

Municipal Class Environmental Assessment Study: Wolfedale Creek Erosion Control Project from Burnhamthorpe Road West to the Credit River

Project File Report

City of Mississauga

60701082

December 2024

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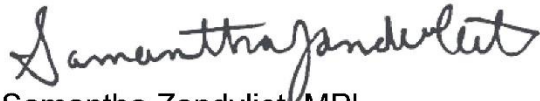
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City of Mississauga

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Control Project from Burnhamthorpe Road West to the Credit River
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Revision History

Revision Number	Date	Revised By	Revision Description
-	September 6, 2024	-	Draft report submitted to City
1	October 15, 2024	SZ	Draft report submitted to City and review agencies (MECP, MCM, CVC)
2	December 16, 2024	SZ, RVR, KP	Final report submitted to City for 40-day public review

Executive Summary

Introduction and Background

The City of Mississauga (the City), through its consultant AECOM Canada Ltd. (AECOM), has completed a Schedule B Municipal Class Environmental Assessment study for erosion control and restoration of Wolfedale Creek between Burnhamthorpe Road West and the Credit River. The City recognizes that these sections of Wolfedale Creek are in need of rehabilitation to remediate existing erosion issues and improve safety.

This study characterizes these sections of Wolfedale Creek to identify existing problems, potential risks, and opportunities for restoration and safety improvements. Based on the identification and evaluation of various alternative solutions, a preferred erosion control and restoration strategy has been recommended in this report.

The study has been undertaken in accordance with the planning and design process for Schedule 'B' projects, as outlined in the "Municipal Class Environmental Assessment" document (as amended in 2023), which is approved under the *Ontario Environmental Assessment Act*.

Study Area

The study area encompasses two sections of Wolfedale Creek as described below and shown in **Figure ES-1**.

Study Area 1

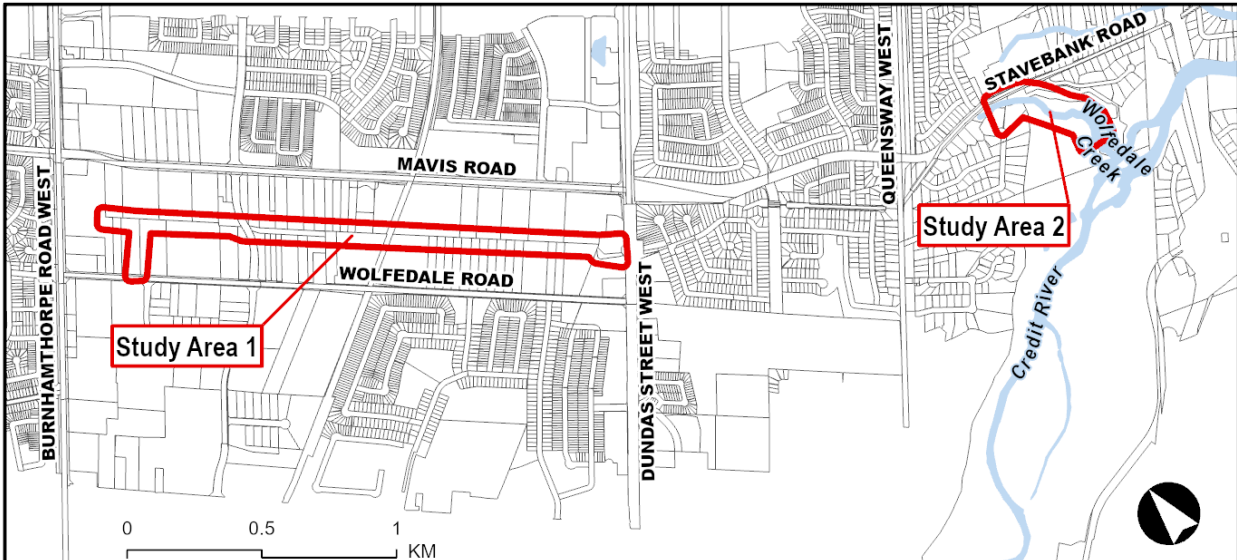
- Study Area 1 includes Wolfedale Creek from Burnhamthorpe Road West to Dundas Street West.
- The land is heavily urbanized, with many industrial and commercial establishments.
- Wolfedale Creek flows to Study Area 1 from a storm sewer outlet from Burnhamthorpe Road West to Dundas Street West. From there it enters another storm sewer pipe, and the flows are conveyed underground for approximately 1.5 km before outletting just west of Stavebank Road into the Study Area 2, which outlets to the Credit River.

Study Area 2

- Study Area 2 includes the tributary outlet to the Credit River, south of Queensway West and west of Stavebank Road.

- The watercourse is surrounded by residential development to the west and east and by forested lands/ a large golf course in the south.
- The watercourse discharges into the Credit River.

Figure ES-1: Study Area



Phase 1: Problem or Opportunity Statement

Phase 1 of the Municipal Class Environmental Assessment planning process requires the City to first document factors leading to the conclusion that the improvement is needed, and to develop a clear statement of the identified problems and opportunities to be investigated. The Problem or Opportunity for this study is presented as follows:

- Located in the City of Mississauga Wolfedale Creek originates at a storm sewer outlet south of Burnhamthorpe Road West, flows parallel to and between Wolfedale Road and Mavis Road and ultimately discharges into the Credit River, south of Queensway West and immediately west of Stavebank Road.
- Ongoing erosion within the Wolfedale Creek corridor has resulted in vertical and unstable creek banks, loss of habitat, potential scour and sediment deposition along the channel bed, and impacts to adjacent land uses posing a risk to private property and infrastructure.
- The creek bank and bed erosion happens when frequent high stormwater flows from upstream and/or adjacent urbanized catchment areas are discharged into Wolfedale Creek without adequate dissipation (i.e., natural floodplains or engineered methods).

- The majority of the channel was originally constructed in a straightened alignment approximately 40 to 50 years ago, and rehabilitation was completed over the years for certain segments.
- The City has determined segments of Wolfedale Creek require rehabilitation through its ongoing erosion monitoring program and has accordingly identified the need for an erosion control and restoration strategy, including engineered bank stabilization, to help prevent further issues for the creek and neighbouring properties.
- Environmental enhancement opportunities will also be explored as part of the preferred erosion mitigation strategy.

Phase 2: Alternative Solutions

The following hereafter summarizes the Phase 2 alternative solutions that have been considered for the Wolfedale Creek Erosion Control Project from Burnhamthorpe Road West to the Credit River based on the existing property limits and constraints.

- **Alternative 1** – Do nothing. This will be used as a base case comparison to other more viable alternatives or strategies.
- **Alternative 2** – Full replacement of failed bank protection with structural bank protection options to maintain long term erosion protection, such as reinforced soil slope walls, cast-in-place re-enforced concrete walls, or steel sheet pile. Structural grade control solutions will consist of structural options, such as concrete weir structures. Incorporation of a natural channel bed will be included to improve fish habitat and passage. Such examples of structural bank protection include armourstone slope protection or retaining wall.
- **Alternative 3** – Full replacement of failed bank protection with non-structural bank protection options to maintain long term erosion protection, such as rock, green gabion, or geogrid retaining walls. Non-structural grade control could include rock weir structures. Incorporation of a natural channel bed will be included to improve fish habitat and passage.
- **Alternative 4** – A combination of both structural and non-structural bank protection and grade control structures to maintain long term erosion protection. Incorporation of a natural channel bed will be included to improve fish habitat and passage.
- **Alternative 5** – Enclose the watercourse in storm sewer and landscape a trail over top.

Criteria were developed to evaluate the solutions based on the following factors: technical environment, natural and physical environment, socio-economic environment, climate change, cultural heritage environment and cost. Refer to **Section 6.3** of this report for the detailed evaluation.

Based on the evaluation, **Alternative 4 (combination of both structural and non-structural bank protection) was identified as the preferred erosion control and restoration strategy** based on the following rationale:

- Flexibility to implement both non-structural and structural improvements.
- Lower anticipated environmental impacts.
- Constructability.
- There are no anticipated flooding impacts.
- Cost-effectiveness with primarily non-structural bank protection options being recommended with localized small-scale structural measures.

Improvements recommended as part of the preferred erosion and restoration strategy as shown in **Figure ES-2** through to **Figure ES-8** are primarily non-structural as the channel bed is degrading for the majority of the creek and armourstone could potentially lose its base support over time. The majority of erosional issues along the creek overbanks could also be addressed with non-structural measures, though in select areas co-operation with the adjacent landowners would be required to address erosional issues to address deficiencies to existing structures (for example, small section of retaining wall failing) along the property limits. As such, localized small-scale structural measures, such as retaining wall repair or replacement, would then be implemented as required in select areas.

Table ES-1 outlines the design considerations within each restoration reach that have been identified in support of the preferred erosion control and restoration strategy (i.e., Alternative 4) as shown in **Figure ES-2** through to **Figure ES-8**.

Table ES-1: Preferred Design Solution Considerations

	Restoration Reach 1	Restoration Reach 2	Restoration Reach 3	Restoration Reach 4	Restoration Reach 5	Restoration Reach 6	Restoration Reach 7
Structural and Non-structural Bank Protection Options	X	X	X	X	X	X	X
Structural and Non-structural Grade Control Measures	X	-	X	-	X	X	X
Culvert and Stormwater Outlet Rehabilitation	X	X	-	-	X	-	-
Debris Jam Removal	X	-	X	-	-	X	-

Figure ES-2: Preferred Erosion Control and Restoration Strategy – Restoration Reach 1 (Study Area 1)

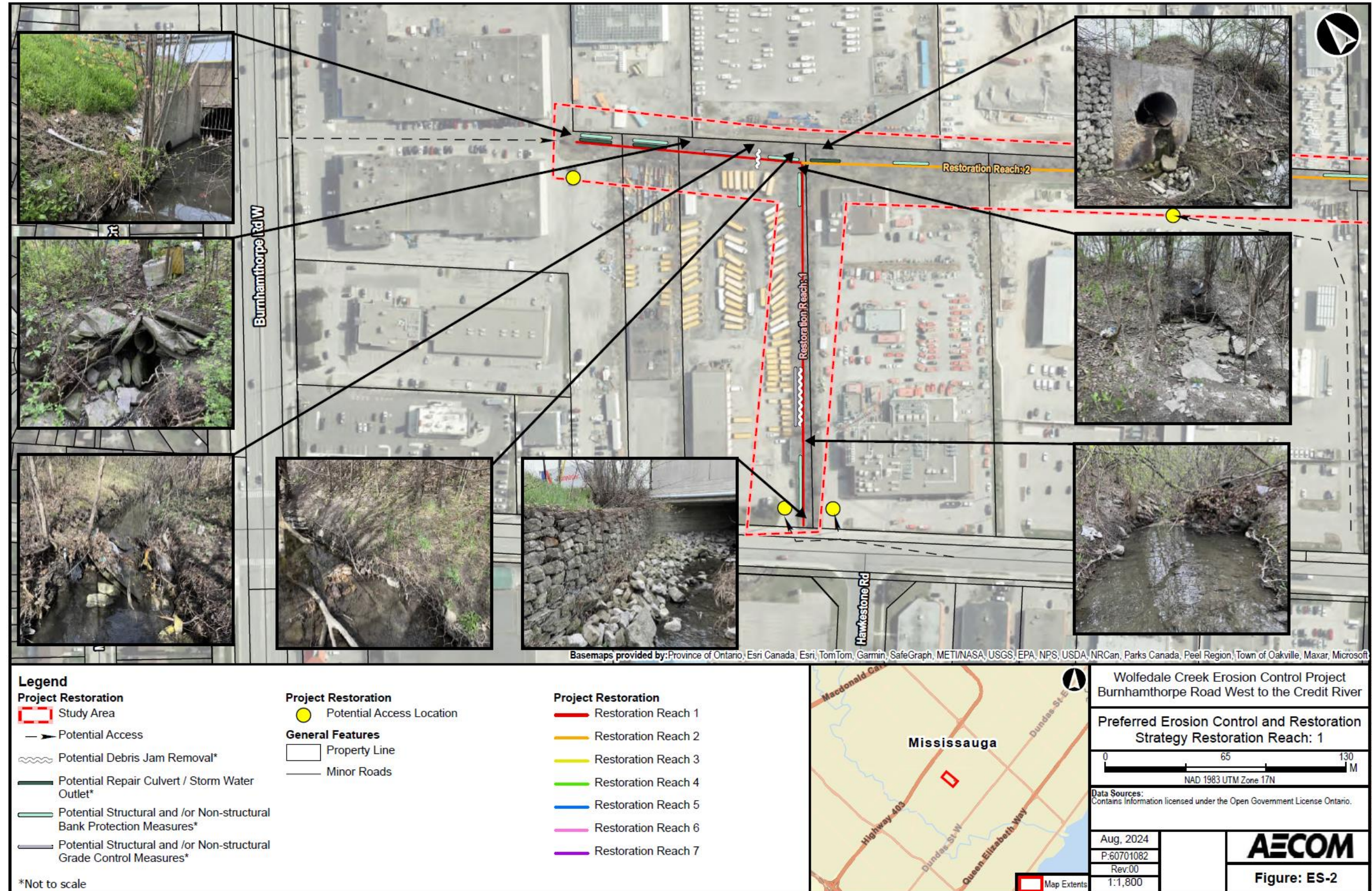


Figure ES-3: Preferred Erosion Control and Restoration Strategy – Restoration Reach 2 (Study Area 1)

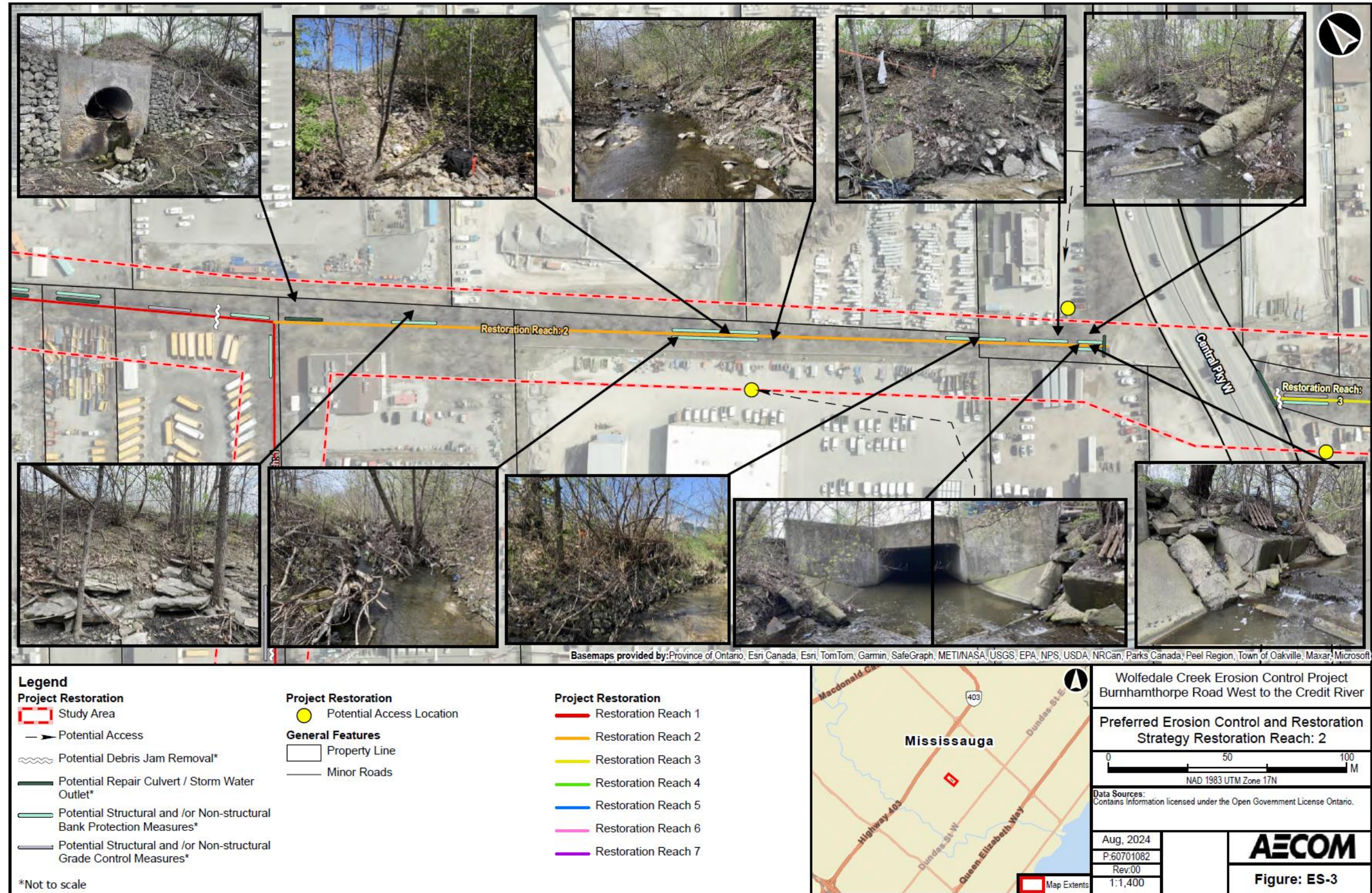


Figure ES-4: Preferred Erosion Control and Restoration Strategy – Restoration Reach 3 (Study Area 1)

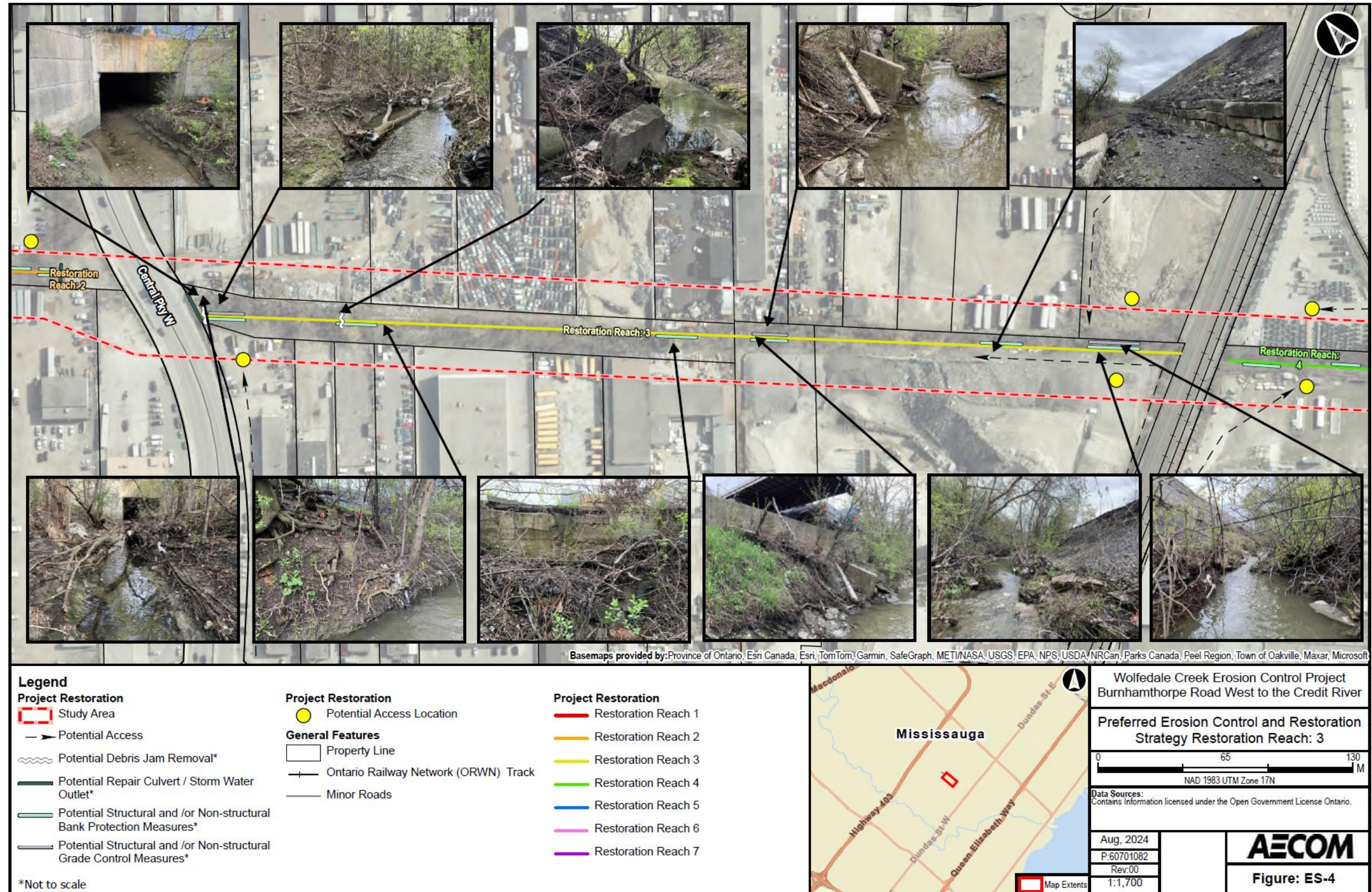


Figure ES-5: Preferred Erosion Control and Restoration Strategy – Restoration Reach 4 (Study Area 1)

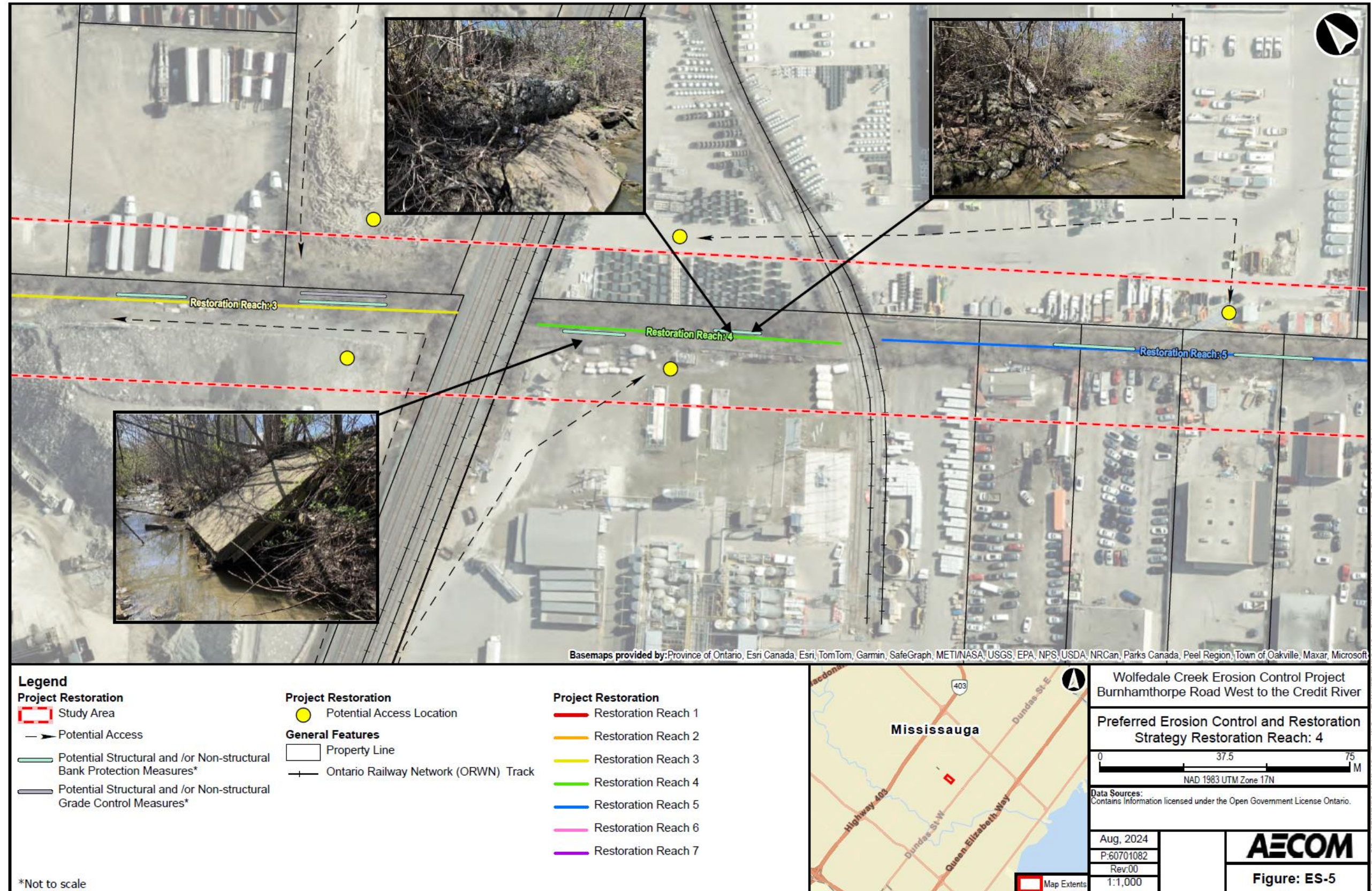


Figure ES-6: Preferred Erosion Control and Restoration Strategy – Restoration Reach 5 (Study Area 1)

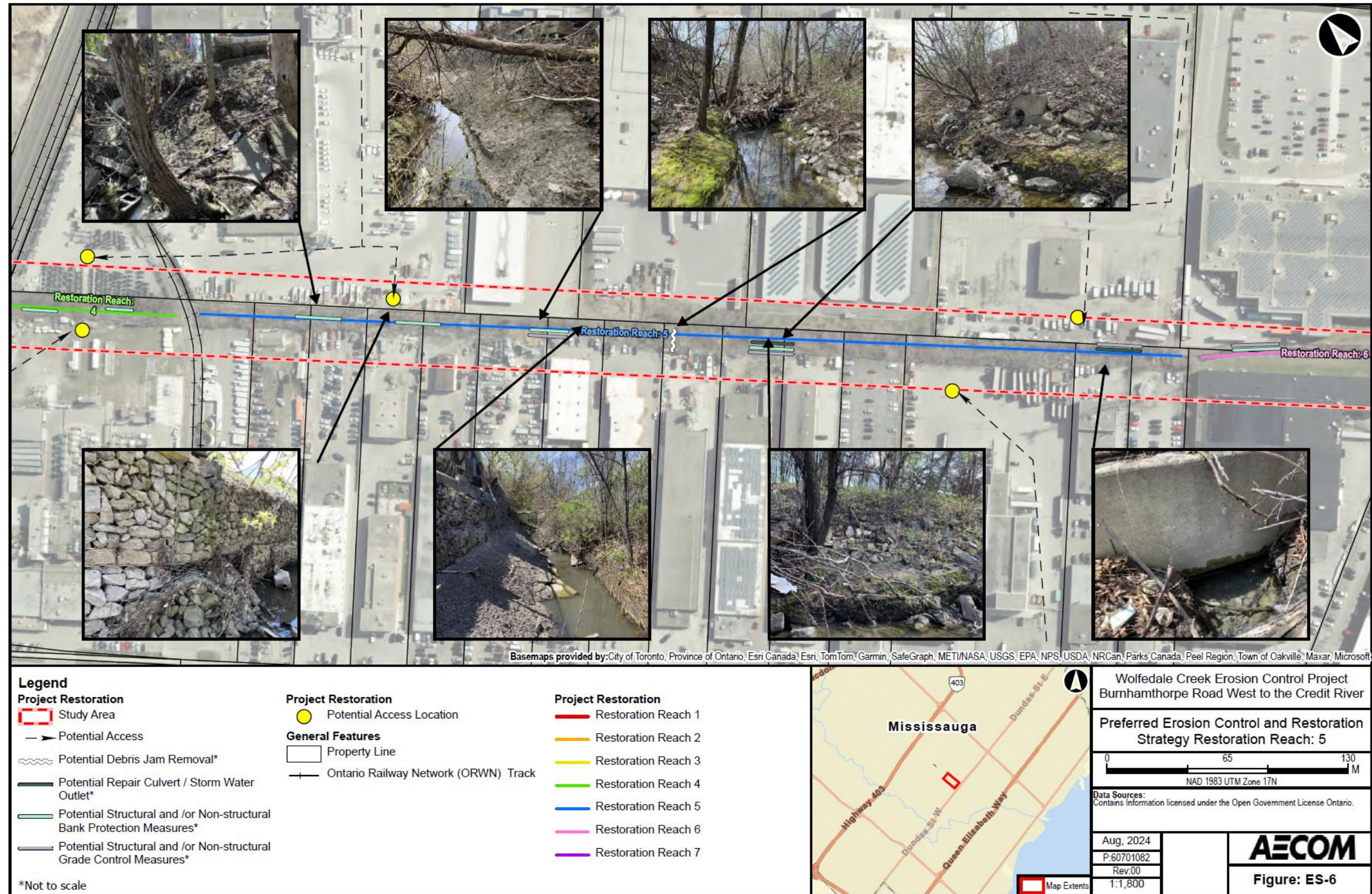


Figure ES-7: Preferred Erosion Control and Restoration Strategy – Restoration Reach 6 (Study Area 1)

