



PROJECT FILE REPORT

The Regional Municipality of Halton

Replacement, Rehabilitation or Relocation of the
Aldershot Creek Wastewater Main
Municipal Class Environmental Assessment

JULY 2023



GLOBAL PERSPECTIVE.
LOCAL FOCUS.



Platinum
member

CONFIDENTIALITY AND © COPYRIGHT FOR THIS REPORT

This document is for the sole use of the addressee and Associated Engineering (Ont.) Ltd. The document contains proprietary and confidential information that shall not be reproduced in any manner or disclosed to or discussed with any other parties without the express written permission of Associated Engineering (Ont.) Ltd. Information in this document is to be considered the intellectual property of Associated Engineering (Ont.) Ltd. in accordance with Canadian copyright law.

This report was prepared by Associated Engineering (Ont.) Ltd. for the account of The Regional Municipality of Halton. The material in it reflects Associated Engineering (Ont.) Ltd.'s best judgement, in the light of the information available to it, at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Associated Engineering (Ont.) Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

REVISIONS PAGE

**Replacement, Rehabilitation or Relocation of the
Aldershot Creek Wastewater Main
Municipal Class Environmental Assessment**

Client:	Engineer:
The Regional Municipality of Halton	Associated Engineering (Ont.) Ltd.

Revision/Issue	Date	Description	Prepared By/ Reviewed By	Client Review
1	2023-05-02	Project File Report – Draft	CM/AL	
2	2023-07-25	Project File Report – Final	AL	

EXECUTIVE SUMMARY

INTRODUCTION

Associated Engineering (Ont.) Ltd. (Associated) was retained by the Regional Municipality of Halton (Halton Region) to assist with the completion of a Municipal Class Environmental Assessment (MCEA) for the Aldershot Creek wastewater main in the City of Burlington (the Study). The Study developed and evaluated servicing alternatives to address deficiencies, capacity needs, accessibility and environmental impacts. In accordance with the Municipal Engineers Association’s (MEA) Municipal Class Environmental Assessment (MCEA) process, this Study follows the planning process for a Schedule B project.

The study area, as shown in **Figure E-1-1** includes the West Aldershot Creek corridor between Fairwood Place West and North Shore Boulevard and surrounding area in the City of Burlington. The surrounding area consists of a mix of single residential dwellings, townhomes and apartment/condominium properties and Aldershot High School. The study area is located within the North Shore Watershed, West Aldershot Creek subwatershed, under the jurisdiction of the Conservation Halton (CH). The existing wastewater main traverses along property owned by Halton District School Board (HDSB), private property and City of Burlington property via existing easements and ultimately discharges to the LaSalle Park Wastewater Pumping Station (WWPS).

