located in wellhead protection areas or intake protection zones, meaning groundwater and surface water resources in these areas are not as sensitive to chemical or pathogen contamination.

Refer to the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1** for MECP water well records for areas adjacent to the Stouffville rail corridor ROW.

The Rouge River is the only watershed that exists within the Stouffville Corridor. Below is a description of the Rouge River Watershed.

##### 4.7.2.1 Unionville Storage Yard Facility

The segment is located in the Rouge River Sub-watershed. Within the Rouge River Sub-watershed, land cover is 40% rural, 35% urban and 25% natural cover, with a drainage area of approximately 336 km<sup>2</sup>. Like most of the other watersheds in the TRCA jurisdiction, waters within the watershed originate from the ORM and flow south to Lake Ontario. As part of the 2007 watershed report, between 40% and 80% of the baseflow in the Rouge River tributaries was sourced from the shallow ORM Aquifer Complex; however, baseflow losses were significant in the southern reaches of the watershed.

The surface water quality in the Rouge River Sub-watershed is generally considered clean with no significant parameters of concern. Phosphorus levels have decreased; however, as a result of increased urbanization, chloride levels have increased over the past decade.

Additional details are found in the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1**.

##### 4.7.2.2 Track Segment ST-1 – Mile 51.00 to Mile 50.60

Refer to Section 4.6.2.1 – Unionville Storage Yard Facility

##### 4.7.2.3 Track Segment ST-2 – Mile 50.60 to Mile 50.00

Refer to Section 4.6.2.1 – Unionville Storage Yard Facility

##### 4.7.2.4 Track Segment ST-3 – Mile 46.30 to Mile 45.80

Refer to Section 4.6.2.1 – Unionville Storage Yard Facility



#### 4.7.2.5 Track Segment ST-4 – Mile 45.80 to Mile 45.30

Refer to Section 4.6.2.1 – Unionville Storage Yard Facility

#### 4.7.3 Land Use and Socio-Economic

##### 4.7.3.1 Unionville Storage Yard Facility

###### Existing Land Use

Bill Crothers S.S. Park is located on the eastern edge of the rail corridor, west of Kennedy Road. A pathway also runs along Enterprise Boulevard, crossing under the rail corridor and along the east side of the corridor. It is noted that the lot direct adjacent (west side) to the proposed storage yard was previously used as a parking lot for the 2015 Pam Am Games. Since the Pam Am Games, the site has been allocated as off-site parking for York University's Markham Campus. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor. Figure 4-40 presents existing land use at the proposed Unionville Storage Facility.

This section of the rail corridor is zoned Transportation and Utilities within the City of Markham.

###### Planned Land Use

A planned bike pathway extends within Rouge Park, per the City of Markham's Cycling Master Plan. It is noted that the City of Markham has initiated an Active Transportation Master Plan and has conducted public meetings to gain feedback from the community. The final report is anticipated to be prepared in Fall 2020, and therefore the study is still in draft.

Additionally, the City of Markham has approved the Markham Greenlands Master Plan in 2004, which defines a connected trail network in three areas. The Warden Avenue to Main Street Unionville (Area 3) has undergone detailed design and the trail network is anticipated to begin being constructed in 2020.



FIGURE 4-40 EXISTING LAND USE AT THE PROPOSED UNIONVILLE STORAGE FACILITY

This segment of the rail corridor passes through the Markham Centre Secondary Plan area – widely considered the City’s downtown. The general purpose of this Plan is to promote a vibrant urban growth centre that is characterized by a diversity of residential, retail, office and public uses that are accessible by public transit. It is noted that the City of Markham is currently preparing an updated secondary plan for the area known as Markham Centre. Based on information available to date, the City of Markham is exploring opportunities to enhance the integration of this civic centre with future developments.

#### 4.7.3.2 Track Segment ST-1 – Mile 51.00 to Mile 50.60

##### Existing Land Use

A pedestrian pathway runs along Enterprise Boulevard, crossing under the rail corridor. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This section of the rail corridor is zoned Transportation and Utilities within the City of Markham.



### Planned Land Use

This segment of the rail corridor passes through the Markham Centre Secondary Plan area – widely considered the City’s downtown. The general purpose of this Plan is to promote a vibrant urban growth centre that is characterized by a diversity of residential, retail, office and public uses that are accessible by public transit. Any future development will comply with the land use designations. a cycling route is planned along 14th Avenue According to the City of Markham’s Pathway and Trails Master Plan (see Figure 4-41).

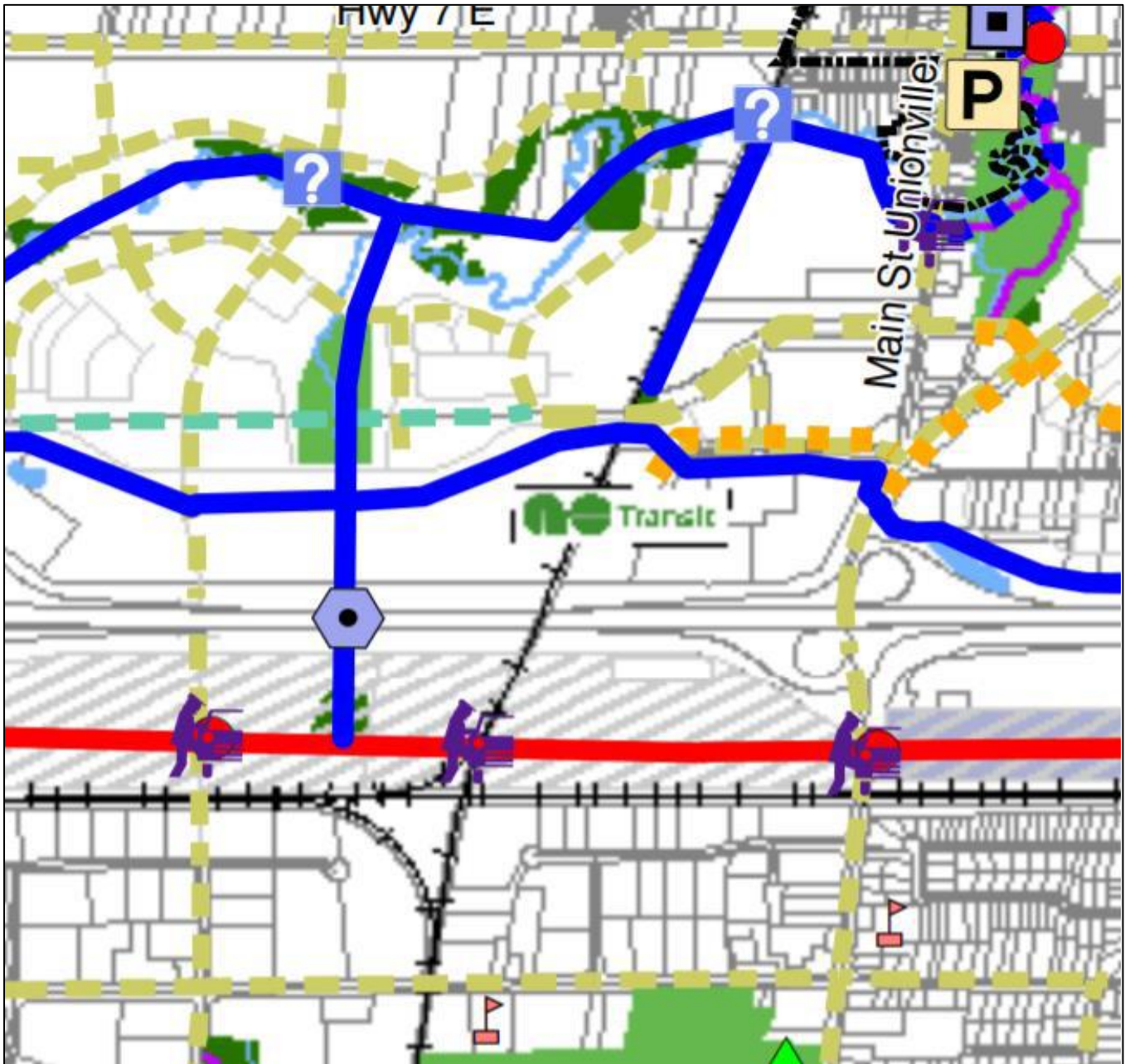


FIGURE 4-41 EXCERPT FROM CITY OF MARKHAM PATHWAY AND TRAILS MASTER PLAN MAP 4  
There are no other known planned recreational amenities within this segment of the rail corridor.

#### 4.7.3.3 Track Segment ST-2 – Mile 50.60 to Mile 50.00

This segment corresponds to the location of the proposed Unionville Storage Facility. Refer to Section 4.7.3.1.

#### 4.7.3.4 Track Segment ST-3 – Mile 46.30 to Mile 45.80

##### Existing Land Use

The Mount Joy Community Centre and Park are located directly west of the rail corridor. The park comprises Exhibition Creek, Mount Joy Lake, and a trail around the lake that leads to a sports field. Two child-care centres and one community centre are located within 100 metres of the rail corridor. They include:

- Markham Montessori - located just south of 16th Avenue
- Little Readers Academy - located north of 16th Avenue
- The Mount Joy Community Centre - located west of the rail corridor

Segment ST-5 also includes a pathway that traverses Exhibition Creek.

This section of the rail corridor is zoned Transportation and Utilities within the City of Markham.

##### Planned Land Use

This segment of the rail corridor falls within the Berczy Village/Wismer Commons/Greensborough/Sawn Lake site specific policy area. This policy area is further divided into sub-policy areas. The rail corridor is designated within the Local Corridor – Markham Road Corridor – Mount Joy. The land use objectives within this designation promote mixed-use areas that seek to integrate housing, employment, shopping and recreational opportunities, while supporting transit opportunities. The City of Markham is also currently preparing the Mount Joy Secondary Plan for a mixed-use corridor that integrates a range of housing, employment, shopping and recreation opportunities, at transit supportive densities adjacent to the Mount Joy GO station. Any future development will comply with existing land use designations.

A cycling route is planned along 16th Avenue and Highway 48/Markham Road, per the City of Markham's Pathway and Trails Master Plan.

This segment of the rail corridor is zoned Transportation and Utilities within the City of Markham.

#### 4.7.3.5 Track Segment ST-4 – Mile 45.80 to Mile 45.30

##### Existing Land Use

Along the east side of the rail corridor is a pathway that extends north into the Town of Whitchurch-Stouffville. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

##### Planned Land Use

This segment of the rail corridor falls within the Berczy Village/Wismer Commons/Greensborough/Sawn Lake site specific policy area. An existing cycling route along Highway 48/Markham Road is planned to be extended to Anderson Avenue and Castlemore Avenue, as identified in the City of Markham's Pathway and Trails Master Plan.

#### 4.7.4 Cultural Heritage

##### 4.7.4.1 Unionville Storage Yard Facility

No previously identified BHLs or CHLs are located at the Unionville Storage Yard location in the City of Markham.



#### 4.7.4.2 Track Segment ST-1 – Mile 51.00 to Mile 50.60

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.7.4.3 Track Segment ST-2 – Mile 50.60 to Mile 50.00

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.7.4.4 Track Segment ST-3 – Mile 46.30 to Mile 45.80

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.7.4.5 Track Segment ST-4 – Mile 45.80 to Mile 45.30

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

### 4.7.5 Archaeology

For the detailed historical and archaeological context of the Stouffville Corridor, please refer to the *Metrolinx NTF TPAP Archaeology – Baseline Conditions Report*, (**Appendix G1**). A summary of the historical and archaeological context for key segments of the Stouffville is provided below.

#### 4.7.5.1 Unionville Storage Yard Location

The Unionville Storage Yard corresponds to segments ST-1 and ST-2.

Segment ST-1 is located between Highway 407 and Unionville GO Station in the City of Markham. This area corresponds to lands within the Johnson-Butler/Williams Treaties, Markham Township, and Borden block AIGt. Eight previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least six previous reports detail fieldwork within 50 m of segment ST-1, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment ST-1 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Rouge River);
- Early historic transportation routes (14th Avenue, Kennedy Road);
- Proximity to early settlements (Hagerman's Corners); and
- Well drained soils (Woburn loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Areas of archaeological potential at this location are presented visually in Figure 4-42.

#### 4.7.5.2 Track Segment ST-2 – Mile 50.60 to Mile 50.00

Segment ST-2 is located between Highway 407 and Unionville GO Station in the City of Markham. This area corresponds to lands within the Johnson-Butler/Williams Treaties, Markham Township, and Borden block AIGt. Six previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least six previous reports detail

fieldwork within 50 m of segment ST-2, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment ST-2 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Rouge River);
- Early historic transportation routes (14th Avenue, Kennedy Road);
- Proximity to early settlements (Hagerman's Corners); and
- Well drained soils (Woburn loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.



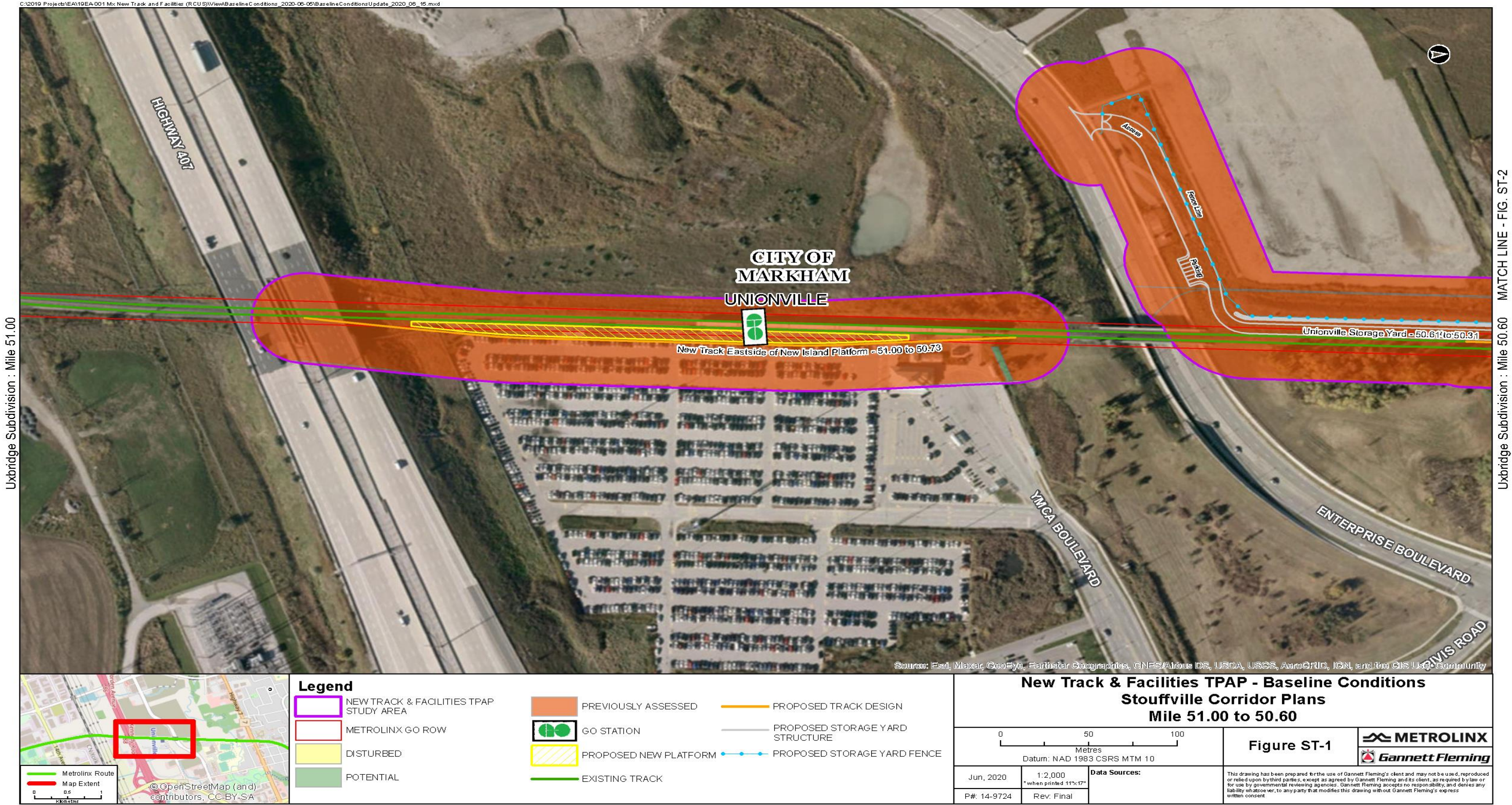


FIGURE 4-42 ARCHAEOLOGICAL POTENTIAL AT THE UNIONVILLE STORAGE FACILITY (SEGMENT ST-1)





FIGURE 4-43 ARCHAEOLOGICAL POTENTIAL AT THE UNIONVILLE STORAGE FACILITY (SEGMENT ST-2)



#### 4.7.5.3 Track Segment ST-4 – Mile 46.30 to Mile 45.80

Segment ST-4 is located between 16th Avenue and Bur Oak Avenue through Mountjoy GO Station in the City of Markham. These lands correspond to the Johnson-Butler/Williams Treaties, Markham Township, and Borden block AIGt. 13 previously registered archaeological sites are located within 1 km of the study area according to the OASD, none of which are located within 50 m. At least four previous reports detail fieldwork within 50 m of segment ST-4, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment ST-4 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Rouge River);
- Early historic transportation routes (16th Avenue, Markham Road); and
- Proximity to early settlements (Mountjoy).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.7.5.4 Track Segment ST-5 – Mile 45.80 to Mile 45.30

Segment ST-5 is located south of Bur Oak Avenue through Mountjoy GO Station to Castlemore Avenue in the City of Markham. This area corresponds to lands within the Johnson-Butler/Williams Treaties, Markham Township, and Borden block AIGt. 12 previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, one of which is located within 50 m. At least five previous reports detail fieldwork within 50 m of segment ST-5, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment ST-5 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Rouge River);
- Early historic transportation routes (16th Avenue, Markham Road); and
- Proximity to early settlements (Mountjoy).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.7.6 Visual/Aesthetics

##### 4.7.6.1 Unionville Storage Yard Facility

This segment is located north of the Unionville GO Station between Enterprise Road and south of Highway 7 in the City of Markham (see Figure 4-44). Land uses abutting the rail corridor are currently mixed use, institutional and/or natural area, which are planned for the future development of Downtown

Markham. Downtown Markham is to be a mix of residential and commercial buildings, intertwined with natural park areas and easy access to public transit.

Just north of Highway 7, the character of the rail corridor is comprised of mostly residential development interspersed with parks abutting the rail ROW. Some homes back up to the track while in other areas, the homes front the track facing a local street that closely parallels the corridor.



FIGURE 4-44 HISTORIC UNIONVILLE GO STATION

Since the proposed Unionville equipment storage yard is in an area surrounded by commercial, residential, and institutional uses, the baseline conditions are classified as *Moderate*. The proposed storage facility has the potential of disturbing the existing views from the school and future commercial and residential buildings, as well as current and proposed park spaces areas.