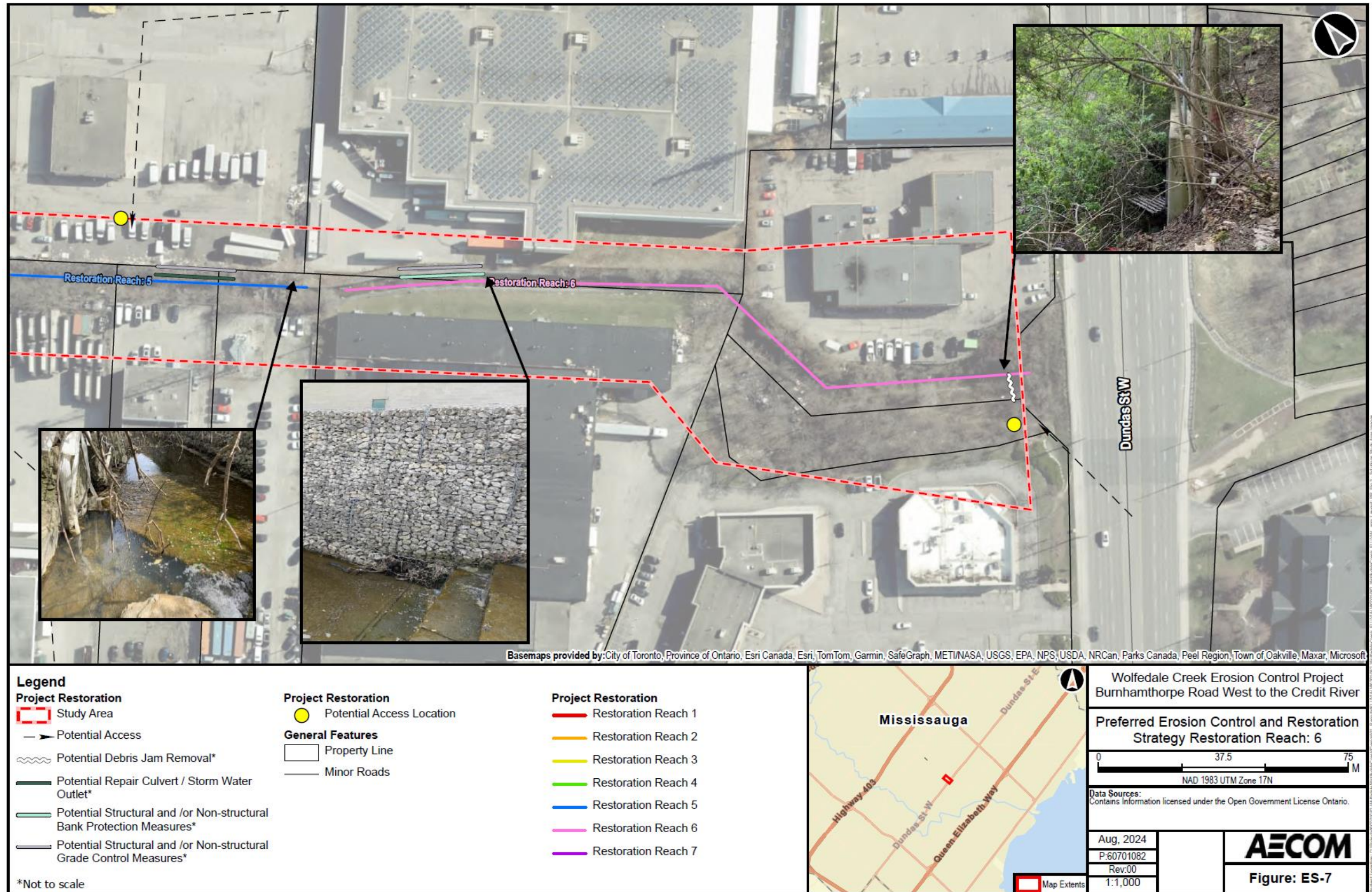
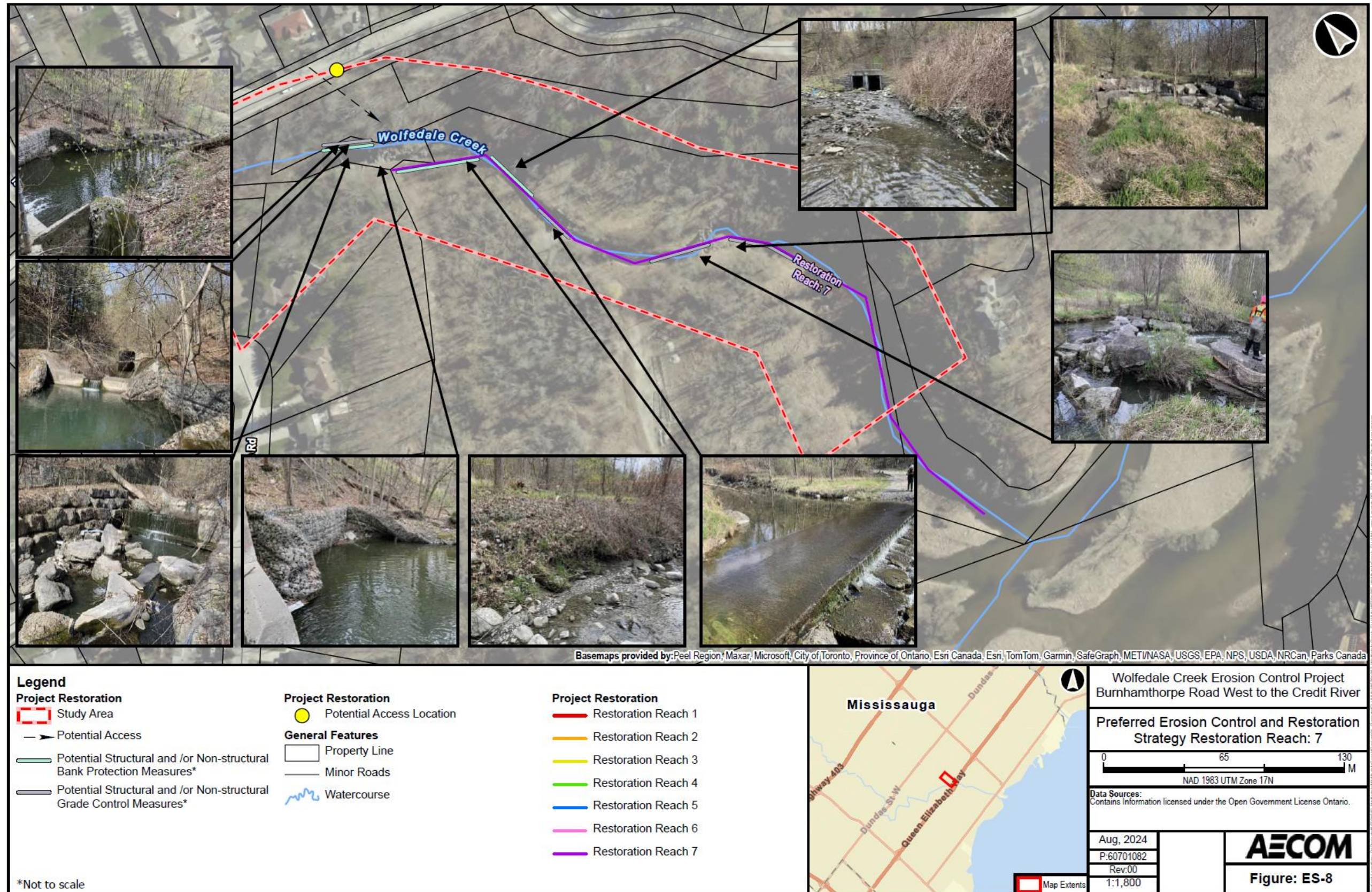


Figure ES-8: Preferred Erosion Control and Restoration Strategy – Restoration Reach 7 (Study Area 2)



Potential Impacts and Proposed Mitigation and Compensation Measures

Key potential natural environmental impacts from the Project may include damage and disturbance to natural heritage features, disturbance to terrestrial wildlife, including potential SAR and SOCC, increased sedimentation and erosion potential, and disturbance to aquatic species and their habitat. There may also be adverse impact to the heritage attributes of the Credit River Corridor Cultural Heritage Landscape within Study Area 2 related to the temporary impacts to the scenic quality of the natural environment.

Avoidance measures, such as work limit restrictions designed for the Project and compliance with restriction of construction activities to outside of sensitive periods for local or significant wildlife species should be adhered to. In addition to avoidance measures, incorporation of mitigation measures, such as installation of tree protection fencing and establishing no-go zones on construction maps, wildlife exclusion measures, erosion and sediment control measures, machinery and equipment best practices, and invasive species control strategies can aid in addressing potential impacts to natural heritage features and wildlife.

Overall, the Project is anticipated to result in a benefit to the natural environment given the opportunities to remove invasive species, replant the area with native vegetation to enhance the scenic quality of the Valley's natural environment, stabilize shoreline and banks, and incorporate a natural channel design to improve fish habitat and passage. A site restoration plan will be developed for the Project.

The City will also continue to engage with select property owners regarding access in support of constructing the preferred erosion control and restoration strategy for Wolfedale Creek during the preliminary and detailed design phases of the Project.

Proposed mitigation measures, in addition to compensation, restoration and enhancement opportunities are further described in **Section 8** of this report. These measures will be reviewed and further developed during the detailed design phase of the Project through the completion of additional studies, updated natural environment impact assessment, and the submission of permits and approvals, where applicable.

Communications and Consultation Overview

A key priority of community engagement has been to encourage the participation of property owners along the studied sections of Wolfedale Creek, key review agencies, Indigenous communities and the general public to help inform the decision making

process in identifying the preferred erosion control and restoration strategy. The following summarizes the key activities undertaken:

- Developing and maintaining a contact list.
- Distribution of notifications to property owners adjacent to the creek within the Study Areas, key review agencies, stakeholders, Indigenous communities and interested members of the public.
- Distribution of letters to select property owners requesting potential access to their property to facilitate construction.
- Posting of key information to the City's website (<https://www.mississauga.ca/projects-and-strategies/environmental-assessments/wolfedale-creek-erosion-control/>).
- Posting online Public Information Centre materials to the City's website to provide the community, stakeholders, key review agencies, and Indigenous communities an opportunity to learn about the project and provide feedback.
- Engagement with key review agencies, including meeting with Credit Valley Conservation staff.

Conclusions

This Project File covers the process required to ensure that the preferred Wolfedale erosion control and restoration strategy complies with the *Environmental Assessment Act*. The proposed works described in **Section 7** involves a combination of both structural and non-structural bank protection and grade control structures to maintain long term erosion protection. Incorporation of a natural channel bed is also included to improve fish habitat and passage in select locations along Wolfedale Creek.

A preliminary evaluation of potential impacts indicates varied environmental impacts that can be addressed by a combination of avoidance, mitigation and compensation measures as identified in **Section 8**.

Upon clearance of this Municipal Class Environmental Assessment study, the City will complete the preliminary and detailed design and proceed to tender and construction as soon as late 2025 or 2026, subject to the City's capital budget process and receiving all necessary approvals.

Table of Contents

1.	Introduction	1
1.1	Background	1
1.2	Study Area	1
2.	Municipal Class Environmental Assessment Planning Process	5
2.1	Overview	5
2.2	Project Planning Schedules	6
2.2.1	Wolfedale Creek Erosion Control Planning Schedule	7
2.3	Communications and Consultation Overview	7
3.	Existing Conditions	9
3.1	Technical Environment	9
3.1.1	Utility Infrastructure	9
3.2	Transportation	9
3.2.1	Road Network	9
3.2.2	Transit and Rail Network	9
3.2.3	Cycling Network	9
3.2.4	Pedestrian Network	10
3.3	Fluvial Geomorphology	10
3.4	Hydraulics	16
3.5	Geotechnical / Slope Stability	16
3.6	Natural Environment	17
3.7	Socio-Economic Environment	26
3.8	Cultural Heritage Environment	26
3.8.1	Archaeological Resources	26
3.8.2	Built Heritage Resources and Cultural Heritage Landscapes	27
4.	Policy Context	32
4.1	Provincial Policy Statement	32
4.2	Peel Region Official Plan	32
4.3	City of Mississauga Official Plan	33
4.4	Ontario Regulation 41/ 24: Prohibited Activities, Exemptions, and Permits	34
4.5	Credit Valley-Toronto and Region-Central Lake Ontario (CTC) Source Protection Region	34
5.	Phase 1: Problem or Opportunity Statement	36

6.	Phase 2: Alternative Solutions	37
6.1	Alternatives	37
6.2	Evaluation Criteria and Methodology	39
6.3	Evaluation of Alternatives	40
6.4	Preferred Solution – Alternative 4	47
7.	Preferred Undertaking – Project Description	55
7.1	Design Considerations	55
7.1.1	Property, Easement, and Access Requirements	58
7.1.2	Climate Change Considerations	61
7.2	Cost Estimate	61
7.3	Permits and Approvals	61
7.4	Preliminary Project Schedule	61
8.	Anticipated Environmental Impacts, Mitigation Measures, Compensation, and Monitoring	63
8.1	Potential Environmental Impacts and Mitigation	63
8.2	Compensation, Restoration and Enhancement Opportunities	67
8.3	Proposed Construction Monitoring	68
8.4	Post-Construction Monitoring	68
9.	Consultation Summary	69
9.1	Notifications	69
9.1.1	Notice of Commencement	69
9.1.2	Notice of Public Information Centre	69
9.1.3	Notice of Completion	69
9.2	Property Access Locations Letters	70
9.3	Public Information Centre	70
9.4	Agency and Stakeholder Engagement	71
9.5	Indigenous Communities Engagement	73
10.	Additional Studies, Commitments, and Future Opportunities	74
11.	Public Review of Project File and Next Steps	79
12.	Conclusions	81

Figures

Figure 1-1:	Study Area 1 _____	3
Figure 1-2:	Study Area 2 _____	4
Figure 3-1:	Locations of Exposed Bedrock Along Channel Bed – Study Area 1 _____	11
Figure 3-2:	Locations of Exposed Bedrock Along Channel Bed – Study Area 2 _____	12
Figure 3-3:	Structure Observations – Study Area 1 _____	13
Figure 3-4:	Structure Observations – Study Area 1 _____	14
Figure 3-5:	Structure Observations – Study Area 2 _____	15
Figure 3-6:	Natural Heritage Features – Study Area 1 _____	19
Figure 3-7:	Wolfedale Creek Fish and Fish Habitat – Study Area 1 _____	20
Figure 3-8:	Ecological Land Classification– Study Area 1 _____	21
Figure 3-9:	Natural Heritage Features – Study Area 2 _____	23
Figure 3-10:	Wolfedale Creek Fish and Fish Habitat – Study Area 2 _____	24
Figure 3-11:	Ecological Land Classification– Study Area 2 _____	25
Figure 3-12:	Stage 1 Archaeological Assessment Results – Study Area 1 _____	28
Figure 3-13:	Stage 1 Archaeological Assessment Results – Study Area 2 _____	29
Figure 6-1:	Structural Slope/Bank Protection (Armourstone Retaining Wall) _____	37
Figure 6-2:	Non-Structural Bank Protection _____	38
Figure 6-3:	Enclosed Watercourse _____	38
Figure 6-4:	Preferred Erosion Control and Restoration Strategy – Restoration Reach 1 (Study Area 1) _____	48
Figure 6-5:	Preferred Erosion Control and Restoration Strategy – Restoration Reach 2 (Study Area 1) _____	49
Figure 6-6:	Preferred Erosion Control and Restoration Strategy – Restoration Reach 3 (Study Area 1) _____	50
Figure 6-7:	Preferred Erosion Control and Restoration Strategy – Restoration Reach 4 (Study Area 1) _____	51
Figure 6-8:	Preferred Erosion Control and Restoration Strategy– Restoration Reach 5 (Study Area 1) _____	52
Figure 6-9:	Preferred Erosion Control and Restoration Strategy – Restoration Reach 6 (Study Area 1) _____	53
Figure 6-10:	Preferred Erosion Control and Restoration Strategy – Restoration Reach 7 (Study Area 2) _____	54
Figure 7-1:	City Owned Property and Easement – Study Area 1 _____	59
Figure 7-2:	City Owned Property and Easement – Study Area 2 _____	60

Tables

Table ES-1: Preferred Design Solution Considerations _____	v
Table 6-1: Evaluation Criteria _____	39
Table 6-2: Evaluation of Alternatives _____	41
Table 7-1: Preferred Design Solution Considerations _____	57
Table 7-2: Anticipated Permits and Approvals _____	62
Table 8-1: Potential Construction Related Impacts and Mitigation Measures _____	64
Table 9-1: Key Agency and Stakeholder Correspondence _____	72

Appendices

Appendix A. Fluvial Geomorphological Assessment Report	
Appendix B. Hydraulic Assessment Report	
Appendix C. Geotechnical Investigation and Design Report	
Appendix D. Natural Environment Report	
Appendix E. Stage 1 Archaeological Assessment Report	
Appendix F. Heritage Impact Assessment: 1725 Mississauga Road, Mississauga, and Credit River Corridor Cultural Heritage Landscape	
Appendix G. Public Consultation Record	
Appendix H. Agency and Stakeholder Consultation Record	
Appendix I. Indigenous Communities Consultation Record	

1. Introduction

1.1 Background

The City of Mississauga (the City), through its consultant AECOM Canada Ltd. (AECOM), has completed a Schedule B Municipal Class Environmental Assessment study for erosion control and restoration of Wolfedale Creek between Burnhamthorpe Road West and the Credit River.

The City recognizes that sections of Wolfedale Creek need rehabilitation to remediate existing erosion issues and improve safety. This study aims to:

- Mitigate the existing erosion problems.
- Ensure stability of the creek using natural design techniques, where feasible.
- Protect or enhance the existing natural environment within the area.

Through the Municipal Class Environmental Assessment planning process, alternative solutions have been identified and evaluated and a preferred erosion control and restoration strategy has been recommended in this report.

The study has been undertaken in accordance with the planning and design process for Schedule 'B' projects, as outlined in the "Municipal Class Environmental Assessment" document (as amended in 2023), which is approved under the *Ontario Environmental Assessment Act*.

1.2 Study Area

The Study Area is divided into two sections and is further categorized into project restoration reaches as shown in **Figure 1-1** and **Figure 1-2**.

Study Area 1

- Study Area 1 includes Wolfedale Creek from Burnhamthorpe Road West to Dundas Street West.
- The land is heavily urbanized, with many industrial and commercial establishments.
- Wolfedale Creek flows to Study Area 1 from a storm sewer outlet from Burnhamthorpe Road West to Dundas Street West. From there it enters another storm sewer pipe, and the flows are conveyed underground for approximately 1.5 km before outletting just West of Stavebank Road into the Study Area 2, which outlets to the Credit River.

Study Area 2

- Study Area 2 includes the tributary outlet to the Credit River, south of Queensway West and west of Stavebank Road.
- The watercourse is surrounded by residential development to the west and east and by forested lands/ a large golf course in the south.
- The watercourse discharges into the Credit River.

Figure 1-1: Study Area 1



Figure 1-2: Study Area 2



2. Municipal Class Environmental Assessment Planning Process

2.1 Overview

All municipalities in Ontario are subject to the provisions of the Ontario *Environmental Assessment Act* and its requirements to prepare an Environmental Assessment for applicable public works projects. The Ontario Municipal Engineers Association “Municipal Class Environmental Assessment” manual (as amended in 2023) provides municipalities with a phased planning procedure, to plan and undertake all municipal sewage, water, stormwater management and transportation projects that occur frequently, are usually limited in scale and have a predictable range of environmental impacts and applicable mitigation measures.

In Ontario, infrastructure projects are subject to the Municipal Class Environmental Assessment process and must follow a series of mandatory steps as outlined in the Municipal Class Environmental Assessment manual. The Municipal Class Environmental Assessment manual consists of five phases and the application of the phases depends on the Municipal Class Environmental Assessment Schedule that applies to a project. The phases are summarized below:

- **Phase 1 – Problem or Opportunity:** Identify the problems or opportunities to be addressed and the needs and justification.
- **Phase 2 – Alternative Solutions:** Identify alternative solutions to the problems or opportunities by taking into consideration the existing environment, and establish the preferred solution considering public and agency review and input.
- **Phase 3 – Alternative Design Concepts for the Preferred Solution:** Examine alternative methods of implementing the preferred solution based upon the existing environment, public and agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effect.
- **Phase 4 – Environmental Study Report:** Document in an Environmental Study Report, a summary of the rationale, planning, design and consultation process for the project as established through Phases 1 to 3 above and make such documentation available for scrutiny by review agencies and the public
- **Phase 5 – Implementation:** Complete contract drawings and documents, proceed to construction and operation, and monitor construction for

adherence to environmental provisions and commitments. Also, where special conditions dictate, monitor the operation of the completed facilities.

Phases 1, 2 and 5 of the Municipal Class Environmental Assessment process apply to this project as it falls under the Schedule B project category. The Municipal Class Environmental Assessment process ensures that all projects are carried out with effectiveness, efficiency and fairness. The process serves as a mechanism for understanding economic, social and environmental concerns while implementing improvements to municipal infrastructure.

2.2 Project Planning Schedules

The Municipal Class Environmental Assessment as per the 2023 Municipal Engineers Association “Municipal Class Environmental Assessment” manual undertakings are classified as exempt, eligible for screening, Schedule B, and Schedule C with each classification having different requirements. The selection of the appropriate schedule is dependent on the anticipated level of environmental impact, and for some projects, the anticipated construction costs and/ or results of a screening process for eligible projects. Projects are categorized according to their environmental significance and their effects on the surrounding environment. This study is categorized as a schedule B planning activity. The following describes the Municipal Class Environmental Assessment planning schedules in accordance with the 2023 Municipal Engineers Association “Municipal Class Environmental Assessment” manual:

- **Exempt Projects:** Projects which were formerly classified as Schedule A and A+ projects and include various municipal maintenance, operational activities, rehabilitation works, minor reconstruction or replacement of existing facilities, and new facilities that are limited in scale and have minimal adverse effects on the environment. These projects are exempt from the requirements of the Environmental Assessment Act.
- **Eligible for Screening to Exempt:** Some projects may be eligible for exemption based on the results of a screening process. The applicable screening is completed to determine whether a project is eligible for exemption from the Environmental Assessment Act or proceed with the applicable Schedule B or C process.
- **Schedule B:** Projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process (Phases 1 and 2), involving mandatory contact with directly affected public and with relevant review agencies to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. At the end of Phase 2, a Project

File documenting the planning process followed through Phases 1 and 2 shall be finalized and made available for public and agency review. However, if a concern is raised related to aboriginal and treaty rights which cannot be resolved, a Section 16 Order may be requested and considered by the Minister of the Environment, Conservation and Parks. Schedule B projects generally include improvements and minor expansions to existing facilities or smaller new projects.

- **Schedule C:** Projects have the potential for significant adverse environmental effects and must proceed under the full planning and documentation (Phases 1 to 4) procedures specified in the Municipal Class Environmental Assessment manual. Schedule C projects require that an Environmental Study Report be prepared and filed for review by the public and review agencies. If concerns related to aboriginal and treaty rights are raised that cannot be resolved then a Section 16 Order may be requested. Schedule C projects generally include the construction of new facilities and major expansions to existing facilities.

2.2.1 Wolfedale Creek Erosion Control Planning Schedule

This study has been completed in accordance with the 2023 Ontario Municipal Engineers Association Municipal Class Environmental Assessment manual. The Project is defined as a Schedule B activity as works are being undertaken in a watercourse for the purpose of erosion control. As such, Phases 1 and 2 of the Municipal Class Environmental Assessment planning process as described above (**Section 2.1**) applies to this study.

2.3 Communications and Consultation Overview

A key priority of community engagement has been to encourage the participation of property owners along the studied sections of Wolfedale Creek, key review agencies, Indigenous communities and the general public to help inform the decision making process in identifying the preferred erosion control and restoration strategy. The following summarizes the key activities undertaken:

- Developing and maintaining a contact list.
- Distribution of notifications to property owners adjacent to the creek within the Study Area, key review agencies, stakeholders, Indigenous communities and interested members of the public.
- Distribution of letters to select property owners requesting potential access to their property to facilitate construction.

- Posting of key information to the City's website (<https://www.mississauga.ca/projects-and-strategies/environmental-assessments/wolfedale-creek-erosion-control/>).
- Posting online Public Information Centre materials to the City's website to provide the community, stakeholders, key review agencies, and Indigenous communities an opportunity to learn about the project and provide feedback
- Engagement with key review agencies, including meeting with Credit Valley Conservation staff.

All comments received were considered and addressed to the extent possible by the Study Team. Refer to **Section 10** for the overview of consultation completed for Phases 1 and 2 of this Municipal Class Environmental Assessment study.

3. Existing Conditions

3.1 Technical Environment

3.1.1 Utility Infrastructure

A Quality-Level B (QL-B) Subsurface Utilities Engineering (SUE) was completed in June 2023. No municipal utilities (stormwater, sanitary, water) are located within the Study Area 1 and Study Area 2, except within Central Parkway West right-of-way. Existing storm sewer outfalls are the only municipal infrastructure works within the creek overbanks. Third-party utilities (specifically, Bell and Enbridge utilities) were seen within the upstream and downstream limits of Study Area 1. There were no municipal and third-party utilities found in Study Area 2.

3.2 Transportation

3.2.1 Road Network

Study Area 1 includes Mavis Road to the east, Dundas Street West to the south, Wolfedale Road to the west and Burnhamthorpe Road West to the north. As per the City of Mississauga's Official Plan (Office Consolidation March 4, 2024) Long Term Road Network (Schedule 5), Dundas Street West, Burnhamthorpe Road West, and Mavis Road are designated Arterial Roads and Wolfedale Road is a Minor Collector Road.

Central Parkway West which crosses directly through Study Area 1 has a 23 m right-of-way width and is designated a Major Collector Road.

Study Area 2 includes Stavebank Road to the west, which is a minor collector (scenic route).

3.2.2 Transit and Rail Network

The Canadian Pacific Railway/ Metrolinx Go Rail Line crosses Study Area 1 between Central Parkway West and Dundas Street West. Dundas Street West is also an Intensification Corridor as part of the City's Long Term Transit Network.

3.2.3 Cycling Network

Along the Credit River is a Primary Off-Road Route as per the City of Mississauga's Official Plan (Office Consolidation March 4, 2024) Long Term Cycling Routes (Schedule 7). Dundas Street West and Central Parkway West are Primary On-Road Routes / Boulevard Routes.

3.2.4 Pedestrian Network

Study Area 1, which includes Central Parkway West, Wolfedale Road, Mavis Road, Dundas Street West, and Burnhamthorpe Road West have paved sidewalks on both sides of the Road.

Stavebank Road in Study Area 2 has a sidewalk on one side of the road.

3.3 Fluvial Geomorphology

A fluvial geomorphology assessment (**Appendix A**) has been undertaken to document fluvial geomorphological conditions, inform the context for the Project and:

- Describe the existing fluvial geomorphic environmental conditions (based on information collected through background information review and field investigations).
- Evaluate and identify key reach characteristics.
- Identify design objectives.
- Identify potential constraints and opportunities to consider for design.

Refer to **Appendix A** for the complete **Fluvial Geomorphology Report**. Below summarizes the key findings:

- Portions of the watercourse in each study area have been altered by human activity, which have effectively reduced the watercourse length, increased the channel gradient, and introduced obstructions to fish migration.
- Exposed bedrock along the channel banks and bed is a major constraint for the study area, impacting the watercourse shape, pattern, and susceptibility to erosion. Bedrock may also limit the type of bank protection treatment options that can be applied. Refer to **Figure 3-1** and **Figure 3-2** for the locations of exposed bedrock along the channel bed.
- Erosion of the creek banks was identified throughout most of the study area. Undercutting of the creek banks was observed in most areas, in addition to evidence of channel bed downcutting, and multiple woody debris jams
- There are several bank protection structures within the creek that have been constructed historically to maintain the channelized shape of the watercourse. Many of the structures are now failing. Refer to **Figure 3-3**, **Figure 3-4**, and **Figure 3-5** for existing structure observations.
- Slope stability concerns were identified in multiple spots in the Study Areas
- Study Area 1 is heavily urbanized, which contributes to increased stormwater runoff.
- The steep channel bed slope upstream of Study Area 2 can increase flow velocities and erosion in the watercourse.