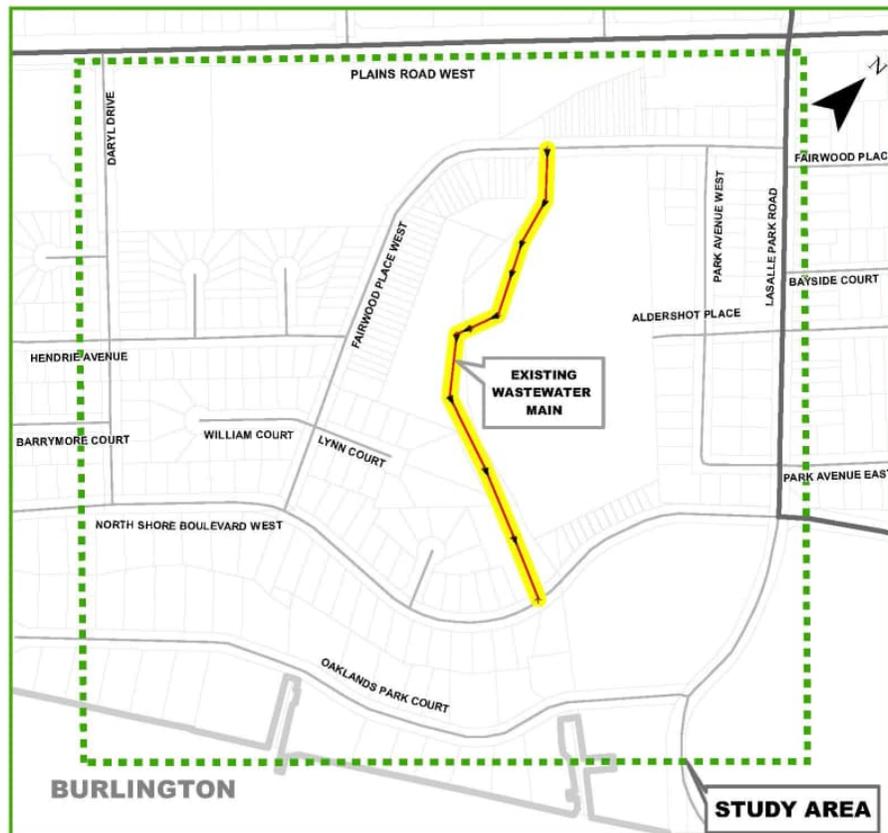


Figure E-1-1: Aldershot Creek Wastewater Main Study Area

STUDY OBJECTIVES

The purpose of this study is to determine the preferred servicing alternative for the relocation, rehabilitation and/or replacement of the Aldershot Creek wastewater main. In developing these alternatives, the Study Team took into consideration the objectives of the Study:

- Address existing deficiencies and the condition of the wastewater infrastructure;
- accommodation of future capacity requirements;
- improvement of accessibility of wastewater infrastructure by Regional Operations staff;
- minimize impact on the natural environment and creek corridor; and
- minimize construction impact, timing and cost.

The alternatives proposed to achieve the study objectives are outlined in **Section 5** as are the evaluation of the alternatives and the identification of the preferred alternative.

PHASE I: IDENTIFICATION OF PROBLEMS AND OPPORTUNITIES

The Problem and Opportunity Statements provide a clear statement of the problem and opportunities that need to be addressed for a specific undertaking. The various analyses (e.g. geotechnical investigation, archaeological assessment, natural environment) and existing conditions provide input for and contribute to the identification and description of the problem or opportunity. The prevailing deficiencies within the study area can be summarized by the following statements.

Problem Statement

This study evaluates the existing (200mm to 300mm diameter) wastewater main servicing an area in south Burlington including Aldershot High School, Fairwood Place condominiums and growth areas to the west of the West Aldershot Creek valley. The wastewater main was constructed in 1961 and has an alignment which runs along the West Aldershot Creek from Fairwood Place West to North Shore Boulevard. The existing wastewater main is nearing the end of its useful life and is threatened by severe erosion within the West Aldershot Creek valley, including the sewer section crossing the creek and several maintenance holes which are located within the creek banks and bed. Planned creek rehabilitation works by the City of Burlington poses a risk to the existing wastewater main being damaged during construction and continued impacts to the creek environment after rehabilitation works are completed. Inaccessibility of the system by Regional Operations staff makes inspection, cleaning and maintenance works on the sewer and maintenance holes extremely difficult.

Opportunity Statement

Due to these identified problems with the existing wastewater main, Halton Region has initiated a Municipal Class Environmental Assessment (MCEA) to develop and evaluate servicing alternatives for the Aldershot Creek wastewater main. Servicing alternatives will address capacity needs, improve accessibility for Regional Operations staff to complete maintenance and repair works, and reduce the environmental impacts on the West Aldershot Creek corridor while considering property impacts and requirements, alignment and coordination with ongoing and future capital projects in the proximity of Fairwood Place West and North Shore Boulevard, and financial implications of constructing and maintaining the system. The final servicing alternative has the opportunity to coordinate creek

rehabilitation works by the City of Burlington with the wastewater main works, including the relocation of wastewater infrastructure to improve the final creek rehabilitation design.

PHASE II: IDENTIFICATION AND EVALUATION OF ALTERNATIVE SOLUTIONS

The Alternative Solutions that have been developed for the *Replacement, Rehabilitation or Relocation of the Aldershot Creek Wastewater Main* Study include:

- Alternative 1 – Do Nothing
- Alternative 2 – Re-routing of Sewers to the Eastern Side of the Creek
- Alternative 3 – Two Sewer Systems and Pumping Station
- Alternative 4 – Two Sewer Systems and Gravity Sewers
- Alternative 5 – Re-routing of Sewers to the Eastern Side of the Creek via Trenchless Crossing
- Alternative 6 – Two Sewer Systems and Gravity Sewers with Townhouse Complex Flows to East
- Alternative 7 – Replace the Existing Wastewater Main along a Similar Alignment including Trenchless Creek Crossing

Each of these alternatives are described and evaluated in **Section 5**.

Evaluation of Alternatives

Each alternative solution to address the problem and opportunity statements and achieve the project objectives was compared and evaluated using five (5) categories and twenty (20) criteria, as summarized in **Table E-1-1**.