#### 4.7.6.2 Track Segment ST-1 – Mile 51.00 to Mile 50.60

Refer to Section 4.7.6.1. Segment ST-2 comprises similar characteristics as the Unionville Storage Facility.

This segment extends from Enterprise Drive to the south of the Highway 407 Express Toll Road, passing by Unionville GO Station. Lands to the west of the corridor are proposed for future commercial/residential development and lands to the east of the corridor contain the existing Unionville GO Station parking lot.

Unionville is the site of the original train station on Main Street, with an at-grade crossing adjacent to the old station building. Main Street is the gateway to the scenic Unionville town center and Unionville Heritage Conservation District, which is located north-east of the proposed infrastructure.

#### 4.7.6.3 Track Segment ST-2 – Mile 50.60 to Mile 50.00

Refer to Section 4.7.6.1. This segment corresponds to the location of the Unionville Storage Facility.

#### 4.7.6.4 Track Segment ST-3 – Mile 46.30 to Mile 45.80

Segment ST-3 comprises industrial development north of 16th Avenue on the east side of the rail right-of-way. The west side of the right-of-way includes a residential development approximately 30 metres



away, as well as Mount Joy Lake Park and recreational fields. Between the Mount Joy GO Station at Bur Oak Avenue and Major MacKenzie Drive, there is industrial development on the east side of the track and residential development on the west side. The side platform and track upgrades are proposed to occur within the existing Metrolinx rail right-of-way. As a result, the visual baseline conditions are classified as *Negligible*.

#### 4.7.6.5 Track Segment ST-4 – Mile 45.80 to Mile 45.30

Refer to Section 4.6.6.4 above as segment ST-4 comprises similar characteristics as ST-3.

### 4.7.7 Stormwater Management

#### 4.7.7.1 Unionville Storage Yard Facility

The total area affected by the proposed Unionville storage yard is approximately 2.0 ha consisting of existing industrial space, railroad tracks/ballast, and undeveloped land. Most of the site is within Metrolinx's right of way (ROW) except for 1) the access road, which runs through the City of Markham ROW, and 2) a strip of land that extends the length of the storage yard, currently privately owned. The Unionville storage yard project area is within the urbanized setting of the City of Markham. Surrounding land use is comprised of a woodland and (fields) lands undergoing preparation for intensive urbanization and a high school. In the subsequent sections of this report only the area affected by the development is considered for the analysis.

Available topographic information indicates there is a berm that runs parallel to the existing tracks and prevents flow from the west from reaching the tracks. Enterprise Boulevard is grade separated below the tracks with retaining walls extending 140 meters to the west of the railway overpass structure. North of the retaining walls exists a relatively flat area which appears to have been graded for future development. The topography indicates that runoff between the berm and tracks is collected in a ditch/swale that drains north toward the Rouge River. The runoff between the area west of the berm and north of Enterprise Boulevard flows overland to the north towards Rouge River.

Detailed geotechnical and hydrogeological investigations will be required at detailed design stage to precisely determine the soil type and confirm Source Water Protection impacts and requirement.

For the existing condition, based on the split land use of industrial and open space (which includes the existing berm), the runoff coefficient, 'C', is estimated at 0.35. Runoff coefficients for industrial and open space were taken from the City of Markham, Engineering Department, Design Criteria Document, Section E (June 2016). See Table 4-22 for characteristics of the existing drainage areas.

Runoff from the proposed site along the railway tracks will be collected in a proposed ditch/swale that will run parallel to the west. Ditch drainage will discharge into a proposed ditch inlet and connect into the existing storm sewer system on Enterprise Boulevard. Further investigations are required to determine the existing storm sewer system capacity and detail the proposed storm sewer connections. It should be noted that the existing and proposed catchment areas are preliminary and need to be reconfirmed during detailed design.

As a result of the proposed site footprint, regrading of the existing berm may be required for the proposed ditch/swale. Further investigations are required to determine the existing berm soil composition and propose solutions to prevent flows entering the site from the west.

The proposed Unionville Storage Yard site development will include a track storage yard, access road and limited parking enclosed by a chain link fence. The site will have a mix of industrial impervious surfaces, track and ballast areas and open space. The industrial impervious, track and ballast and open space areas are 0.8, 0.4 and 0.8 ha respectively. The drainage areas and runoff coefficients for the different area types are shown in Table 4-22. The composite runoff coefficient for the entire site area of 2.0 ha, after development, will be approximately 0.58. Runoff coefficients for industrial and open space were taken from the City of Markham, Engineering Department, Design Criteria Document, Section E

(June 2016). Runoff coefficients for track and ballast areas were taken from the Colorado DOT report titled, "Modeling Ballasted Tracks for Runoff Coefficient C" (August 2012).

TABLE 4-22 UNIONVILLE STORAGE YARD EXISTING AND PROPOSED DRAINAGE AREAS

Existing Condition - Catchment 1			Proposed Condition - Catchment 1		
Area Type	Drainage Area (ha)	Runoff Coefficient	Area Type	Drainage Area (ha)	Runoff Coefficient
Industrial	0.27	0.90	Industrial	0.50	0.90
Track and Ballast	-	-	Track and Ballast	0.43	0.84
Open Space	1.48	0.25	Open Space	0.83	0.25
Total/Composite	1.75	0.35		1.75	0.58

The Unionville Storage Yard is partially within the area regulated by TRCA under O. Reg. 166/06. It is located south of the Rouge River, fully within the Rouge River Watershed.

## 4.8 Lakeshore East Corridor

### 4.8.1 Natural Environment

The Lakeshore East Corridor portion of the Project study area is located in urban settings extending from the eastern end of the City of Toronto through the Town of Whitby and ending in the City of Oshawa. Surrounding land use primarily consists of industrial and commercial facilities, intermixed with residential areas which are dominated by landscaped and planted hedgerows, and cultural vegetation communities including mainly meadow (CUM) habitat. These vegetation communities provide opportunities for urban wildlife habitat. Few watercourses are present within the Project study area segments of this corridor. The main watercourse features include Corbett Creek East and West Branches that contain fish habitat which is afforded protection under the federal *Fisheries Act* and provide conveyance to the Corbett Creek Coastal Community Wetland Complex beyond the Project study area.

SAR "generalists" with habitats that may occur anywhere or may change from year to year include: three species of Bats, Butternut, Nine-spotted lady Beetle and Monarch Butterfly which may occur throughout the Project study Area. These species are difficult to survey, and the occurrence of their potential habitat cannot be discounted. For these reasons, the following SAR "generalists" are considered to potentially occur within most Project study area segments.

SAR Bats include: Tri-colored Bat, Little Brown Myotis and Northern Myotis. Any tree (typically greater than 10 cm DBH) landscaped or naturally occurring as part of forested environments, hedgerows or planted along the track corridor study area may be utilized as bat day roosts or possibly bat maternity roosts. Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fence lines, and grow within the tracks due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, the Nine-Spotted Lady Beetle or C9 is also a habitat generalist, typically found in areas with grassland, parkland, riparian areas, agricultural fields and other habitats where aphids (food source) is in abundance. In Ontario this species of insects is considered overlooked (individuals or small populations) with no occurrences reported after the 1990's.

SWH is limited with candidate habitats occurring in association with Lynde and Corbet Creek, Lynde Shores Conservation Area and small abutting woodlands (edge habitats only) extending beyond this corridor of the Project study area. Similar to SAR bat roost habitat, bat maternity colonies for non-SAR



bats may occur where any tree (typically greater than 10 cm DBH) occurs. This type of habitat is very difficult to evaluate and map, although it shall not be discounted from potentially occurring within the corridor.

An overview of the baseline conditions for the Lakeshore East Corridor is provided below.

#### 4.8.1.1 Track Segment LSE-1 – Mile 323.90 to Mile 323.40

This segment of the Project study area occurs within the urbanized setting of the City of Toronto within Ecoregion 7E-4. Surrounding land use consists of mix of residential and commercial and industrial uses.

##### Wetlands

No wetland features are present within this segment of the Project study area.

##### Vegetation

Deciduous trees and shrubs line the margins of the existing rail corridor through much of this segment of the Project study area. Owing to the highly urbanized setting, small pockets of Cultural Meadow (CUM) and Cultural Thicket (CUT) communities occur in the previously disturbed areas of the CVI (Transportation and Utilities) corridor within this segment of the Project study area. See Figure 4-45 for a depiction of the ecological land classification communities within this segment.



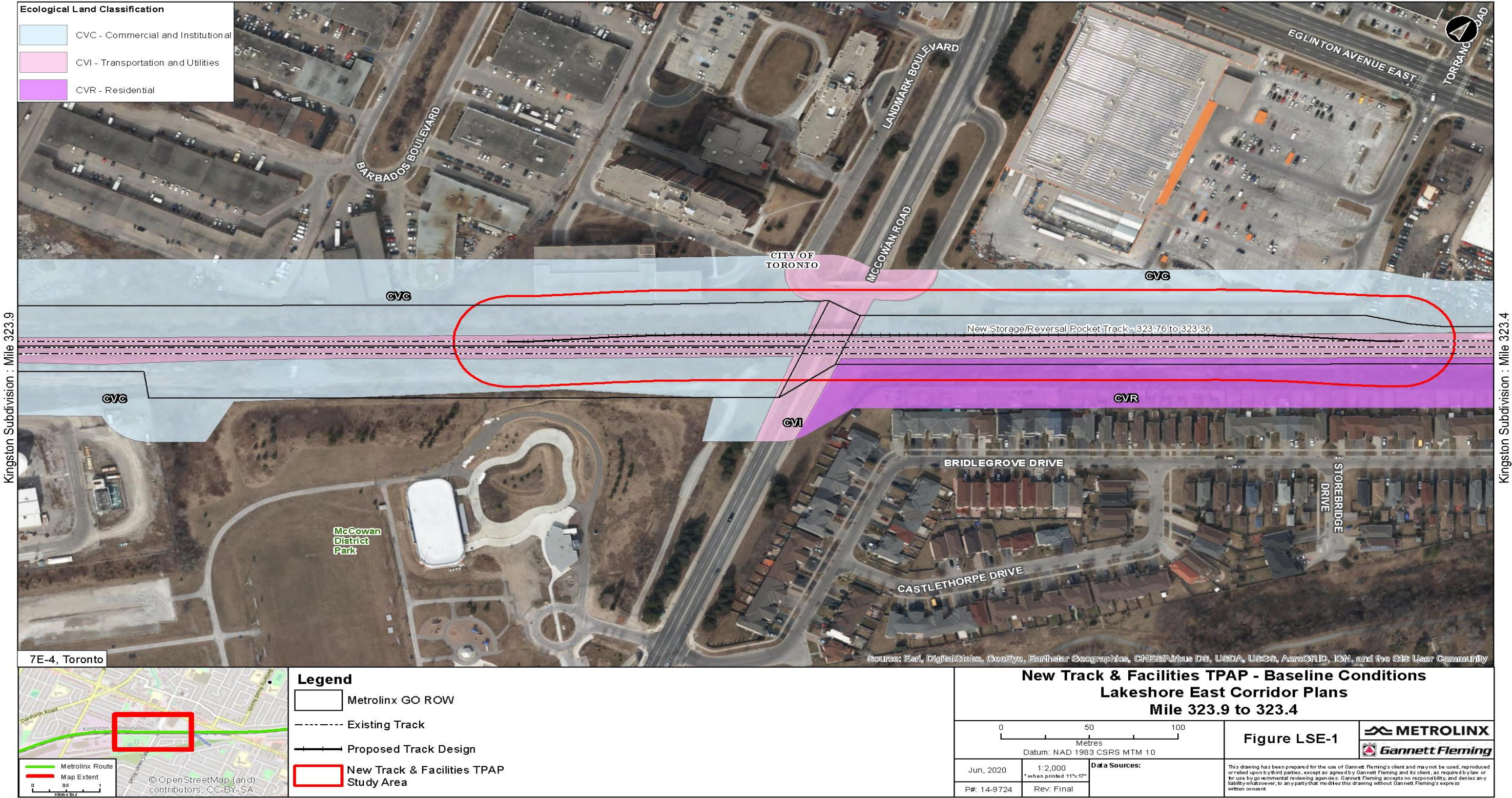


FIGURE 4-45 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT LSE-1 – MILE 323.90 TO MILE 323.40



### Wildlife

Targeted wildlife investigations were not conducted as part of previous TPAP studies. The vegetation occurring along the existing rail corridor provides limited foraging and nesting/shelter habitat for resident and migratory birds and common urban mammals.

### Aquatic Environment

No aquatic features are present within this segment of the Project study area.

### Species at Risk

No species at risk were identified in this segment of the Project study area during previous TPAP studies. An updated evaluation determined that SAR habitat is extremely limited within this segment of Project study area due to the highly urbanized setting (SAR generalists).

### Significant Wildlife Habitat

No SWH candidate or confirmed areas were identified through previous TPAP studies. An updated evaluation determined that candidate habitat is very limited and may include candidate bat roost habitat.

### Designated Areas

No provincially or municipally designated features are present within this segment of the Project study area however McCown District Park, a component of the City of Toronto's Natural Heritage System, borders a portion of this segment boundary.

#### 4.8.1.2 Track Segment LSE-2 – Mile 10.10 to Mile 10.70

This segment occurs within the urbanized setting of the Town of Whitby and within Ecoregion 6E-13. Surrounding land use consists primarily of commercial and industrial uses.

### Wetlands

No Provincially Significant Wetlands occur within these Project study area segment. During the 2019 field investigations a Meadow Marsh (MAM) community within the Corbett Creek West corridor was identified along the western portion of the Thickson Road Expansion (see Figure 4-46).

### Vegetation

The meadow marsh community (MAM) typifies the northern portion of this segment with some cultural meadow (CUM) communities in the southern portion east of Thickson Road. Sporadically occurring deciduous trees and shrubs are present along the existing rail corridor through much of this portion of the Project study area.

### Wildlife

Targeted wildlife investigations were not conducted as part of previous TPAP studies. Vegetation occurring along the existing rail corridor, together with the adjacent cultural thicket and meadow communities provide foraging and nesting habitat opportunities for resident and migratory birds and common urban mammals.



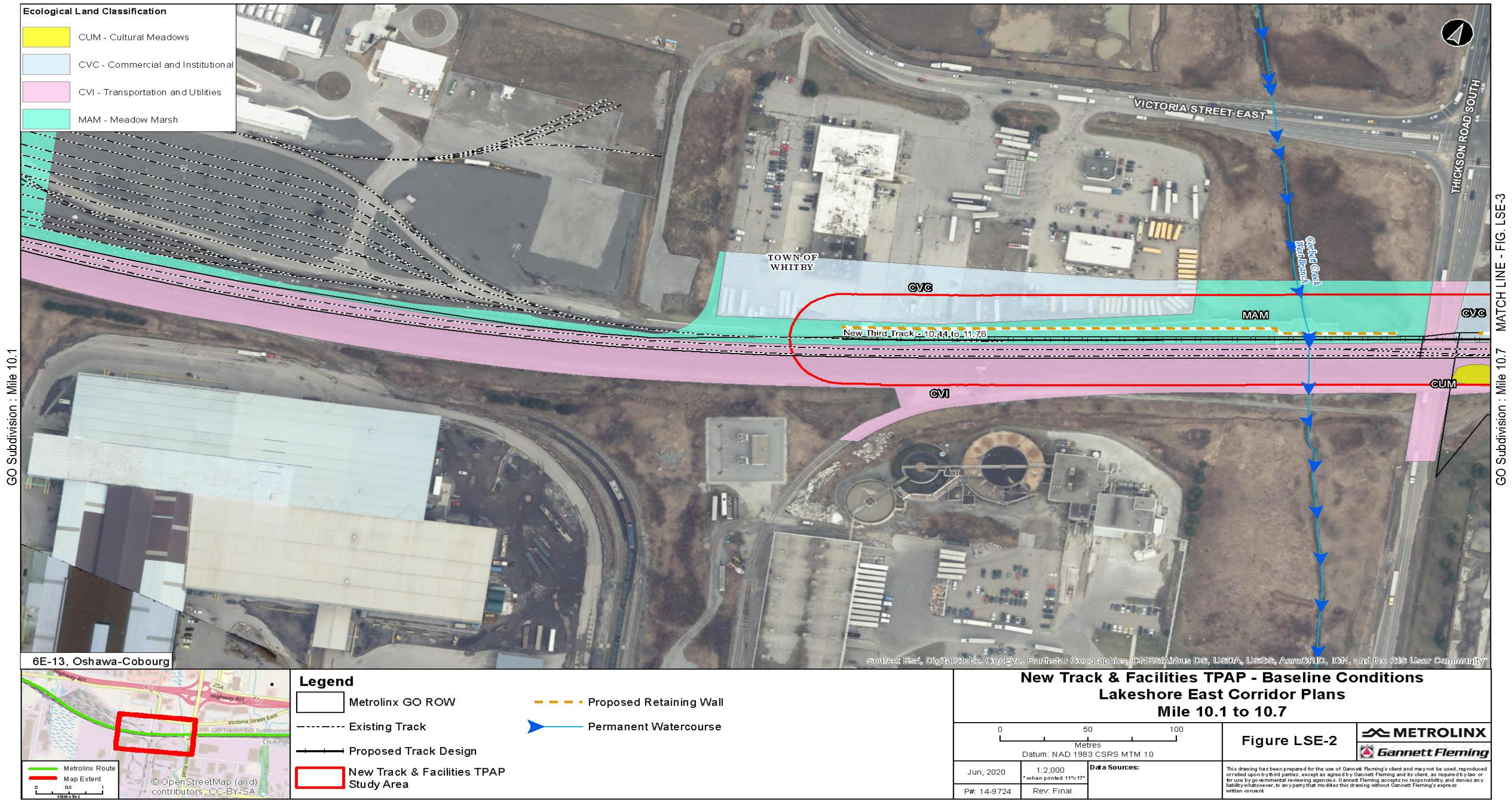


FIGURE 4-46 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT LSE-2 – MILE 10.10 TO MILE 10.70