Figure 3-1: Locations of Exposed Bedrock Along Channel Bed – Study Area 1



Figure 3-2: Locations of Exposed Bedrock Along Channel Bed – Study Area 2



Figure 3-3: Structure Observations – Study Area 1

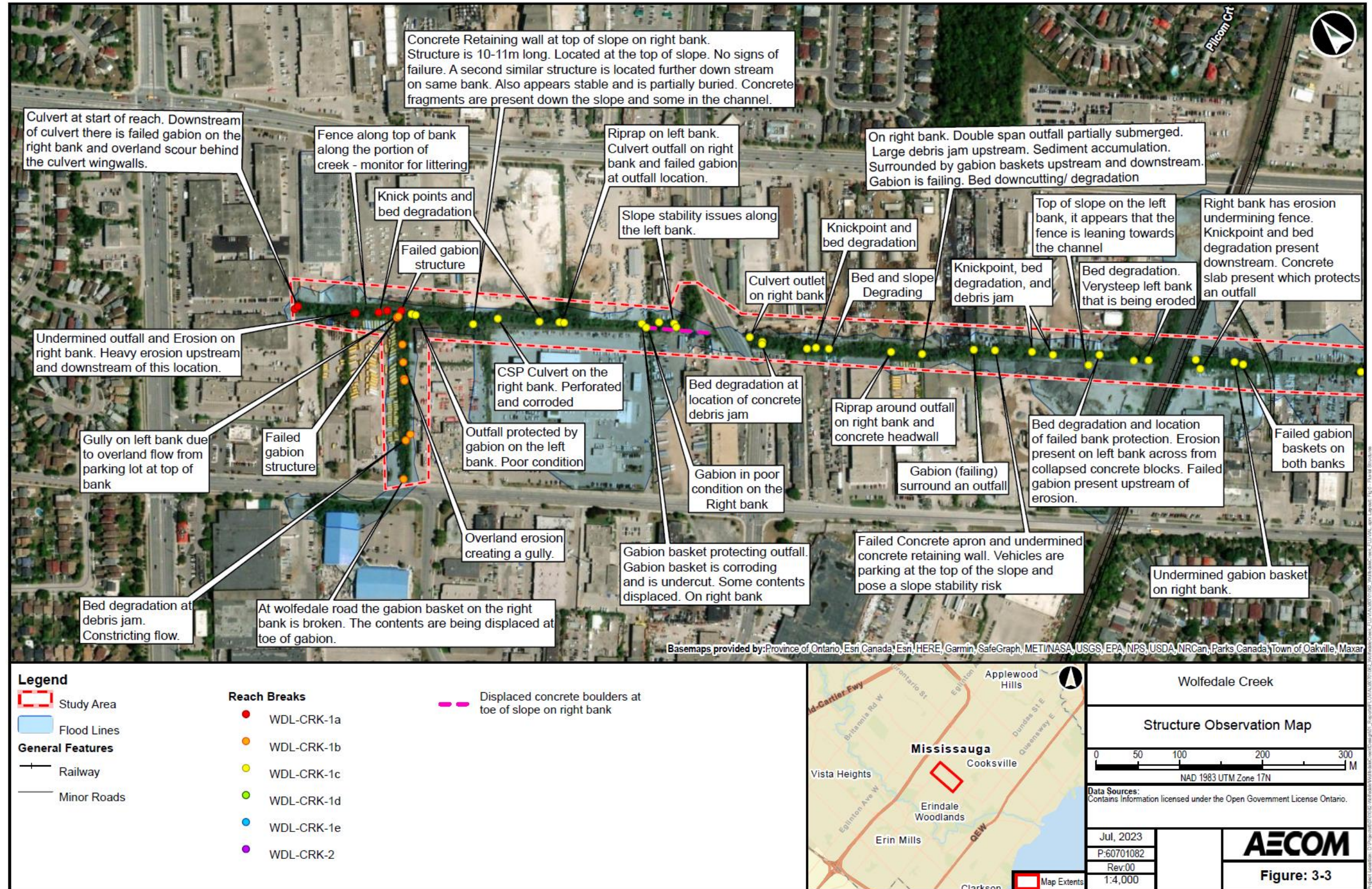


Figure 3-4: Structure Observations – Study Area 1

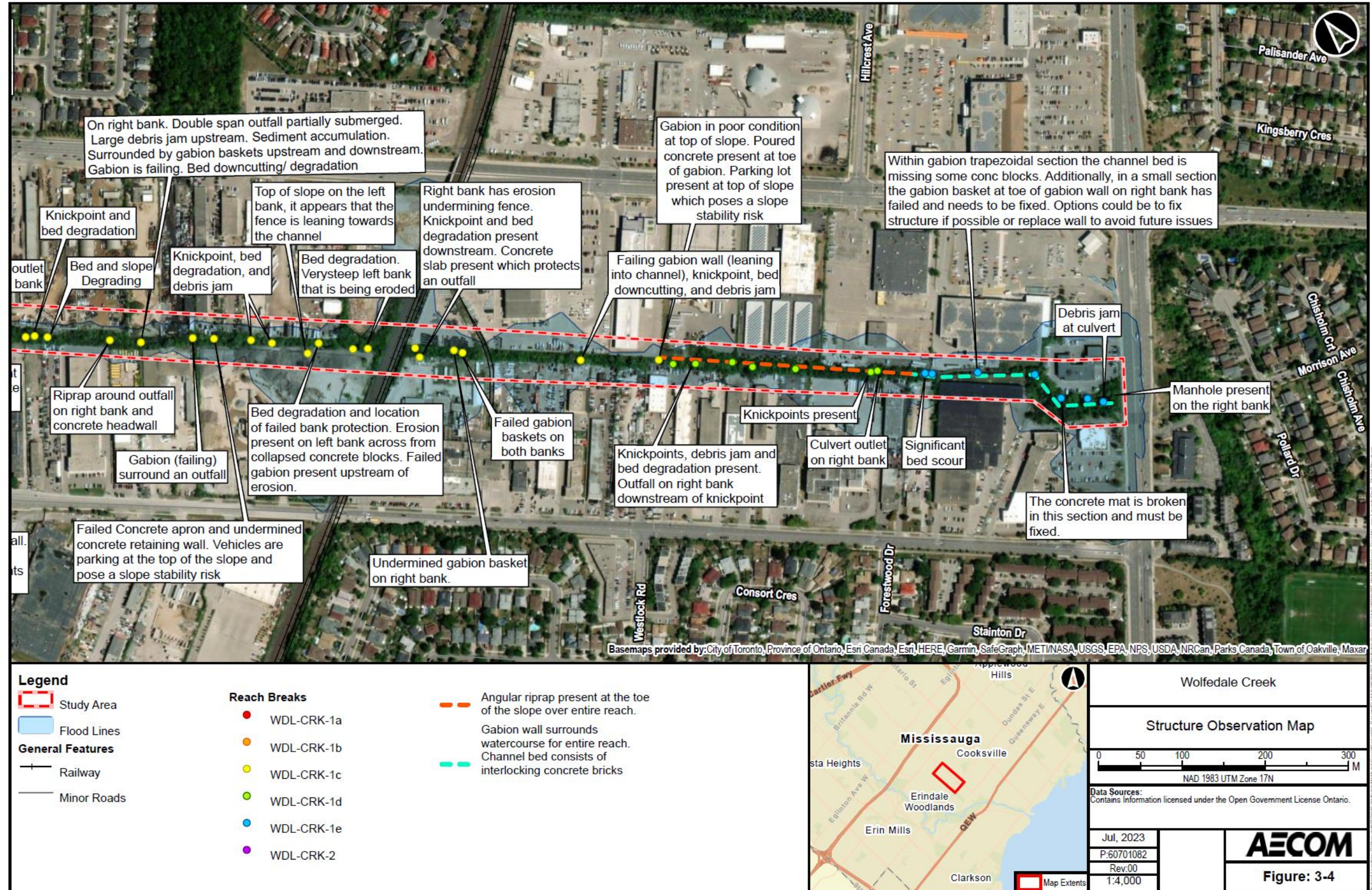
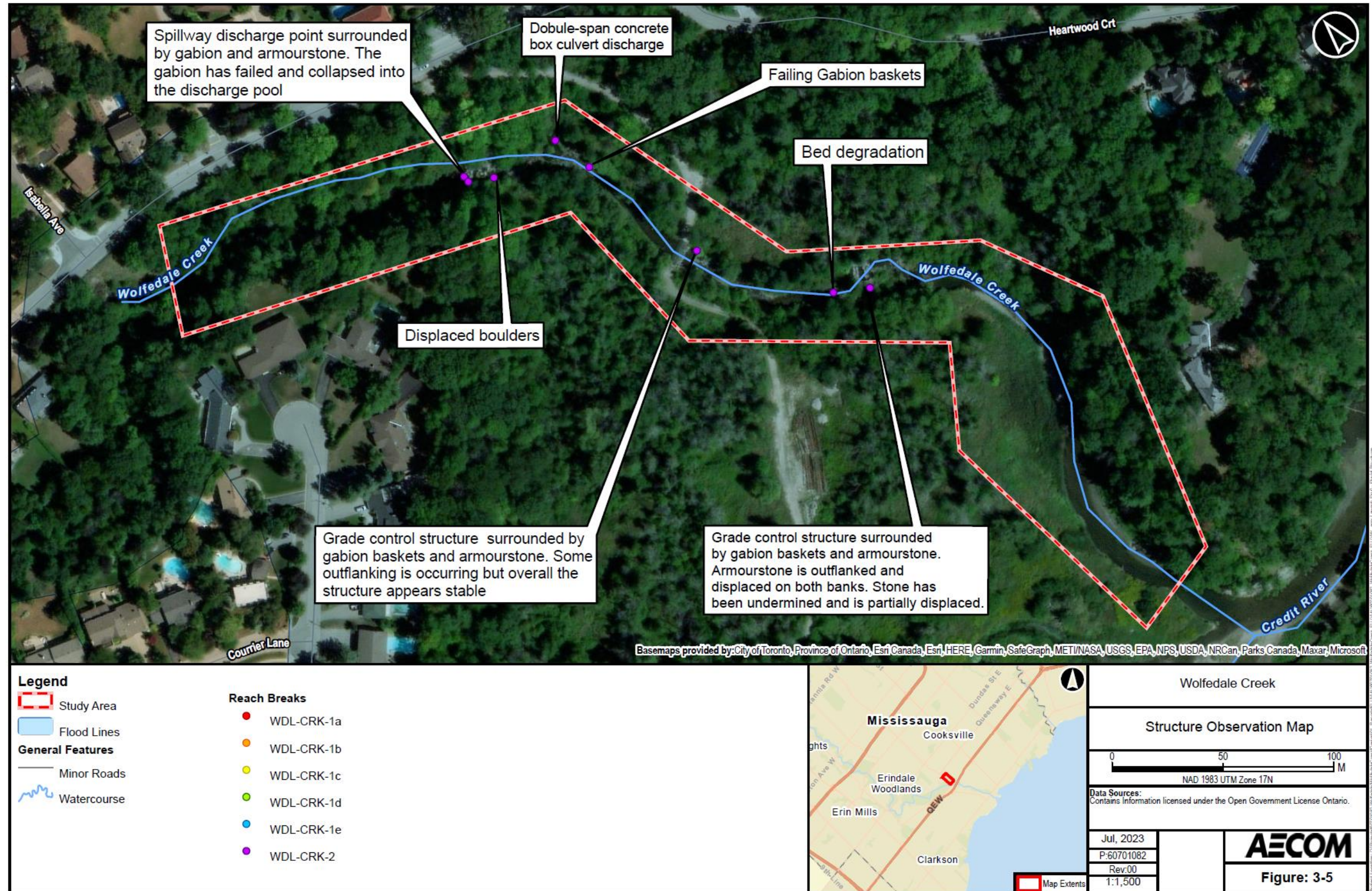


Figure 3-5: Structure Observations – Study Area 2



3.4 Hydraulics

A **Hydraulic Assessment Report (Appendix B)** has been completed, which summarizes the existing stormwater hydraulics along the creek.

A 1-D HEC-RAS model was obtained from Credit Valley Conservation (CVC) for Wolfedale Creek. This original model was updated based on survey data to reflect current, existing conditions of the site. A few areas of concern along the study area have been noted;

- The watercourse is very confined in several sections, with adjacent properties abutting the edge of the study area, leaving no room to expand the cross-section.
- There are portions of the watercourse that have vertical side walls, which cause velocities and erosion risks to increase due to the smooth walls, and flood levels to rise quickly due to the narrow cross-section.
- The space constraints limit proposed options, and all potential solution alternatives will have to be run through the hydraulic model to ensure no negative impacts to water levels and flooding risk.

3.5 Geotechnical / Slope Stability

Geotechnical investigations have been completed. Refer to **Appendix C** for the **Geotechnical Report**. In support of the investigations completed, six (6) boreholes were drilled. A monitoring well was also installed.

Generally, the subsurface profile consists of topsoil overlying varying thickness of fill. The native soils underlying the fill consist of a brown sand and gravel overlying sandy silt.

It is anticipated that seasonal fluctuations in groundwater levels will occur. It is recommended that additional groundwater level measurements and monitoring well development be completed to aid the detailed design process.

Based on the analysis results, it is noted that some of the existing conditions along the channel do not meet the recommended Factor of Safety (FS) ($FS > 1.3$ and $FS > 1.5$) based on the Canadian Foundation Engineering Manual for the short-term and long-term condition, respectively.

The design options include:

- Improve slope drainage, as elevated groundwater and pore pressures can result in loss of shear strength of the soil.
 - Improve surface drainage; and
 - Installing sub-horizontal drains within slope face at critical locations.
- Re-grading & revegetation of slopes.
- Increase weight distribution at the toe of slope to provide extra resistance against sliding.
- Soil nails or anchors in areas with limited access or tight property constraints.

3.6 Natural Environment

A **Natural Environment Report (Appendix D)** has been completed to:

- Provide background and context for the Project.
- Describe the existing environmental conditions (based on information collected through background information review and ecological field investigations).
- Evaluate and identify significant natural heritage features.
- Describe the proposed work, and identifies environmental constraints.
- Provide a potential effects assessment based on the preferred solution.

Below summarizes the key findings from the **Natural Environment Report (Appendix D)** in terms of existing conditions. The assessment of potential natural environment impacts are discussed in Section 6 of the **Natural Environment Report (Appendix D)**. Mitigation measures based on the preliminary impact assessment are summarized in **Section 8** of this report.

Existing aquatic and terrestrial conditions were identified through a background review of secondary sources and field investigations. A Species at Risk (SAR) and Significant Wildlife Habitat (SWH) screening were completed based on the existing conditions data and species records identified. Hereafter summarizes the significant features identified within each Study Area.

Study Area 1

- Credit Valley Conservation (CVC) Authority Regulated Area (**Figure 3-6**). Please note that **Figure 3-6** will be updated with Credit Valley Conservation's most recently approved floodplain mapping for Wolfedale Creek.

- The City of Mississauga Public Tree Protection By-law 0020-2022.
- Candidate SWH for Bat Maternity Colonies, Turtle Wintering Areas, Amphibian Movement Corridors and habitat for Barn Swallow (*Hirundo rustica*), Snapping Turtle (*Chelydra serpentina*) and Common Nighthawk (*Chordeiles minor*).
- Candidate SAR habitat for Chimney Swift (*Chaetura pelagica*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Bat SAR including Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-coloured Bat (*Perimyotis subflavus*), Butternut (*Juglans cinerea*) and Black Ash (*Fraxinus nigra*).
- Fish habitat as shown in **Figure 3-7** Study Area 1 has been identified as direct fish habitat for a community that consists of warmwater and a few coolwater species. Impediments to fish passage were observed along the creek.

Further, as shown in the Ecological Land Classification (**Figure 3-8**), all vegetation communities were disturbed and largely limited to narrow vegetation strips along Wolfedale Creek surrounded by heavily developed commercial and industrial areas.

Figure 3-6: Natural Heritage Features – Study Area 1

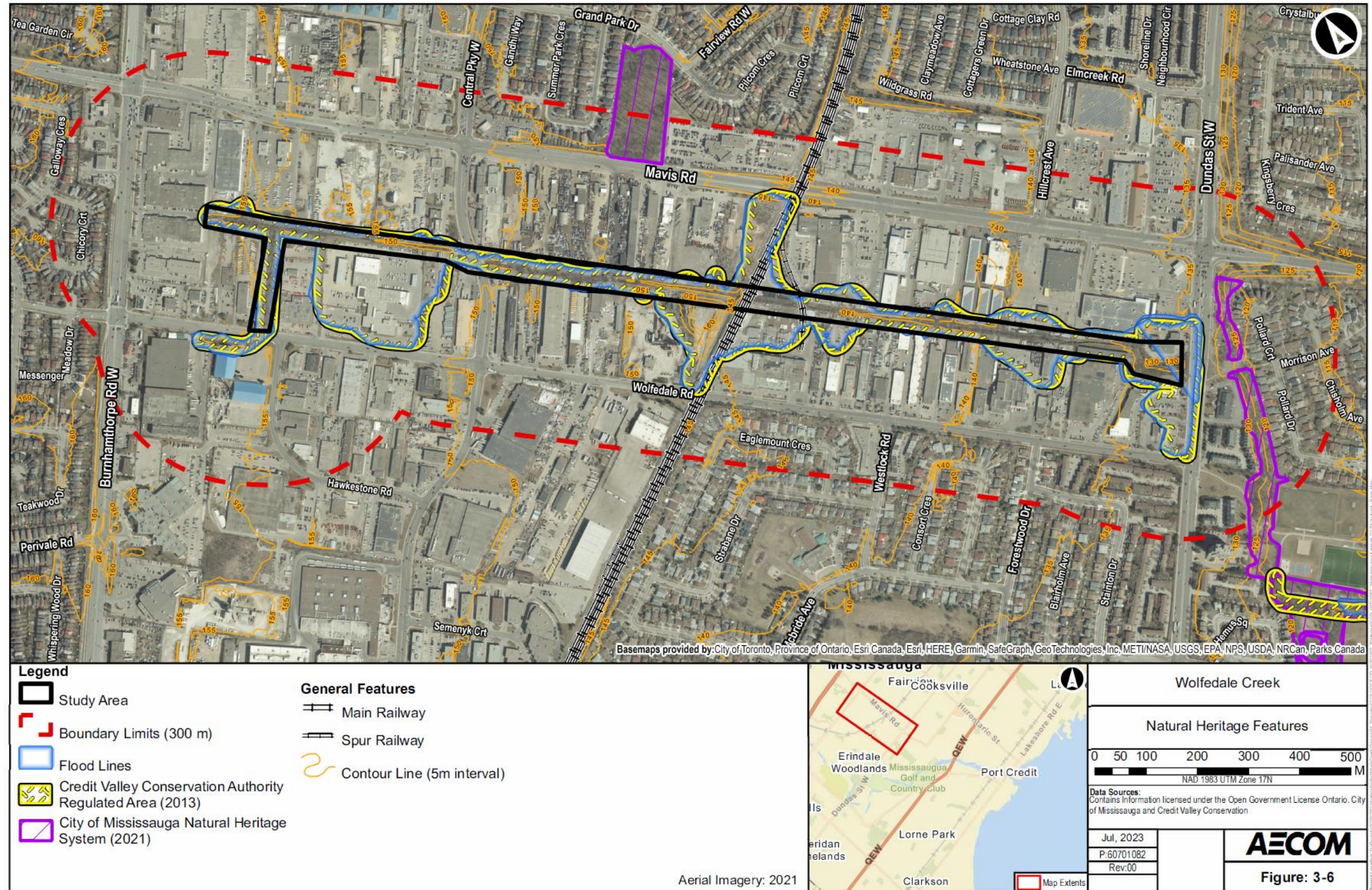


Figure 3-7: Wolfedale Creek Fish and Fish Habitat – Study Area 1

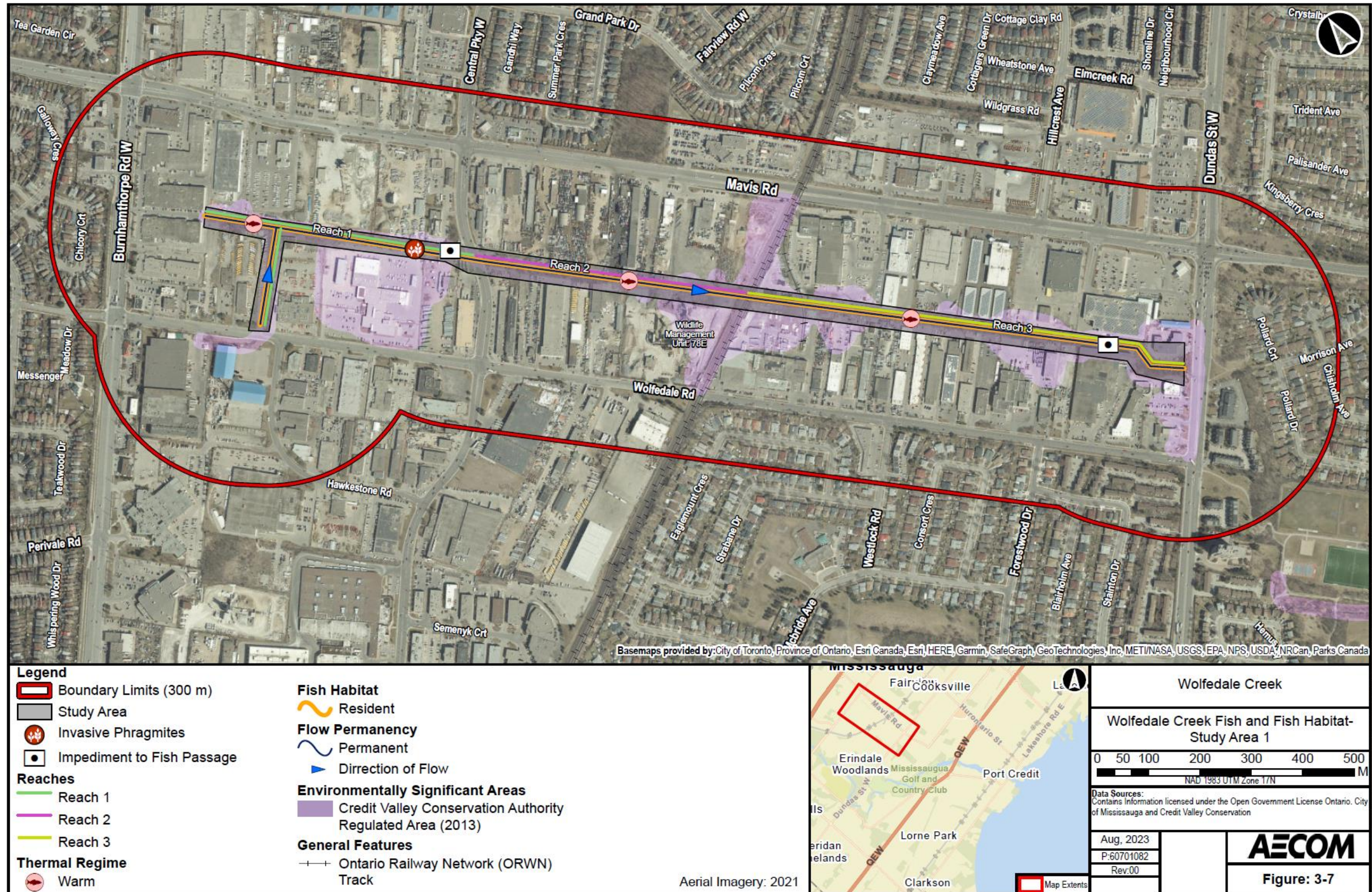
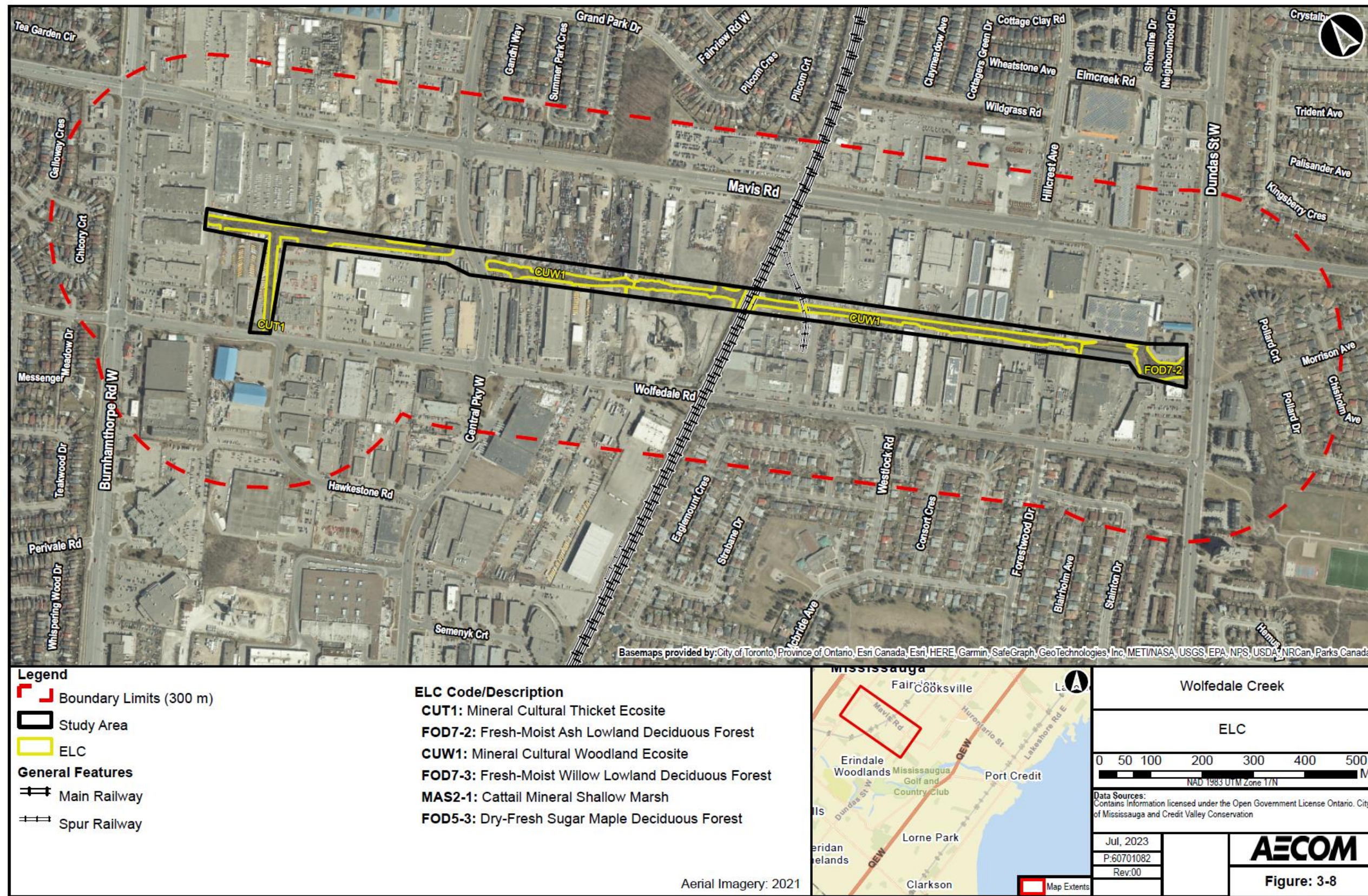


Figure 3-8: Ecological Land Classification– Study Area 1



Study Area 2

- Credit Valley Conservation (CVC) Authority Regulated Area (**Figure 3-9**).
Please note that **Figure 3-9** will be updated with Credit Valley Conservation's most recently approved floodplain mapping for Wolfedale Creek.
- The City of Mississauga Public Tree Protection By-law 0020-2022.
- Region of Peel Greenlands System.
- City of Mississauga Natural Heritage System (**Figure 3-9**).
- Credit River Coastal Marsh Provincially Significant Wetland Complex (**Figure 3-9**).
- Credit River Marshes Regional Area of Natural and Scientific Interest (**Figure 3-9**).
- Valleylands.
- Stavebank Oak Woods Environmentally Significant Area.
- Fish Habitat (**Figure 3-10**) for Study Area 2 has been identified as direct fish habitat for a community that consists of warmwater and a few coolwater species. American Eel has been determined to have a high potential to occur within Study Area 2. Impediments to fish passage were also observed along the creek.
- Candidate SWH for Bat Maternity Colonies, Turtle Wintering Areas, Woodland Raptor Nesting, Amphibian Breeding Habitat (*Woodland*), Amphibian Movement Corridors and habitat for Eastern Wood-pewee (*Contopus virens*), Wood Thrush (*Hylocichla mustelina*), Snapping Turtle (*Chelydra serpentina*) and Western-chorus Frog (*Pseudacris triseriata*).
- Candidate SAR habitat for Chimney Swift (*Chaetura pelagica*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Bat SAR including Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-coloured Bat (*Perimyotis subflavus*), Butternut (*Juglans cinerea*) and Black Ash (*Fraxinus nigra*).