Table E-1-1: Evaluation Criteria

	Evaluation Criteria	Weight	Definition
Natural Environment (20%)	Terrestrial Environment Impacts	5%	<ul style="list-style-type: none"> • Impacts on existing trees and vegetation community; need for tree removal; impact on Regional Natural Heritage System • Impacts on identified or potential Species at Risk
	Aquatic Environment Impacts	5%	<ul style="list-style-type: none"> • Impacts on existing aquatic environment within West Aldershot Creek • Impacts to existing surface water quality and drainage patterns; risk of flooding
	Geotechnical Considerations	5%	<ul style="list-style-type: none"> • Disturbance of soil/subsurface conditions; slope stability considerations
	Climate Change Considerations	5%	<ul style="list-style-type: none"> • Potential for adaptation and mitigation measures to be implemented to minimize climate

	Evaluation Criteria	Weight	Definition
			change impacts on infrastructure and surrounding area
Socio-Cultural Environment (25%)	Impact on Existing Land Use	5%	<ul style="list-style-type: none"> Impact/compatibility of proposed works with existing land use
	Short-term/Construction Impact to Local Residents/Community	5%	<ul style="list-style-type: none"> Impact of construction and implementation of proposed works to local residents/ community including road closures, dust, noise, access to property and amenities
	Short-term/Construction Impact to School Community	5%	<ul style="list-style-type: none"> Impact of construction and implementation of proposed works to school community including field closures, access to parking lot/building, dust, and noise
	Long-term Impact on Local Residents/Community	5%	<ul style="list-style-type: none"> Impact of maintenance and operation of proposed works to local residents/community
	Impact on Archaeological Resources, Indigenous Lands, Treaty Rights	5%	<ul style="list-style-type: none"> Impact of proposed works on lands with archaeological potential (as per Stage 1 Archaeological Assessment); need for additional archaeological assessments Impact on Indigenous lands, treaty rights, land claims, archaeological sites
Legal/Jurisdictional Environment (15%)	Land Acquisition/Easement Requirements	5%	<ul style="list-style-type: none"> Required land acquisition and easements required for the proposed works
	Complexity of Approval Processes/ Regulatory Constraints	5%	<ul style="list-style-type: none"> Complexity of approval processes and ability to meet regulatory constraints
	Accessibility and Ownership Considerations	5%	<ul style="list-style-type: none"> Considerations for accessibility of Region's Operation staff to provide regular maintenance; ownership of WW infrastructure
Technical/Operational	Complexity of Construction	5%	<ul style="list-style-type: none"> Consideration for open-cut versus trenchless installation, depth of sewers, conflict with existing infrastructure
	Ability to Meet Region Design Standards/CH Requirements	5%	<ul style="list-style-type: none"> Ability to implement in accordance with latest Region

	Evaluation Criteria	Weight	Definition
			Design Standards and CH Design requirements
	Implementation Phasing	5%	<ul style="list-style-type: none"> Length of construction; considerations for timing of construction
	Impacts to Utilities	5%	<ul style="list-style-type: none"> Consideration for conflict and relocation of utilities
	Complexity of Operation and Maintenance	5%	<ul style="list-style-type: none"> Consideration of ease of operation and maintenance of WW infrastructure, coordinating with stakeholders on on-going basis
Economic Environment (15%)	Capital Construction Costs	5%	<ul style="list-style-type: none"> Cost to Region to complete construction (order of magnitude has been used; refer to Section 5.2 and Appendix E for costing information)
	Land Acquisition Costs	5%	<ul style="list-style-type: none"> Cost consideration to secure property acquisition/easements
	Operation and Maintenance Costs	5%	<ul style="list-style-type: none"> Cost consideration to Region to maintain new works

Details of the evaluation process are provided in **Section 5.3**.

Selection of Preferred Solution

Based on the evaluation completed, *Alternative 7 – Replace the Existing Wastewater Main along a Similar Alignment including Trenchless Creek Crossing* is identified as the preferred solution for the Aldershot wastewater main. *Alternative 7* was determined to be the most preferred with key considerations including:

- It accommodates capacity requirements.
- It has minimal impact to the community.
- It has minor impact on existing vegetation and need for tree removal.
- It will remove at-risk wastewater infrastructure from the sensitive creek corridor.

Full details of the preferred solution are provided in **Section 7**.