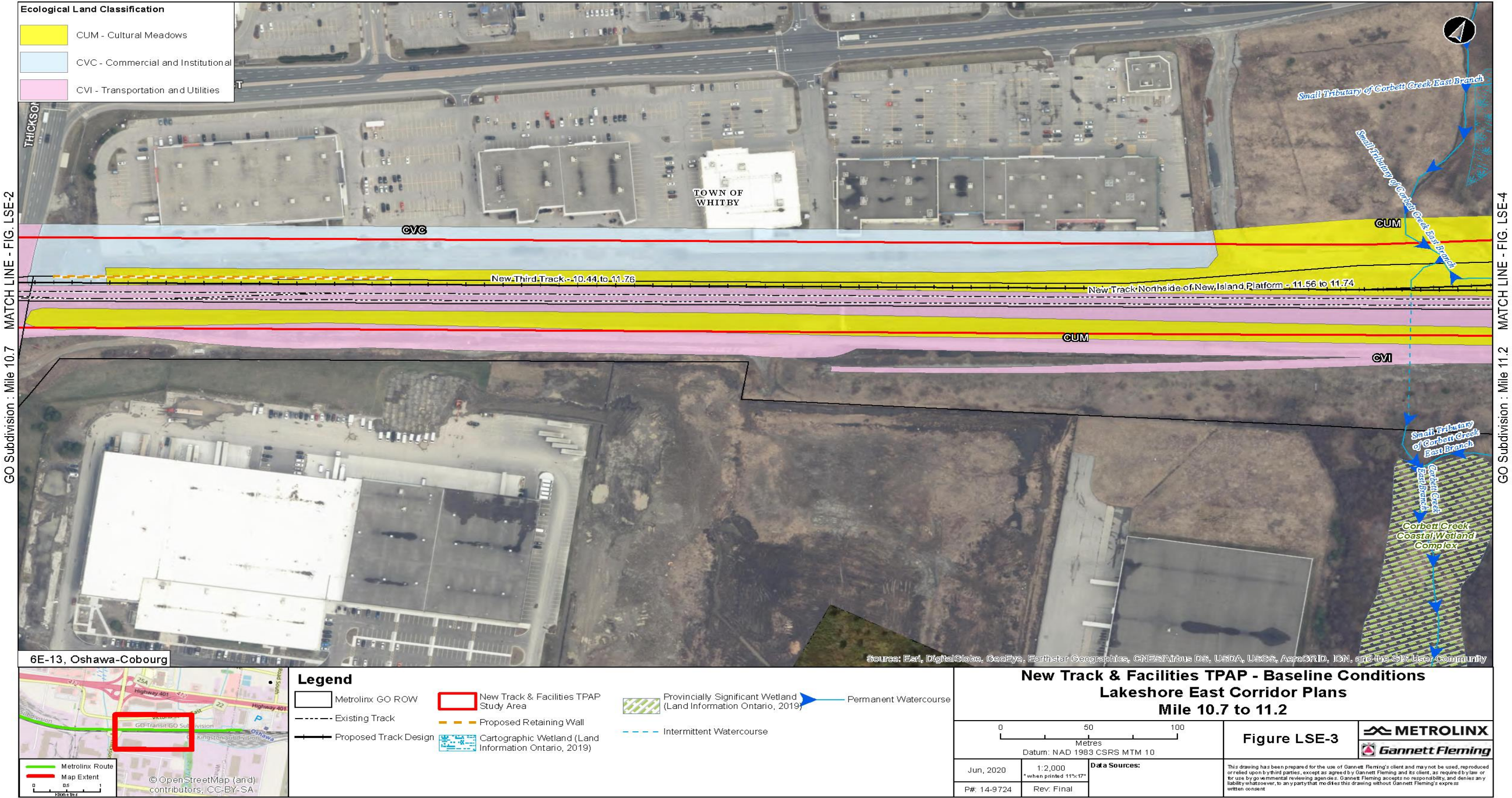


FIGURE 4-47 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT LSE-3 – MILE 10.70 TO MILE 11.20



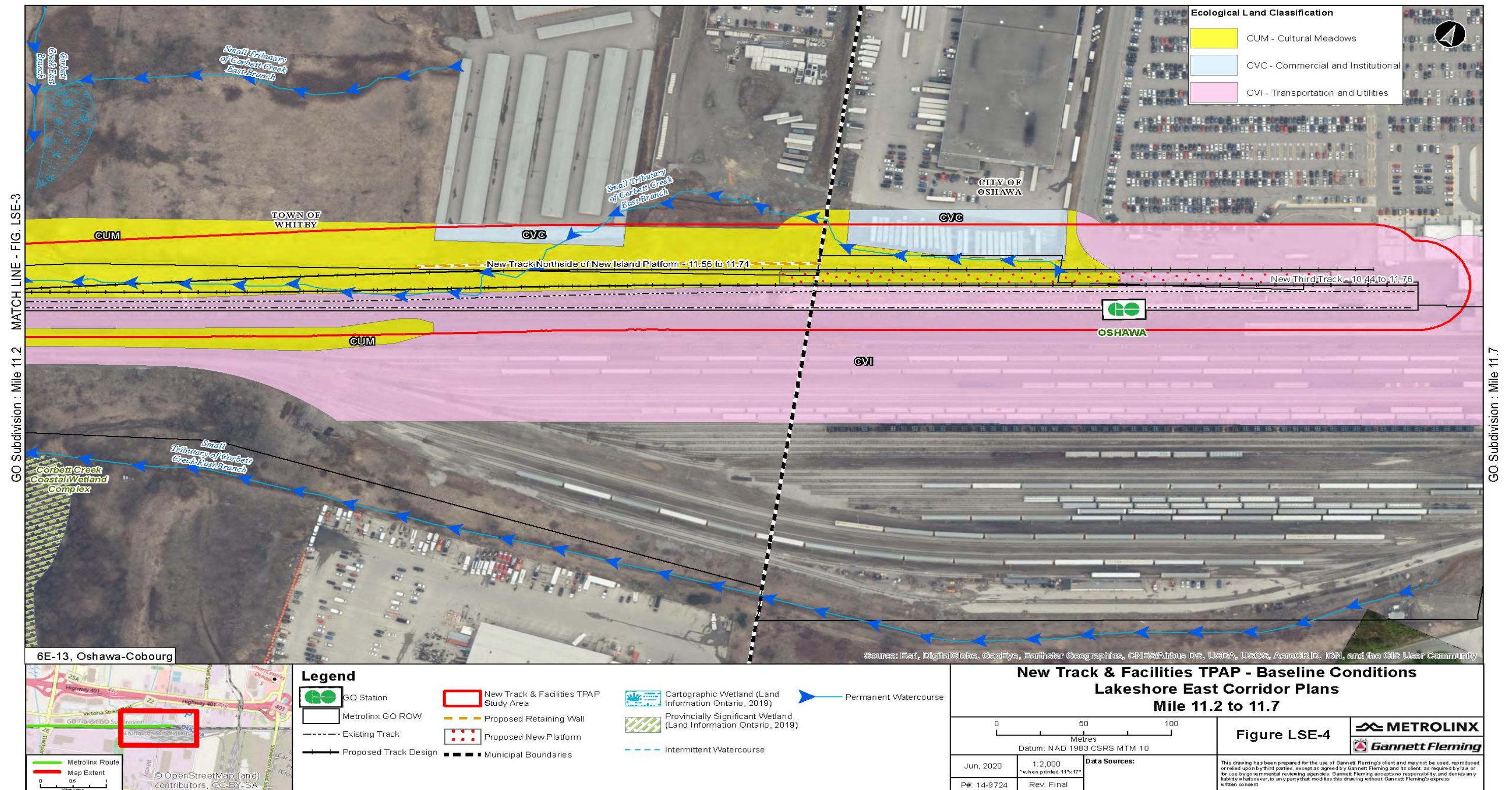


FIGURE 4-48 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT LSE-4 – MILE 11.20 TO MILE 11.70



### Aquatic Environment

This segment of the Project study area occurs within the Corbett Creek watershed. Within the LSE-2 segment, the Western Branch flows in a north-south direction under the existing rail corridor. The headwaters of this system originate on the Lake Iroquois Plain and the channel outlets into Lake Ontario. The MNRF manages the fish habitat in this system for warmwater species.

Information obtained from an MTO study (SLR, 2016) indicates that the Corbett Creek West is known to provide fish and fish habitat. At that time, MNRF identified that White Sucker, Brown Bullhead (*Ameiurus nebulosus*), Pumpkinseed, and Brook Stickleback are present in the watercourse. In addition, fish collections completed as part of that study found young-of-year Cyprinids in this system just upstream of this segment. The portion of channel through the Project study area is conveyed through a culvert under the rail bed.

Similar information provided by MNRF as part of the MTO study indicated that the small Tributary of Corbett Creek East is not known to provide fish and fish habitat; however, fish collections conducted indicate that the watercourse supports a small number of fish including Creek Chub (*Semotilus atromaculatus*). The lower portion East Branch downstream of the project study area was identified by MNRF to support Muskellunge (*Esox masquinongy*), Pumpkinseed, Brown Bullhead, and White Sucker. Table 4-23 summarizes fish and fish habitat conditions in segments LSE-2 through LSE-4.

TABLE 4-23 EXISTING FISH AND FISH HABITAT SUMMARY – SEGMENTS LSE-2 – LSE-4

Waterbody	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
Kronso Creek	Subterranean	N/A	No	None	Entire subcatchment Buried Upstream; Outlets Downstream of Project Study Area	None	July 1 to March 31 due to downstream connection to Krono Creek Branch
Lynde Creek	Permanent	Warmwater	Direct	Diverse fish community including coldwater Brown Trout and Brook Char in the upper reaches, subject reach contains several species of cyprinids and cool-warm water species including White Sucker and Pumpkinseed.	Well defined channel through Lynde Creek Shores Wetland Complex	None	July 1 to March 31
Small Tributary of Lynde Creek	N/A	N/A	None	N/A	Buried upstream catchment – no open channel through the	None	July 1 to March 31 due to direct connection

Waterbody	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
					Project study area.		with Lynde Creek
Corbett Creek West Branch	Permanent	Warmwater	Direct	Common cyprinids, White Sucker, Brown Bullhead Pumpkinseed, and Brook Stickleback	Low gradient defined channel; through a wetland/meadow	None	July 1 to March 31
Corbett Creek East Branch	Permanent	Warmwater	Direct	Creek Chub, Pumpkinseed, Brown Bullhead, and White Sucker. Muskellunge reported in mouth at Lake Ontario	Portion of upstream catchment buried. Channel meanders through meadow before entering a 70m culvert under the rail corridor.	None	July 1 to March 31

### Species at Risk

No species at risk were identified in this portion of the Project study area during previous TPAP studies. The 2019 (SLR) evaluation determined that potential SAR habitat would be limited to generalist species within this portion of the Project study area and confirmed that potential for grassland SAR is unlikely, although it may exist in adjacent suitable habitat beyond the area of study.

### Significant Wildlife Habitat

No SWH candidate or confirmed habitats were identified in this segment of the Project study area during previous TPAP studies. The 2019 (SLR) evaluation determined that SWH habitat is extremely limited. In addition to potential bat roost habitat, candidate SWH may include: Amphibian Movement Corridors. Possible amphibian movement may occur between north (wetland) areas (outside of the Project study area) of Corbett Creek and south (woodland) areas of the Corbett Creek Coastal Wetland Complex. SWH habitats and criteria identified are outlined in **Appendix B1**.

### Designated Areas

No provincially designated features are present within this segment of the Project study area. The Western Branch Corbett Creek is municipally designated as part of the Town of Whitby's Natural Heritage System.

#### 4.8.1.3 Track Segment LSE-3 – Mile 10.70 to Mile 11.20

This segment of the Project study area occurs within the urbanized setting of the Town of Whitby within Ecoregion 6E-13. Surrounding land use consists primarily of commercial and institutional uses. The features discussed below are provided on Figure 4-47.

### Wetlands

No wetlands features are present within this segment of the Project study area. A provincially significant wetland, the Corbett Creek Coastal Wetland Complex, occurs within approximately 100 meters



downstream of the corridor along the East Branch of Corbett Creek. A small unevaluated wetland occurs on the northern portion of the Eastern Branch of Corbett Creek; approximately 75 m north of the existing rail corridor.

### Vegetation

Sporadically occurring deciduous trees and shrubs are present along the existing rail corridor through much of these segments of the Project study area. Cultural meadow (CUM) communities typify the remaining vegetation within and adjacent to the existing corridor.

### Wildlife

Targeted wildlife investigations were not conducted as part of previous TPAP studies. Vegetation occurring along the existing rail corridor, together with the adjacent cultural meadow community provide foraging and nesting habitat opportunities for resident and migratory birds and common urban mammals.

### Aquatic Environment

This segment of the Project study area occurs within the Corbett Creek watershed. The East Branch flows in a north-south direction under the existing rail corridor at the eastern terminus of the segment. The East Branch of Corbett Creek headwaters originate on the Lake Iroquois Plain. A third smaller tributary of the East Branch also occurs and joins the East Branch immediately upstream of the culvert under the existing rail corridor. The East Branch outlets into Lake Ontario at the Corbett Creek Marsh, in the Town of Whitby (CLICA, 2005). The MNRF manages the fish habitat in this system for warmwater species.

Information obtained from an MTO study (SLR, 2016) indicated that the small Tributary of Corbett Creek East is not known to provide fish and fish habitat, although fish collections conducted indicate that the watercourse supports a small number of fish including Creek Chub. The lower portion of the East Branch downstream of the Project study area was identified by MNRF to support Muskellunge (*Esox masquinongy*), Pumpkinseed, Brown Bullhead, and White Sucker; while investigations completed as part of that study indicate that White Sucker, Longnose Dace, and Creek Chub are also present in the subject section of this watercourse.

### Species at Risk

No species at risk were identified in this portion of the Project study area during previous TPAP studies. The 2019 (SLR) evaluation determined that potential SAR habitat would be limited to generalist species within this portion of the Project study area and confirmed that potential for grassland SAR is unlikely, although it may exist in adjacent suitable habitat beyond the area of study.

### Significant Wildlife Habitat

No SWH candidate or confirmed habitats were identified in this segment of the Project study area during previous TPAP studies. The 2019 (SLR) evaluation determined that SWH habitat is extremely limited. In addition to potential bat roost habitat, candidate SWH may include Amphibian Movement Corridors. Possible amphibian movement may occur between north (wetland) areas (outside of the Project study area) of Corbett Creek and south (woodland) areas of the Corbett Creek Coastal Wetland Complex. SWH habitats and criteria identified are outlined in **Appendix B1**.

### Designated Areas

No provincially designated features are present within this segment of the Project study area. The East Branch of Corbett Creek is municipally designated as part of the Town of Whitby's Natural Heritage System. A provincially significant wetland, the Corbett Creek Coastal Wetland Complex, occurs within approximately 100 meters downstream of the corridor along the East Branch of Corbett Creek.

#### 4.8.1.4 Track Segment LSE-4 – Mile 11.20 to Mile 11.70

This segment of the Project study area occurs within the urbanized settings of the Town of Whitby and the City of Oshawa within Ecoregion 6E-13. Surrounding land use consists primarily of commercial and institutional uses (Oshawa GO Station). See Figure 4-48 for a depiction of the ecological land classification communities.

##### Wetlands

No wetland features are present within this segment of the Project study area. A provincially significant wetland, the Corbett Creek Coastal Wetland Complex, occurs within approximately 100 meters downstream of the corridor along the East Branch of Corbett Creek. A small unevaluated wetland occurs on the northern portion of the Eastern Branch of Corbett Creek; approximately 75 m north of the existing rail corridor.

##### Vegetation

Cultural Meadow (CUM) communities typify the northwestern portion of this segment, with sporadically occurring deciduous trees and shrubs present along the existing rail corridor, and little to no vegetation within the Oshawa GO Station yard.

##### Wildlife

Targeted wildlife investigations were not conducted as part of previous TPAP studies. Vegetation occurring along the existing rail corridor, together with the adjacent CUM provide foraging and nesting habitat opportunities for resident and migratory birds and common urban mammals.

##### Aquatic Environment

This segment of the Project study area occurs within the Corbett Creek watershed. The East Branch flows in a north-south direction under the existing rail corridor at the western terminus of the segment. The East Branch of Corbett Creek headwaters originate on the Lake Iroquois Plain. A third smaller tributary of the East Branch also occurs and joins the East Branch immediately upstream of the culvert under the existing rail corridor. The East Branch outlets into Lake Ontario at the Corbett Creek Marsh, in the Town of Whitby (CLICA, 2005). The MNR manages the fish habitat in this system for warmwater species.

Information obtained from an MTO study (SLR, 2016) indicated that the small tributary of Corbett Creek East is not known to provide fish and fish habitat, although fish collections conducted indicate that the watercourse supports a small number of fish including Creek Chub. The lower portion of the East Branch downstream of the Project study area was identified by MNR to support, Pumpkinseed, Brown Bullhead, and White Sucker; while investigations completed as part of that study indicate that White Sucker, Longnose Dace, and Creek Chub are also present in the subject section of this watercourse.

##### Species at Risk

No species at risk were identified in this portion of the Project study area during previous TPAP studies. The 2019 (SLR) evaluation determined that potential SAR habitat would be limited to generalist species within this portion of the Project study area and confirmed that potential for grassland SAR is unlikely, although it may exist in adjacent suitable habitat beyond the area of study.

##### Significant Wildlife Habitat

No SWH candidate or confirmed habitats were identified in this segment of the Project study area during previous TPAP studies. The 2019 (SLR) evaluation determined that SWH habitat is extremely limited. In addition to potential bat roost habitat, candidate SWH may include Amphibian Movement Corridors. Possible amphibian movement may occur between north (wetland) areas (outside of the Project study



area) of Corbett creek and south (woodland) areas of the Corbet Creek Costal Wetland Complex. SWH habitats and criteria identified are outlined in **Appendix B1**.

#### Designated Areas

No provincially designated features are present within this segment of the Project study area. The East Branch of Corbett Creek is municipally designated as part of the Town of Whitby's Natural Heritage System. A provincially significant wetland, the Corbett Creek Coastal Wetland Complex, occurs within approximately 100 meters downstream of the corridor along the East Branch of Corbett Creek.

#### 4.8.2 Hydrogeology

The Corbett Creek West Branch (LSE-2, LSE-3 and LSE-4), and Corbett Creek East Branch (LSE-2, LSE-3 and LSE-4) watercourse crossings exist within the Lakeshore East Corridor. Kronso Creek is a subterranean watercourse with an unknown thermal regime. Lynde Creek is a permanent watercourse with warmwater habitat. Little information is known about the Lynde Creek Tributary. The Corbett Creek is a permanent creek providing warmwater habitat.

All segments within the Lakeshore East corridor are located within the Iroquois Plain physiographic region, except for segment LSE-1, which is located on the South Slope region. The Iroquois Plain includes shoreline and lacustrine deposits associated with the flooding of Lake Iroquois during the last glacier retreat. The sediment deposits border the western part of Lake Ontario spanning from the Niagara River to the Trent River. The old Iroquois shoreline can be easily identified by cliffs, bars, beach ridges and boulder pavements. Underlying undulating till planes often host drumlins that extend above the plain features and host localized shoreline deposits. Sediment deposits within the Iroquois plain are comprised of sand, clay, gravel bars, till and shale, and are coarse grained (sand and gravel) near the historic shorelines and fine grained (silt then clay) in an offshore direction.

The South Slope is located on the southern slope of the Oak Ridges Moraine, extending from the Niagara Escarpment to the Trent River, and covering 940 square miles. The south slope is generally comprised of drumlinized till plains that are sandier to the east and clayey to the west. Streams originating in the ORM flow within sharp cut valleys run directly down the slope towards Lake Ontario. Substantial buried sands in the tills are regional in nature. The south slope overlies limestone and shales, and the material in the till is directly related, suggesting it was deposited from glacial ice advancing and retreating.

No segments within the Lakeshore East corridor are located in wellhead protection areas or intake protection zones, meaning groundwater and surface water resources in these areas are not as sensitive to chemical or pathogen contamination.

A summary of the watersheds that exist within the Lakeshore East Corridor is provided in Table 4-24 below.