As noted above and shown in the Ecological Land Classification **Figure 3-11**, Study Area 2 consisted of more naturalized communities that were a part of the Credit River Marshes Wetland PSW Complex and ANSI, which were surrounded by residential development and the Mississauga Golf and Country Club

Figure 3-9: Natural Heritage Features – Study Area 2

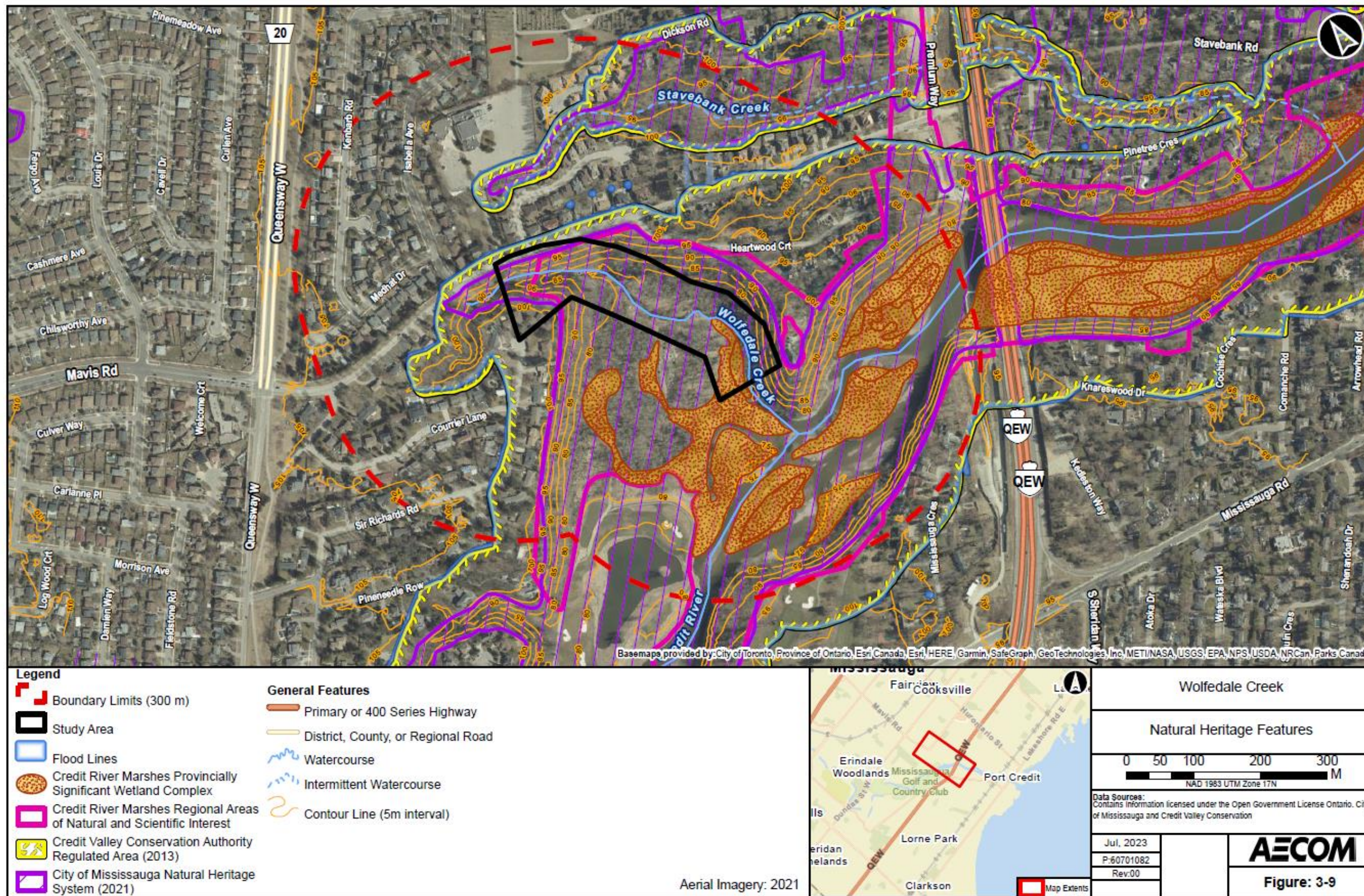


Figure 3-10: Wolfedale Creek Fish and Fish Habitat – Study Area 2

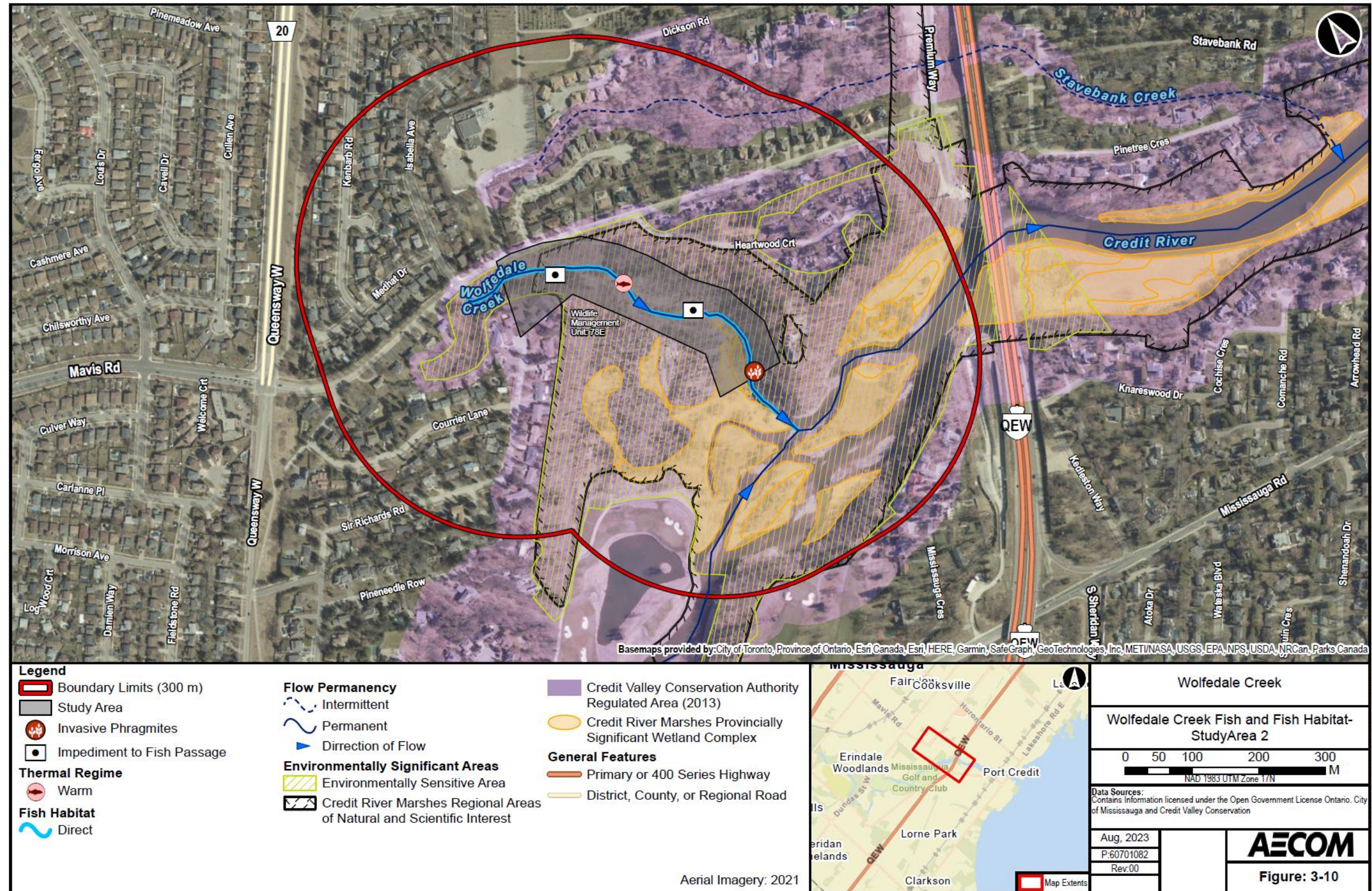
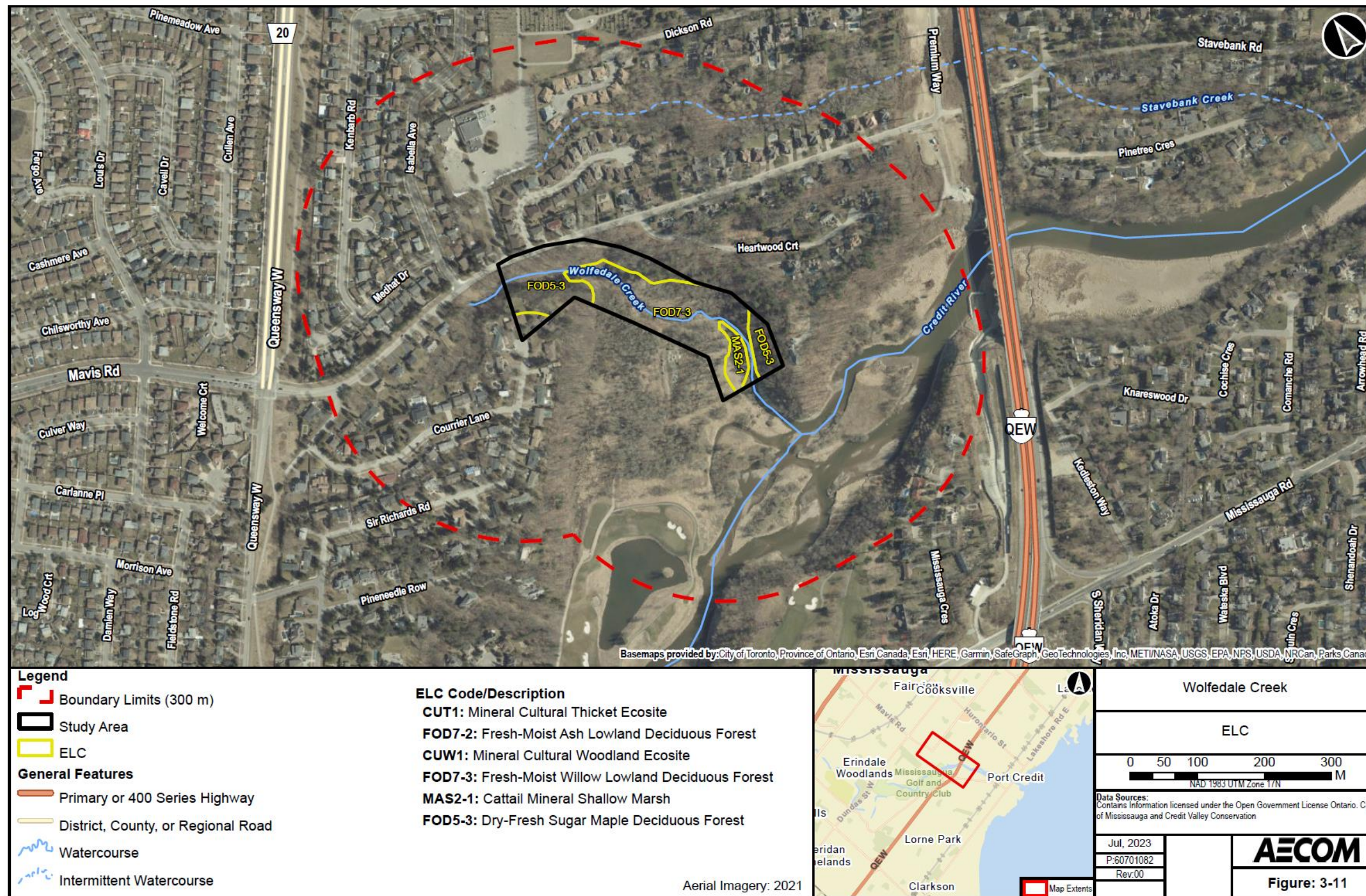


Figure 3-11: Ecological Land Classification– Study Area 2



3.7 Socio-Economic Environment

The land around Study Area 1 is heavily urbanized, with many industrial and commercial establishments adjacent to the watercourse. There are also numerous residential subdivisions further to the north, east and west of the watercourse. The urbanized nature of the surrounding land (higher percentage of impervious surfaces) and lack of modern stormwater management controls contributes to increased stormwater runoff during stormwater events due to the. This increased runoff has the potential to cause significant erosion issues for watercourses downstream of the urbanized area. Please note that there is frequent dumping from the surrounding industrial properties, resulting in frequent maintenance requirements for the City.

In Study Area 2 the watercourse is surrounded by residential development on both sides of the river, and by forested lands and the large golf course to the south. The watercourse discharges into the Credit River. Forest cover tends to slow runoff and increase infiltration of water into the ground.

3.8 Cultural Heritage Environment

3.8.1 Archaeological Resources

A Stage 1 Archaeological Assessment (Project Information Form Number P316-0532-2023) has been completed by AECOM to evaluate the archaeological potential within the Study Areas.

The **Stage 1 Archaeological Assessment Report (Appendix E)** details the rationale, methods and results of the Stage 1 Archaeological Assessment. The Stage 1 Archaeological Assessment was completed by using background research to describe the geography, land use history, previous archaeological field work and current conditions of the study area to determine its archaeological potential. In addition, satellite imagery and thematic and historic maps were analyzed.

AECOM's Stage 1 background study and property inspection for the Wolfedale Creek Erosion Control Project: Burnhamthorpe Road West to the Credit River has determined that the potential for the recovery of pre- and post- contact Indigenous and 19th century Euro-Canadian archaeological resources within portions of Study Area 2 is high. Based on these findings, Stage 2 archaeological assessment is recommended for all areas of potentially undisturbed land within the Study Area 2 limits addressed within the scope of this report (Figure 13). The Stage 2 archaeological assessment must be conducted by a licensed archaeologist and must follow the requirements set out in *Standards and Guidelines for*

Consultant Archaeologists (Ontario Government 2011), including the standard test pit survey method at 5 m intervals to be conducted in all areas that will be impacted where ploughing is not feasible (e.g., woodlots, overgrown areas, manicured lawns). In addition to the above, it is also recommended that a marine archaeology checklist be completed, which may result in the recommendation that a marine archaeological assessment be undertaken. The Stage 1 results for Study Area 2 are shown in **Figure 3-13**.

No further work is recommended within the areas cleared of archaeological concern and/or determined to have been subject to previous disturbance as part of AECOM's property inspection and background research, including the entirety of Study Area 1, are illustrated within **Figure 3-12**.

3.8.2 Built Heritage Resources and Cultural Heritage Landscapes

In support of the Municipal Class Environmental Assessment planning process, AECOM completed the Ministry of Citizenship and Multiculturalism's Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes checklist (MCM Criteria Checklist) for Study Area 1 and Study Area 2, which can be found in **Appendix F**.

Study Area 1 was screened for potential built heritage resources and cultural heritage landscapes using the MCM Criteria Checklist and none were identified within or adjacent to Study Area 1. Therefore, Study Area 1 was excluded from requiring a heritage impact assessment.

Study Area 2 was also screened for potential built heritage resources and cultural heritage landscapes using the MCM Criteria Checklist and it was determined that Study Area 2 is within a portion of the Credit River Corridor Cultural Heritage Landscape which, parcels within it, are listed as non-designated properties on the City of Mississauga Heritage Register. The Credit River Corridor Cultural Landscape boundaries include the Credit River from Port Credit to the northern boundary of Mississauga; the landscape is a greenspace core, and its topography varies from sharply sloping valley walls to wide floodplains (ASI, 2022).

Study Area 2 is also adjacent to 1725 Mississauga Road, the Mississauga Golf and County Club, which is listed on the Heritage Register. Since the Credit River Corridor has been evaluated for cultural heritage value or interest, a Statement of Significance has been prepared and therefore, a **Heritage Impact Assessment (Appendix F)** was completed to assess the impacts of the infrastructure improvements on the listed properties at 1725 Mississauga Road (the Mississauga Golf and County Club), and the Credit River Corridor Cultural Heritage Landscape.

Figure 3-12: Stage 1 Archaeological Assessment Results – Study Area 1

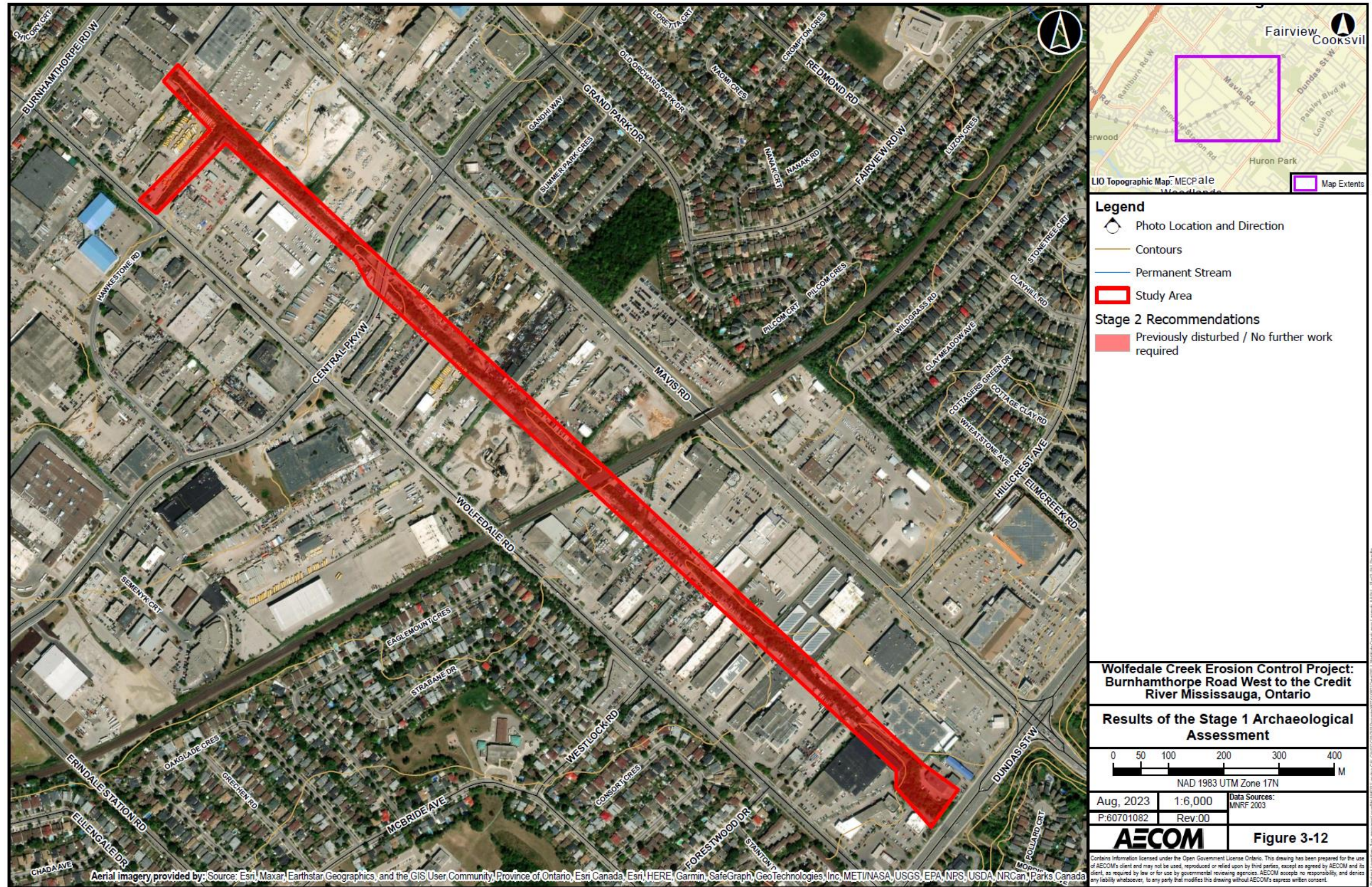
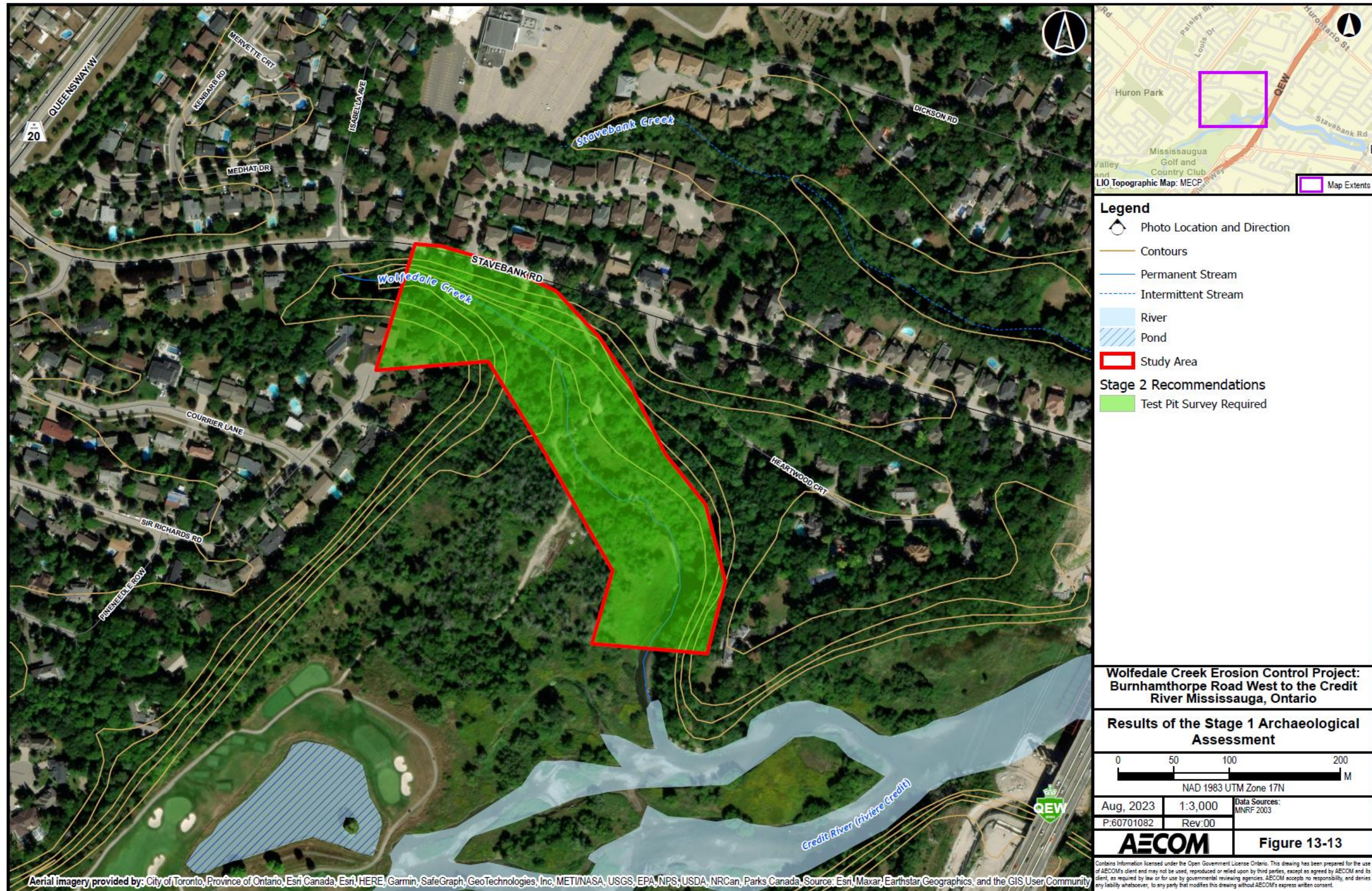


Figure 3-13: Stage 1 Archaeological Assessment Results – Study Area 2



Furthermore, approximately 1.2 kilometres the southwest of Study Area 2, on the eastern side of Mississauga Road, just north of the Queen Elizabeth Way and adjacent to the entrance of the Mississauga Golf and Country Club, stands an Ontario Heritage Trust plaque commemorating the Credit Mission (Credit Indian Village). The inscription on the plaque is as follows:

In 1826 the government assisted a band of Mississauga, who had recently been converted to Christianity, to settle in this vicinity, and within five years laid out a village plot and constructed log cottages and a sawmill. Methodist missionaries, notably Peter Jones and Egerton Ryerson, ministered to the converts who in 1829 built a combined schoolhouse and chapel. By 1837 about 50 houses had been erected for the Indians. Three years later they had approximately 200 ha under cultivation. Pressure from local white settlement and a decline in the Indian population led to the closing of the mission and the return of the major portion of the Mississauga to the Grand River Reserve in 1847.

Ontario Heritage Trust n.d.

The Heritage Impact Assessment in **Appendix F** adheres to the guidelines set out in the Ministry of Citizenship and Multiculturalism (MCM) *InfoSheet #5 Heritage Impact Assessment and Conservation Plans* as part of the *Ontario Heritage Tool Kit* (2006) and the City of Mississauga *Heritage Impact Assessment Terms of Reference*. The Heritage Impact Assessment assesses the proposed changes to Study Area 2 and evaluates the impact on the cultural heritage value of the surrounding area. The Heritage Impact Assessment proposes mitigation options and measures if required to mitigate and limit any adverse impacts to the identified heritage attributes of the property (areas of avoidance, design measures, construction buffering, commemoration, etc.).

The following summarizes the key tasks completed in support of the Heritage Impact Assessment:

- Reviewed appropriate background documents including the:
 - Conserving Heritage Landscapes: Cultural Heritage Landscape Project – Volume 1, Volume 2 & Volume 3. (ASI., Final January 2022).
 - Heritage Impact Assessment on the Pump House at the Mississauga Golf and Country Club: 1725 Mississauga Road, Mississauga, Ontario (Dilse, October 11, 2012).
 - Cultural Heritage Inventory (Landplan Collaborative Ltd. et al., 2005)
- Consulted with the City of Mississauga Heritage Planner, to confirm the scope of the HIA and to provide background information on cultural heritage features that maybe impacted by the Project.

- Conducted a field review to document the existing conditions of the Study Areas, on September 7, 2023.
- Identified and prepared a description of the proposed undertaking.
- Assessed the proposed infrastructure impacts, based on the preferred alternative (Alternative 4), on 1725 Mississauga Road and the Credit River Corridor Cultural Heritage Landscape; and
- Prepared mitigation options and measures with recommendations to avoid or reduce any negative impacts to the built heritage resources and cultural heritage landscapes.

Based on the results of the Heritage Impact Assessment, it is not anticipated that 1725 Mississauga Road, adjacent to Study Area 2, will be directly or indirectly adversely impacted by the project. As such, mitigation options, measures and recommendations have not been developed for 1725 Mississauga Road. However, as a portion of the Credit River Corridor is within Study Area 2, it was determined that there is potential for direct adverse impact to the vegetation which contributes to the scenic quality of the natural environment, a heritage attribute of the Credit River Corridor. Therefore, the mitigation strategy has developed in the Heritage Impact Assessment which recommends protective measures of the vegetation within the Study Area 2. The following recommendations should be considered as part of the approval of the proposed Project:

1. Ensure that the boundary of the Credit River Corridor Cultural Heritage Landscape is indicated on Project mapping.
2. Complete a Landscape Plan or Tree Preservation Plan for Study Area 2 to identify the contributing vegetation to the scenic quality of the landscape (i.e., native species). The plan should include a detailed vegetation protection methodology and strategies to mitigate any direct impacts to the vegetation if necessary.

4. Policy Context

4.1 Provincial Policy Statement

The 2024 Provincial Policy Statement came into effect on October 20, 2024, and replaces the previous Provincial Policy Statement (2020) and A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020). The 2024 Provincial Policy Statement provides streamlined single document with provincial policy direction on matters related to land use planning and development that affect communities, such as ensuring the appropriate infrastructure is planned or available to accommodate current and future needs.

Relevance to this study: The key chapters and associated sections of policies that have been considered in the development of the Wolfedale Creek erosion control and restoration strategy:

- Chapter 3: Infrastructure and Facilities:
 - 3.1 General Policies for Infrastructure and Public Service Facilities
 - 3.6 Sewage, Water and Stormwater
- Chapter 4: Wise Use and Management of Resources
 - 4.1 Natural Heritage
 - 4.6 Cultural Heritage and Archaeology
- Chapter 5: Protecting Public Health and Safety
 - 5.1 General Policies for Natural and Human-Made Hazards
 - 5.2 Natural Hazards
- Chapter 6: Implementation and Interpretation
 - 6.2 Co-ordination

4.2 Peel Region Official Plan

The Region of Peel Official Plan (April 2022 Consolidation) is a long-term plan for managing Peel's growth and development to 2051.

Relevance to this study: The Region's Official Plan was reviewed in the development of the Wolfedale Creek erosion control strategy. Pursuant to Schedule E-1 (Regional Structure) each Study Area is within the designated Urban System and within the Built-up Area (Schedule E-3) as per the Growth Plan Policy Areas in Peel. Study Area 1 is within the Region's Employment Area (Schedule E-4).

Each Study Area is within the CTC Region Source Protection Plan Area as per Schedule A-4 (Source Protection Plan Areas in Peel) in the Region's Official Plan. Section 2.7 contains policies associated with Source Water Protection and below summarizes the vulnerable source water protection areas associated with the Project:

- Schedule A-2 (Highly Vulnerable Aquifers) shows each Study Area is located within Highly Vulnerable Aquifers
- Schedule A-3 (Significant Groundwater Recharge Areas) shows a small portion of Study Area 2 includes a Significant Groundwater Recharge Area.
- Schedule A-6 (Intake Protection Zones) shows Study Area 2 is within Intake Protection Zone 3.

Each Study Area also falls within the Region's Greenlands System Overlay (Schedule C-1) as documented in the **Natural Environment Report (Appendix D)**.

Section 3.6 of the Region's Official Plan contains policies pertaining to Cultural Heritage acknowledging Indigenous Communities history on these lands. A **Stage 1 Archaeological Assessment (Appendix E)** and a **Heritage Impact Assessment (Appendix F)** has been completed for 1725 Mississauga Road, Mississauga, and the Credit River Corridor Cultural Heritage Landscape.