Public Consultation

Throughout the project, stakeholders, including the public and property owners, Indigenous communities, conservation authorities, government agencies and utilities, were given a variety of opportunities to review and comment on the project process, key findings, proposed alternatives, and recommended solution. Numerous consultation activities were undertaken as part of the Study, including:

- Development of a stakeholder contact list, which was updated throughout the Study;
- Communication with Indigenous communities by mail and/or email;

- Development of a page on Halton Region’s website with Study updates and contact information (<https://www.halton.ca/For-Residents/Roads-Construction/Municipal-Class-Environmental-Assessment-Studies/Aldershot-Creek-Wastewater-Main-Study>);
- Project notices;
- Online Public Information Centre (PIC);
- Consultation with key stakeholders; and
- Public release of this Project File Report.

Details of public and stakeholder consultation and communication throughout the study are provided in **Section 6**.

CONCLUSION AND RECOMMENDATIONS

The preferred solution includes replacing the existing wastewater main along a similar alignment. Key features of the preferred solution include:

- Rehabilitation/replacement of approximately 60m of sewer;
- Approximately 255m of 300mm diameter sewer along Aldershot High School and across West Aldershot Creek;
- Trenchless crossing (50m approx. length) of West Aldershot Creek with a minimum cover of 2m (depth to be confirmed during detailed design) including 600mm casing pipe;
- Connection of existing laterals from Aldershot High School to new sewer;
- Approximately 515m of 375mm diameter sewer from Fairwood Place West, along West Aldershot Creek to LaSalle Park WWPS;
- Approximately 30m of 150mm diameter sewer from Fairwood Place Townhouse complex to the new regional main; and
- Permanent access road (3m wide) along the west side of West Aldershot Creek from North Shore Boulevard.

Conceptual design of the new wastewater main has been prepared for the preferred solution. Following the completion of the MCEA study, preliminary and detailed design, permitting, land acquisition and construction will be undertaken to implement the preferred solution and remedy the identified problems.

During the MCEA study, recommendation for additional works and implementation measures were identified. These items should be taken into consideration during the detailed design and include, but are not limited to, the following items:

- Confirm design criteria for wastewater main;
- Complete detailed topographical survey of project area;
- Finalize wastewater main alignment;
- CCTV of existing sewer to confirm if rehabilitation is viable between MHB (existing MH #13682) to MHC (existing MH #13681);
- Scour analysis of trenchless creek crossing to confirm stability of creek bed and identify necessary erosion protection;
- Complete further geotechnical investigation, stable top of bank assessment, toe erosion allowance determination along west side of creek, excess soil planning (as per Ontario Regulation 406/19 *On-Site and Excess Soil Management*) and groundwater conditions identifications, as required;

- Confirm preferred construction methodologies and viable trenchless technologies to be utilized;
- Complete Stage 2 archaeological assessment for areas impacted with archaeological potential, as per Stage 1 archaeological findings;
- Continue to engage with interested Indigenous Communities throughout the Stage 2 Archaeological Assessment and subsequent stages, if necessary;
- Complete Arborist Report to support development of a Tree Preservation and Removal Plan;
- Continue consultation with CH to confirm permitting requirements and secure permit;
- Discuss with HDSB impacts to Aldershot High School property and confirm restoration and access requirements;
- Review final design with Fairwood Place Townhouse Condominium Boards to confirm restoration and access requirements;
- Continue coordination with the City of Burlington to explore options to consolidate wastewater works and creek rehabilitation works under one contract and/or coordinate timing of all works within West Aldershot Creek corridor;
- Secure all necessary permits and approvals to facilitate construction;
- Confirm all utility infrastructure and identify potential conflicts and need for relocations, if required;
- Finalize property needs (permanent and temporary easements) and secure prior to construction;
- Finalize capital construction cost estimates of proposed works; and
- Ensure construction is coordinated with other planned and ongoing activities in the vicinity of the project are by the Region, City, HDSB and others.

During detail design, a final Public Information Centre (PIC) will be held to inform the public and adjacent landowners of the upcoming construction works including construction schedule, construction staging and implementation details.