TABLE 4-24 SUMMARY OF WATERSHEDS FOR THE LAKESHORE EAST STUDY AREA SEGMENTS

NTFTPAP Study Area Segment		Watershed
<b>Lakeshore East Corridor (LSE)</b>		
LSE-1	Mile 323.90 to Mile 323.40 (Kingston Subdivision)	Highland Creek
LSE-2 to LSE-4	Mile 10.10 to Mile 11.70	Corbett Creek

Refer to the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1** for MECP water well records for areas adjacent to the Stouffville rail corridor ROW.

#### 4.8.2.1 Track Segment LSE-1 – Mile 323.90 to Mile 323.40

This segment is located within the Highland Creed Sub-watershed. The drainage area for the Highland Creek Sub-Watershed is one of the smallest in the TRCA area at approximately 102 km<sup>2</sup>. Urban land uses comprise 100% of the watershed. The mean annual flow near the mouth is about 35 mm<sup>3</sup>/yr, with waters primarily originating from runoff.

The TRCA considers surface water quality in this watershed poor due in part to e-coli and phosphorous concentrations. Little change is noted in water quality over the past five years; however, limited surface water quality results are available.

#### 4.8.2.2 Track Segment LSE-2 – Mile 10.10 to Mile 10.70 and Retaining Wall

The Corbett Creek watershed is managed by CLOCA. The drainage area is approximately 15 km<sup>2</sup> and includes segments LSE-2, LSE-3 and LSE-4. Neighboring watersheds include the Pringle Watershed to the west and Whitby Watershed to the east.

#### 4.8.2.3 Track Segment LSE-3 – Mile 10.70 to Mile 11.20 and Retaining Wall

Refer to Section 4.8.2.2 – Segment LSE-3.

#### 4.8.2.4 Track Segment LSE-4 – Mile 11.20 to Mile 11.70 and Retaining Wall

Refer to Section 4.8.2.2– Segment LSE-4.

### 4.8.3 Land Use and Socio-Economic

#### 4.8.3.1 Track Segment LSE-1 – Mile 323.90 to Mile 323.40

##### Existing Land Use

McCowan District Park borders this segment of the rail corridor to the south, comprising open spaces with paved walkways and a trail. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation under City of Toronto Zoning By-law 569-2013.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Future development will comply with existing land use designations. There are also no known planned recreational amenities within this segment of the rail corridor.

#### 4.8.3.2 Track Segment LSE-2 – Mile 10.10 to Mile 10.70 and Retaining Wall

##### Existing Land Use

A boulevard path extends along a portion of Victoria Street East, parallel to the rail corridor. A Natural Area traverses the rail corridor to the west of Thickson Road. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

The rail corridor has no zoning designation under Town of Whitby Zoning By-law 1784.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with existing land use designations. There is a proposed in-boulevard path along Victoria Street East and Thickson Road South that will pass under the rail corridor according to the Town of Whitby Active Transportation Plan.



#### 4.8.3.3 Track Segment LSE-3 – Mile 10.70 to Mile 11.20 and Retaining Wall

##### Existing Land Use

In regards to the proposed new third track, the area surrounding the rail corridor is largely designated as Commercial and Employment, therefore there are no trails, along this segment. There is a large Open Space area between the Employment lands.

There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

The rail corridor has no zoning designations under Town of Whitby Zoning By-law 1784.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with existing land use designations. The proposed in-boulevard path along Victoria Street East and adjacent to the rail corridor extends to the City of Oshawa. There are no other known planned recreational amenities within this section of the corridor.

#### 4.8.3.4 Track Segment LSE-4 – Mile 11.20 to Mile 11.70 and Retaining Wall

##### Existing Land Use

There are no trails, large parks or other recreational amenities along this segment of the rail corridor. There are also no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

The rail corridor does not have any zoning designations under Town of Whitby Zoning By-law 1784 and City of Oshawa Zoning By-law 60-94.

##### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with existing land use designations. There are also no known planned trails, parks or other recreational amenities within this segment of the corridor.

#### 4.8.4 Cultural Heritage

##### 4.8.4.1 Track Segment LSE-1 – Mile 323.90 to Mile 323.40

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

##### 4.8.4.2 Track Segment LSE-2 – Mile 10.10 to Mile 10.70 and Retaining Wall

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

##### 4.8.4.3 Track Segment LSE-3 – Mile 10.70 to Mile 11.20 and Retaining Wall

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

##### 4.8.4.4 Track Segment LSE-4 – Mile 11.20 to Mile 11.70 and Retaining Wall

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

#### 4.8.5 Archaeology

For the detailed historical and archaeological context of the Lakeshore East Corridor, please refer to the *Metrolinx NTF TPAP Archaeology – Baseline Conditions Report (Appendix G1)*. A summary of the historical and archaeological context for key segments of the Lakeshore East Corridor is provided below.

##### 4.8.5.1 Track Segment LSE-1 – Mile 323.90 to Mile 323.40

Segment LSE-1 is located west and east of McCowan Road in the City of Toronto. This area corresponds to lands within the Johnson-Butler/Williams Treaties, Scarborough Township, and Borden block AkGt. One previously registered archaeological site is located within 1 km of the Study Area according to the OASD, which is not located within 50 m. At least one previous report details fieldwork within 50 m of segment LSE-1, as detailed in **Appendix G1 – Archaeology Baseline Conditions Report**.

Segment LSE-1 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites (AkGt-15);
- Water sources: primary, secondary, or past water source (Lake Ontario, West Highland Creek);
- Early historic transportation routes (McCowan Road); and
- Well drained soils (Woburn sandy loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

##### 4.8.5.2 Track Segment LSE-2 – Mile 10.10 to Mile 10.70 and Retaining Wall

Segment LSE-2 is located between west of Thicksen Road and Oshawa GO Station, west of Thornton Road, in the Town of Whitby and City of Oshawa. This area corresponds to lands within the Johnson-Butler/Williams Treaties, Whitby Township, and Borden block AlGr. Three previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least one previous report details fieldwork within 50 m of segment LSE-2, as detailed in **Appendix G1 – Archaeology Baseline Conditions Report**.

Segment LSE-2 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Lake Ontario, Corbett Creek);
- Early historic transportation routes (Thicksen Road);
- Proximity to early settlements (Whitby); and
- Well drained soils (Darlington loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

##### 4.8.5.3 Track Segment LSE-3 – Mile 10.70 to Mile 11.20 and Retaining Wall

Segment LSE-3 is located between west of Thicksen Road and Oshawa GO Station, west of Thornton Road, in the Town of Whitby and City of Oshawa. This area corresponds to lands within the Johnson-Butler/Williams Treaties, Whitby Township, and Borden block AlGr. Four previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are



located within 50 m. At least one previous report details fieldwork within 50 m of segment LSE-3, as detailed in **Appendix G1 – Archaeology Baseline Conditions Report**.

Segment LSE-3 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Lake Ontario, Corbett Creek);
- Early historic transportation routes (Thickson Road);
- Proximity to early settlements (Whitby); and
- Well drained soils (Darlington loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.8.5.4 Track Segment LSE-4 – Mile 11.20 to Mile 11.70 and Retaining Wall

Segment LSE-4 is located between west of Thickson Road and Oshawa GO Station, west of Thornton Road, in the Town of Whitby and City of Oshawa. This area corresponds to lands within the Johnson-Butler/Williams Treaties, Whitby Township, and Borden block AIGr. Four previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least one previous report details fieldwork within 50 m of segment LSE-4, as detailed in **Appendix G1 – Archaeology Baseline Conditions Report**.

Segment LSE-4 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Lake Ontario, Corbett Creek);
- Early historic transportation routes (Thickson Road);
- Proximity to early settlements (Whitby); and
- Well drained soils (Darlington loam).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.8.6 Visual/Aesthetics

##### 4.8.6.1 Track Segment LSE-1 – Mile 323.90 to Mile 323.40

Segment LSE-1 traverses a mixture of single-family and high-rise housing, interspersed with employment and mixed-use buildings, in Toronto. Many private backyards abut the rail corridor at more than 20 metres from the right-of-way. While there are several high-rise residential complexes in this segment, they are located more than 100 metres from the right-of-way; and changes to the views of the rail corridor from the upper floors will likely not change.

The new storage and reversal pocket track are proposed within the existing Metrolinx rail right-of-way. The potential operational uses of such infrastructure suggest minimal changes to the views in the area, thus the baseline conditions in this segment are classified as *Negligible*.

#### 4.8.6.2 Track Segment LSE-2 – Mile 10.10 to Mile 10.70 and Retaining Wall

Segment LSE-2 passes through the Town of Whitby and the City of Oshawa. The land use on either side of the rail right-of-way is categorized as open space or large-scale industrial buildings. Oshawa GO Station has a large parking lot north of the rail corridor and a freight rail yard south of the station. The track upgrades are proposed to occur within the existing right-of-way; therefore, views from the Oshawa GO Station and surrounding areas are not expected to be altered. Based on this, the baseline conditions in this segment are categorized as *Negligible*.

Thickson Road Bridge (in the Town of Whitby) is intended to be expanded/widened to the north to accommodate a new third track in this segment of the Lakeshore East Rail Corridor. The visual baseline conditions of the bridge are classified as *Negligible*, as the visual profile of the bridge is not anticipated to change significantly. Additionally, the surrounding area consists of commercial and industrial uses; as such, the visual baseline conditions in this area are classified as *Negligible*.

#### 4.8.6.3 Track Segment LSE-3 – Mile 10.70 to Mile 11.20 and Retaining Wall

Refer to Section 4.7.6.2 above as Segment LSE-3 comprises similar characteristics as LSE-2.

#### 4.8.6.4 Track Segment LSE-4 – Mile 11.20 to Mile 11.70 and Retaining Wall

In this segment, the rail corridor passes through the City of Oshawa. The lands on either side of the rail ROW are generally used for industrial/transportation uses, with a small natural area traversing the corridor. The surrounding area contains Oshawa GO Station with a large parking lot to the north of the corridor and a freight rail yard south of the corridor. The new third track is proposed to occur within the existing ROW and may be used to store trains overnight. Additionally, a new platform is proposed at Oshawa GO Station to accommodate the new third track and allow transit users to safely enter/exit the trains. Given that the surrounding area is already a train station, views are not expected to be altered. Based on this, the visual baseline conditions in this segment are classified as Low.

## 4.9 Richmond Hill Corridor

### 4.9.1 Natural Environment

The Project study area within the Richmond Hill Corridor is located in an urbanized setting of the City of Toronto within the Lower Don River Valley, where surrounding land use consists of densely treed urban valley open space, the Don Valley Parkway and residential and commercial land uses. Treed hedgerows (successional in nature) occur along the riparian woodlands of the Don River Valley which together comprise a part of the City of Toronto's Natural Heritage System. Trees are mid-mature to mature with Willow, Black Walnut, and Manitoba Maple dominating the edge composition. The majority of the vegetation communities present with the Project study area consist of Cultural Thicket (CUT), Cultural Meadow (CUM) in association with hedgerows and the edge of woodlands (FOM) and typified as communities that develop from or are supported by anthropogenic disturbance. These vegetation communities provide wildlife opportunities (e.g., habitat for songbirds and small mammals) and have potential to support SAR.

The Lower Don Valley is Toronto's most highly urbanized natural corridor. This is reflected in the vegetation which is often dominated by non-native species. Several restoration programs have been initiated which include replanting with native trees and shrubs and the construction of Chester Springs Marsh as part of "Bring Back the Don". The main channel of the Lower Don River flows adjacent to the existing rail corridor and provides degraded and highly disturbed habitat conditions for fish, which are mainly warmwater and cool-water species.

SAR "generalists" with habitats that may occur anywhere or may change from year to year include: three species of Bats, Butternut, Nine-spotted lady Beetle and Monarch Butterfly which may occur throughout



the Don Valley portion of the Project study area. These species are difficult to survey, and the occurrence of their potential habitat cannot be discounted. For these reasons, the following SAR “generalists” are considered to potentially occur within most Project study area segments.

Blanding’s Turtle has been recorded within the broader area (10 kilometre radius), however no records exist within the Lower Don. Observations for this species are generally associated with Tommy Thompson Park. The Nine-Spotted Lady Beetle or C9 is a habitat generalist, typically found in areas with grassland, parkland, riparian areas, agricultural fields and other habitats where aphids (food source) is in abundance. In Ontario, this species of insect is considered overlooked (individuals or small populations) with no occurrences reported after the 1990’s.

SAR Bats include: Tri-colored Bat, Little Brown Myotis, and Northern Myotis. Any tree (typically greater than 10 cm diameter at breast height) may be utilized as bat day roost or, possibly, bat maternity roost. Butternut habitat also occurs throughout these segments, and seedlings may occur within open edges, hedgerows, fence lines, and grow within the tracks due to dispersal by wildlife, such as squirrels. Monarch Butterfly can often be found wherever the host plant (milkweed) occurs. This is often disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, the Nine-Spotted Lady Beetle is also a habitat generalist, typically found in areas with grassland, parkland, riparian areas, agricultural fields and other habitats where aphids (food source) are in abundance. In Ontario, this species of insects is considered overlooked (individuals or small populations) with no occurrences reported after the 1990’s.

Candidate SWH occurs across the Richmond Hill Corridor portion of the Project study area. They occur in association with the Don River Valley (edges only) and extend well beyond the Project study area. Similar to SAR bat roost habitat, bat maternity colonies for non-SAR bats may occur anywhere trees (typically greater than 10 cm DBH) occur. This type of habitat is very difficult to evaluate and map, although it cannot be discounted from potentially occurring within the corridor.

#### 4.9.1.1 Don Valley Layover Facility

The Don Valley layover comprises multiple Project segments; including segments RH-3, RH-4 and RH-5. All segments occur within the urbanized setting of the City of Toronto and within Ecoregion 7E-4. The surrounding land use is very similar to other areas of the Don River Valley, intermixed with pockets of CUM, CUW and Cultural Plantation (CUP) communities. The footprint of the proposed layover is confined almost entirely to existing linear infrastructure footprints and pre-disturbed areas including a pre-existing rail bed and an existing maintained access road. The proposed layover occurs along the east side of the river valley floor and is bounded to the east by the Don Valley Parkway, a major urban highway. The main channel of the Lower Don River flows in proximity to the proposed layover, crossing under once through an existing rail bridge. See Figure 4-49 through Figure 4-51 for a depiction of the ecological land classification communities within these segments

#### Wetlands

A small open water linear wetland community (Reed Canary Grass Mineral Meadow Marsh (MAM2-2) occurs between the existing site access road and the proposed layover track, better known as the Helliwell Hill Wetland. Chester Springs Marsh, a significant restoration project of “Bring Back the Don” occurs west of the proposed layover, south of the Bloor Street viaduct. This formerly constructed marsh has undergone natural succession and currently resembles wet meadow with sporadic occurrences of shrubs. One small Narrow-leaved Cattail Mineral Shallow Marsh (MAS2-1b) occurs within the proposed footprint of the layover although no open water or seepage areas were visible during the field visits performed as part of this study in 2019/2020. None of these wetlands have been evaluated.

### Vegetation

Sporadically occurring deciduous trees and shrubs are present along the existing inactive rail corridor through much of this portion of the Project study area. Vegetation represents a broad mix of established native and landscaped (exotic) species (e.g., Russian Olive, Manitoba Maple, Black Walnut and Siberian Elm) typically found in urban landscapes. Cultural Thicket (CUT), Cultural Meadow (CUM) and Cultural Plantation (CUP) communities form the majority of the vegetation communities within the footprint of the proposed layover. Exotic Successional Savannah (CUS1-b) occurs within the proposed layover footprint to the south while Dry-Fresh Exotic Deciduous Forest (FOD4-e) occurs adjacent to the northern portion of the proposed layover corridor and the existing access road.

Successional field species such as Tall Goldenrod (*Solidago altissima*), Common Mullen (*Verbascum Thapsus*), Wild Carrot (*Daucus carota*), and Wild Mint (*Mentha arvensis*) occur along the inactive rail corridor portion of the proposed layover. Dense stands of invasive herbaceous plants such as Dog-strangling Vine, Bindweed and Japanese Knotweed (*Polygonum cuspidatum*) often dominate the vegetation in the vicinity of the inactive rail corridor and proposed layover. Other invasive plants including Himalayan Balsam (*Impatiens glandulifera*), Canada Thistle (*Cirsium arvense*) and European Common Reed are also present.

The proposed location of the staff office building, a sanding facility, an electrical substation buildings and related ancillary facilities have been positioned partially within an area previously used as a laydown for past construction activities and are devoid of vegetation. The remaining portion of the proposed building footprints within exotic CUM and CUM/CUT communities are characterized as highly disturbed due to the dominance of non-native invasive vegetation including Knot Weed and Dog-Strangling Vine.

### Wildlife

The Lower Don River valley is part of a larger 200-hectare park, Toronto's largest urban park. It is home to numerous species of flora and fauna. Species within this park setting include urban tolerant wildlife species, such as Coyote, Raccoon, Red Fox (*Vulpes vulpes*), White Tailed Deer (*Odocoileus virginianus*), Muskrat (*Ondatra zibethicus*) and Beaver (*Castor canadensis*). The Lower Don also provides a variety of habitats including coniferous and deciduous forest, successional edges, and meadow habitat for a variety of songbirds, accipiter's, butterflies and refuge habitat for waterfowl.

Vegetation communities occurring within and adjacent to the proposed layover provide nesting/shelter habitat for many resident and migrating avian and mammal species although most of the communities are dominated by non-native vegetation species. While these "exotic" vegetation communities and wildlife habitat opportunities are common and abundantly distributed throughout the Lower Don River Valley the TRCA considers them to have an elevated importance in the context of an urban landscape such as Toronto as compared to their role in a rural setting.