4.3 City of Mississauga Official Plan

The City of Mississauga Official Plan (Office Consolidation March 4, 2024) guides how the City will grow and develop to 2031, including policy framework to address transportation, housing, culture and heritage, the environment, and the economy.

Relevance to this study: Study Areas 1 and 2 are located within the Neighbourhood and Green System of the Urban System as per Schedule 1 of the City's Official Plan. Chapter 16 of the Official Plan details the policies for the Erindale Neighbourhood Character Area, which encompasses Study Area 2. Study Area 1 is within the Mavis-Erindale Employment Area.

The Official Plan designated land uses (Schedule 10) include primarily Business Employment with Mixed Use in Study Area 1 with Natural Hazards along Wolfedale Creek. There is one Community Facility east of Central Parkway West adjacent to Wolfedale Creek. Study Area 2 is designated Residential Low Density I with Greenlands and Natural Hazards along Wolfedale Creek.

The City of Mississauga's Natural Heritage System includes Significant Natural Areas, Natural Green Spaces, Special Management Areas, Residential Woodlands and Linkages as identified on Schedule 3 (Natural System) as per the City's Official Plan. Development and site alteration will not be permitted within or adjacent to the Natural

Heritage System unless it has been demonstrated that there will be no negative impact to the natural heritage features and their ecological functions and opportunities for their protection, restoration, enhancement and expansion have been identified. This will be demonstrated through a study in accordance with the requirements of the *Environmental Assessment Act*. When not subject to the *Environmental Assessment Act*, an Environmental Impact Study will be required. For the purposes of this Project, an EIS is not required as this Project is following the Schedule B Municipal Class Environmental Assessment planning process. Refer to **Appendix D** for a copy of the **Natural Environment Report**.

Further, policies from Section 7.5 of the Official Plan, which pertains to Heritage Planning in the City have been considered in the development of the **Heritage Impact Assessment (Appendix F)**.

4.4 Ontario Regulation 41/ 24: Prohibited Activities, Exemptions, and Permits

Ontario Regulation (O. Reg) 41/24 under Section 28 of the Conservation Authorities Act (1990) establishes guidelines for the mapping of regulated areas within conservation authorities' jurisdictions where development could be subject to flooding, erosion, or dynamic beaches, or where interference with wetlands and alterations to shorelines and watercourses might have an adverse effect on those environmental features. This regulation identifies the processes to be followed to obtain exemptions and permits to allow for prohibited activities to occur within these regulated areas.

Relevance to this study: Study Area 1 and Study Area 2 are situated within the Credit Valley Conservation regulation limits. The proposed works will require approval as per O. Reg. 41/24: Prohibited Activities, Exemptions, and Permits. Credit Valley Conservation staff have been engaged in support of this study and will continue to be consulted during the design phase, as required.

4.5 Credit Valley-Toronto and Region-Central Lake Ontario (CTC) Source Protection Region

Source Water Protection has been considered in the context of the *Clean Water Act*, 2006. Projects proposed within a Source Water Protection vulnerable area are required to consider policies in the applicable Source Protection Plan including their impact with respect to the project. A watershed-based Source Protection Plan contains policies to reduce existing and future threats to drinking water in order to safeguard human health through addressing activities that have the potential to impact municipal drinking water systems.

The Study Areas are located in the Credit Valley Source Protection Area. The applicable source protection plan for the overall Study Areas is entitled “Approved Source Protection Plan: CTC Source Protection Region” (Approved February 23, 2022). The most recent amendments to the CTC Source Protection Plan were approved on February 29, 2024 and came into effect on March 6, 2024.

Relevance to this study: The following vulnerable areas are located within the Study Areas:

- Intake Protection Zone 3 (Study Area 2).
- Highly Vulnerable Aquifer; score is 6 (Study Area 1 and Study Area 2).
- Event Based Area; Type: Pipeline Fuel/Oil Spill (Study Area 2).
- Significant Groundwater Recharge Area (Study Area 2).

There are no Wellhead Protection Areas located in Study Area 1 or Study Area 2.

5. Phase 1: Problem or Opportunity Statement

Phase 1 of the five-phase Municipal Class Environmental Assessment planning process requires the proponent of an undertaking (i.e., the City) to first document factors leading to the conclusion that the improvement is needed, and to develop a clear statement of the identified problems or opportunities to be addressed. As such, the problem or opportunity statement is the main starting point in the undertaking of a Municipal Class Environmental Assessment and becomes the central theme and integrating element of the Project. It also assists in setting the scope of a Municipal Class Environmental Assessment study.

The following problem or opportunity statement has been developed for this Municipal Class Environmental Assessment study:

- Located in the City of Mississauga Wolfedale Creek originates at a storm sewer outlet south of Burnhamthorpe Road West, flows parallel to and between Wolfedale Road and Mavis Road and ultimately discharges into the Credit River, south of Queensway West and immediately west of Stavebank Road.
- Ongoing erosion within the Wolfedale Creek corridor has resulted in vertical and unstable creek banks, loss of habitat, potential scour and sediment deposition along the channel bed, and impacts to adjacent land uses posing a risk to private property and infrastructure.
- The creek bank and bed erosion happens when frequent high stormwater flows from upstream and/or adjacent urbanized catchment areas are discharged into Wolfedale Creek without adequate dissipation (i.e., natural floodplains or engineered methods).
- The majority of the channel was originally constructed in a straightened alignment approximately 40 to 50 years ago, and rehabilitation was completed over the years for certain segments.
- The City has determined segments of Wolfedale Creek require rehabilitation through its ongoing erosion monitoring program and has accordingly identified the need for an erosion control and restoration strategy, including engineered bank stabilization, to help prevent further issues for the creek and neighbouring properties.
- Environmental enhancement opportunities will also be explored as part of the preferred erosion mitigation strategy.

6. Phase 2: Alternative Solutions

6.1 Alternatives

The following hereafter summarizes the Phase 2 alternative solutions that have been considered for the Wolfedale Creek Erosion Control Project from Burnhamthorpe Road West to the Credit River based on the existing property limits and constraints.

Alternative 1 – Do nothing. This will be used as a base case comparison to other more viable alternatives or strategies.

Alternative 2 – Full replacement of failed bank protection with structural bank protection options to maintain long term erosion protection, such as reinforced soil slope walls, cast-in-place re-enforced concrete walls, or steel sheet pile. Structural grade control solutions will consist of structural options, such as concrete weir structures. Incorporation of a natural channel bed will be included to improve fish habitat and passage. Such examples of structural bank protection include armourstone slope protection or retaining wall (refer to **Figure 6-1**).

Figure 6-1: Structural Slope/Bank Protection (Armourstone Retaining Wall)



Alternative 3 – Full replacement of failed bank protection with non-structural bank protection options to maintain long term erosion protection, such as rock, green gabion, or geogrid retaining walls. Non-structural grade control could include rock weir structures. Incorporation of a natural channel bed will be included to improve fish habitat and passage. Examples of non-structural bank protection such as turf reinforcement matting (TRM) is provided in **Figure 6-2**.

Figure 6-2: Non-Structural Bank Protection



Alternative 4 – A combination of both structural and non-structural bank protection and grade control structures to maintain long term erosion protection. Incorporation of a natural channel bed will be included to improve fish habitat and passage. Refer to **Figure 6-1** and **Figure 6-2** for structural and non-structural bank protection examples.

Alternative 5 – Enclose the watercourse in storm sewer and landscape a trail over top. Refer to **Figure 6-3** for an example of an enclosed watercourse.

Figure 6-3: Enclosed Watercourse



6.2 Evaluation Criteria and Methodology

To identify the recommended preferred erosion control and restoration strategy the criteria listed in **Table 6-1** have been developed to evaluate the alternatives carried forward for detailed evaluation.

Table 6-1: Evaluation Criteria

Category	Evaluation Criteria
Physical and Natural Environment	<ul style="list-style-type: none"> ■ Potential effects on terrestrial habitat and species ■ Potential effects on aquatic habitat and species ■ Potential effects on channel morphology ■ Potential effects on hydraulics and flooding impacts ■ Erosion mitigation ■ Potential effects on Species at Risk and Species at Risk habitat ■ Potential effects on surface water and groundwater ■ Anticipated environmental permitting and approval considerations
Socio-Economic Environment	<ul style="list-style-type: none"> ■ Impact on Public Safety ■ Potential impacts to the community during construction (e.g., noise, air) ■ Potential impacts to adjacent properties and access ■ Potential for property acquisition
Cultural Heritage Environment	<ul style="list-style-type: none"> ■ Potential effects on archaeological resources ■ Potential effects on built heritage resources and cultural heritage landscapes
Climate Change	<ul style="list-style-type: none"> ■ Potential for greenhouse gas emissions ■ Vulnerability of project/infrastructure to climate change effects
Technical Environment	<ul style="list-style-type: none"> ■ Ability to address Problem and Opportunity Statement ■ Potential constructability complexities related to access and staging ■ Ability to address slope stability ■ Lifespan of infrastructure ■ Potential future maintenance requirements (e.g., structural maintenance and vegetation maintenance)
Cost	<ul style="list-style-type: none"> ■ Estimated capital costs ■ Estimated operation and maintenance costs

A comparative evaluation has been completed for the alternative solutions using the above noted criteria and were rated based on their potential constraints relative to the other alternatives as follows:

- High Constraints (Less Preferred).
- Medium Constraints (Moderately Preferred).
- Low Constraints (More Preferred).

6.3 Evaluation of Alternatives

Table 6-2 details the comparative evaluation of the alternatives. The evaluation is qualitative and has been informed through documentation of existing conditions and consideration of feedback from potentially affected and interested agencies and stakeholders.

Do nothing (Alternative 1) has been used as a base case comparison and does not address the problem or opportunity statement and is therefore not a viable overall preferred solution.

As shown in **Table 6-2**, the recommended overall preferred solution is Alternative 4.

Table 6-2: Evaluation of Alternatives

Category	Criteria	Alternative 1 – Do nothing	Alternative 2 – Structural bank protection	Alternative 3 – Non-structural bank protection	Alternative 4 – Combination of both structural and non-structural bank protection	Alternative 5 – Enclose the watercourse in storm sewer
Description of Alternative		Do nothing. No changes are proposed.	Full replacement of failed bank protection with structural bank protection options. Grade control solutions will consist of structural options. Incorporation of a natural channel bed will be included to improve fish habitat and passage.	Full replacement of failed bank protection with non-structural bank protection options. Non-structural grade control will be considered. Incorporation of a natural channel bed will be included to improve fish habitat and passage.	A combination of both structural and non-structural bank protection and grade control structures. Incorporation of a natural channel bed will be included to improve fish habitat and passage.	Enclose the watercourse in storm sewer and landscape a trail over top.
Physical and Natural Environment	Potential effects on terrestrial habitat and species	<ul style="list-style-type: none"> No direct impacts, however potential for loss of riparian habitat and potential impacts to species. 	<ul style="list-style-type: none"> Study Area 1: Low potential effects on terrestrial habitat and species given the limited removal of generally low-quality riparian vegetation. No opportunities for planting native plants as restoration. Study Area 2: Medium potential effects on terrestrial habitat and species given the removal of higher quality riparian vegetation and significant natural heritage features (e.g., valleyland, Credit River Coastal Marsh PSW complex, Credit River Marshes Regional ANSI, Stavebank Oak Woods Environmentally Significant Area). No opportunities for planting native plants as restoration. 	<ul style="list-style-type: none"> Study Area 1: Low potential effects on terrestrial habitat and species given the limited removal of generally low-quality riparian vegetation and wildlife habitat. Opportunities for planting native species as part of non-structural bank protection could be a benefit. Study Area 2: Low to medium potential effects on terrestrial habitat and species given the removal of higher quality riparian vegetation habitat and significant natural heritage features. Opportunities for planting native species as part of non-structural bank protection could be a benefit. 	<ul style="list-style-type: none"> Study Area 1: Low potential effects on terrestrial habitat and species given the limited removal of generally low-quality riparian vegetation and wildlife habitat. Opportunities for planting native species as part of non-structural bank protection could be a benefit. Study Area 2: Medium potential effects on terrestrial habitat and species given the removal of higher quality riparian vegetation habitat and significant natural heritage features. Opportunities for planting native species as part of non-structural bank protection could be a benefit. 	<ul style="list-style-type: none"> Study Area 1 and 2: Highest potential effects on terrestrial habitat and species based on the potential construction footprint and removal/alteration of habitat to entomb the watercourse and landscape the resulting space
Physical and Natural Environment	Potential effects on aquatic habitat and species	<ul style="list-style-type: none"> Continued degradation of aquatic habitat and potential impacts to species. 	<ul style="list-style-type: none"> Study Area 1: Medium potential effects on aquatic habitat and species based on potential construction footprint of structural bank protection options. Study Area 2: Medium potential effects on aquatic habitat and species based on potential construction footprint of structural bank protection options. 	<ul style="list-style-type: none"> Study Area 1: Low to medium potential effects on aquatic habitat and species based on potential construction footprint of non-structural bank protection options based on opportunities for additional riparian plantings, in stream cover base of retaining walls. Study Area 2: Low to medium potential effects on aquatic habitat and species based on potential construction footprint of non-structural bank protection options based on opportunities for additional riparian plantings, in stream cover base of retaining walls. 	<ul style="list-style-type: none"> Study Area 1: Medium potential effects on aquatic habitat and species based on potential construction footprint of structural and non-structural bank protection options. Study Area 2: Low to medium potential effects on aquatic habitat and species based on potential construction footprint of structural and non-structural bank protection options 	<ul style="list-style-type: none"> Study Area 1 and 2: Highest potential effects on aquatic habitat and species

Category	Criteria	Alternative 1 – Do nothing	Alternative 2 – Structural bank protection	Alternative 3 – Non-structural bank protection	Alternative 4 – Combination of both structural and non-structural bank protection	Alternative 5 – Enclose the watercourse in storm sewer
Physical and Natural Environment	Potential effects on channel morphology.	<ul style="list-style-type: none"> Continued erosion along the channel bed and banks and sediment accumulation for channel morphology. Potential for continued failure of existing bank protection and grade control structures. 	<ul style="list-style-type: none"> High potential effects on channel morphology as structural solutions lock the channel in place and eliminate sediment input into channel. In addition, structural solutions tend to modify channel hydraulics and could result in increased erosion potential. 	<ul style="list-style-type: none"> Non-structural solutions are not expected to dramatically alter cross-sections and no fill is proposed within the floodplain. Non-structural solutions also lock channel in place but provide more opportunities to offset this through incorporation of natural features. 	<ul style="list-style-type: none"> Both options are not expected to dramatically alter cross-sections and no fill is proposed within the floodplain. Structural and non-structural solutions lock channel in place but incorporating non-structural solutions provides more opportunities to offset this through the addition of natural features. 	<ul style="list-style-type: none"> Highest potential effects on channel morphology.
Physical and Natural Environment	Potential effects on hydraulics and flooding impacts.	<ul style="list-style-type: none"> Minimal flooding impacts. 	<ul style="list-style-type: none"> Minimal flooding impacts. Bank protection will not require loss of flood storage. 	<ul style="list-style-type: none"> Minimal flooding impacts. Bank protection will not require loss of flood storage. 	<ul style="list-style-type: none"> No anticipated additional flooding impacts. Bank protection will not require loss of flood storage. 	<ul style="list-style-type: none"> Highest potential impact to flooding upstream and downstream of watercourse.
Physical and Natural Environment	Erosion mitigation.	<ul style="list-style-type: none"> Existing erosion unmitigated and increased potential for further erosion. 	<ul style="list-style-type: none"> High degree of erosion mitigated for replacement of failed bank protection with structural bank protection options. Isolated works would stabilize and lock the channel in place Due to the potential for altered channel hydraulics, there is increased potential for erosion to occur in additional locations along the bed and/or channel banks. Structural solutions are possible in locations where banks are 1H:1V, elevated bank height is present, and consideration for weight restrictions at top of bank is required. Potential higher durability and longer lasting (if constructed properly). 	<ul style="list-style-type: none"> High degree of erosion mitigated for replacement of failed bank protection with non-structural bank protection options. Isolated works would stabilize and lock the channel in place Due to the potential for altered channel hydraulics, there is increased potential for erosion to occur in additional locations along the bed and/or channel banks. Non-structural solutions are possible where the bank slope can be graded to a stable angle, lower bank slopes are present, and vegetation used in the solution can grow. 	<ul style="list-style-type: none"> Combination of Alternatives 2 and 3. High degree of erosion mitigated for replacement of failed bank protection with structural and non-structural bank protection options. Isolated works would stabilize and lock the channel in place Due to the potential for altered channel hydraulics, there is increased potential for erosion to occur in additional locations along the bed and/or channel banks. Structural solutions are possible in locations where banks are 1H:1V, elevated bank height is present, and consideration for weight restrictions at top of bank is required. Non-structural solutions are possible where the bank slope can be graded to a stable angle, lower bank slopes are present, and vegetation used in the solution can grow. 	<ul style="list-style-type: none"> High degree of erosion mitigated for enclosure of watercourse in storm sewer.
Physical and Natural Environment	Potential effects on Species at Risk and Species at Risk habitat.	<ul style="list-style-type: none"> Continued degradation of terrestrial habitat adjacent to Wolfedale Creek and potential impacts to Species at Risk and their habitat. 	<ul style="list-style-type: none"> Medium potential effects on Species at Risk and Species at Risk habitat, including: <ul style="list-style-type: none"> American Eel (Study Area 2 only); Red-Headed Woodpecker; Bat SAR; Black Ash; and Butternut. 	<ul style="list-style-type: none"> Lowest potential effects on Species at Risk and Species at Risk habitat, including: <ul style="list-style-type: none"> American Eel (Study Area 2 only); Red-Headed Woodpecker; Bat SAR; Black Ash; and Butternut. 	<ul style="list-style-type: none"> Low to medium potential effects on Species at Risk and Species at Risk habitat, including: <ul style="list-style-type: none"> American Eel (Study Area 2 only); Red-Headed Woodpecker; Bat SAR; Black Ash; and Butternut. 	<ul style="list-style-type: none"> Highest Potential effects on Species at Risk and Species at Risk habitat, including: <ul style="list-style-type: none"> American Eel (Study Area 2 only); Red-Headed Woodpecker; Bat SAR; Black Ash; and Butternut.

Category	Criteria	Alternative 1 – Do nothing	Alternative 2 – Structural bank protection	Alternative 3 – Non-structural bank protection	Alternative 4 – Combination of both structural and non-structural bank protection	Alternative 5 – Enclose the watercourse in storm sewer
Physical and Natural Environment	Potential effects on surface water and groundwater.	<ul style="list-style-type: none"> No additional impacts to surface water and groundwater interaction. 	<ul style="list-style-type: none"> Minor potential effects to groundwater flow paths and minimize impact to groundwater-surface interaction. 	<ul style="list-style-type: none"> Minimal potential effects to groundwater flow paths and groundwater-surface interaction. 	<ul style="list-style-type: none"> Minor potential effects to groundwater flow paths and minimize impact to groundwater-surface interaction. 	<ul style="list-style-type: none"> High potential effects to groundwater flow paths and groundwater-surface interaction. Natural groundwater recharge would be impacted for northern portion of Study Area, with impacts to the groundwater-surface interaction.
Physical and Natural Environment	Anticipated environmental permitting and approval considerations.	<ul style="list-style-type: none"> No permits and approvals required. 	<ul style="list-style-type: none"> Straight forward environmental permitting and approvals that may include: <ul style="list-style-type: none"> A CVC permit will be required under Ontario Regulation 41/24: Prohibited Activities, Exemptions, and Permits. A permit will be required under the City of Mississauga Public Tree Protection By-law 0020-2022 if tree removals are required. A request for review will be required by DFO due to construction activities occurring below the high water line. Permits may be required under the ESA. 	<ul style="list-style-type: none"> Straight forward environmental permitting and approvals that may include: <ul style="list-style-type: none"> A CVC permit will be required under Ontario Regulation 41/24: Prohibited Activities, Exemptions, and Permits A permit will be required under the City of Mississauga Public Tree Protection By-law 0020-2022 if tree removals are required. A request for review will be required by DFO due to construction activities occurring below the high water line. Permits may be required under the ESA. Applicable permits will be identified during the Environmental Assessment phase and confirmed during Preliminary and Detailed Design based on the final construction footprint. 	<ul style="list-style-type: none"> Straight forward environmental permitting and approvals that may include: <ul style="list-style-type: none"> A CVC permit will be required under Ontario Regulation 41/24: Prohibited Activities, Exemptions, and Permits A permit will be required under the City of Mississauga Public Tree Protection By-law 0020-2022 if tree removals are required. A request for review will be required by DFO due to construction activities occurring below the high water line. Permits may be required under the ESA. Applicable permits will be identified during the Environmental Assessment phase and confirmed during Preliminary and Detailed Design based on the final construction footprint. 	<ul style="list-style-type: none"> Most difficult environmental permitting and approvals that may include: <ul style="list-style-type: none"> A CVC permit will be required under Ontario Regulation 41/24: Prohibited Activities, Exemptions, and Permits A permit will be required under the City of Mississauga Public Tree Protection By-law 0020-2022 if tree removals are required. A request for review will be required by DFO due to construction activities occurring below the high water line. An Authorization under the Fisheries Act is anticipated due to the entombment of the watercourse, which will permanently alter fish habitat and has the potential to destroy fish habitat. Permits may be required under the ESA.
Physical and Natural Environment	Evaluation Ranking	Low Constraints (More Preferred)	Medium Constraints (Moderately Preferred)	Low Constraints (More Preferred)	Low (More Preferred) to Medium Constraints (Moderately Preferred)	High Constraints (Less Preferred)
Socio-Economic Environment	Impact on Public Safety.	<ul style="list-style-type: none"> Existing risks associated with failed bank protection and erosion unmitigated. 	<ul style="list-style-type: none"> Mitigated erosion reduces risk to public safety. 	<ul style="list-style-type: none"> Mitigated erosion reduces risk to public safety. 	<ul style="list-style-type: none"> Mitigated erosion reduces risk to public safety. 	<ul style="list-style-type: none"> Mitigated erosion reduces risk to public safety.
Socio-Economic Environment	Potential impacts to the community during construction (e.g., noise, air).	<ul style="list-style-type: none"> No impacts to the community as no construction is proposed. 	<ul style="list-style-type: none"> Impacts anticipated with construction area in proximity to private properties. 	<ul style="list-style-type: none"> Impacts anticipated with construction area in proximity to private properties. 	<ul style="list-style-type: none"> Impacts anticipated with construction area in proximity to private properties. 	<ul style="list-style-type: none"> Largest construction area/duration with highest impacts to properties along creek.

Category	Criteria	Alternative 1 – Do nothing	Alternative 2 – Structural bank protection	Alternative 3 – Non-structural bank protection	Alternative 4 – Combination of both structural and non-structural bank protection	Alternative 5 – Enclose the watercourse in storm sewer
Socio-Economic Environment	Potential impacts to adjacent properties and access.	<ul style="list-style-type: none"> No impacts to adjacent properties and access. Existing risks associated with failed bank protection unmitigated. 	<ul style="list-style-type: none"> Impacts to adjacent properties in key locations of proposed works. Access required at select locations and will require negotiation and result in temporary disruption to use of property. Land modifications to the top of bank required to prevent future encroachment 	<ul style="list-style-type: none"> Impacts to adjacent properties in key locations of proposed works. Access required at select locations and will require negotiation and result in temporary disruption to use of property. Land modifications to the top of bank required to prevent future encroachment 	<ul style="list-style-type: none"> Impacts to adjacent properties in key locations of proposed works. Access required at select locations and will require negotiation and result in temporary disruption to use of property. Land modifications to the top of bank required to prevent future encroachment 	<ul style="list-style-type: none"> Impacts to adjacent properties in key locations of proposed works. Access required at select locations and will require negotiation and result in temporary disruption to use of property. Modification to top of bank would be required.
Socio-Economic Environment	Potential for property acquisition.	<ul style="list-style-type: none"> No property acquisition. 	<ul style="list-style-type: none"> No property acquisition anticipated. Work with select land owners to provide buffer from top of bank. 	<ul style="list-style-type: none"> No property acquisition anticipated. Work with select land owners to provide buffer from top of bank. 	<ul style="list-style-type: none"> No property acquisition anticipated. Work with select land owners to provide buffer from top of bank. 	<ul style="list-style-type: none"> No property acquisition anticipated.
Socio-Economic Environment	Evaluation Ranking	Low Constraints (More Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	High Constraints (Less Preferred)
Cultural Heritage Environment	Potential effects on archaeological resources.	<ul style="list-style-type: none"> No improvements proposed – no effects on archaeological resources. 	<ul style="list-style-type: none"> Study Area 1: No further work is recommended, Study Area 2: Stage 2 archaeological assessment (and further assessments, as required) required for all areas of potentially undisturbed land Potential for marine archaeological impacts if creek bed is disturbed within the Study Area 2. To be confirmed based on final proposed construction footprint. 	<ul style="list-style-type: none"> Study Area 1: No further work is recommended, Study Area 2: Stage 2 archaeological assessment (and further assessments, as required) required for all areas of potentially undisturbed land Potential for marine archaeological impacts if creek bed is disturbed within the Study Area 2. To be confirmed based on final proposed construction footprint. 	<ul style="list-style-type: none"> Study Area 1: No further work is recommended, Study Area 2: Stage 2 archaeological assessment (and further assessments, as required) required for all areas of potentially undisturbed land Potential for marine archaeological impacts if creek bed is disturbed within the Study Area 2. To be confirmed based on final proposed construction footprint. 	<ul style="list-style-type: none"> Study Area 1: No further work is recommended, Study Area 2: Stage 2 archaeological assessment (and further assessments, as required) required for all areas of potentially undisturbed land Potential for marine archaeological impacts if creek bed is disturbed within the Study Area 2. To be confirmed based on final proposed construction footprint.
Cultural Heritage Environment	Potential effects on built heritage resources and cultural heritage landscapes.	<ul style="list-style-type: none"> Study Area 1: No improvements proposed – no effects on built heritage resources and cultural heritage landscapes. Study Area 2: No improvements proposed – no effects on built heritage resources and cultural heritage landscapes. 	<ul style="list-style-type: none"> Study Area 1: No potential effects identified on built heritage resources and cultural heritage landscapes. Scope of work limited to Heritage Impact Assessment. Study Area 2: High potential for direct effects on the Credit River Corridor Cultural Heritage Landscape. There may also be potential effects on the Mississauga Golf and Country Club (1725 Mississauga Road) that is designated as a Heritage Property and is listed on the City of Mississauga Register. 	<ul style="list-style-type: none"> Study Area 1: No potential effects identified on built heritage resources and cultural heritage landscapes. Scope of work limited to Heritage Impact Assessment. Study Area 2: High potential for direct effects on the Credit River Corridor Cultural Heritage Landscape. There may also be potential effects on the Mississauga Golf and Country Club (1725 Mississauga Road) that is designated as a Heritage Property and is listed on the City of Mississauga Register. 	<ul style="list-style-type: none"> Study Area 1: No potential effects identified on built heritage resources and cultural heritage landscapes. Scope of work limited to Heritage Impact Assessment. Study Area 2: High potential for direct effects on the Credit River Corridor Cultural Heritage Landscape. There may also be potential effects on the Mississauga Golf and Country Club (1725 Mississauga Road) that is designated as a Heritage Property and is listed on the City of Mississauga Register. 	<ul style="list-style-type: none"> Study Area 1: No potential effects identified on built heritage resources and cultural heritage landscapes. Scope of work limited to Heritage Impact Assessment. Study Area 2: High potential for direct effects on the Credit River Corridor Cultural Heritage Landscape. There may also be potential effects on the Mississauga Golf and Country Club (1725 Mississauga Road) that is designated as a Heritage Property and is listed on the City of Mississauga Register.
Cultural Heritage Environment	Evaluation Ranking	Low Constraints (More Preferred)	High Constraints (Moderately Preferred)	High Constraints (Moderately Preferred)	High Constraints (Moderately Preferred)	High Constraints (Moderately Preferred)

Category	Criteria	Alternative 1 – Do nothing	Alternative 2 – Structural bank protection	Alternative 3 – Non-structural bank protection	Alternative 4 – Combination of both structural and non-structural bank protection	Alternative 5 – Enclose the watercourse in storm sewer
Climate Change	Potential for greenhouse gas emissions.	■ No potential for greenhouse gas emissions – no changes proposed.	■ Potential for increased greenhouse gas emissions based on longer construction duration and use of heavy equipment.	■ Lower potential for increased greenhouse gas emissions based on shorter construction duration and potential for use of less heavy equipment.	■ Potential for increased greenhouse gas emissions based on longer construction duration and use of heavy equipment.	■ Potential for increased greenhouse gas emissions based on longer construction duration and use of heavy equipment.
Climate Change	Vulnerability of project/ infrastructure to climate change effects.	■ Infrastructure subject to climate change effects unmitigated.	■ Structural bank protection options may result in less potential vulnerability to climate change effects.	■ Non-structural bank protection options may result in slightly higher potential vulnerability to climate change effects.	■ Structural and non-structural bank protection options may result in less potential vulnerability to climate change effects.	■ Enclose the watercourse may result in less potential vulnerability to climate change effects in Study Area 1; however there are downstream infrastructure in Study Area 2 subject to negative impacts.
Climate Change	Evaluation Ranking	Low Constraints (More Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	High Constraints (Less Preferred)
Technical Environment	Ability to address Problem and Opportunity Statement.	■ Does not address the Problem and Opportunity statement.	■ Addresses the Problem and Opportunity statement.	■ Addresses the Problem and Opportunity statement.	■ Addresses the Problem and Opportunity statement with greatest design flexibility.	■ Addresses the Problem and Opportunity statement.
Technical Environment	Potential constructability complexities related to access and staging.	■ No complexities as no changes are proposed.	■ Moderate constructability complexities related to access and staging; however, will require heavier machinery and deeper footings to install structural bank protection.	■ Moderate constructability complexities related to access and staging.	■ Moderate constructability complexities related to access and staging.	■ Highest constructability complexities related to access and staging.
Technical Environment	Ability to address slope stability.	■ Existing risk to slope stability unmitigated.	■ Mitigated erosion would reduce risk to slope stability at key locations.	■ Mitigated erosion would reduce risk to slope stability at key locations.	■ Mitigated erosion would reduce risk to slope stability at key locations with greatest design flexibility.	■ New sewer would address slope stability.
Technical Environment	Lifespan of infrastructure.	■ Existing risk to infrastructure lifespan unmitigated.	■ Structural bank protection options may have longer lifespan than non-structural options.	■ Non-structural bank protection options may have reduced lifespan.	■ Combination approach. Structural bank protection options may have longer lifespan than non-structural bank protection options.	■ Longest lifespan compared to other alternatives; however, may reduce lifespan of infrastructure in Study Area 2.
Technical Environment	Potential future maintenance requirements (e.g., structural maintenance and vegetation maintenance).	■ Potential for maintenance related to ongoing erosion (e.g., tree removal, sediment accumulation).	■ Lower maintenance required for structural bank protection options compared to non-structural bank protection options.	■ Higher maintenance required for non-structural bank protection options.	■ Lower maintenance required for structural bank protection options compared to non-structural bank protection options.	■ Lowest future maintenance requirements; however, may trigger additional maintenance for infrastructure in Study Area 2.
Technical Environment	Evaluation Ranking	High Constraints (Less Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	Low (More Preferred) to Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)

Category	Criteria	Alternative 1 – Do nothing	Alternative 2 – Structural bank protection	Alternative 3 – Non-structural bank protection	Alternative 4 – Combination of both structural and non-structural bank protection	Alternative 5 – Enclose the watercourse in storm sewer
Cost	Estimated capital costs.	■ None.	■ \$5 M - \$10 M.	■ \$1 M - \$5 M.	■ \$1 M - \$10 M.	■ Greater than \$10 M.
Cost	Estimated operation and maintenance costs.	■ Potential for maintenance costs related to ongoing erosion (e.g., tree removal, sediment accumulation).	■ Regular maintenance required and may be higher in cost compared to non-structural.	■ Regular maintenance required. ■ Incorporation of vegetation in design details may require greater maintenance.	■ Regular maintenance required.	■ Regular maintenance required. ■ Confined space access will be required.
Cost	Evaluation Ranking	Low Constraints (More Preferred)	Medium Constraints (Moderately Preferred)	Low Constraints (More Preferred)	Low (More Preferred) to Medium Constraints (Moderately Preferred)	High Constraints (Less Preferred)
Overall	Recommended Preferred Solution?	No	No	No	Yes	No

6.4 Preferred Solution – Alternative 4

Based on the evaluation results, Alternative 4 (combination of both structural and non-structural bank protection) was identified as the preferred erosion control and restoration strategy. All of the alternatives, excluding Alternative 1 (Do Nothing), have similar evaluation rating impacts to the socio-economic environment, cultural heritage environment and climate change considerations. Alternatives 3 and 4 both have lower impacts to the physical and natural environment and capital costs compared to the other alternatives. Alternative 4 is slightly more preferred overall in terms of the technical environment with the greatest design flexibility.