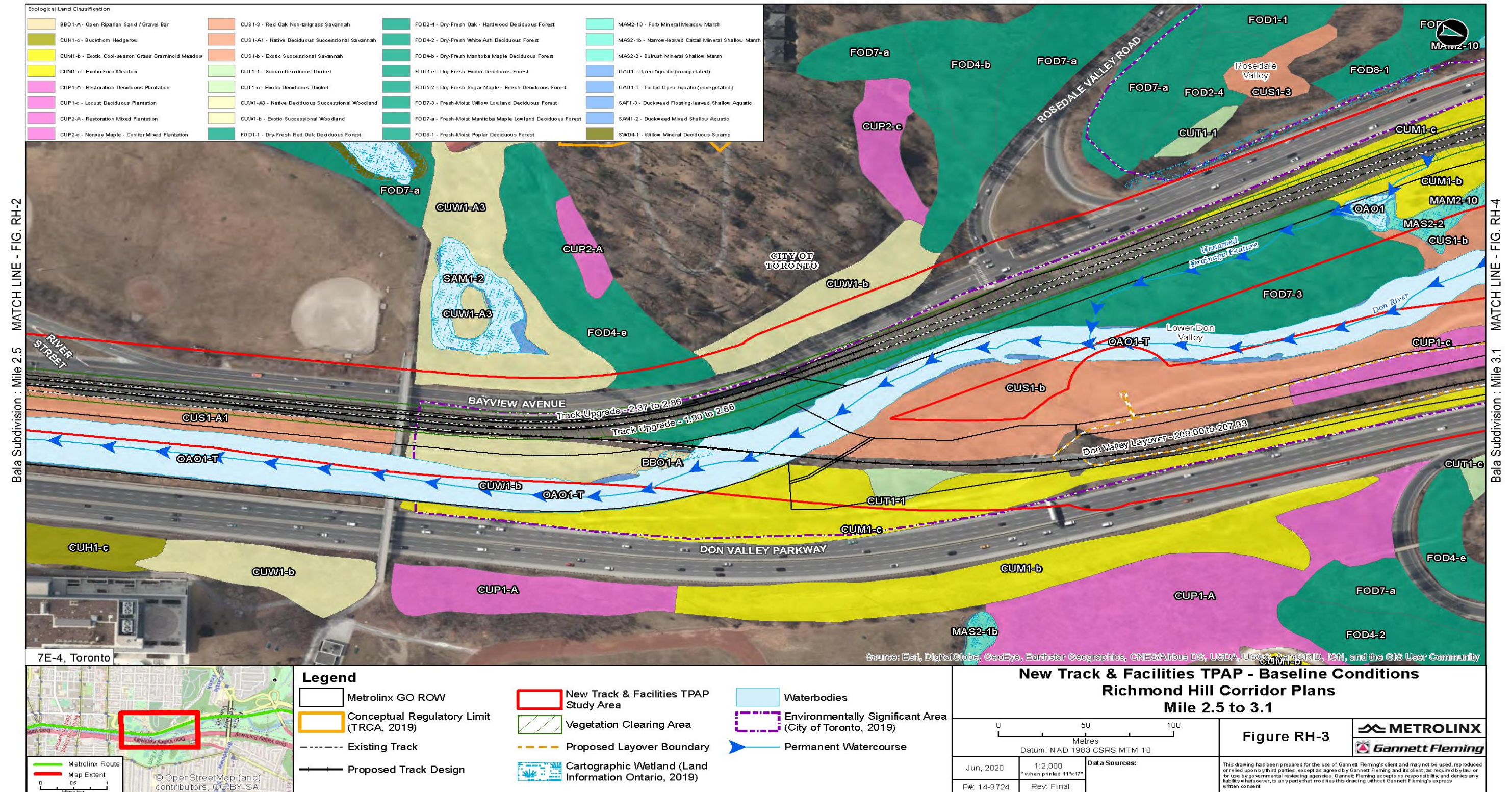


FIGURE 4-49 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT RH-3 – MILE 2.50 TO MILE 3.10



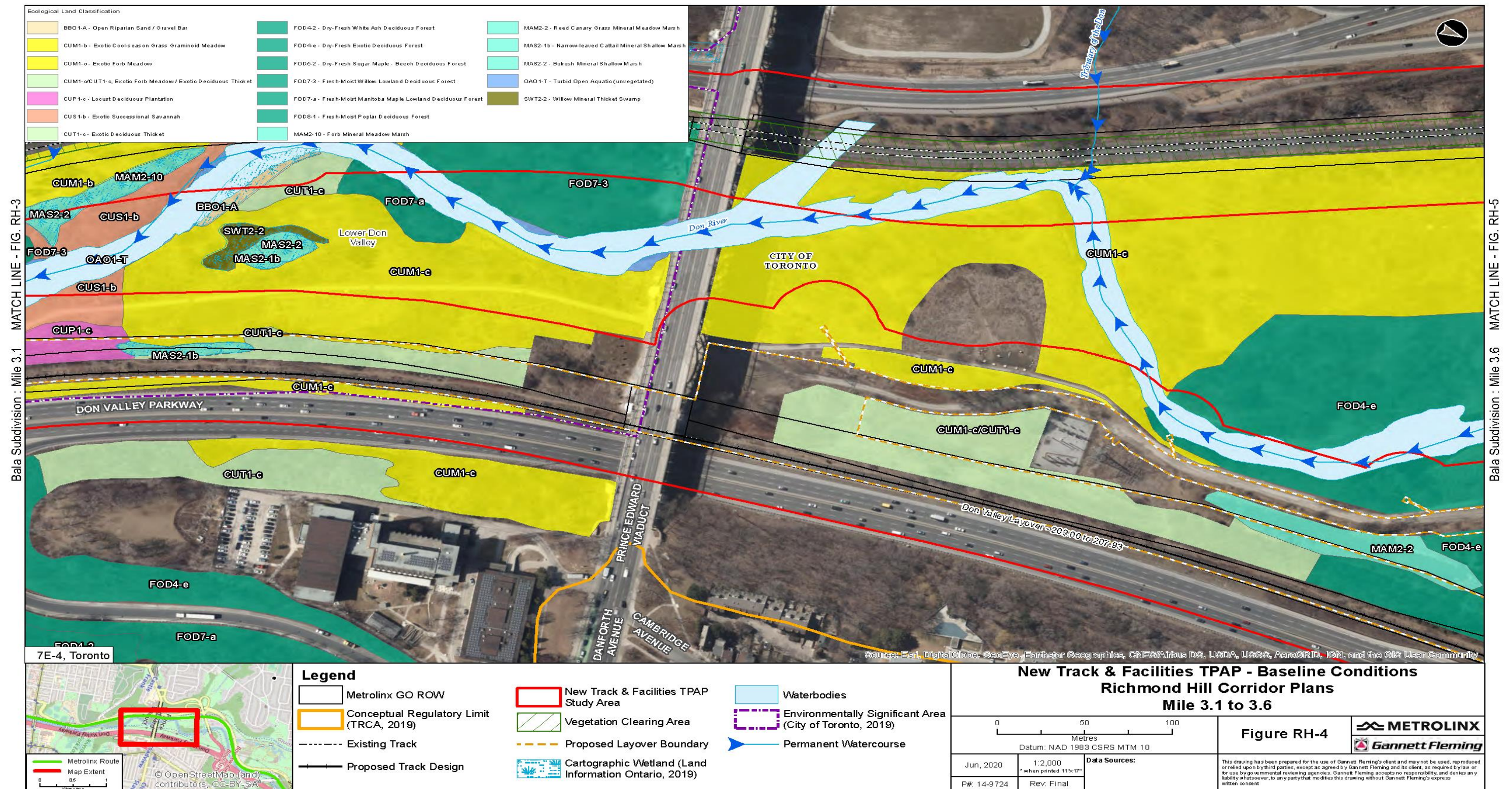


FIGURE 4-50 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT RH-4 – MILE 3.10 TO MILE 3.60



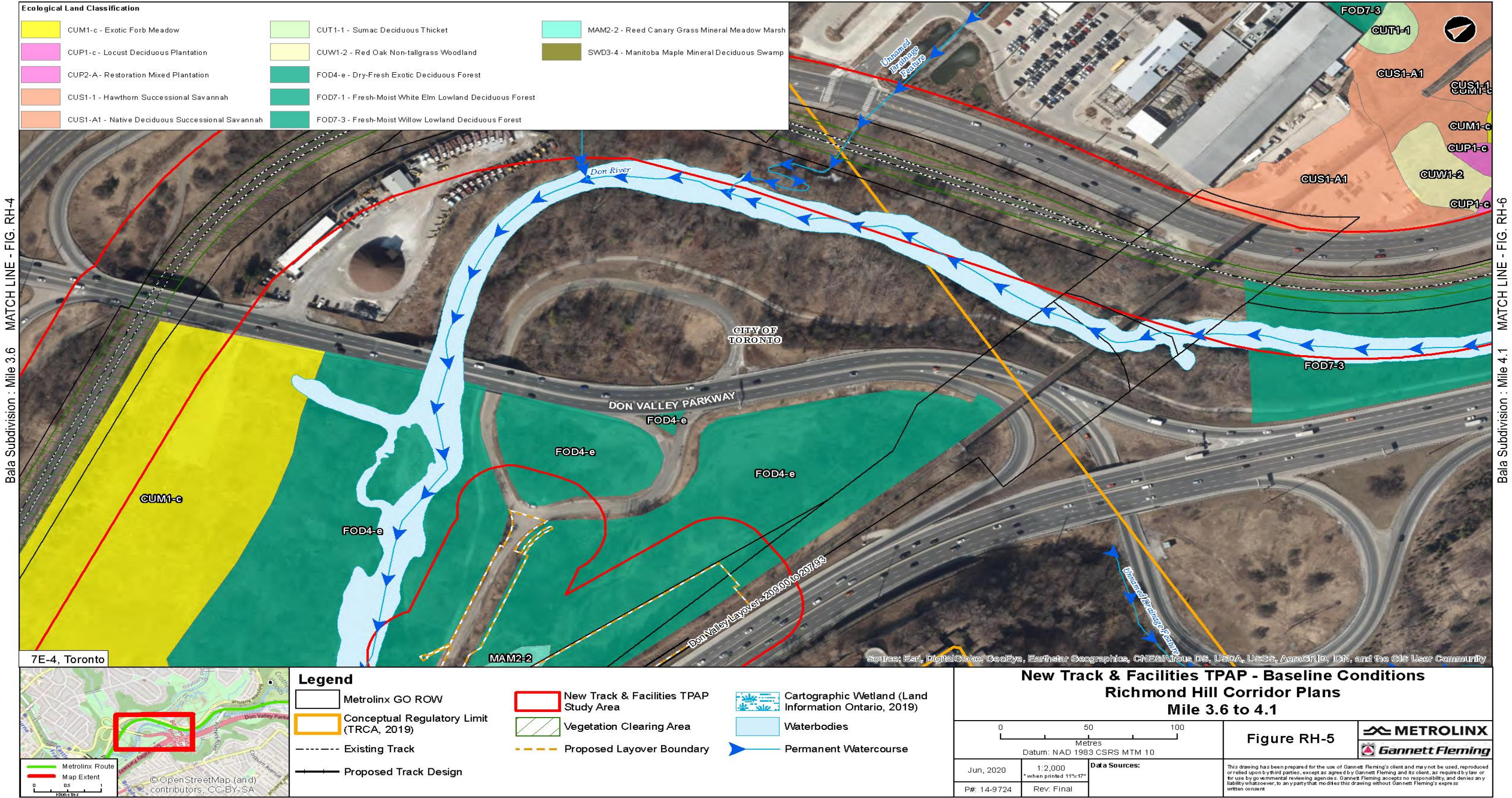


FIGURE 4-51 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT RH-5 – MILE 3.60 TO MILE 4.10



### Aquatic Environment

The Lower Don River flows southward and crosses under the inactive rail corridor once near the southern terminus of the layover track through an existing rail bridge (RH-3). Providing habitat for a diverse fish community, the fish and aquatic habitat of the Lower Don River reach are afforded protection under the federal *Fisheries Act*.

The entire watershed area of the Don River is approximately 360 square kilometres. It is the most heavily urbanized watershed in TRCA's jurisdiction. The confluence of the East and West Branches occur approximately 5 kilometres upstream of the Project study area to form the single main channel of the Lower Don River that flows adjacent to the existing rail corridor. The Lower Don River from Riverdale Park downstream to the Keating Channel has been significantly altered as a result of historic and adjacent land uses. Along this lower 4-kilometre section, the river is relatively straight (the channel banks largely consist of vertical steel sheet pile walls), lacks discernable grade, and has little natural connectivity to the floodplain.

Fish habitat features within the Lower Don River are characterized as degraded, highly disturbed conditions that are uniform in nature and lack habitat diversity and complexity. There is a lack of instream cover in terms of aquatic vegetation and substrates, such as boulders and crevasse habitat. The morphology of the stream is generally low velocity, run habitat with very few riffles, pools and depth variability. The substrates consist primarily of silt and fine sediments, and the turbidity of the water is generally high, which is typical of the lower reach of warm, surface water systems.

TRCA reports a total of 24 fish species inhabiting the Lower Don River between May and November. All fish captured were typically warmwater and cool-water species; however, Chinook Salmon (*Oncorhynchus tshawytscha*) and alewife (*Alosa pseudoharengus*), which are typically cold-water species, were also noted to be present.

The Don River is a CRA Fishery. One existing watercourse rail crossing occurs along this portion of the corridor associated with the approach to the proposed layover facility. A summary of aquatic habitat characteristics is provided below in Table 4-25.

TABLE 4-25 EXISTING FISH AND FISH HABITAT SUMMARY – RICHMOND HILL CORRIDOR

Waterbody	Flow	Thermal Regime	Contains a CRA Fishery	Fish Species Present	Habitat Characteristics	Known Species at Risk / Critical Habitat Present	In-water Works Timing Window
Lower Don River	Permanent	Warmwater	Direct	More than 30 species including: bass species, pike, emerald shiner, carp, gar, alewife	Connections with the fish species collected from the mouth/estuary of the Lower Don River are present due to the influence of the Lake Ontario.	None	July 1 to September 15

### Species at Risk

Barn Swallow, Eastern Wood-Pewee, Wood Thrush, Red-headed Woodpecker, and Snapping Turtle have the potential to occur based on availability of suitable habitat. Avian SAR may occur in association with the bridges, mature trees, adjacent parkland and cultural woodland habitats associated with the Don



River. No Barn Swallow nests were observed on any structure or bridge within the proposed layover during the field program performed as part of this study in 2019/2020.

Owing to the proximity of the Don River, the proposed layover may provide habitat for Snapping Turtles whereby they could utilize the south slope embankments and or gravel surfaces of the tracks for nesting.

SAR Bats include: Tri-colored Bat, Little Brown Myotis, and Northern Myotis. Any tree (typically greater than 10 cm DBH) landscaped or naturally occurring as part of forested environments, hedgerows or planted within the proposed layover area may be utilized as bat day roosts or possibly bat maternity roosts.

Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fencelines, and grow within the tracks due to dispersal by wildlife, such as squirrels although none were observed during field visits performed as part of this study in 2019/2020. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, general habitat for the Nine-Spotted Lady Beetle or C9 is also present throughout much of the segment due to the generalist nature of this species. No SAR species aside from Monarch Butterfly and sporadic occurrences of their preferred plant, Milkweed were observed in the proposed layover footprint.

#### Significant Wildlife Habitat

The 2019 (SLR) evaluation determined that candidate SWH may be present within the adjacent woodland features and the Don River Valley. Candidate habitats in addition to bat roosts may include: Seeps and Springs, Provincially Rare S1, S2 and S3 vegetation communities (several are known to occur within the Don River Valley), Turtle Nesting Habitat (slopes of the Don River), Amphibian Breeding Habitat (Wetlands), and Special Concern and Rare Wildlife Species (Don River Valley). No evidence of confirmed SWH was identified during field visits performed as part of this study in 2019 and 2020.

#### Designated Areas

No provincially designated features occur within and or adjacent to the proposed layover. The natural areas and the Lower Don River and its riparian lands are within the municipally designated City of Toronto Environmental Significant Area (ESA) and the Natural Heritage System. The Don River is contained within a defined floodplain and the regulatory limit of the TRCA.

##### 4.9.1.2 Track Segment RH-1 – Mile 1.60 to Mile 2.15

This segment of the Project study area occurs within the urbanized setting of the City of Toronto within Ecoregion 7E-4. Occurring within the Lower Don River Valley, the surrounding land use is more intensified, with a narrower riparian zone than other areas of the Don River Valley. Bayview Avenue bounds this segment to the west while the Lower Don River channel parallels this segment to the east. The Don Valley Parkway, a major urban highway, also parallels this segment further east, on the opposite side of the river. See Figure 4-52 for a depiction of the ecological land classification communities.

#### Wetlands

No wetland features are present within this segment of the Project study area.

#### Vegetation

Sporadically occurring deciduous trees and shrubs are present along the existing rail corridor through much of this segment of the Project study area. Native Deciduous Successional Savannah (CUS1-A1) borders the southern boundary of this segment. Within the active rail corridor track margins are typified by the presence of successional field species such as Tall Goldenrod, Common Mullen, Wild Carrot, and Wild Mint. Invasive herbaceous plants such as Dog- strangling Vine, Bindweed, Himalayan Balsam,

Japanese Knotweed, Canada Thistle and European Common Reed often occur along and adjacent to the rail corridor although their presence is less abundant than in adjacent Project areas to the north.

### Wildlife

The Lower Don River valley is part of a larger 200-hectare park, Toronto's largest urban park. It is home to numerous species of flora and fauna. Species within this park setting include urban tolerant wildlife species, such as Coyote, Raccoon, Red Fox, White Tailed Deer, Muskrat and Beaver. The Lower Don also provides a variety of habitats (coniferous and deciduous forest, successional edges, and meadows) for a variety of songbirds, accipiter's, butterflies and refuge habitat for waterfowl.

Vegetation communities occurring within this segment of the Project study area provides nesting/shelter habitat for many resident and migrating avian and mammal species. These vegetation communities and wildlife habitat opportunities are common to the Don River Watershed and abundantly distributed throughout the Lower Don River Valley.

### Aquatic Environment

The Lower Don River flows southward adjacent to this segment and one location occurs within the 30 metre wide segment study area (see Figure 4-52). Providing habitat for a diverse fish community, these features of the Lower Don River reach are afforded protection under the federal *Fisheries Act*.

### Species at Risk

Barn Swallow, Eastern Wood-pewee, Wood Thrush, Red-headed Woodpecker, and Snapping Turtle have the potential to occur based on availability of suitable habitat. Avian SAR may occur in association with the bridges, mature trees, adjacent parkland and cultural woodland habitats associated with the Don River. No Barn Swallow nests were observed on any structure or bridge within this Project study area segment during the field program performed as part of this study in 2019/2020. The proximity of the Don River within this segment of the Project study area means the south slope embankments and/or gravel (ballast) surfaces of the tracks could provide nesting habitat for Snapping Turtles.

SAR Bats include: Tri-colored Bat, Little Brown Myotis, and Northern Myotis. Any tree (typically greater than 10 cm DBH) landscaped or naturally occurring as part of forested environments, hedgerows or planted along the track of this segment of the Project study area may be utilized as bat day roosts or possibly bat maternity roosts.

Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fencelines, and grow within the tracks due to dispersal by wildlife, such as squirrels although none were observed during field visits performed as part of this study in 2019/2020. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, general habitat for the Nine-Spotted Lady Beetle or C9 is also present throughout much of the segment due to the generalist nature of this species. No SAR species aside from Monarch Butterfly and sporadic occurrences of their preferred plant, Milkweed were observed in the proposed layover footprint.

### Significant Wildlife Habitat

The 2019 (SLR) evaluation determined that candidate SWH may be present within the adjacent woodland features and the Don River Valley. Candidate habitats in addition to bat roosts may include: Seeps and Springs, Provincially Rare S1, S2 and S3 vegetation communities (several are known to occur within the Don River Valley, none observed by SLR in 2019), Turtle Nesting Habitat (slopes of the Don River), Amphibian Breeding Habitat (Wetlands), and Special Concern and Rare Wildlife Species (Don River Valley). No evidence of confirmed SWH was identified during field visits performed as part of this study in 2019 and 2020.



### Designated Areas

No provincially designated features occur within or adjacent to segment. The natural areas and the Lower Don River and its riparian lands are within the municipally designated City of Toronto Environmental Significant Area (ESA) and the Natural Heritage System. The Don River is contained within a defined floodplain and the regulatory limit of the TRCA.