Alternative 4 is the overall recommended preferred solution based on the following rationale:

- Flexibility to implement both non-structural and structural improvements.
- Lower anticipated environmental impacts.
- Constructability.
- There are no anticipated flooding impacts.
- Cost-effectiveness with primarily non-structural bank protection options being recommended with localized small-scale structural measures.

Improvements recommended as part of the preferred solution as shown in **Figure 6-4** through to **Figure 6-10** are primarily non-structural as the channel bed is degrading for the majority of the creek and armourstone could potentially lose its base support over time. The majority of erosional issues along the creek overbanks could also be addressed with non-structural measures, though in select areas co-operation with the adjacent landowners would be required to address erosional issues to address deficiencies to existing structures (for example, small section of retaining wall failing) along the property limits. As such, localized small-scale structural measures, such as retaining wall repair or replacement, would then be implemented as required in select areas.

Figure 6-4: Preferred Erosion Control and Restoration Strategy – Restoration Reach 1 (Study Area 1)

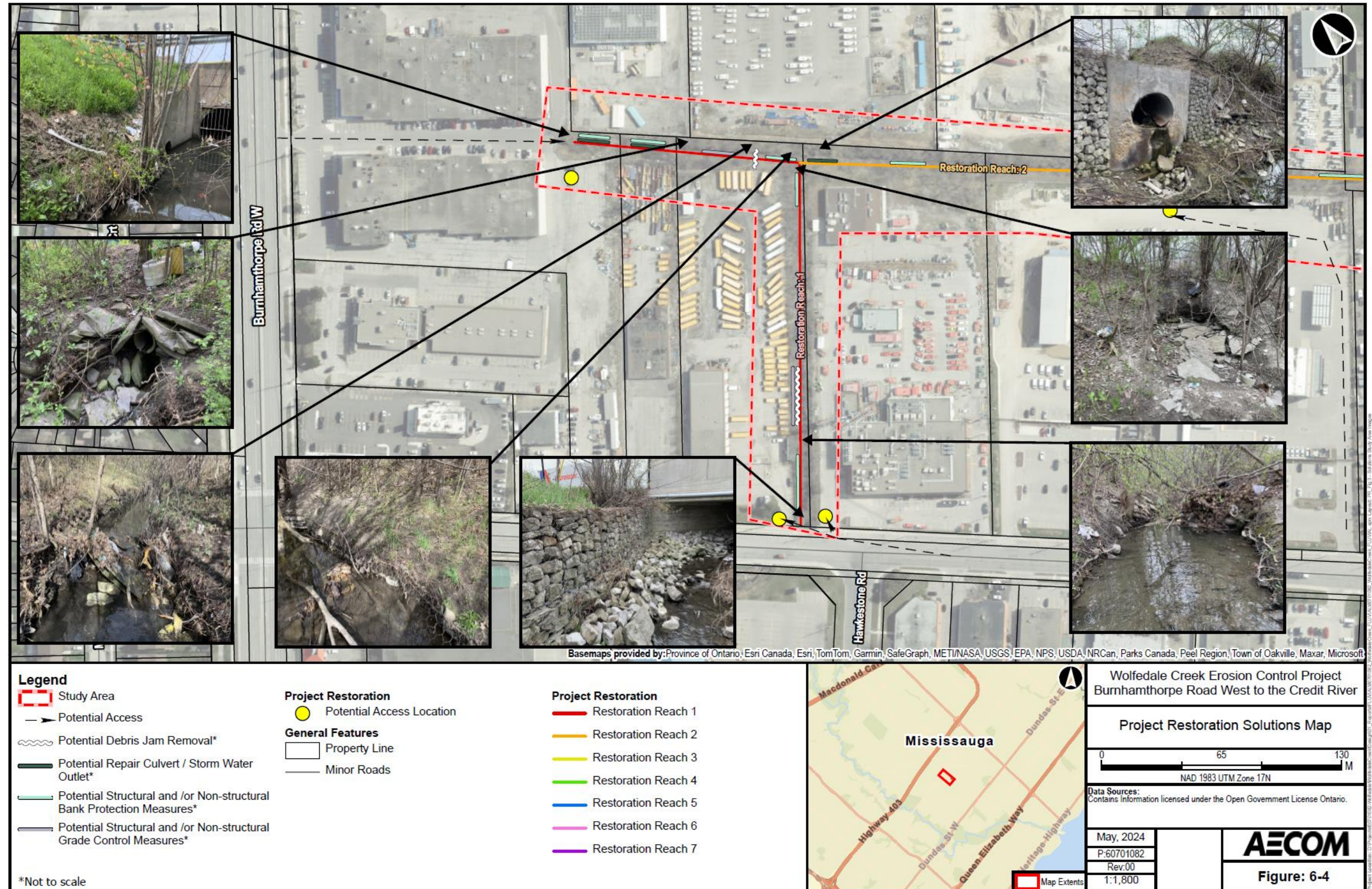


Figure 6-5: Preferred Erosion Control and Restoration Strategy – Restoration Reach 2 (Study Area 1)

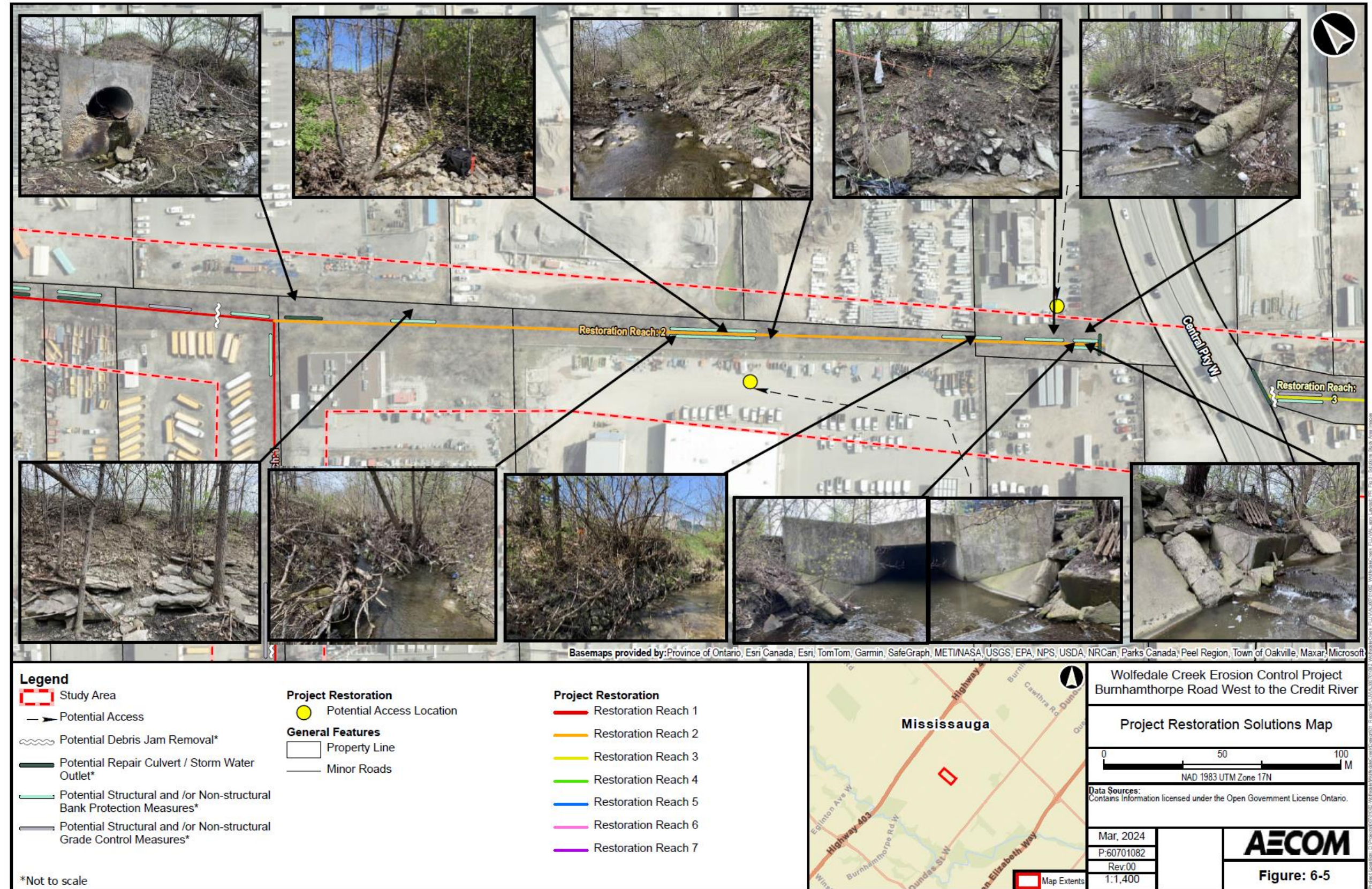


Figure 6-6: Preferred Erosion Control and Restoration Strategy – Restoration Reach 3 (Study Area 1)

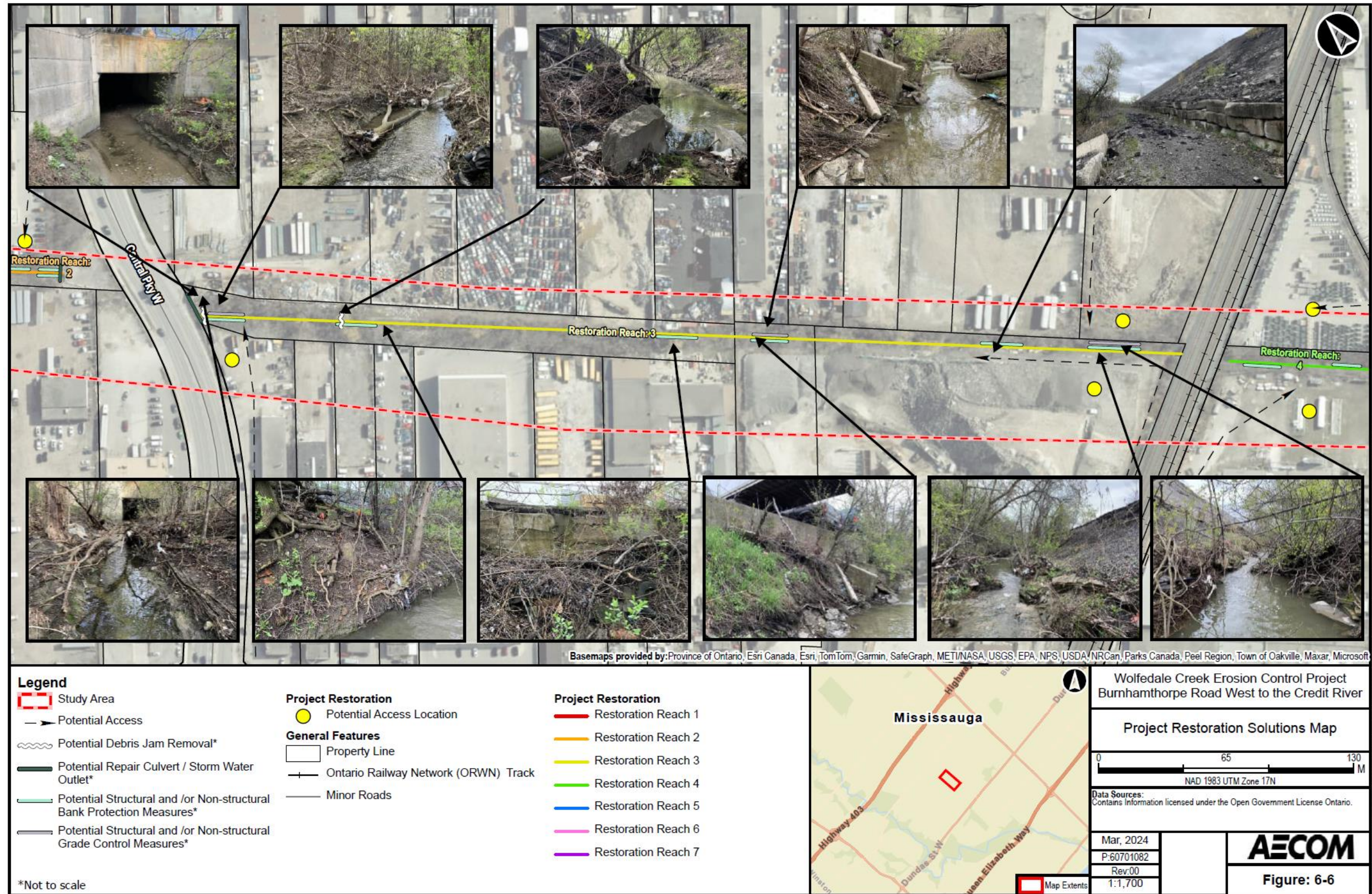


Figure 6-7: Preferred Erosion Control and Restoration Strategy – Restoration Reach 4 (Study Area 1)

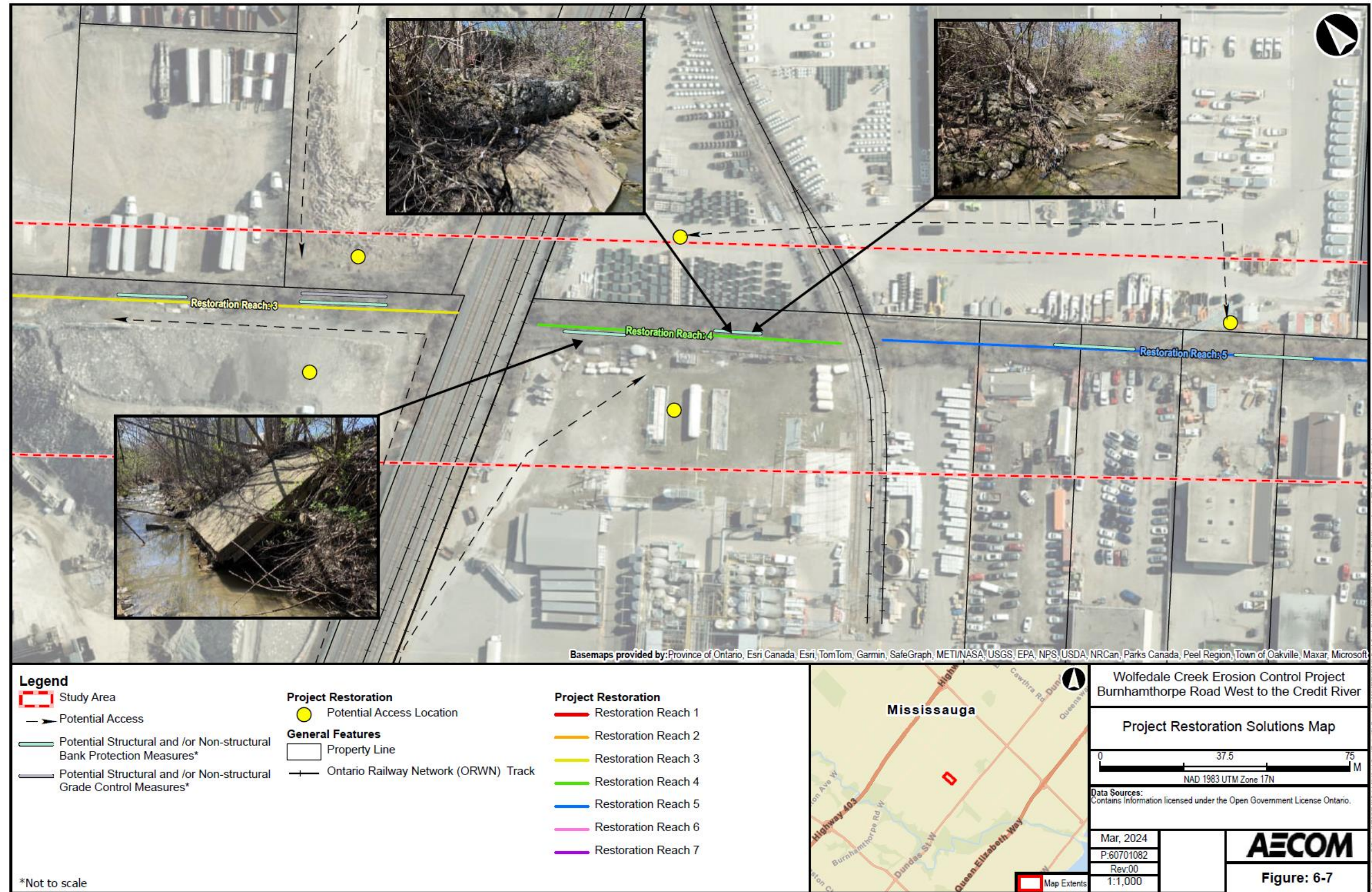


Figure 6-8: Preferred Erosion Control and Restoration Strategy– Restoration Reach 5 (Study Area 1)

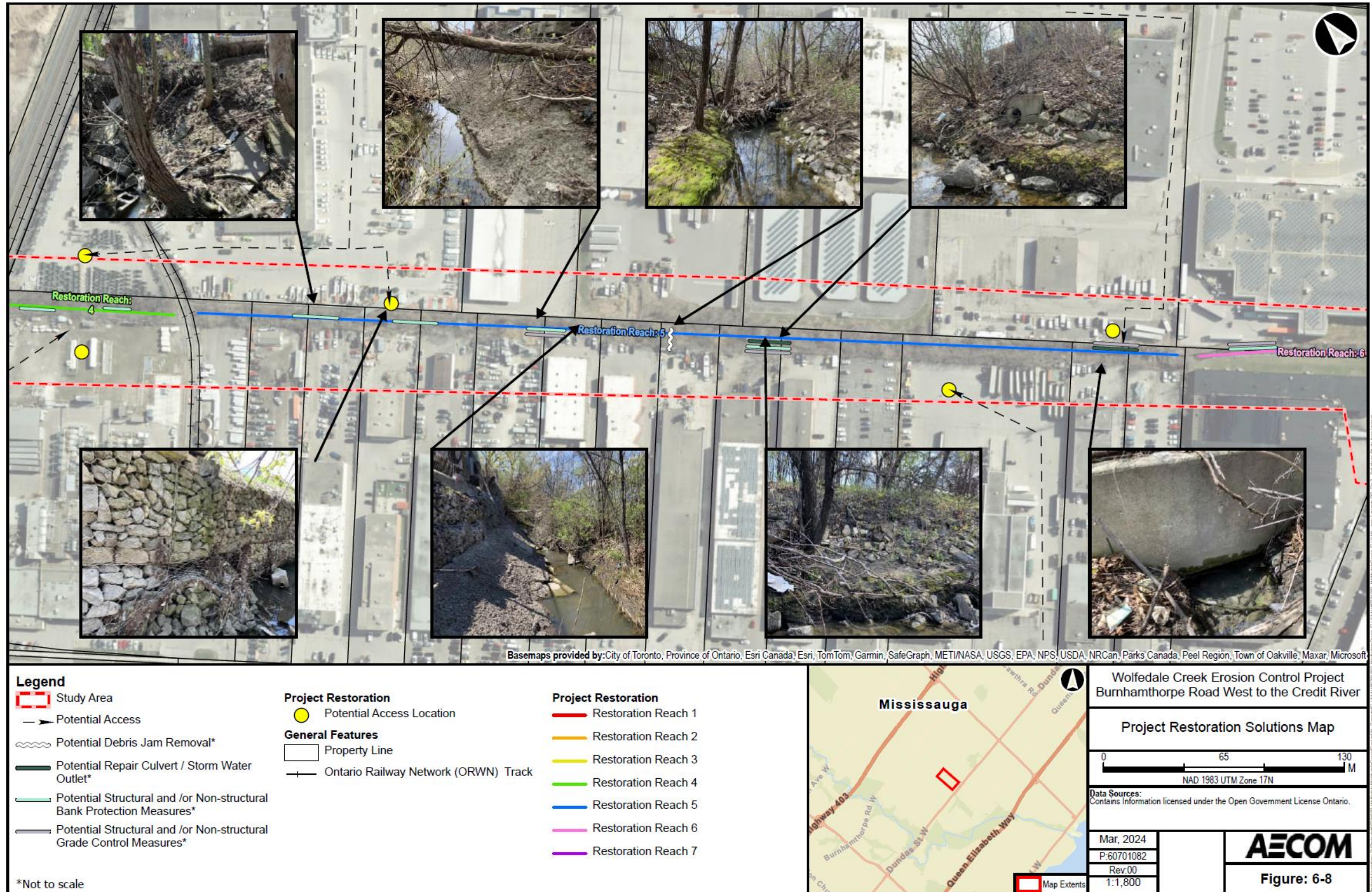


Figure 6-9: Preferred Erosion Control and Restoration Strategy – Restoration Reach 6 (Study Area 1)

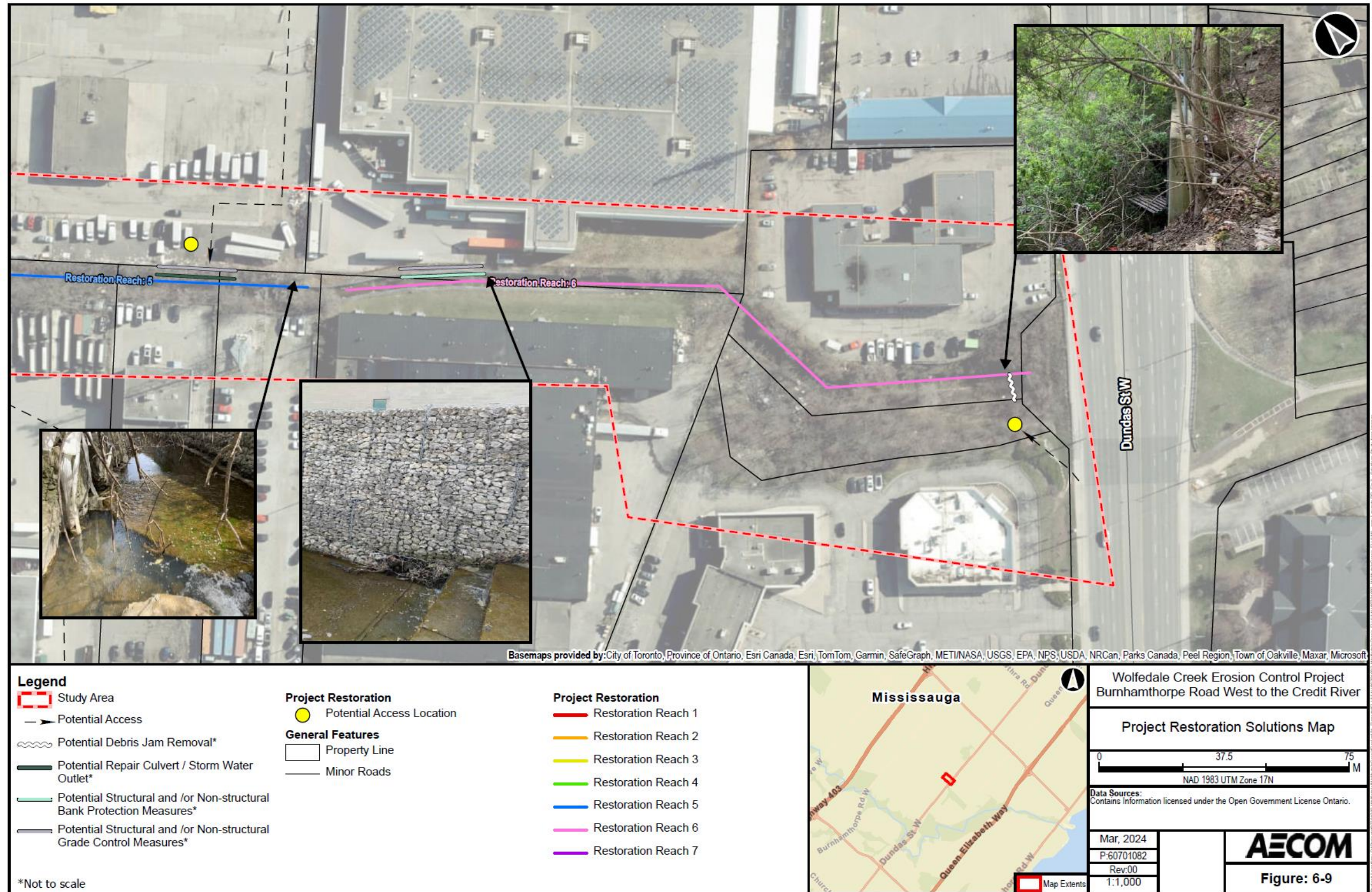
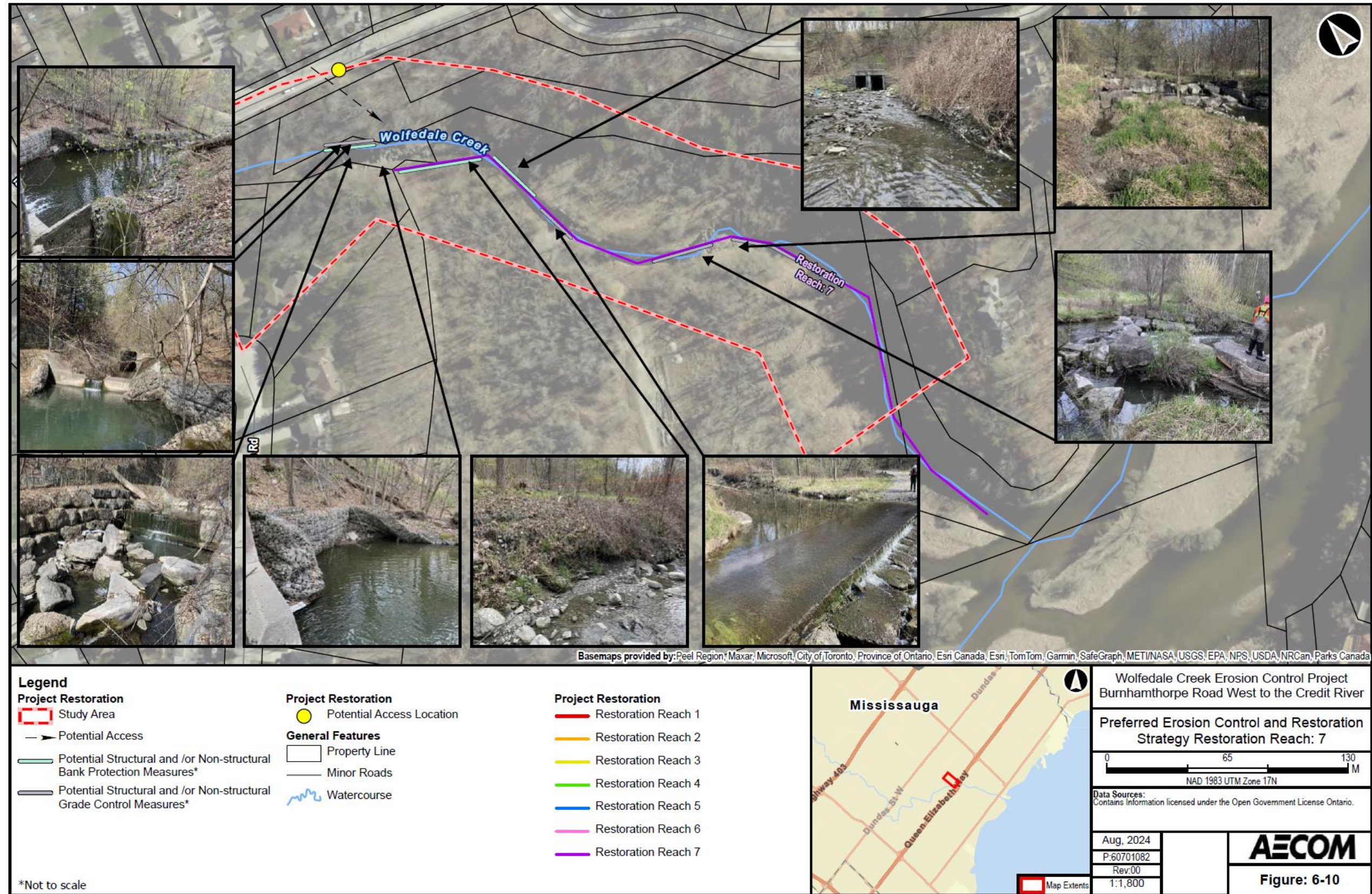


Figure 6-10: Preferred Erosion Control and Restoration Strategy – Restoration Reach 7 (Study Area 2)



7. Preferred Undertaking – Project Description

7.1 Design Considerations

Erosion is a natural process by which soil is removed, transported, and deposited by the flow within the creek. Streams are naturally dynamic systems with alternating areas of erosion and deposition within the creek. All stabilization projects are unique (each with their own specific conditions to evaluate), so it is important to identify the actual source and cause of the erosion problem and recommend a solution specifically adapted to local conditions. Protection solutions can be classified as non-structural or structural.