#### 4.9.1.3 Track Segment RH-2 – Mile 2.15 to Mile 2.50

This segment of the Project study area occurs within the urbanized setting of the City of Toronto within Ecoregion 7E-4. Occurring within the Lower Don River Valley, the surrounding land use is more intensified, with a narrower riparian zone than other areas of the Don River Valley. Bayview Avenue bounds this segment to the west while the Lower Don River channel parallels this segment to the east. The Don Valley Parkway, a major urban highway, also parallels this segment further east, on the opposite side of the river. See Figure 4-53 for a depiction of the ecological land classification communities.

### Wetlands

No wetland features are present within this segment of the Project study area.

### Vegetation

Sporadically occurring deciduous trees and shrubs are present along the existing rail corridor through much of this segment of the Project study area. Cultural Meadow (CUM) and native Deciduous Successional Savannah (CUS1-A1) border this segment. The active rail corridor track margins are typified by the presence of successional field species such as Tall Goldenrod, Common Mullen, Wild Carrot, and Wild Mint. Invasive herbaceous plants such as Dog-strangling Vine, Bindweed, Himalayan Balsam, Japanese Knotweed, Canada Thistle and European Common Reed often occur along and adjacent to the rail corridor although their presence is less abundant than in adjacent Project study area segments to the north.

### Wildlife

The Lower Don River valley is part of a larger 200-hectare park, Toronto's largest urban park. It is home to numerous species of flora and fauna. Species within this park setting include urban tolerant wildlife species, such as Coyote, Raccoon, Red Fox, White Tailed Deer, Muskrat and Beaver. The Lower Don also provides a variety of habitats (coniferous and deciduous forest, successional edges, and meadows habitat for a variety of songbirds, accipiter's, butterflies and refuge habitat for waterfowl.

Vegetation communities occurring within this segment of the Project study area provides nesting/shelter habitat for many resident and migrating avian and mammal species. These vegetation communities and wildlife habitat opportunities are common to the Don River Watershed and abundantly distributed throughout the Lower Don River Valley.

### Aquatic Environment

The Lower Don River flows southward adjacent to this segment and one location occurs within the 30 metre wide segment study area. Providing habitat for a diverse fish community, these features of the Lower Don River reach are afforded protection under the federal *Fisheries Act*.

### Species at Risk

Barn Swallow, Eastern Wood-Pewee, Wood Thrush, Red-headed Woodpecker, and Snapping Turtle have the potential to occur based availability of suitable habitat. Avian SAR may occur in association with the bridges, mature trees, adjacent parkland and cultural woodland habitats associated with the Don River. No Barn Swallow nests were observed on any structure or bridge within this Project study area

segment during the field program performed as part of this study in 2019/2020. The proximity of the Don River within this segment of the Project study area means the south slope embankments and/or gravel (ballast) surfaces of the tracks could provide nesting habitat for Snapping Turtles.

SAR Bats include: Tri-colored Bat, Little Brown Myotis, and Northern Myotis. Any tree (typically greater than 10 cm DBH) landscaped or naturally occurring as part of forested environments, hedgerows or planted along the track of this segment of the Project study area may be utilized as bat day roost or possibly bat maternity roost.

Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fencelines, and grow within the tracks due to dispersal by wildlife, such as squirrels although none were observed during field visits performed as part of this study in 2019/2020. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed areas immediately adjacent to the tracks regardless of whether the habitat is landscaped or naturalized. Finally, general habitat for the Nine-Spotted Lady Beetle or C9 is also present throughout much of the segment due to the generalist nature of this species. No SAR species aside from Monarch Butterfly and sporadic occurrences of their preferred plant, Milkweed were observed in the proposed layover footprint.

#### Significant Wildlife Habitat

The 2019 (SLR) evaluation determined that candidate SWH may be present within the adjacent woodland features and the Don River Valley. Candidate habitats in addition to bat roosts may include: Seeps and Springs, Provincially Rare S1, S2 and S3 vegetation communities (several are known to occur within the Don River Valley, none observed by SLR in 2019), Turtle Nesting Habitat (slopes of the Don River), Amphibian Breeding Habitat (Wetlands), and Special Concern and Rare Wildlife Species (Don River Valley). No evidence of confirmed SWH was identified during field visits performed as part of this study in 2019 and 2020.

#### Designated Areas

No provincially designated features occur within and adjacent to the proposed layover. The natural areas and the Lower Don River and its riparian lands are within the municipally designated City of Toronto Environmental Significant Area (ESA) and the Natural Heritage System. The Don River is contained within a defined floodplain and the regulatory limit of the TRCA.

##### 4.9.1.4 Track Segment RH-3 – Mile 2.50 to Mile 3.10

Refer to Section 4.9.1.1 – this segment corresponds to the proposed location of the Don Valley layover facility.

##### 4.9.1.5 Track Segment RH-4 – Mile 3.10 to Mile 3.60

Refer to Section 4.9.1.1 – this segment corresponds to the proposed location of the Don Valley layover facility.

##### 4.9.1.6 Track Segment RH-5 – Mile 3.60 to Mile 4.10

Refer to Section 4.9.1.1 – this segment corresponds to the proposed location of the Don Valley layover facility.

##### 4.9.1.7 Track Segment RH-6 – Mile 4.10 to Mile 4.65

This segment of the Project study area occurs within the urbanized setting of the City of Toronto within Ecoregion 7E-4. Occurring within the Lower Don River Valley, the surrounding land use is very similar to other areas of the Don River Valley, with pockets of densely treed urban valley, mature treed hedgerows intermixed with small Cultural Meadow (CUM) communities adjacent to industrial and commercial (Evergreen Brickworks) properties. Bayview Avenue bounds this segment to the west while the Lower



Don River channel parallels this segment to the east. The Don Valley Parkway, a major urban highway, also parallels this segment further east, on the opposite side of the river. See Figure 4-54 for a depiction of the ecological land classification communities.

#### Wetlands

No wetland features are present within this segment of the Project study area.

#### Vegetation

Sporadically occurring deciduous trees and shrubs are present along the existing rail corridor through much of this segment of the Project study area. Cultural Thicket (CUT) and Cultural Meadow (CUM) borders the west side of this segment while a more mature Forest Community (FOD7-3) dominated by willow trees borders the eastern boundary. Within the active rail corridor track margins are typified by the presence of successional field species such as Tall Goldenrod, Common Mullen, Wild Carrot, and Wild Mint. Invasive herbaceous plants such as Dog-strangling Vine, Bindweed, Himalayan Balsam, Japanese Knotweed, Canada Thistle and European Common Reed often occur along and adjacent to the rail corridor; forming dense dominant patches in some locations.

#### Wildlife

The Lower Don River valley is part of a larger 200-hectare park, Toronto's largest urban park. It is home to numerous species of flora and fauna. Species within this park setting include urban tolerant wildlife species, such as Coyote, Raccoon, Red Fox, White Tailed Deer, Muskrat and Beaver. The Lower Don also provides a variety of habitats (coniferous and deciduous forest, successional edges, and meadows) for a variety of songbirds, accipiter's, butterflies and refuge habitat for waterfowl.

Vegetation communities occurring within this segment of the Project study area provides nesting/shelter habitat for many resident and migrating avian and mammal species. These vegetation communities and wildlife habitat opportunities are common to the Don River Watershed and abundantly distributed throughout the Lower Don River Valley.

#### Aquatic Environment

The Lower Don River flows southward adjacent to this segment and one location occurs within the 30 metre wide segment study area. Providing habitat for a diverse fish community, these features of the Lower Don River reach are afforded protection under the federal *Fisheries Act*.

#### Species at Risk

Barn Swallow, Eastern Wood-pewee, Wood Thrush, Red-headed Woodpecker, and Snapping Turtle have the potential to occur based availability of suitable habitat. Avian SAR may occur in association with the bridges, mature trees, adjacent parkland and cultural woodland habitats associated with the Don River. No Barn Swallow nests were observed on any structure or bridge within this Project study area segment during the field program performed as part of this study in 2019/2020. The proximity of the Don River within this segment of the Project study area means the south slope embankments and/or gravel (ballast) surfaces of the tracks could provide nesting habitat for Snapping Turtles.

SAR Bats include: Tri-colored Bat, Little Brown Myotis, and Northern Myotis. Any tree (typically greater than 10 cm DBH) landscaped or naturally occurring as part of forested environments, hedgerows or planted along the track of this segment of the Project study area may be utilized as bat day roosts or possibly bat maternity roosts.

Butternut habitat also occurs throughout, and seedlings may occur within open edges, hedgerows, fence lines, and grow within the tracks due to dispersal by wildlife, such as squirrels although none were observed during field visits performed as part of this study in 2019/2020. Monarch Butterfly can often be found wherever the host plant (Milkweed) occurs. This is often disturbed areas immediately adjacent to

the tracks regardless of whether the habitat is landscaped or naturalized. Finally, general habitat for the Nine-Spotted Lady Beetle or C9 is also present throughout much of the segment due to the generalist nature of this species. No SAR species aside from Monarch Butterfly and sporadic occurrences of their preferred plant, Milkweed were observed in this segment.

#### Significant Wildlife Habitat

The 2019 (SLR) evaluation determined that candidate SWH may be present within the adjacent woodland features and the Don River Valley. Candidate habitats in addition to bat roosts may include: Seeps and Springs, Provincially Rare S1, S2 and S3 vegetation communities (several are known to occur within the Don River Valley, none observed by SLR in 2019), Turtle Nesting Habitat (slopes of the Don River), Amphibian Breeding Habitat (Wetlands), and Special Concern and Rare Wildlife Species (Don River Valley). No evidence of confirmed SWH was identified during field visits performed as part of this study in 2019 and 2020.

#### Designated Areas

No provincially designated features occur within this segment of the Project study area. The natural areas and the Lower Don River and its riparian lands are within the municipally designated City of Toronto Environmental Significant Area (ESA). The Don River is contained within a defined floodplain and the regulatory limit of the TRCA.



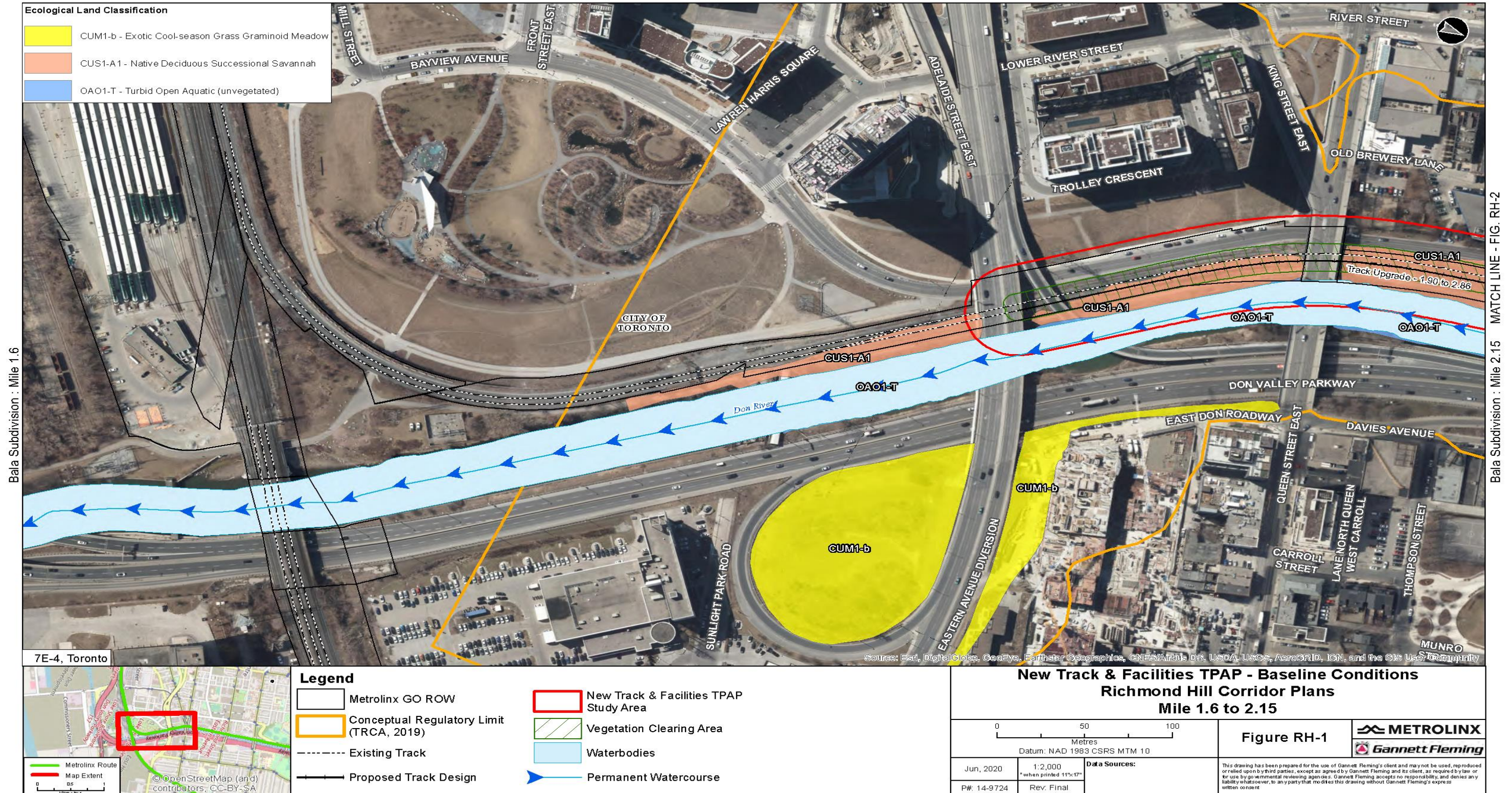


FIGURE 4-52 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT RH-1 – MILE 1.60 TO MILE 2.15



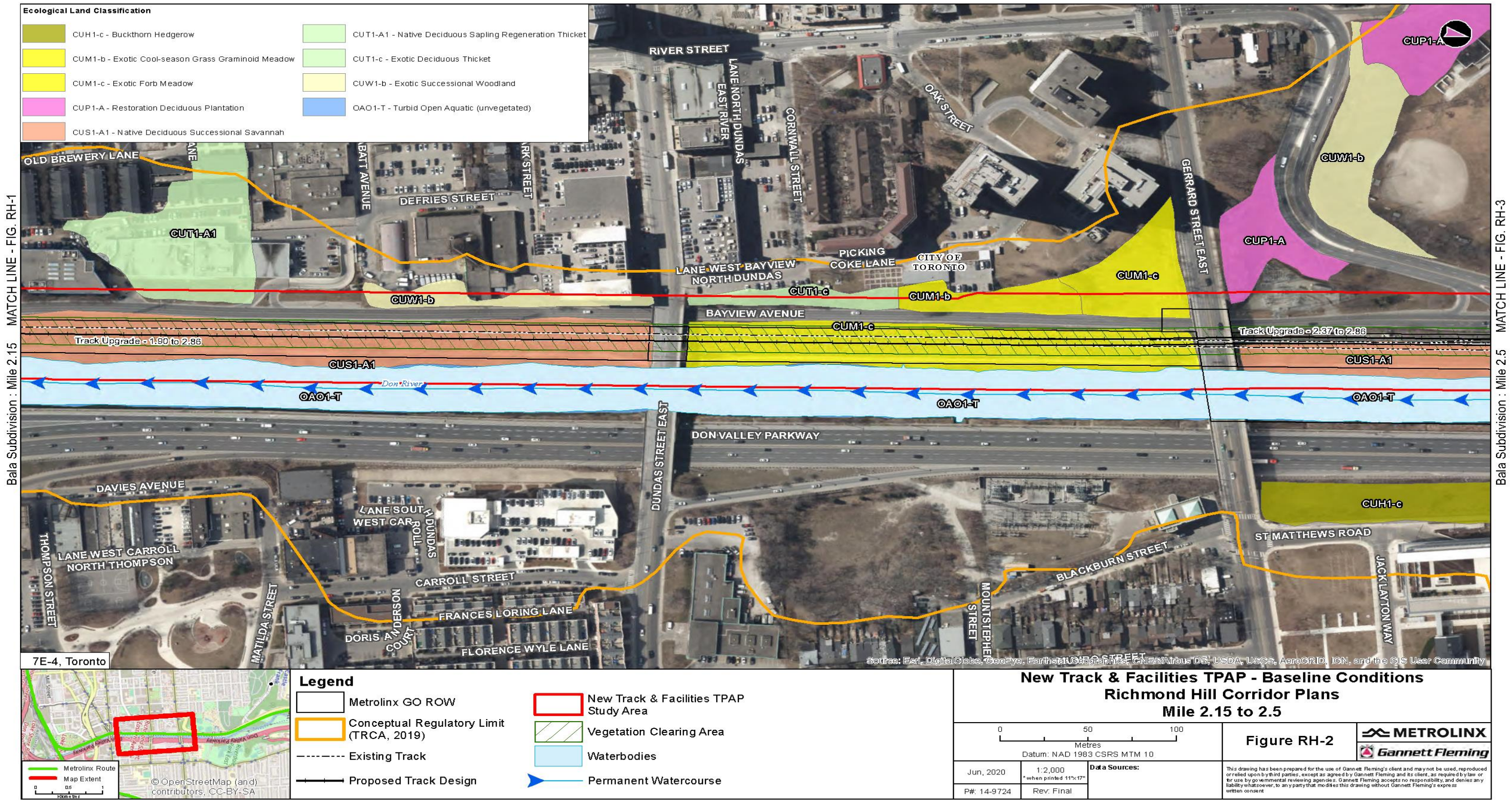


FIGURE 4-53 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT RH-2 – MILE 2.15 TO MILE 2.50



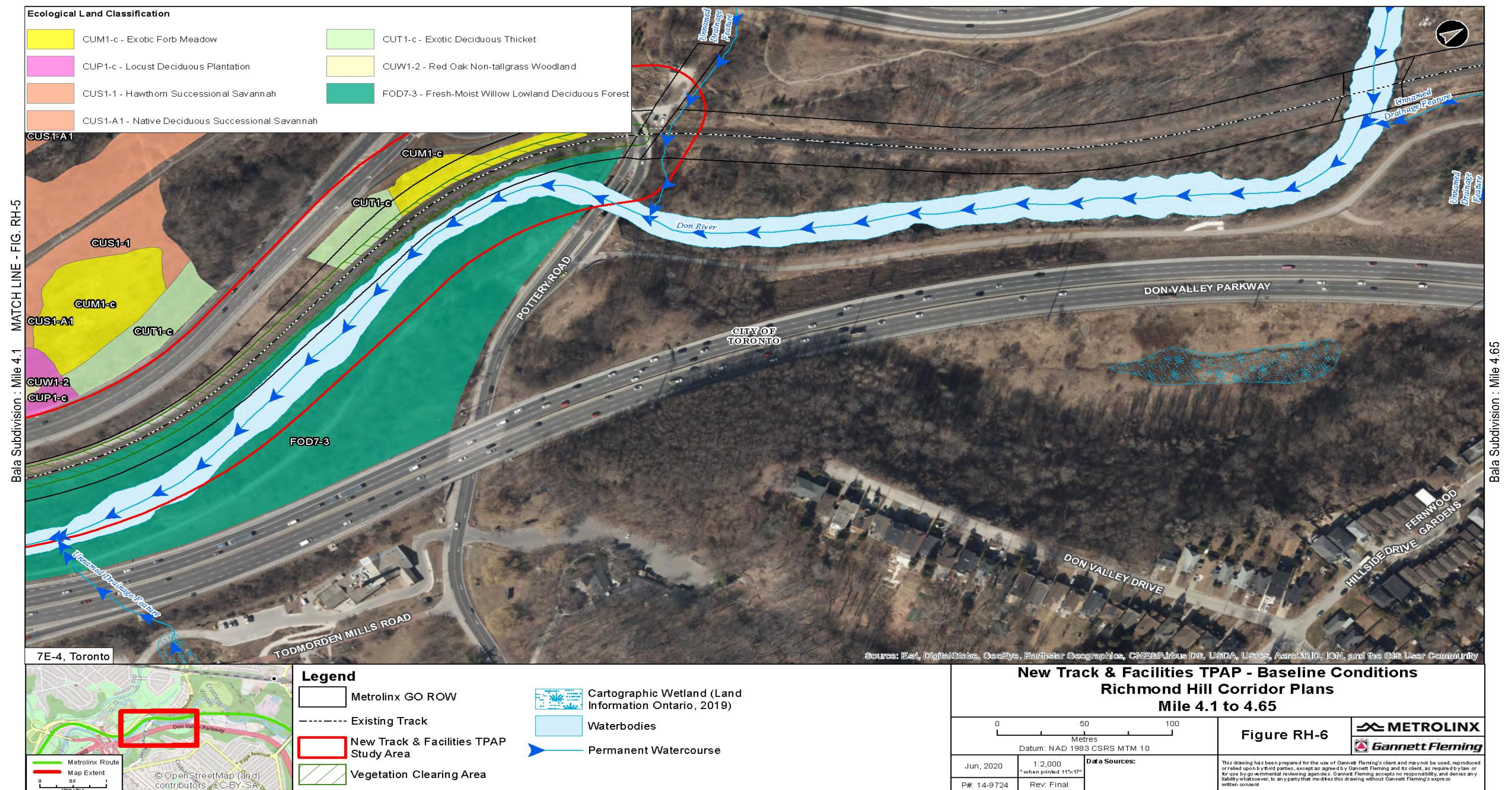


FIGURE 4-54 NATURAL ENVIRONMENT FEATURES WITHIN TRACK SEGMENT RH-6 – MILE 4.10 TO MILE 4.65



#### 4.9.2 Hydrogeology

One watercourse rail crossing occurs along this portion of the corridor associated with the approach to the proposed Don Valley Layover facility area.