- Structural protection works involve the construction and/or placement of significant additional structures and/or materials along the river or stream system.
- Non-structural protection works are activities that do not involve the construction or placement of significant additional structures or material along or in the river or stream system.

While it may be necessary to use structural means to control erosion, it is possible to utilize techniques that stabilize streambanks while protecting the natural integrity of the stream. This provides bank protection with wildlife habitat values, and strategic choice of vegetation can further diffuse erosive energy of flood flows. In addition to providing local site protection, a bank stabilization project also reduces the input and movement of sediment in a given waterway downstream, reducing the risk of downstream sediment accumulation and flooding.

Structural practices include the following:

- **Rock Riprap & Rock Gabions** – Riprap stabilization designs should include appropriate bank slope and rock size to protect the bank from the creek's velocity and shear stress.
- **Bulkheads/Revetment Walls** – These structures (typically sheet steel, concrete, or wood) produce a sterile, vertical, flat-faced structure that is of little use to aquatic organisms and other wildlife. When erosive forces are severe and existing building foundations or structures are threatened, and other stabilization approaches would not be effective, a new or replacement retaining wall may be warranted.

Non structural practices include the following:

- Bioengineering approaches, including bank shaping and sloping practices that achieve stable banks.
- Native vegetation which slows runoff and diverts flow across the land surface to allow for infiltration and treatment of potentially polluted stormwater
- Vegetation to stabilize the soil surface which reduces erosion and promotes sediment deposition/accretion.
- Integrated practices – combination of structural and vegetative stabilization measures, which preserve the stream under normal flow conditions and withstand the impact of substantially increased flows.
- Biodegradable materials that temporarily control soil movement and eventually disintegrate into humus, a media that allows for infiltration and air exchange which promotes the growth of plants.
- Environmentally-sensitive synthetics that provide permanent stabilization with the ecological benefits.
- Vegetation to shade the water, which lowers the water temperature and increases its capacity to hold oxygen needed by aquatic animals to breathe.

Table 7-1 outlines the design considerations within each restoration reach that have been identified in support of the preferred erosion control and restoration strategy (i.e., Alternative 4).

Table 7-1: Preferred Design Solution Considerations

	Restoration Reach 1	Restoration Reach 2	Restoration Reach 3	Restoration Reach 4	Restoration Reach 5	Restoration Reach 6	Restoration Reach 7
Structural and Non-structural Bank Protection Options	X	X	X	X	X	X	X
Structural and Non-structural Grade Control Measures	X	-	X	-	X	X	X
Culvert and Stormwater Outlet Rehabilitation	X	X	-	-	X	-	-
Debris Jam Removal	X	-	X	-	-	X	-

7.1.1 Property, Easement, and Access Requirements

The City is not planning to acquire property for the proposed works and owns the property and various easements along the Creek as shown in **Figure 7-1** and **Figure 7-2**.

The City is currently engaging landowners to request access to select properties in support of constructing the preferred erosion control and restoration strategy as per **Figure 6-4 to Figure 6-10**. The access locations will be reviewed during the preliminary and detailed design phases and proposed access locations may be modified through further engagement and consultation with property owners.

Figure 7-1: City Owned Property and Easement – Study Area 1

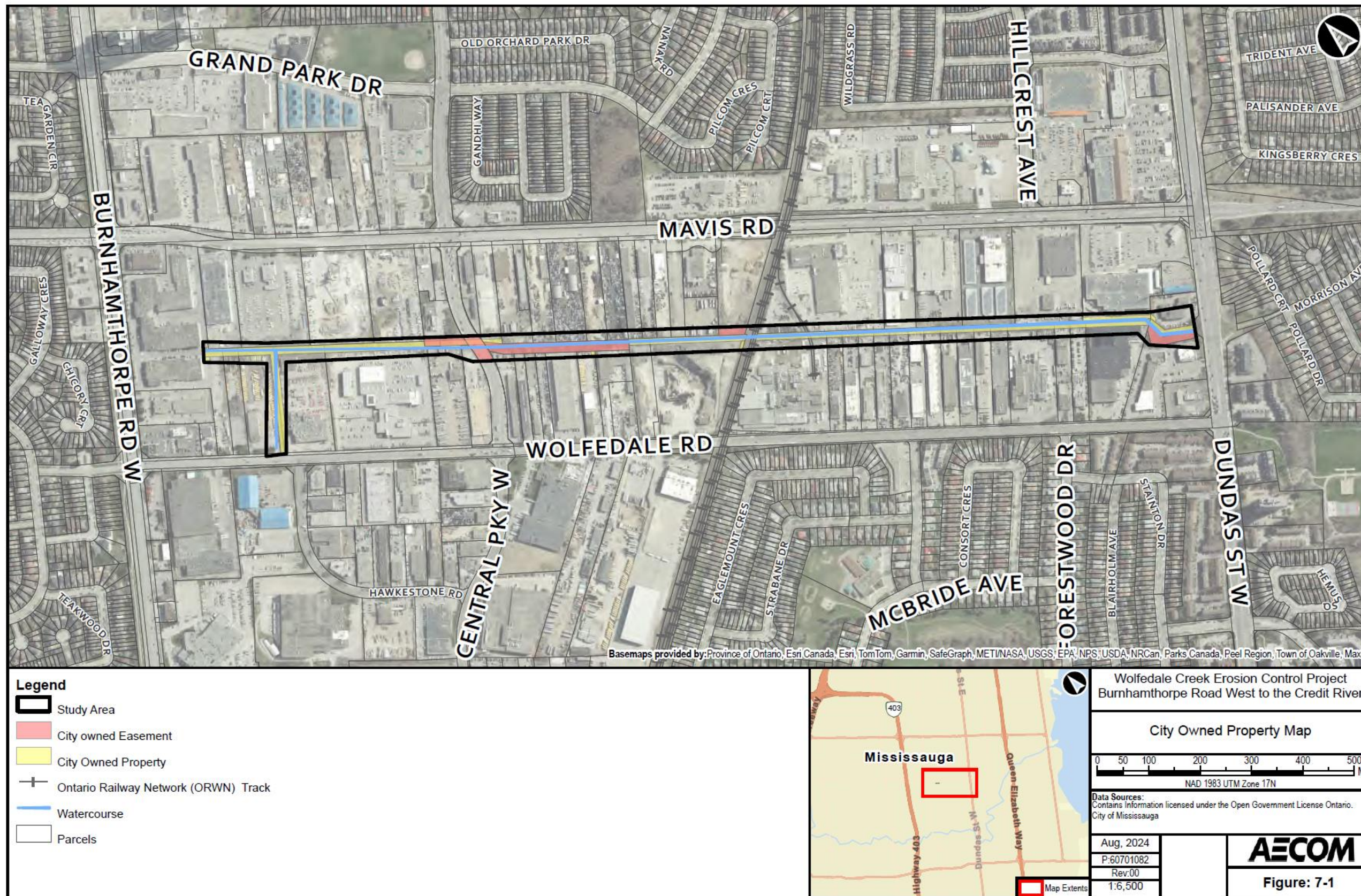
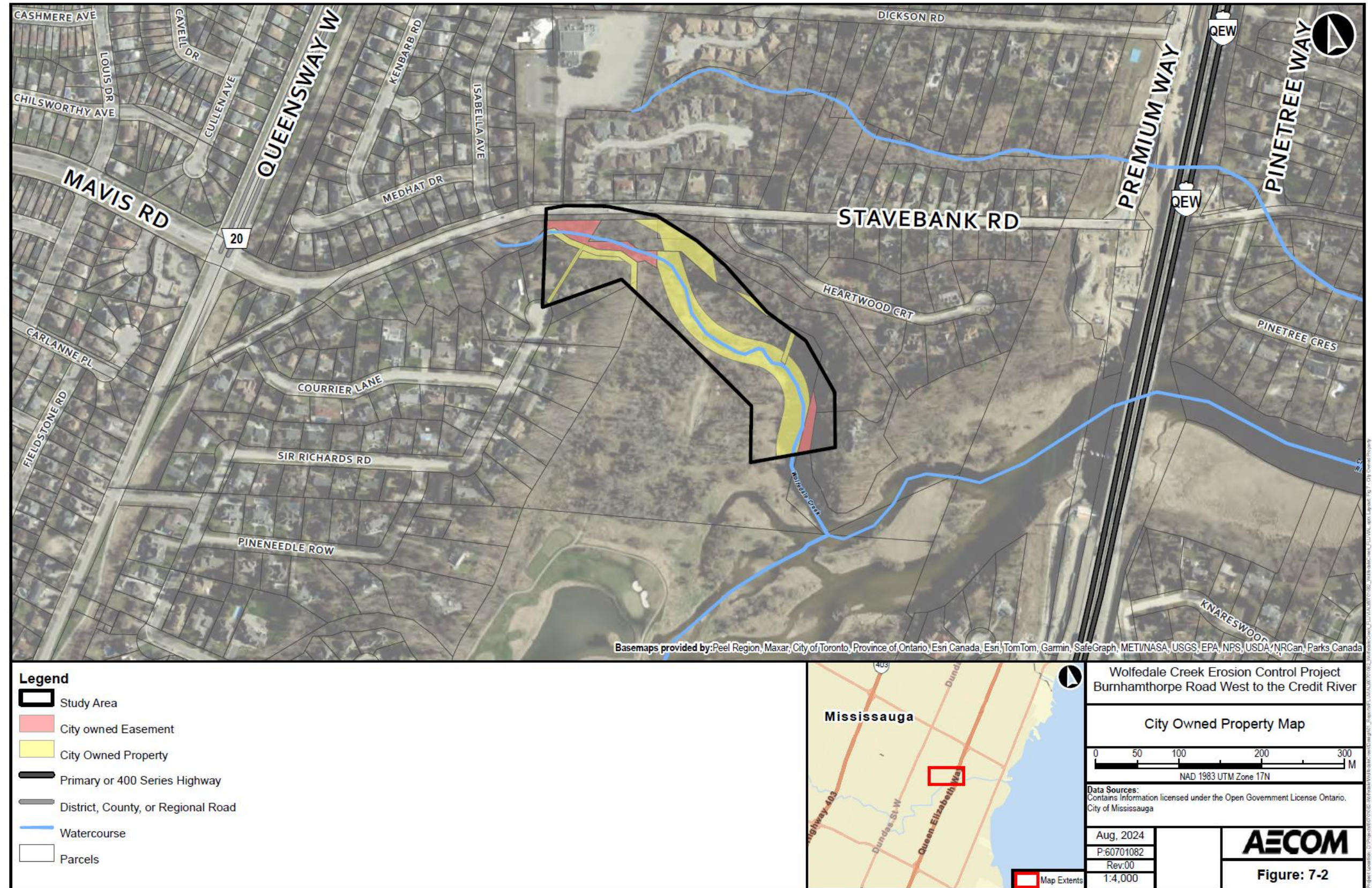


Figure 7-2: City Owned Property and Easement – Study Area 2



7.1.2 Climate Change Considerations

Climate change considerations for the proposed erosion control and restoration strategy include ensuring that the works are designed and built to include resiliency to more extreme storm events.

In addition, climate mitigation includes reduction of carbon emissions both during and after construction. Considerations include avoiding the idling of construction equipment, and ensure equipment is in good working order to reduce inefficiencies in the operation of the equipment, in addition to increasing tree and vegetation cover from existing conditions (to be confirmed through detailed design).

7.2 Cost Estimate

The preliminary estimated cost for the preferred erosion and control strategy is anticipated to be between \$1 and \$10 million dollars. The preliminary cost estimate will be reviewed and updated during detailed design.

7.3 Permits and Approvals

The anticipated permits and approvals required prior to construction are summarized in **Table 7-2**. Permit and approval requirements will be confirmed during the preliminary and detailed design phase of the Project and will require additional consultation with the applicable regulatory agencies.

7.4 Preliminary Project Schedule

If no issues are raised during the Municipal Class Environmental Assessment phase, the City intends to proceed to initiate the preliminary design phase in Winter 2025 followed by the detailed design thereafter to proceed to tender and construction in late 2025 or 2026, subject to the City's capital budget process and receiving all necessary approvals. Construction may be undertaken in several phases over the short and long term.

Table 7-2: Anticipated Permits and Approvals

Level of Legislation	Governing Authority and Legislation	Permits and Approvals	Timing
Federal	<ul style="list-style-type: none"> Canadian Pacific Railway 	<ul style="list-style-type: none"> A work permit may be required from Canadian Pacific Railway. 	Detailed Design
Federal	<ul style="list-style-type: none"> Fisheries and Oceans Canada <i>Fisheries Act, 1985</i> 	<ul style="list-style-type: none"> Submission of a Fisheries and Oceans Canada (DFO) Request for Review will be required based on the in-water works associated with the proposed bank stabilization and channel rehabilitation works. DFO will determine if an Authorization is required based on their review of the Request for Review 	Detailed Design
Federal	<ul style="list-style-type: none"> Environment and Climate Change Canada <i>Migratory Birds Convention Act, 1994</i> 	<ul style="list-style-type: none"> Contravention of the MBCA is not anticipated provided vegetation removal occurs outside of the breeding bird season (April 1 to August 31). While no nests belonging to species listed under Schedule 1 of the MBCA (i.e., Pileated Woodpecker) were identified, potential for Pileated Woodpecker nests may appear from year to year and could be proposed for removal. Unoccupied nests of these migratory birds, whose nests are commonly re-used from one year to the next, cannot be removed without a permit unless reported through the Abandoned Nest Registry and nest remains unoccupied for the corresponding period of time (i.e., 36 months for Pileated Woodpecker). 	Detailed Design
Provincial	<ul style="list-style-type: none"> Metrolinx 	<ul style="list-style-type: none"> A work permit may be required from Metrolinx if the works are proposed within a third party projects review zone (30 feet from Metrolinx live railway tracks). 	Detailed Design
Provincial	<ul style="list-style-type: none"> <i>Provincial Policy Statement, 2020</i> 	<ul style="list-style-type: none"> Permits to be obtained under the PPS are not anticipated; however, mitigation measures and best management practices should prevent negative impacts to SWH and the PSW. If work is proposed within 30 m of the PSW (Study Area 2), an Environmental Impact Study may be required to ensure no adverse effects to the PSW occur as result of the proposed alternative solution. 	Not Applicable
Provincial	<ul style="list-style-type: none"> Ministry of the Environment, Conservation and Parks <i>O. Reg. 387/04; Ontario Water Resources Act, 1990</i> 	<ul style="list-style-type: none"> A Permit to Take Water under the Ontario Water Resources Act (OWRA) may be required. A Permit to Take Water is required for any water takings that exceed 50,000 Litres per day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – O. Reg. 63/16. These prescribed water-taking activities require registration in the Environmental Activity and Sector Registry (EASR) instead of a Permit to Take Water. 	Detailed Design
Provincial	<ul style="list-style-type: none"> Ministry of the Environment, Conservation and Parks <i>Ontario Water Resources Act, 1990</i> 	<ul style="list-style-type: none"> The City currently has a Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) agreement with the MECP since 2022 to use, operate, establish, alter, extend, or replace new or existing drainage infrastructure. An amendment may be required. 	Detailed Design
Provincial	<ul style="list-style-type: none"> Ministry of the Environment, Conservation and Parks <i>Endangered Species Act, 2007</i> 	<ul style="list-style-type: none"> Impacts to SAR and SAR habitat should be re-assessed during the early phases of detailed design to determine the need for additional surveys and permits. Correspondence with the Ministry of the Environment, Conservation and Parks will be required to confirm if approvals are needed under the ESA in relation to the records of American eel in Study Area 2. 	Detailed Design
Provincial	<ul style="list-style-type: none"> Ministry of Natural Resources <i>Fish and Wildlife Conservation Act, 1997</i> 	<ul style="list-style-type: none"> A Fish Collection Licence will be required if there is in-water works that require fish or wildlife salvage to prevent impacts to fish. A Wildlife Scientific Collector's Authorization (WSCA) for relocation of herpetofauna (amphibians and reptiles) during fish and wildlife salvages for any in-water works will be required. 	Post Tender
Provincial	<ul style="list-style-type: none"> Credit Valley Conservation <i>Conservation Authorities Act, 1990; Ontario Regulation 41/24</i> 	<ul style="list-style-type: none"> Study Area 1 and Study Area 2 fall within the Credit Valley Conservation regulation limit and the proposed works will require approval as per O. Reg. 41/24: Prohibited Activities, Exemptions, and Permits under Section 28 of the Conservation Authorities Act (1990). The Act establishes guidelines for the mapping of regulated areas within conservation authorities' jurisdictions where development could be subject to flooding, erosion, or dynamic beaches, or where interference with wetlands and alterations to shorelines and watercourses might have an adverse effect on those environmental features. This regulation identifies the processes to be followed to obtain exemptions and permits to allow for prohibited activities to occur within these regulated areas. Any works proposed within Credit Valley Conservation land generally require an access permit in addition to Credit Valley Conservation's development permit. Credit Valley Conservation will confirm any permitting requirements once provided with detailed information on the exact location and extent of the proposed works. 	Detailed Design
Municipal	<ul style="list-style-type: none"> City of Mississauga 	<ul style="list-style-type: none"> A Parks Access permit will be required for accessing and working within select areas along Wolfedale Creek. 	Detailed Design and Post Tender
Municipal	<ul style="list-style-type: none"> City of Mississauga <i>The City of Mississauga Public Tree Protection By-law 0020-2022</i> <i>The City of Mississauga Private Tree Protection By-law 0021-2022</i> 	<ul style="list-style-type: none"> An Arborist Report should be completed and detail permits that may be required for tree removals and injuries. 	Detailed Design

8. Anticipated Environmental Impacts, Mitigation Measures, Compensation, and Monitoring

8.1 Potential Environmental Impacts and Mitigation

Potential impacts related to construction of the preferred erosion control and restoration strategy, as described in **Section 7**, will be largely limited to the duration and location of construction; however there will also be long terms impacts as potential activities associated with the Project will result in vegetation and potential wildlife habitat removal as well as alteration to natural heritage features along Wolfedale Creek. Construction is expected to have varied environmental and community impacts. By incorporating proper best management practices and construction techniques, adverse construction related impacts can be minimized. In order to address potential effects, the following approach was taken:

- **Avoidance:** The first priority is to prevent the occurrence of negative or adverse environmental impacts associated with construction.
- **Mitigation:** Where adverse environmental impacts cannot be avoided, it will be necessary to develop appropriate measures to eliminate, or reduce to some degree, the negative effects associated with construction.
- **Compensation:** In situations where appropriate mitigation measures are not available, or significant net adverse impacts will remain following the application of mitigation measures, compensation measures may be required to counterbalance the negative effect through replacement in kind, or provision of a substitute or reimbursement.

The existing conditions (**Section 3**) were used as baseline conditions against which changes due to the project (impacts) were assessed. Based on the project description for the preferred undertaking (**Section 7**), avoidance measures can be applied in many cases, thereby reducing the extent of potential adverse environmental impacts requiring the application of mitigation measures. The potential mitigation measures summarized below (**Table 8-1**) are recommended to ensure that any short and long-term disturbances are managed efficiently through a variety of measures. Compensation, restoration and enhancement opportunities are further discussed in **Section 8.2**. A detailed natural environment impact assessment and the provision of detailed recommendations for mitigation and compensation should be provided at the detailed design stage of the proposed works.

Table 8-1: Potential Construction Related Impacts and Mitigation Measures

Indicator	Potential Impacts	Potential Mitigation, Compensation
Utilities	<ul style="list-style-type: none"> ■ Potential need to relocate or protect existing utilities and infrastructure 	<ul style="list-style-type: none"> ■ During Preliminary/Detailed Design: <ul style="list-style-type: none"> - All subsurface utilities have been surveyed. For noted areas with Bell and Enbridge utilities, QL-A investigation may be completed during detailed design to confirm depth of utility
Natural Environment	<ul style="list-style-type: none"> ■ Vegetation Removal 	<ul style="list-style-type: none"> ■ During Detailed Design and Construction: <ul style="list-style-type: none"> - Avoid vegetation and tree removal to the extent possible, especially within natural heritage features and candidate SWH and SAR habitat. Natural heritage features within the Study Area include the Credit River Coastal Marsh PSW complex, the Credit River Marshes Regional ANSI and Stavebank Oak Woods Environmentally Significant Area. The design should avoid encroachment within these natural heritage features to the greatest extent possible. If work is required within 30 m of the PSW, an Environmental Impact Study, may be required to demonstrate that there will be no adverse effects on the wetland function as result of the proposed restoration works. - Construction vehicle access should be limited to existing roadways and construction paths, where feasible. - Construction fencing and silt fencing, where appropriate, should be installed and maintained to clearly define the construction footprint, prevent accidental damage or intrusion to adjacent vegetation communities and natural heritage features. - Temporarily disturbed areas should be re-vegetated using non-invasive, native plantings and / or seed mix appropriate to the site conditions and adjacent vegetation communities using CVC’s Plant Selection Guideline (2018) and CVC’s Guidelines for Designing Enhancement Plans within Setbacks and Buffers (2023). - If applicable, removal of ash trees, or portions of ash trees, will be carried out in compliance with the Canada Food and Inspection Agency Directive ‘D-03-08: Phytosanitary Requirements to Prevent the Introduction into and Spread within Canada of the emerald ash borer, <i>Agrilus planipennis</i> (Fairmaire). To comply with this Directive, all Ash trees requiring removal, including any wood, bark or chips, will be restricted from being transported outside of the emerald ash borer regulated areas of Canada. - A tree inventory and an Arborist Report may be required. The tree protection measures described in the Arborist Plan should be adhered to
Natural Environment	<ul style="list-style-type: none"> ■ Wildlife and Wildlife Habitat, including Species at Risk 	<ul style="list-style-type: none"> ■ During Detailed Design and Construction: <ul style="list-style-type: none"> - Vegetation removal timing window: Vegetation removal activities should be limited to outside of the breeding bird nesting period (April 1 to August 31) in all types of vegetation communities and bat active season (April 1 to September 30) in treed or forested communities of any given year. Other wildlife sensitive periods may need to be considered as well based on the results of field investigations to be completed during future study stages as applicable. - If constructions activities are required during the active bird nesting period, exclusionary netting should be installed on culverts in advance of the active season in accordance with the Best Management Practices for Excluding Barn Swallows and Chimney Swifts from Buildings and Structures (MNRF, 2017). Additional wildlife exclusionary measures including fencing should also be implemented to prevent wildlife encounters with turtles during construction. Exclusion fencing should be installed around the work areas prior to the turtle active season (April 1 – October 30) to avoid turtles entering the work area. A Preclearance survey should be completed prior to the installation of exclusionary measures to ensure that turtles are not present within the area of construction, if this cannot be accommodated. Exclusion fencing type and installation should follow the Best Management Practices for Mitigation the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario (MNRF 2016). - Candidate SWH was identified for Bat Maternity Colonies, Amphibian Movement Corridor, Turtle Wintering Areas, Amphibian Breeding Habitat and habitat for Barn Swallow, Wood Thrush, Western Chorus Frog and Snapping Turtle. Confirmed SWH included habitat for Eastern Wood-pewee. Wildlife-specific mitigation measures to minimize effects on affected SWH may include avoiding vegetation removal within SWH, avoiding construction during the breeding bird season (April 1 – August 31), avoiding in-water work during the turtle brumation period (October 31 - April 1) and use of exclusionary measures outlined above. - Work on watercourse banks or in Wolfedale Creek shall be carried out during the appropriate in-water work timing window of July 15 – March 14 (i.e., no in-water work is permitted between March 15 – July 14). - All stockpiled materials of soil, overburden or similar materials are to be maintained at 70 degrees or less by sloping off stockpiles to create a slot angle that will not support nesting breeding birds during the breeding bird season (April 1 to August 31). - Construction personnel will be trained in ways to prevent a wildlife encounter from occurring, including the following: <ul style="list-style-type: none"> ● No personnel shall approach, feed or harass wildlife; ● Food waste will be properly stored and disposed of; and ● Vehicles will yield to wildlife. ● If wildlife is encountered, measures will be implemented to avoid destruction, injury, or interference with the species, and / or its habitat. For example, construction activities will cease or be reduced, and wildlife will be encouraged to move off-site and away from the construction area on its own. A qualified Biologist will be contacted to define the appropriate buffer required from wildlife or to move the wildlife to a nearby suitable habitat outside of the construction site if necessary.