A small open water linear wetland community occurs between the existing site access road and the proposed layover track. In addition, one small Narrow-leaved Cattail Mineral Shallow Marsh occurs within the proposed footprint of the proposed layover although no open water or seepage areas were visible during the field visits performed as part of this study in 2019/2020.

The Richmond Hill Corridor lies entirely within the Lower Don River watershed. The Don River is classified as a CRA fishery, has permanent flow and provides warmwater habitat. Flow is in a southerly direction.

All segments within the Richmond Hill corridor are located within the Iroquois Plain physiographic region. The Iroquois Plain includes shoreline and lacustrine deposits associated with the flooding of Lake Iroquois during the last glacier retreat. The sediment deposits border the western part of Lake Ontario spanning from the Niagara River to the Trent River. The old Iroquois shoreline can be easily identified by cliffs, bars, beach ridges and boulder pavements. Underlying undulating till planes often host drumlins that extend above the plain features and host localized shoreline deposits. Sediment deposits within the Iroquois plain are comprised of sand, clay, gravel bars, till and shale, and are coarse grained (sand and gravel) near the historic shorelines and fine grained (silt then clay) in an offshore direction.

All Project segments within the Richmond Hill rail corridor are located within an Intake Protection Zone (IPZ). IPZs are intended to protect surface water resources that are relatively sensitive to chemical or pathogen contamination. Although precautionary measures to protect groundwater and surface water must be applied on all projects, additional protection measures and related documentation may be required where Study Areas fall within an IPZ.

Refer to the *Hydrogeology Baseline Conditions Report* contained in **Appendix C1** for MECP water well records for areas adjacent to the Richmond Hill rail corridor ROW.

##### 4.9.2.1 Don Valley Layover Facility

The proposed Don Valley layover facility is located within the Don River Sub-watershed, which covers an area of approximately 360 km<sup>2</sup> that stretches about 38 km from the headwaters of the Oak Ridges Moraine to the outflow in Lake Ontario. The major groundwater discharges in the sub-watershed occur on the south slope of the ORM, where flow occurs from the ORM Aquifer Complex and along the south glacial Lake Iroquois shoreline (close to Eglinton Avenue). Stream flows average approximately 4.0 m<sup>3</sup>/sec, with a mean annual discharge of almost 125 mm<sup>3</sup>/yr. The sub-watershed is one of most urbanized in the country - nearly 80% of the drainage area is urbanized.

The Don River's surface water quality is considered poor and highly reflective of urbanization and lack of control of stormwater drainage. Concentrations of total suspended solids, turbidity, chloride, ammonia and nutrients are typically elevated throughout the watershed.

##### 4.9.2.2 Track Segment RH-1 – Mile 1.60 to Mile 2.15

Refer to Section 4.9.2.1 – Don Valley Layover Facility.

##### 4.9.2.3 Track Segment RH-2 – Mile 2.15 to Mile 2.50

Refer to Section 4.9.2.1 – Don Valley Layover Facility.

##### 4.9.2.4 Track Segment RH-3 – Mile 2.50 to Mile 3.10

Refer to Section 4.9.2.1 – Don Valley Layover Facility.



#### 4.9.2.5 Track Segment RH-4 – Mile 3.10 to Mile 3.60

Refer to Section 4.9.2.1 – Don Valley Layover Facility.

#### 4.9.2.6 Track Segment RH-5 – Mile 3.60 to Mile 4.10

Refer to Section 4.9.2.1 – Don Valley Layover Facility.

#### 4.9.2.7 Track Segment RH-6 – Mile 4.10 to Mile 4.65

Refer to Section 4.9.2.1 – Don Valley Layover Facility.

### 4.9.3 Land Use and Socio-Economic

#### 4.9.3.1 Don Valley Layover Facility

##### Existing Land Use

Extending north along the Richmond Hill Corridor is the Lower Don Parklands, and four parks, including Toronto Necropolis, Wellesley Park, Riverdale Park West and Rosedale Ravine Lands. Within these parks are many pedestrian trails and discovery walks, such as the Lower Don Trail that meanders through the Don Valley. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

Under the City of Toronto Zoning By-law 569-2013, this segment of the rail corridor is zoned for *Utility and Transportation (UT)*. The proposed Don Valley Layover site is partially zoned *Open Space Natural (ON)*. North of Mile 1.60 along the Richmond Hill Corridor, surrounding land uses are primarily designated as Regeneration Area and Employment/Industrial. Extending north, lands transition to Residential, Mixed Use and Park/Open Space areas near the Lower Don Parklands. Additionally, the Don River Valley is designated as an Urban River Valley under the Greenbelt Plan of Ontario (2017).

##### Planned Land Use

Lands within the Don Valley are designated as an Environmentally Significant Area (ESA) by the City of Toronto and are within the City's Natural Heritage System. Natural heritage features require special attention to preserve their environmentally significant qualities, provide ecosystem functions, promote biodiversity and increase resiliency. Any development should seek to minimize negative impacts, and restore the ecological functions of the area, where possible.

The Don Valley Layover is partially (i.e., lead track) within the Downtown Toronto Urban Growth Centre.

The Lower Don Trails Master Plan proposes multiple observation points within the Lower Don Parklands, the Bayview Multi-Use Path, as well as improvements to bridge crossings, intersections and underpasses.

#### 4.9.3.2 Track Segment RH-1 – Mile 1.60 to Mile 2.15

##### Existing Land Use

Corktown Common is a Toronto park located near the lower Don Valley. The Don River runs along the east side of the rail corridor where it meets the Lower Don Trail. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation (*UT*) under City of Toronto Zoning By-law 569-2013.

### Planned Land Use

Three Secondary Plan areas are located in the vicinity of the Richmond Hill Corridor, including:

- King-Parliament (Area 15)
- Central Waterfront (Area 31)
- Queen-River (Area 34)

The King-Parliament Secondary Plan Area targets growth in commercial, institutional, industrial, recreational and residential uses. It is intended to promote the retention and expansion of commercial activities, particularly in businesses such as film, media, design and technology. The policies for this specialty area encourage the re-use and enhancement of existing buildings to maintain the characteristics of the neighbourhood. It is noted that the King-Parliament Secondary Plan is currently under review and subject to policy changes.

The Central Waterfront Secondary Plan Area maintains four core principles to help manage the City's waterfront spaces. The first core principal is to remove barriers and enhance connections between the City and Lake Ontario to ultimately achieve the full potential of Toronto's waterfront. The second policy focuses on building a network of waterfront parks and public spaces; to achieve this goal, the City intends to rehabilitate natural waterfront locations for tourism and local enjoyment. The third policy promotes a clean and green waterfront through a variety of environmental and sustainability strategies. Lastly, the Secondary Plan Area policies are working toward creating new, dynamic and diverse waterfront communities for both live-work opportunities. These waterfront communities will be acclaimed for their economic, natural, cultural and environmental characteristics, while contributing to the long-term sustainability of the City.

The Queen-River Secondary Plan Area policies promote a mix of residential and commercial uses. This Secondary Plan Area intends to foster high quality outdoor spaces that include tree lined streets, parks and public open spaces, while working towards improving connections to surrounding neighbourhoods and the Don Valley. This segment is also within the Downtown Toronto Urban Growth Centre, which established policies and minimum density targets to encourage intensification and downtown revitalization.

Any future development will comply with existing land use designations.

The City of Toronto commissioned a Master Plan in 2013 to guide development for the Lower Don Trail and surrounding parklands. The goal of this plan is to improve environmental protection and access, provide long-term strategies to create positive user experiences, and incorporate existing City plans and initiatives.

Within this segment of the rail corridor, the City has proposed an observation point near the Corktown Commons. There are no other known planned recreational amenities in the surrounding area.

#### 4.9.3.3 Track Segment RH-2 – Mile 2.15 to Mile 2.50

### Existing Land Use

Riverdale Park borders this segment of the rail corridor, containing both a sports track and two baseball diamonds. The Don River watercourse and Lower Don Trail extend northbound adjacent to the corridor. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation under City of Toronto Zoning By-law 569-2013.



### Planned Land Use

There are two Secondary Plan areas within the vicinity of the rail corridor:

- Regent Park (Area 28)
- Queen-River (Area 34)

The Regent Park Secondary Plan Area establishes a framework to guide the redevelopment of a mixed use/residential neighbourhood. The intent of this policy is to integrate the neighbourhood with the surrounding area, while also accommodating a diverse population in a sustainable environment. Part of the revitalization of Regent Park will involve the reconstruction of social housing and transforming the physical character of the park by creating a continuous network of public streets and spaces that are well integrated into the existing character of the area.

The Queen-River Secondary Plan Area is described above in Section 4.9.3.2. This segment is also within the Downtown Toronto Urban Growth Centre. Any future development will comply with existing land use designations. The Lower Don Trail Master Plan promotes improved access to the Lower Don Trail by providing stairs on Dundas Street East and Gerrard Street East bridges.

#### 4.9.3.4 Track Segment RH-3 – Mile 2.50 to Mile 3.10

### Existing Land Use

Located west of the Richmond Hill Corridor are the Rosedale Ravine Land, Wellesley Park, Riverdale Park West and the Toronto Necropolis Park. To the east of the rail corridor lies Riverdale Park East and the Lower Don Parklands. The Lower Don Trail extends adjacent to the Don River. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor. The Don River watercourse and Lower Don Trail extend northbound adjacent to the rail corridor.

Under the City of Toronto Zoning By-law 569-2013, this segment of the rail corridor is zoned for *Utility and Transportation (UT)*.

Existing land use at the site of the proposed Don Valley layover facility is presented visually in Figure 4-55.



FIGURE 4-55 EXISTING LAND USE AT THE PROPOSED DON VALLEY LAYOVER SITE

#### Planned Land Use

Lands within the Don Valley are designated as an Environmentally Significant Area (ESA) by the City of Toronto. An ESA encourages building the City, while protecting and enhancing the natural environment by carrying out good stewardship practices. This segment is partially within the Downtown Toronto Urban Growth Centre.

Within this segment, the Lower Don Trails Master Plan proposes an observation point and the Bayview Multi-Use Path (see Figure 4-56).





FIGURE 4-56 EXCERPT FROM THE LOWER DON TRAIL MASTER PLAN

#### 4.9.3.5 Track Segment RH-4 – Mile 3.10 to Mile 3.60 and Retaining Wall

##### Existing Land Use

Rosedale Ravine Lands and Bloor Street East Open Space are located west of the Richmond Hill Corridor. To the east of the rail corridor lies Playter Gardens, which includes the Lower Don Parklands. The Lower Don Trail extends adjacent to the Don River. The City Adult Learning Centre is located east of the rail corridor adjacent to Bloor Street East/Danforth Avenue. The Adult Learning Centre is situated on the top of a hill within 100 metres of the rail corridor. There are no hospitals, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation (*UT*) under City of Toronto Zoning By-law 569-2013.

### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with existing land use designations. Within this segment, the Lower Don Trails Master Plan is proposing the Bayview Multi-Use Path.

#### 4.9.3.6 Track Segment RH-5 – Mile 3.60 to Mile 4.10

### Existing Land Use

Segment RH-5 of the Richmond Hill Corridor comprises the Lower Don Parklands and trails. The Park Drive Reservation Lands and the Kay Gardner Beltline Park are located north of the rail corridor.

Evergreen Brickworks is recognized locally as a hub to educate and experience sustainable practices that enable residents to contribute back to the community. The facility hosts many community events, such as fresh food markets, art exhibits, nature and outdoor learning sessions, and children and youth camps. Evergreen Brickworks is located within 30 metres of the rail corridor.

There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation (*UT*) under City of Toronto Zoning By-law 569-2013.

### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with existing land use designations. The Lower Don Trail Master Plan proposed observation points that connect to the Lower Don Trail.

#### 4.9.3.7 Track Segment RH-6 – Mile 4.10 to Mile 4.65

### Existing Land Use

This segment of the rail corridor includes the Lower Don Trail and Parklands. There are no hospitals, schools, places of worship, child-care centres or long-term care centres in the vicinity of the rail corridor.

This segment of the rail corridor is zoned for Utility and Transportation (*UT*) under City of Toronto Zoning By-law 569-2013.

### Planned Land Use

There are no Secondary Plans affecting the lands adjacent to this segment of the rail corridor. Any future development will comply with existing land use designations. The City of Toronto is proposing a new pedestrian structure at Pottery Road to connect the Pottery Road trailhead with the new Bayview Avenue multi-use trail.

#### 4.9.4 Cultural Heritage

##### 4.9.4.1 Don Valley Layover Facility

One previously identified BHR (RH-03) is located within the 30 m buffer within this study area.

##### 4.9.4.2 Track Segment RH-1 – Mile 1.60 to Mile 2.15

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

##### 4.9.4.3 Track Segment RH-2 – Mile 2.15 to Mile 2.50

One previously identified CHL (RH-01) is located within the 30 m buffer along this segment.



#### 4.9.4.4 Track Segment RH-3 – Mile 2.50 to Mile 3.10 and Retaining Wall

Two previously identified CHLs (RH-01 and RH-02) are located within the 30 m buffer along this segment.

#### 4.9.4.5 Track Segment RH-4 – Mile 3.10 to Mile 3.60 and Retaining Wall

One previously identified BHR (RH-03) is located within the 30 m buffer along this segment.

#### 4.9.4.6 Track Segment RH-5 – Mile 3.60 to Mile 4.10

One previously identified CHL (RH-04) is located within the 30 m buffer along this segment.

#### 4.9.4.7 Track Segment RH-6 – Mile 4.10 to Mile 4.65

No previously identified BHRs or CHLs are located within the rail corridor or the 30 m buffer along this segment.

### 4.9.5 Archaeology

For the detailed historical and archaeological context of the Richmond Hill Corridor, please refer to the *Metrolinx NTF TPAP Archaeology – Baseline Conditions Report*. A summary of the historical and archaeological context for key segments of the Richmond Hill Corridor is provided below.

#### 4.9.5.1 Don Valley Layover Facility

The proposed site of the Don Valley layover corresponds to segment RH-3 and is located between Riverdale Park West and the Don Valley Parkway in the City of Toronto. This area corresponds to lands within Treaty 13, York Township, and Borden block AIGu. Three previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least seven previous reports detail fieldwork within 50 m of segment RH-3, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment RH-3 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Lake Ontario, Don River);
- Early historic transportation routes (Queen Street, Dundas Street, Gerrard Street, Danforth Avenue); and
- Proximity to early settlements (York/Toronto).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Areas of archaeological potential at this location are presented visually in Figure 4-57 and Figure 4-58.