Indicator	Potential Impacts	Potential Mitigation, Compensation
Natural Environment	<ul style="list-style-type: none"> Construction Vehicle Re-fuelling Stations 	<ul style="list-style-type: none"> During Construction: <ul style="list-style-type: none"> Re-fuelling stations should be located at least 30 m away from wetlands, watercourses, waterbodies, or other site drainage features. Re-fuelling stations should be located within a centralized location on-site. Re-fuelling stations should be constructed in a manner to prevent soil and/or surface and groundwater contamination from any leaks or spills. An emergency response kit should be made available at each re-fuelling station in case of a spill. All on-site crew members operating construction vehicles should be appropriately trained in handling a potential spill and have Workplace Hazardous Materials Information System (WHMIS) training. All chemical transfer/maintenance should be conducted within the refuelling station areas.
Natural Environment	<ul style="list-style-type: none"> Soil and Water Contamination 	<ul style="list-style-type: none"> During Detailed Design and Construction: <ul style="list-style-type: none"> A Spill Prevention and Contingency Plan will be developed and adhered to. Spills will be immediately contained and cleaned up in accordance with provincial regulatory requirements and the contingency plan. All machinery, construction equipment and vehicles arriving on-site should be in clean condition (e.g., free of fluid leaks, soils containing seeds of plant material from invasive species) and be inspected and washed in accordance with the Clean Equipment Protocol for Industry (Halloran et al., 2013) prior to arriving and leaving the construction site in order to prevent the spread of invasive species between locations.
Fluvial Geomorphology	<ul style="list-style-type: none"> Alteration of flow hydraulics impacting sediment entrainment and transport Increase in erosion potential due to loss of mature vegetation along the channel banks 	<ul style="list-style-type: none"> During Preliminary/ Detailed Design: <ul style="list-style-type: none"> The design process of modifying a watercourse draws upon the principles of fluvial geomorphology and flow hydraulics to ensure that erosion potential is considered in the final design. To minimize impacts, an Erosion and Sediment Control (ESC) Plan will be developed to minimize the risk of sedimentation to the waterbody during all phases of construction. A site restoration plan will need to be established. To minimize the rate of erosion, it is desirable to establish vegetation quickly on the channel banks. Channel design including defining design flow, the planform, longitudinal profile, and cross-sections will be confirmed in subsequent design stages. Channel protection, substrate sizing, and any aquatic habitat design features will also be updated during the next phase of detailed design.
Cultural Heritage Environment	<ul style="list-style-type: none"> Loss or disruption to archaeological resources 	<ul style="list-style-type: none"> During Detailed Design: <ul style="list-style-type: none"> Complete the Stage 2 archaeological assessment for Study Area 2 as per the recommendations in the Stage 1 Archaeological Assessment Report (Appendix E), in addition to potential further archaeological assessments, as required. During Construction: <ul style="list-style-type: none"> Where archaeological resources are impacted by Environmental Assessment project work, the Ministry of Citizenship and Multiculturalism will be notified by contacting archaeology@ontario.ca. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists If human remains are encountered, all activities must cease immediately, and the local police and coroner must be contacted. In situations where human remains are associated with archaeological resources, Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act
Cultural Heritage Environment	<ul style="list-style-type: none"> Adverse impact to the heritage attributes of the Credit River Corridor Cultural Heritage Landscape (Study Area 2) through the temporary impact to the scenic quality of the natural environment through select vegetation and tree removals. 	<ul style="list-style-type: none"> During Detailed Design: <ul style="list-style-type: none"> Undertake one of the two options as summarized below. Preferred Option: Explore methods to facilitate access for construction personnel and machinery required for the replacement of failed bank protection measures while completely avoiding the removal of vegetation of the Valley, utilizing only the existing access route and open areas for staging that do not contain mature vegetation. This approach will completely preserve the scenic quality of the natural environment of the corridor. Potential measures to achieve this objective include: <ul style="list-style-type: none"> Conducting a comprehensive site assessment (i.e., Tree Preservation Plan or Landscape Plan) during the design phase to identify areas of vegetation that should be preserved due to their contribution to the scenic quality of the Valley's natural environment. Installing temporary fencing and establishing no-go zones on construction maps to delineate areas of vegetation that must not be removed/disturbed. Alternative Option: If the preferred option is not feasible, methods should be explored to facilitate access for construction personnel and machinery necessary for replacing the failed bank protection measures while minimizing the removal of significant vegetation in the Valley. Potential measures to achieve this objective include: <ul style="list-style-type: none"> Conducting a comprehensive site assessment (i.e., Tree Preservation Plan or Landscape Plan) during the design phase to identify areas of vegetation that should be preserved due to their contribution to the scenic quality of the Valley's natural environment. Installing temporary fencing and establishing no-go zones on construction maps to delineate areas of vegetation that must not be removed/disturbed. In this alternative option where instances of vegetation removal is unavoidable, prioritizing the replanting of native species to enhance the scenic quality of the Valley's natural environment.

Indicator	Potential Impacts	Potential Mitigation, Compensation
Air Quality	<ul style="list-style-type: none"> ■ Dust emissions during construction 	<ul style="list-style-type: none"> ■ During Construction: <ul style="list-style-type: none"> - Require contractor to implement provisions for dust control. It is recommended that non-chloride dust suppressants be applied during construction. - Require contractor to halt work in event that dust emissions are found to be unacceptable.
Noise	<ul style="list-style-type: none"> ■ Disruption to adjacent residents, and businesses 	<ul style="list-style-type: none"> ■ During Construction: <ul style="list-style-type: none"> - Use of low noise equipment during construction, where possible. - Limit construction activity to within the City's Noise By-law restrictions, where possible.
Excess Materials Management	<ul style="list-style-type: none"> ■ Discharge of a contaminant into the natural environment 	<ul style="list-style-type: none"> ■ During Construction: <ul style="list-style-type: none"> - In December 2019, Ministry of the Environment, Conservation and Parks released a new regulation under the Environmental Protection Act, titled "On-Site and Excess Soil Management" (O. Reg. 406/19). This regulation is a key step to support proper management of excess soils, ensuring valuable resources do not go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. - Activities involving the management of excess soil should be completed in accordance with the Ministry of the Environment, Conservation and Parks current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014) available online (http://www.ontario.ca/document/management-excess-soil-guide-best-management-practices) - All waste generated during construction must be disposed of in accordance with ministry requirements.
Erosion and Sedimentation	<ul style="list-style-type: none"> ■ Potential for erosion and sedimentation entering neighbouring properties and natural areas during construction. 	<ul style="list-style-type: none"> ■ During Detailed Design: <ul style="list-style-type: none"> - Develop an Erosion and Sediment Control Plan prior to construction. ■ During Construction: <ul style="list-style-type: none"> - Implement and monitor erosion and sedimentation control strategy. - Any areas disturbed by construction should be restored and stabilized as soon as practically possible.
Control of Inadvertent Spills	<ul style="list-style-type: none"> ■ Potential inadvertent spill of hazardous materials during construction. 	<ul style="list-style-type: none"> ■ During Construction, require contractor to: <ul style="list-style-type: none"> - Store all oils, lubricants, fuels and chemicals in secure areas. - Construction vehicle re-fuelling stations should be centralized away (30 metres) from natural areas and watercourses. - Contractor to have a spill management plan in place prior to construction.
Socio-Economic Environment	<ul style="list-style-type: none"> ■ Disruption to surrounding properties during construction, including access. ■ Temporary access from select adjacent properties is required to construct the proposed erosion control works. 	<ul style="list-style-type: none"> ■ Prior to Construction: <ul style="list-style-type: none"> - Follow-up with property owners to request and confirm agreement for access during construction and for post construction monitoring. ■ During Construction: <ul style="list-style-type: none"> - Minimize construction duration (working days). - Affected property owners will be notified in advance (e.g., signage, notices), as to construction schedule/duration - General project information and updates will be provided through the City's website. - Implement air and noise mitigation measures (see above).

8.2 Compensation, Restoration and Enhancement Opportunities

Compensation for the loss of vegetation and wildlife habitat or the restoration of degraded areas can provide a net benefit to the natural features and functions that contribute to an overall natural heritage system. The proposed restoration of the creek will result in vegetation removal. Natural heritage features have experienced numerous impacts due to historic land uses within and adjacent to the Study Areas, including the introduction of many invasive plant species. The Project allows for the restoration of natural habitats within disturbed area, providing higher quality habitat for resident wildlife, including potential SAR and SOCC. A site restoration plan will need to be established.

Fish Habitat Restoration – The proposed work is expected to improve habitat for fish. The incorporation of a natural channel design (where feasible) will improve fish habitat by allowing for a more naturally sinuous and morphologically diverse channel in the Study Areas. Particularly in Study Area 2, the improved morphology will help manage sediment in the creek as well as downstream into the Credit River. Additionally, the natural channel will provide habitat for many fish species and benthic invertebrates while also removing several impediments to upstream fish passage. The channel design should consider incorporating a riffle, pool, run morphology, a low flow channel to ensure fish passage during lower flow conditions, and habitat features such as root wads, lunkers, and keystones which can provide hydraulic diversity (micro resting areas for fish), cover, and refuge habitat for aquatic wildlife.

Ecological Restoration – Where vegetation removal is required, compensation plantings should be implemented to enhance and create higher quality habitat to the extent possible following CVC's *Plant Selection Guidelines* (2018). Furthermore, removal of invasive species and replacement with native plants as compensation can improve habitat quality within the Significant Woodlands and Environmentally Significant Area in Study Area 2. It is recommended that an Invasive Plant Control and Monitoring Plan should be developed during detailed design. The spatial extent of invasive plants such as purple loosestrife, common buckthorn and common reed within the Study Areas should be inventoried in the field. The plan should include control measures for invasive plant species, if feasible, and restoration with native wetland plants suitable to soil conditions in order to increase plant biodiversity and wildlife habitat.

Enhancement features should be considered to improve habitat quality and provide specialized habitat to support critical behaviours and life stages of a number of taxa. If bat SAR are determined to be present through future surveys, the design should also

consider incorporating rocket boxes to provide suitable roosting habitat during the early successional stage of restoration as well as planting native host plants, including night-blooming flowers that will attract pollinators in the night to increase bat prey populations. Proposed tree plantings may also include species that are known to provide suitable roosting habitat for bat SAR (i.e., oak and maple species). Eco-passage opportunities should be considered, where feasible. It is recommended that wildlife eco-passage design is incorporated to facilitate wildlife movement, such as an installation of a dry bench placed over the water mark integrated in the tunnel that has access to dry ground at both entrances of the culvert (MNRF, 2016).

Tree Compensation – Compensation requirements for tree removal should be discussed with the City and/or City tree by-laws as appropriate. CVC’s *Ecosystem Offsetting Guidelines* (2020) should be used to determine appropriate tree replacement ratios to offset functional loss of the features in CVC’s regulated areas.

8.3 Proposed Construction Monitoring

Contract tender documents will address mitigation in an explicit manner to ensure that compliance is maintained. The provision of an experienced field representative to review construction will ensure that the works associated with the erosion control and restoration strategy follows contract specifications and does not unnecessarily impact the environment and the surrounding community, including property owners along Wolfedale Creek. On-site inspection will confirm the implementation of the mitigation measures and identify corrective actions, as required.

Corrective actions may include additional site maintenance and alteration of activities to minimize impacts. All erosion and sediment control measures should be inspected weekly, after every rainfall and significant snow melt event, and daily during periods of extended rain or snow melt. All damaged erosion and sediment control measures will be repaired and/or replaced within 48 hours of the inspection.

8.4 Post-Construction Monitoring

Following construction, the operation of the structural and non-structural options described in **Section 7** is not expected to result in any additional negative impacts. Post construction monitoring will be required following construction to ensure that any disturbances have been properly restored (e.g., grading, seeding, and planting). Efforts will be made to keep existing trees, where possible and new trees/vegetation will be planted for those removed. Post construction monitoring details will be developed during detailed design.

9. Consultation Summary

9.1 Notifications

9.1.1 Notice of Commencement

The Notice of Commencement was first issued on April 12, 2023 introducing the study and included contact information for the City and Consultant project managers. The following summarizes the methods of notice distribution:

- Posted on the City's project webpage.
- Issued via email to the study's contact list.
- Mailed to property owners adjacent to the Wolfedale Creek within Study Areas 1 and 2.

The City also mailed out letters to property owners who had areas of concern identified during initial field investigations to ensure they were aware of the property specific concerns and the ongoing study.

Refer to **Appendix G** for a copy of the Notice of Commencement and notification letters for areas of concern.

9.1.2 Notice of Public Information Centre

The Notice of Public Information Centre was first issued on June 18, 2024 inviting anyone with an interest in the study to view online Public Information Centre materials and provide feedback. The following summarizes the methods of notice distribution:

- Posted on the City's project webpage.
- Issued via email to the study's contact list.
- Mailed to property owners adjacent to the Wolfedale Creek within Study Areas 1 and 2.

Refer to **Appendix G** for a copy of the Notice of Public Information Centre.

9.1.3 Notice of Completion

The Notice of Completion was first issued on December 19, 2025. The notice identified the preferred solution and specified where to access the documentation during the 40-day comment period starting on December 19, 2024 and ending on January 17, 2025 .

The procedure for submitting comments and Section 16 Order requests was also explained in the notice.

The following summarizes the methods of notice distribution:

- Posted on the City’s project webpage.
- Issued via email to the study’s contact list.
- Hand delivered to property owners adjacent to the Wolfedale Creek within Study Area 1 and 2.

Refer to **Appendix G** for a copy of the Notice of Completion.

9.2 Property Access Locations Letters

A letter was mailed to select property owners along Wolfedale Creek with the Notice of Public Information Centre inquiring about working with the City to provide construction access to the creek through their property at a future date. Property owners were directed to contact the City to arrange a follow-up meeting or telephone call to share further details about the nature of the anticipated work and timing. The properties currently being considered are shown in the preferred solution mapping shown in **Figure 6-4** through to **Figure 6-10** in **Section 6.4** of this report.

The City will be reviewing responses received and will continue to engage property owners as the project proceeds to preliminary and detailed design. The access locations will be reviewed during the preliminary and detailed design phases and proposed access locations may be modified.

Refer to **Appendix G** for a copy of the property access locations letters and associated correspondence at the time of this publication.

9.3 Public Information Centre

An online Public Information Centre and comment form was posted to the City’s website on June 18, 2024. The purpose of the Public Information Centre was to:

- Introduce the Wolfedale Creek Erosion Control Project study, including key findings of supporting studies completed to date.
- Present the alternatives considered, including the preferred erosion control and restoration strategy.
- Share how potential impacts will be addressed.
- Identify next steps and how to provide feedback.

One online comment form was received from a property owner in Study Area 1 indicating preference for a concrete or permanent retaining wall as part of the preferred long term solution as a long term solution for their property. Also noted they liked the idea of an enclosed watercourse in the storm sewer as a more permanent option.

Refer to **Appendix G** for a copy of the Public Information Centre materials and comments received.

9.4 Agency and Stakeholder Engagement

Key agencies and stakeholders were notified and engaged, as needed, over the course of the study. A copy of the study's external agency and stakeholder contact list is included in **Appendix H**.

The following summarizes the two main project meetings held with Credit Valley Conservation:

- Meeting No. 1: On-site meeting held on February 22, 2023. The purpose of the meeting was to introduce the Project and walk the Study Area.
- Meeting No. 2: Virtual meeting held on November 28, 2023 to introduce and discuss the alternatives being considered.

Table 9-1 summarizes the key agency and stakeholder correspondence received by the Study Team and associated responses. Refer to **Appendix H** for the complete record of correspondence and meeting minutes.

Table 9-1: Key Agency and Stakeholder Correspondence

Agency / Stakeholder	Date	Summary of Correspondence	Summary of Study Team Response
Credit Valley Conservation	May 1, 2023	<ul style="list-style-type: none"> ■ Provided high level preliminary comments and requested to be kept informed of future meetings and proceedings throughout the study, including forwarding any information or reports when available to ensure that their policy and program interests are reflected in the planning and design components of the project. 	<ul style="list-style-type: none"> ■ Comments have been considered.
Credit Valley Conservation	December 1, 2023	<ul style="list-style-type: none"> ■ Provided comments on the draft technical reports including Natural Environment Report (November 2023), Fluvial Geomorphological Assessment (November 2023), Hydraulic Assessment (November 2023), and updated HEC-RAS model (received via email dated November 29, 2023). ■ Requested to include responses to the comments in the future submission. 	<ul style="list-style-type: none"> ■ Comments addressed with draft Project File circulation.
Credit Valley Conservation	April 11, 2024	<ul style="list-style-type: none"> ■ Provided comments on the draft technical memo prepared for the evaluation of the alternative solutions, primary access locations maps, and restoration solutions maps. 	<ul style="list-style-type: none"> ■ Comments have been addressed with the draft Project File circulation.
Credit Valley Conservation	June 19, 2024	<ul style="list-style-type: none"> ■ Confirmed no further comments with receipt of the Notice of Public Information Centre. CVC will review the draft Project File when it is submitted, including responses to previous comments indicating how those comments have been addressed in the draft Project File and provide any additional comments at that time. 	<ul style="list-style-type: none"> ■ Previous comments addressed with the draft Project File circulation.
Credit Valley Conservation	November 20, 2024	<ul style="list-style-type: none"> ■ Provided comments on the draft Project File Circulation. 	<ul style="list-style-type: none"> ■ Comments have been addressed and the final Project File will be available with the issuance of the Notice of Completion. ■ Comments carried forward to the design phase are documented in Appendix H.
Ministry of Citizenship and Multiculturalism	January 9, 2024	<ul style="list-style-type: none"> ■ Letter summarizing the Ministry of Citizenship and Multiculturalism mandate of conserving Ontario’s cultural heritage, which includes: <ul style="list-style-type: none"> – archaeological resources, including land and marine – built heritage resources, including bridges and monuments – cultural heritage landscapes ■ The study requires the determination whether an archaeological assessment is needed and that a Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment be undertaken. Requested to provide technical cultural heritage studies to the ministry before issuing a Notice of Completion or commencing any work on the site. 	<ul style="list-style-type: none"> ■ A Stage 1 Archaeological Assessment Report (Appendix E) and Heritage Impact Assessment Report (Appendix F) have been completed in support of this Municipal Class Environmental Assessment study.
Ministry of Citizenship and Multiculturalism	November 20, 2024	<ul style="list-style-type: none"> ■ Provided comments on the draft Project File Circulation. 	<ul style="list-style-type: none"> ■ Comments have been addressed and the final Project File will be available with the issuance of the Notice of Completion.
Infrastructure Ontario	June 25, 2024	<ul style="list-style-type: none"> ■ Initial scan indicates that there are no properties owned by the Minister of Government and Consumer Services within the Study Area, however, it is the proponent’s responsibility to verify if any provincial government property is within the study area. ■ Requested to send notifications to the dedicated notice email address. 	<ul style="list-style-type: none"> ■ Comments noted.
Ministry of the Environment, Conservation and Parks	June 28, 2024	<ul style="list-style-type: none"> ■ Confirmed receipt of the Notice of Public Information Centre. 	<ul style="list-style-type: none"> ■ No response. The draft Project File was circulated to the Ministry of the Environment, Conservation and Parks prior to the issuance of the Notice of Completion with no formal response received. The final Project File will be available with the issuance of the Notice of Completion.

9.5 Indigenous Communities Engagement

The following Indigenous Communities were notified during this study:

- Mississaugas of the Credit First Nation.
- Six Nations of the Grand River (Elected Council).
- Haudenosaunee Development Institute.
- Huron-Wendat Nation.

The above noted Indigenous Communities were circulated on all notices and those interested were requested to comment on the **Stage 1 Archaeological Assessment Report (Appendix I)** and will be engaged to participate in the recommended future stage 2 archaeological assessment. The City will also continue to engage with the identified Indigenous Communities if there any substantial changes to the project/process. Refer to **Appendix I** for the complete Indigenous Communities consultation record.

10. Additional Studies, Commitments, and Future Opportunities

The following additional studies, commitments and future work should be carried forward and completed during the future preliminary and detailed design phases of the Project for each Study Area as identified through the Municipal Class Environmental Study.

Study Area 1

- Update figures to show the most recently approved Credit Valley Conservation's floodplain mapping for Wolfedale Creek.
- Update the impact assessment in the **Natural Environment Report (Appendix D)** during detailed design, as needed.
- Update the hydraulic model memorandum to show impacts to the floodplain and ensure shear stress and velocities are suitable for the proposed measures.
- Add fencing along the rear property lines of the industrial properties in Study Area 1 where fencing currently does not exist to minimize dumping material into Wolfedale Creek and reduce encroachments.
- Due to the records of provincially and federally listed SAR within the Study Area it is recommended that desktop review screening for SAR continues to be conducted during future design stages of this project since species can be added to or removed from the scheduled list of protected species under the ESA or SARA on a periodic basis.
- Regulatory agencies should also be consulted at the time of the SAR screening to confirm the potential of new SAR and the requirement for permits under the provincial ESA and/or the federal SARA.
- Fisheries in-water timing window: Given the warmwater classification of Wolfedale Creek, a warmwater fisheries timing window is anticipated for any in-water work. The warmwater timing window permits in-water work from **July 15 – March 14** of any given year; however, this should be confirmed with the MNR in advance of the detailed design.
- Aquatic Habitat Assessments during future study stages should be conducted, as applicable to Project sites, to characterize and confirm existing aquatic conditions.

- Rehabilitation work will likely require review by DFO under the *Fisheries Act*, and a Request for Review should be submitted once the project moves into detailed design, prior to construction.
- Depending on the site of proposed works, species-specific surveys targeting SAR presence/absence may be required following MECP approved protocols and guidelines. Impacts and prescribed avoidance and mitigation measures will need to be re-assessed details on the proposed access route and construction disturbance areas are identified during the detailed design phase.
- Recommended additional natural environment studies to be completed during detailed design that should be considered include:
 - Bat and Woodpecker leaf-off cavity tree and acoustic surveys.
 - Bird nest searches under affected structures (e.g., bridges, culverts).
 - Tree Inventory. An Arborist Report should be completed to identify the recommended action (i.e., remove, retain, protect) for individual trees, provide compensation requirements for tree removals and identify required permits for tree removals and injuries.
 - Updated SAR and SWH habitat screenings.
- Address comments provided by Credit Valley Conservation staff that have been carried forward to preliminary design and detailed design as documented in **Appendix H**, where required.
- A cut/fill analysis may be required depending on the scope of the works.
- Finalize access agreements with property owners.
- Develop an overall site restoration plan.
- Initiate the permits and approvals identified in **Section 7.3** of this report.
- Review and implement the recommended mitigation measures as per **Section 8** of this report, as required.

Study Area 2

- Update figures to show the most recently approved Credit Valley Conservation's floodplain mapping for Wolfedale Creek.
- Update the impact assessment in the **Natural Environment Report (Appendix D)** during detailed design, as needed.

- Update the hydraulic model memorandum to show impacts to the floodplain and ensure shear stress and velocities are suitable for the proposed measures.
- Due to the records of provincially and federally listed SAR within the Study Area it is recommended that desktop review screening for SAR continues to be conducted during future study stages of this project since species can be added to or removed from the scheduled list of protected species under the ESA or SARA on a periodic basis.
- Regulatory agencies should also be consulted at the time of the SAR screening to confirm the potential of new SAR and the requirement for permits under the provincial ESA and/or the federal SARA.
- Fisheries in-water timing window: Given the warmwater classification of Wolfedale Creek, a warmwater fisheries timing window is anticipated for any in-water work. The warmwater timing window permits in-water work from **July 15 – March 14** of any given year; however, this should be confirmed with the MNR in advance of the detailed design.
- Aquatic Habitat Assessments during future study stages should be conducted, as applicable to Project sites, to characterize and confirm existing aquatic conditions.
- Rehabilitation work will likely require review by DFO under the *Fisheries Act*, and a Request for Review should be submitted once the project moves into detailed design, prior to construction.
- Additionally, due to the presence of American eel in the Credit River, correspondence will be required with MECP to confirm approvals required under the ESA, if required.
- Depending on the site of proposed works, species-specific surveys targeting SAR presence/absence may be required following MECP approved protocols and guidelines. Impacts and prescribed avoidance and mitigation measures will need to be re-assessed details on the proposed access route and construction disturbance areas are identified during the detailed design phase.
- A scoped Environmental Impact Study may be required if there is work proposed within 30 m of the Credit River Coastal Marsh PSW complex and should be confirmed with the City of Mississauga.

- The following recommended additional natural environment studies to be completed during detail design:
 - Breeding bird surveys.
 - Nocturnal amphibian call surveys.
 - Bat and Woodpecker leaf-off cavity tree and acoustic surveys.
 - Bird nest searches under affected structures (e.g., bridges, culverts);
 - Tree Inventory. An Arborist Report should be completed to identify the recommended action (i.e., remove, retain, protect) for individual trees, provide compensation requirements for tree removals and identify required permits for tree removals and injuries.
 - Wetland delineation and rare plant inventory if restoration activities are planned to occur within 30 m of the PSW.
 - Updated SAR and SWH habitat screenings.
- Complete a Landscape Plan or Tree Preservation Plan for Study Area 2 to identify the contributing vegetation to the scenic quality of the landscape (i.e., native species). The plan should include a detailed vegetation protection methodology and strategies to mitigate any direct impacts to the vegetation, if necessary as per the recommendation of the **Heritage Impact Assessment (Appendix F)**.
- Ensure that the Credit River Corridor Cultural Heritage Landscape is indicated on future Project mapping.
- Complete the recommended Stage 2 Archaeological Assessment as per the recommendations outline in the **Stage 1 Archaeological Assessment Report (Appendix E)**.
- Engage Indigenous Communities identified in this Environmental Assessment study prior to completing the Stage 2 archaeological assessment for Study Area 2.
- Incorporate and address comments shared from Huron-Wendat Nation dated July 24, 2024 in the future Stage 2 archaeological assessment.
- Address comments provided by Credit Valley Conservation staff that have been carried forward to preliminary design and detailed design, as documented in **Appendix H**, where required.
- A cut/fill analysis may be required depending on the scope of the works.
- Any works proposed within Credit Valley Conservation land generally require an access permit in addition to Credit Valley Conservation's development

permit. Credit Valley Conservation will confirm any permitting requirements once provided with detailed information on the exact location and extent of the proposed works.

- Finalize access agreements with property owners.
- Develop an overall site restoration plan.
- Initiate the permits and approvals identified in **Section 7.3** of this report.
- Review and implement the recommended mitigation measures as per **Section 8** of this report, as required.

11. Public Review of Project File and Next Steps

This Project File comprises the documentation for Schedule B requirements. Placement of the Project File report for public review on the City's website (www.mississauga.ca/projects-and-strategies/environmental-assessments/wolfedale-creek-erosion-control) completes Phase 2 of this Municipal Class Environmental Assessment study. The 40-day comment period commences on **December 19, 2024** and ends on **January 27, 2025**. Interested persons are requested to provide written comments to the study team by **January 27, 2025**. All comments and concerns are requested to be sent directly to the Project Managers listed below.

- **Greg Frew, P.Eng.**
Project Manager
City of Mississauga
300 City Centre Drive
Mississauga, ON L5B 3C1
905-615-3200 ext. 3362
greg.frew@mississauga.ca

- **Kosta Paliouras, P.Eng.**
Consultant Project Manager
AECOM Canada Ltd.
5080 Commerce Blvd.
Mississauga, ON L4W 4P2
(905) 578-4129
kosta.paliouras@aecom.com

In addition, a Section 16 Order request may be made to the Ministry of the Environment, Conservation and Parks (MECP or Ministry) for an order requiring a higher level of study (i.e., requiring an individual/comprehensive Environmental Assessment approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests are to include the requester contact information and full name.

Requests are to specify what kind of order is being requested (request for conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate or remedy potential adverse impacts on Aboriginal and treaty

rights, and any information in support of the statements in the request. This is to ensure that the Ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email by **January 27, 2025** to both contacts below with a copy to the City.

- Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto, Ontario M7A 2J3
minister.mecp@ontario.ca
- Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario M4V 1P5
EABDirector@ontario.ca

Please visit the Ministry's website for more information on requests for orders under section 16 of the *Environmental Assessment Act* at: ontario.ca/page/class-environmental-assessments-section-16-order.

All personal information included in the request – such as name, address, telephone number and property location – is collected, under the authority of section 30 of the Environmental Assessment Act and is collected and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the Freedom of Information and Protection of Privacy Act does not apply (s.37). Personal information submitted is part of a public record that is available to the general public, unless it is requested that personal information remain confidential.

12. Conclusions

This Project File covers the process required to ensure that the preferred Wolfedale erosion control and restoration strategy complies with the *Environmental Assessment Act*. The proposed works described in **Section 7** involves a combination of both structural and non-structural bank protection and grade control structures to maintain long term erosion protection. Incorporation of a natural channel bed is also included to improve fish habitat and passage in select locations.

A preliminary evaluation of potential impacts indicates varied environmental impacts that can be addressed by a combination of avoidance, mitigation and compensation measures as identified in **Section 8**. Key potential environmental impacts from the Project may include damage and disturbance to natural heritage features, disturbance to terrestrial wildlife, including potential SAR and SOCC, increased sedimentation and erosion potential, and disturbance to aquatic species and their habitat. There may also be adverse impact to the heritage attributes of the Credit River Corridor Cultural Heritage Landscape within Study Area 2 through the temporary impacts to the scenic quality of the natural environment.

Avoidance measures, such as work limit restrictions designed for the Project, compliance with restriction of construction activities to outside of sensitive periods for local or significant wildlife species should be adhered to. In addition to avoidance measures, incorporation of mitigation measures, such as installation of tree protection fencing and establishing no-go zones on construction maps, wildlife exclusion measures, erosion and sediment control measures, machinery and equipment practices, and invasive species control strategies can aid in addressing potential impacts to natural heritage features and wildlife.

Overall, the Project is anticipated to result in a benefit to the natural environment given the opportunities to remove invasive species, replant the area with native vegetation to enhance the scenic quality of the Valley's natural environment, stabilize shoreline and banks, and incorporate a natural channel design to improve fish habitat and passage. A site restoration plan will be established.

The City will continue to engage with select property owners regarding access in support of constructing the preferred erosion control and restoration strategy for Wolfedale Creek during the preliminary and detailed design phases of the Project.

Upon clearance of this Municipal Class Environmental Assessment study, the City will complete the preliminary and detailed design and proceed to construction as soon as late 2025 or 2026, subject to the City's capital budget process and receiving all necessary approvals.