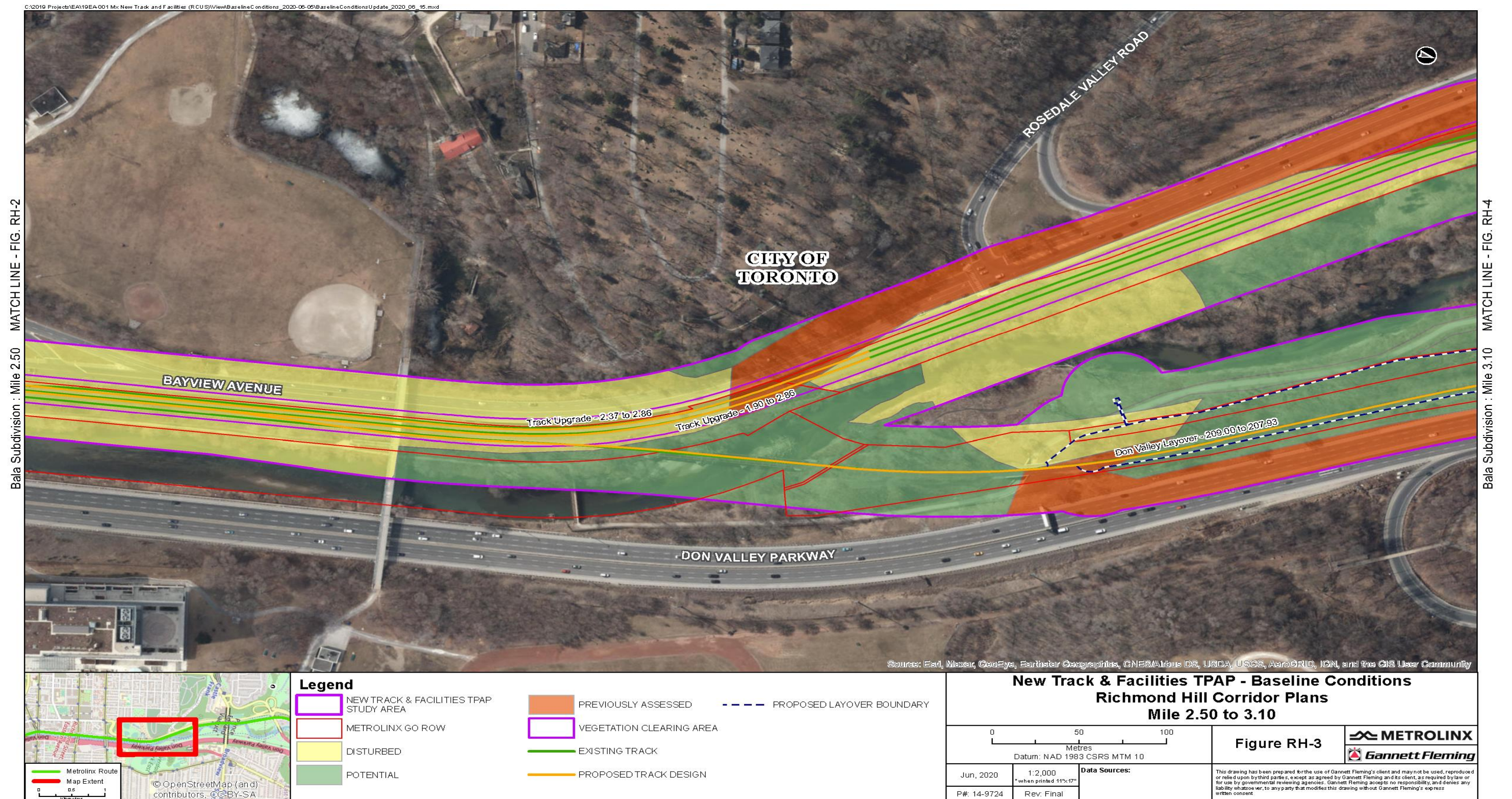


FIGURE 4-57 ARCHAEOLOGICAL POTENTIAL AT THE DON VALLEY LAYOVER SITE



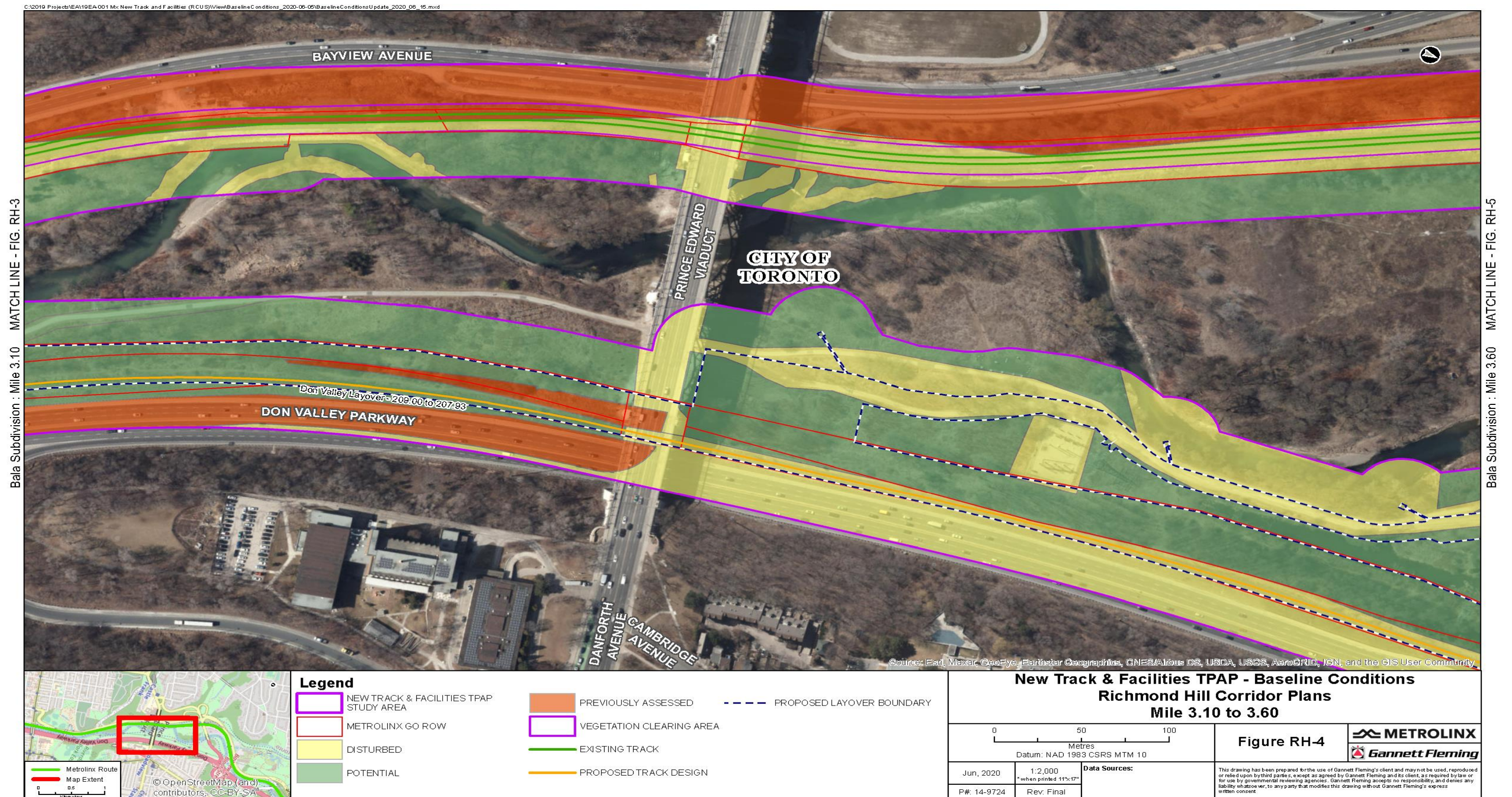


FIGURE 4-58 ARCHAEOLOGICAL POTENTIAL AT THE DON VALLEY LAYOVER SITE (2)



#### 4.9.5.2 Track Segment RH-1 – Mile 1.60 to Mile 2.15

Segment RH-1 is located between Eastern Avenue and south of Queen Street East in the City of Toronto. This area corresponds to lands within Treaty 13, York Township, and Borden block AiGu. Ten previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least five previous reports detail fieldwork within 50 m of segment RH-1, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment RH-1 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Lake Ontario, Don River);
- Early historic transportation routes (Queen Street, Dundas Street, Gerrard Street, Danforth Avenue); and
- Proximity to early settlements (York/Toronto).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.9.5.3 Track Segment RH-2 – Mile 2.15 to Mile 2.50

Segment RH-2 is located between south of Gerrard Street East and north of Dundas Street East in the City of Toronto. This area corresponds to lands within Treaty 13, York Township and Borden block AiGu. Seven previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least five previous reports detail fieldwork within 50 m of segment RH-2, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

RH-2 meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Lake Ontario, Don River);
- Early historic transportation routes (Queen Street, Dundas Street, Gerrard Street, Danforth Avenue); and
- Proximity to early settlements (York/Toronto).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance.

#### 4.9.5.4 Track Segment RH-3 – Mile 2.50 to Mile 3.10

This segment corresponds to the location of the proposed Don Valley layover. Refer to Section 4.8.5.1 for a discussion of existing archaeological conditions.

#### 4.9.5.5 Track Segment RH-4 – Mile 3.10 to Mile 3.60

Segment RH-4 is located south of the Prince Edward Viaduct on Danforth Avenue in the City of Toronto. It includes the following sections of track upgrades:

- Electrification of the rail corridor (Bala subdivision); and
- Don Valley Layover from Mile 209.00 to 207.93 (along Don Branch).



#### 4.9.5.6 Track Segment RH-5 – Mile 3.60 to Mile 4.10

Segment RH-5 is located between Bayview Avenue and the Don Valley Parkway in the City of Toronto. This area corresponds to lands within Treaty 13, York Township, and Borden block AiGu. Seven previously registered archaeological sites are located within 1 km of the Study Area according to the OASD, none of which are located within 50 m. At least six previous reports detail fieldwork within 50 m of segment RH-5, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment RH-5 meets the following criteria indicative of archaeological potential:

- Water sources: primary, secondary, or past water source (Lake Ontario, Don River);
- Early historic transportation routes (Queen Street, Dundas Street, Gerrard Street, Danforth Avenue); and
- Proximity to early settlements (York/Toronto).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.9.5.7 Track Segment RH-6 – Mile 4.10 to Mile 4.65

Segment RH-6 is located near Pottery Road in the City of Toronto. This area corresponds to lands within Treaty 13, York Township, and Borden block AiGu. No previously registered archaeological sites are located within 1 km of the Study Area according to the OASD. At least six previous reports detail fieldwork within 50 m of segment RH-6, as detailed in **Appendix G1 - Archaeology Baseline Conditions Report**.

Segment RH-6 meets the following criteria indicative of archaeological potential:

- Water sources: primary, secondary, or past water source (Lake Ontario, Don River);
- Early historic transportation routes (Queen Street, Dundas Street, Gerrard Street, Danforth Avenue); and
- Proximity to early settlements (York/Toronto).

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance. Detailed archaeological mapping for this segment is available in **Appendix G1**.

#### 4.9.6 Visual/Aesthetics

##### 4.9.6.1 Don Valley Layover Facility

This segment of the Richmond Hill Corridor extends to a section of the rail network known as the Don Branch. It traverses the area of the Don River Valley Park, running alongside the Don Valley Parkway to the east and the Lower Don Valley River trail to the west. This area has significant heritage value, with the Prince Edward Viaduct (designated under the *Ontario Heritage Act*) passing over the Metrolinx rail ROW (refer to Figure 4-59). The views from the bridge (Prince Edward Viaduct), and surrounding trails/parks will likely be altered due to the proposed layover facility. Since the proposed layover location is intended to store trains during the daytime, the visual baseline conditions in this segment are classified as *High* in surrounding areas. See for Figure 4-59 for a view of the Prince Edward Viaduct from ground level.



FIGURE 4-59 VIEW OF THE PRINCE EDWARD VIADUCT FROM GROUND LEVEL

The introduction of electrification infrastructure (i.e., OCS poles, wires, etc.) is proposed along the Richmond Hill Rail right-of-way, up to approximately Mile 4 (Pottery Road). Views from the Prince Edward Viaduct of the railroad are not likely to be affected as safety barriers exist on the bridge that alter/block existing views. Electrification infrastructure across the railroad will be visible from parallel roadways, especially since the Don Valley Parkway is located at a higher elevation than the proposed Don Valley Layover, making electrification infrastructure highly noticeable. A mid-rise adult learning centre located to the east of the rail corridor may block views; however, the electrification infrastructure may still be visible from this building.

Though there is vegetation surrounding the proposed site, winter views may be affected by the introduction of electrification infrastructure; therefore, the visual baseline conditions are classified as *High*.

#### 4.9.6.2 Track Segment RH-1 – Mile 1.60 to Mile 2.15

Segment RH-1 is entirely within the City of Toronto. East of the corridor lies the Don River, where the Lower Don River Trail follows the course of the river and is surrounded with vegetation on both sides. Further east is the Don Valley Parkway. West of the right-of-way, the corridor traverses commercial and employment areas with pockets of high-rise residential buildings located approximately 30 metres from the rail right-of-way. The proposed track upgrades in this area will occur within the existing Metrolinx rail right-of-way; therefore, the visual baseline conditions along this segment are classified as *Negligible*.

Views may also be altered by the introduction of electrification infrastructure along the right-of-way. Electrification infrastructure across the railroad will be visible from parallel roadways (i.e., Don Valley



Parkway). Although vegetation exists along the tracks and in the Lower Don Parklands, winter views may be affected by the introduction of electrification infrastructure. Views along the Lower Don Trail and within the Lower Don Parklands are anticipated to be altered; therefore, visual baseline conditions are classified as *High*.

Views up and down the tracks are likely to be affected by the introduction of safety barriers on bridges, such as the Queen Street East Bridge. High-rise and mid-rise residential and commercial buildings block views of the rail corridor, but the electrification infrastructure may be visible from these buildings. Views of the new electrification infrastructure will extend across the Richmond Hill Rail Corridor up to approximately Mile 4 (Pottery Road), which is generally surrounded by preserved natural areas.

#### 4.9.6.3 Track Segment RH-2 – Mile 2.15 to Mile 2.50

The proposed track and OCS infrastructure continue within this segment of the Richmond Hill Corridor. The visual baseline conditions of the high-rise residential buildings are classified as Moderate since they are set back further from the rail ROW, and employment/commercial buildings are classified as having a Negligible visual effect. It is important to note that while these buildings block views of the corridor, residents may experience altered views from within these buildings (i.e., east facing windows). The visual baseline conditions of the surrounding parklands of the Don Valley are classified as High. Additionally, views up and down the railroad are likely to be affected by the introduction of safety barriers on bridges, such as the Gerrard Street East Bridge.

#### 4.9.6.4 Track Segment RH-3 – Mile 2.50 to Mile 3.10

Refer to Section 4.9.5.1 above as Segment RH-3 comprises similar characteristics as the proposed Don Valley layover.

The proposed track and OCS infrastructure continue within this segment of the Richmond Hill Corridor. The visual baseline conditions of the surrounding parklands directly adjacent to the corridor are classified as *High*.

#### 4.9.6.5 Track Segment RH-4 – Mile 3.10 to Mile 3.60

This segment corresponds to the location of the proposed Don Valley layover. Refer to Section 4.8.5.1 for a description of the existing visual characteristics.

Views may also be altered by the introduction of electrification infrastructure along the ROW. Electrification infrastructure across the railroad will be visible from the parallel roadways (i.e., Bayview Avenue). Though there is vegetation along the corridor and in the Lower Don Parklands, winter views may be affected by the introduction of electrification infrastructure. Views along the Lower Don Trail and within the Lower Don Parklands are anticipated to be altered and are therefore visual baseline conditions are classified in this area as *High*.

#### 4.9.6.6 Track Segment RH-5 – Mile 3.60 to Mile 4.10

This segment is a continuation of the proposed Don Valley layover. Refer to Section 4.8.5.1 for a description of the existing visual characteristics.

Views may also be altered by the introduction of electrification infrastructure along the ROW. Electrification infrastructure across the railroad will be visible from the parallel roadways (i.e., Bayview Avenue). Though there is vegetation along the corridor and in the Lower Don Parklands, winter views may be affected by the introduction of electrification infrastructure. Views along the Lower Don Trail and within the Lower Don Parklands are anticipated to be altered and are therefore visual baseline conditions are classified in this area as *High*. Evergreen Brickworks is classified as having a potentially Low visual baseline conditions since it is a further distance away from the corridor.

#### 4.9.6.7 Track Segment RH-6 – Mile 4.10 to Mile 4.65

This segment does not contain residential dwellings and is currently visually disturbed due to heavily trafficked roadways in close proximity. As such, the visual baseline conditions of the majority of the surrounding area is classified as *Low* due to the proposed OCS infrastructure along the Richmond Hill Corridor.

#### 4.9.7 Stormwater Management

##### 4.9.7.1 Don Valley Layover Facility

The total Layover assessment area for stormwater management is approximately 7.26 ha, consisting of existing railroad tracks/ballast and undeveloped land. The portion of the property parcel, affected by the development of the layover site, will be approximately 7.26 ha. In the subsequent sections of this report only the area affected by the development is considered for the analysis.

Available topographic information indicates that the proposed site is located on the parcel of land to the west of the Don Valley Parkway and east of the Don River and Lower Don Valley Trail. The existing surface data indicates drainage flowing west toward the Don River. Flooding of the existing site is a result of discharge from the Prince Edward Viaduct and Don Valley Parkway. The regulatory flood line shown is from TRCA's Flood Plain Mapping Program (2017).

The proposed Don Valley Layover Facility site development will include access roads, site office buildings, sanitary waste disposal building, electrical/storage building and a layover track enclosed by a chain link fence. The site will have a mix of industrial impervious surfaces, track and ballast areas and open space. The industrial impervious, track and ballast and open space areas are 0.98, 0.73 and 5.55 ha respectively. The drainage areas and runoff coefficients for the proposed catchment area analyzed are shown in Table 4-26. The composite runoff coefficients for this area is 0.46. Runoff coefficients for industrial and open space were taken from the Toronto Design Criteria for Sewers and Watermains (November 2009). Runoff coefficients for track and ballast areas were taken from the Colorado DOT report titled, "Modeling Ballasted Tracks for Runoff Coefficient C" (August 2012).

Runoff from the western portion of the developed site will discharge over the natural grade into to the Don River, mimicking existing condition. At three (3) locations along the west side of the proposed access road, rip-rap is proposed at localized low points to control overland flow. Two (2) precast concrete culverts are proposed to carry flows (north-south) across a part of the proposed access road. Runoff from the eastern access road and site facilities will be collected in a series of catch basins, routed through an oil-grit separator for quality treatment, and discharged to an existing municipal storm sewer system at south end of the site. The use of ditches/swales are not recommended at this location since the site is partially within the existing floodplain. Metrolinx shall review and mitigate the potential for backwatering of the precast culverts due to flooding to be confirmed during detailed design stage. The proposed development areas and their locations are based on conceptual design and may be refined as the design progresses. Therefore, reassessment of the drainage areas will be required at subsequent design stages, as necessary.

The existing and proposed drainage areas and runoff coefficients are summarized below in Table 4-26. Runoff coefficient for open space will be verified after soil type is determined during detailed design investigation.



TABLE 4-26 DON VALLEY LAYOVER EXISTING AND PROPOSED DRAINAGE AREAS

Existing Condition - Catchment 1			Proposed Condition - Catchment 1A and 1B		
Area Type	Drainage Area (ha)	Runoff Coefficient	Area Type	Drainage Area (ha)	Runoff Coefficient
Track and Ballast	0.73	0.84	Track and Ballast	0.73	0.84
Industrial	-	-	Industrial	0.98	0.85
Open Space	6.53	0.30	Open Space	5.55	0.30
Total/Composite	7.26	0.35	Total/Composite	7.2	0.46

The Don Valley Layover Facility is fully within the area regulated by TRCA under *O. Reg. 166/06*. Currently, the existing site is a flood prone area due to excess drainage from the Prince Edward Viaduct and the Don Valley Parkway. The site is located to the west of the Don Valley Parkway, and to the east of the Don River and Lower Don Valley Trail.

Additionally, Metrolinx is currently undergoing a Flood Mitigation Study for the Lower Don River, which extends along the Richmond Hill corridor from Cherry St. to York Mills, up to the observed Regional Storm or 100 year storm flood-line (whichever is greater). This modelling is being complete to update previous studies to better reflect impacts of climate change and advancements in technology, develop options to mitigate impacts of flooding events to GO rail infrastructure and services along the Richmond Hill corridor, and provide options that will feed into a future Initial Business Case for potential GO service expansion on the Richmond Hill corridor.