TABLE OF CONTENTS

SECTION	PAGE NO.
Executive Summary	i
Table of Contents	viii
List of Tables	x
List of Figures	xi
Acronyms	xii
1 Introduction	1
1.1 Description of Study Area	1
1.2 Study Objectives	2
1.3 Related Studies and Adjacent Projects	2
2 Study Process	3
2.1 The Municipal Class Environmental Assessment Process	4
2.2 Study Documentation	6
2.3 30 Day Public Review and Section 16(6) Order	6
2.4 Study Organization and Study Team	7
2.5 Study Schedule and Consultation Process	8
Phase I: Identification of Problems and Opportunities	9
3 Problem and Opportunity Statement	9
Phase II: Identification & Evaluation of Alternative Solutions	10
4 Existing Conditions	10
4.1 Wastewater Infrastructure	10
4.2 Utilities and Other Services	12
4.3 Natural Environment	12
4.4 Socio-Economic Environment	20
4.5 Cultural Environment	21
5 Alternative Solutions	24
5.1 Identification of Alternative Solutions	24
5.2 Costing Summary of Alternatives	40
5.3 Evaluation Process	42
5.4 Preferred Solution	45
6 Consultation and Communications	47
6.1 Summary of Consultation Activities	47
6.2 Project Notices	47
6.3 Public Engagement	48

6.4	Stakeholder Consultation	50
6.5	Consultation with the Ministry of the Environment, Conservation and Parks	52
6.6	Indigenous Communities Consultation	53
7	Implementation of the Preferred Solution	54
7.1	Conceptual Design Features of Preferred Solution	54
7.2	Property Requirements	54
7.3	Permits and Approvals	54
7.4	Proposed Construction Schedule and Cost Estimate	55
7.5	Detailed Design Commitments and Considerations	55
8	Potential Environmental Impacts & Proposed Mitigation Measures	57
8.1	Natural Environment	57
8.2	Socio-Economic and Cultural Environment	58
8.3	Climate Change Considerations	58
8.4	Construction Considerations	59
8.5	Monitoring and Maintenance	62
9	Conclusion and Recommendations	63
9.1	Conclusions	63
9.2	Recommendations	63
	Closure	
	References	
	Appendix A – Existing Environmental Conditions Technical Memo	
	Appendix B - Integrated Geotechnical and Hydrogeological Assessment Report	
	Appendix C - Fluvial Geomorphological Assessment Report	
	Appendix D - Stage 1 Archaeological Assessment Report	
	Appendix E - Alternatives Costing Summary	
	Appendix F - Detailed Evaluation Matrix	
	Appendix G - Study Notices	
	Appendix H - Public and Stakeholder Comments	
	Appendix I - Public Information Centre Materials	
	Appendix J - Indigenous Correspondence	
	Appendix K - Conceptual Drawings	

LIST OF TABLES

	PAGE NO.
Table E-1-1: Evaluation Criteria	iii
Table 2-1: Phases of the MCEA Process	5
Table 2-2: Study Team	8
Table 2-3: Key Milestone Dates	8
Table 5-1: Summary of Unit Prices	41
Table 5-2: Capital Cost Summary	42
Table 5-3: Category and Evaluation Criteria	42
Table 5-4: Criteria Definitions	43
Table 5-5: Evaluation Scale	45
Table 5-6: Evaluation Matrix	46
Table 6-1: Comment Summary for Study	49
Table 6-2: Indigenous Communities Consultation Summary	53
Table 7-1: Approval Requirements	54

LIST OF FIGURES

	PAGE NO.
Figure E-1-1: Aldershot Creek Wastewater Main Study Area	i
Figure 1-1: Aldershot Creek Wastewater Main Study Area	1
Figure 2-1: MEA MCEA Process	4
Figure 4-1: Existing Wastewater Infrastructure Within West Aldershot Creek Corridor	10
Figure 4-2: Exposed Maintenance Holes in Creek Corridor	11
Figure 4-3: Borehole and Monitoring Well Location Plan (Part 1)	16
Figure 4-4: Borehole and Monitoring Well Location Plan (Part 2)	17
Figure 4-5: Upstream view of severe degradation, scour along the banks, and large woody debris jam	18
Figure 4-6: Study Area and Historical Changes	19
Figure 4-7: Easements and Surrounding Property	21
Figure 4-8: Stage 1 Archaeological Assessment Results (Part 1)	22
Figure 4-9: Stage 1 Archaeological Assessment Results (Part 2)	23
Figure 5-1: Existing Wastewater System	25
Figure 5-2: Alternative 2 Proposed Alignment	27
Figure 5-3: Alternative 3 Proposed Alignment	30
Figure 5-4: Alternative 4 Proposed Alignment	33
Figure 5-5: Alternative 5 Proposed Alignment	35
Figure 5-6: Alternative 6 Proposed Alignment	38
Figure 5-7: Alternative 7 Proposed Alignment	40

ACRONYMS

CCTV – Closed Circuit Television

CH – Conservation Halton

CLI-ECA – Consolidated Linear Infrastructure Environmental Compliance Approval

EAA – Environmental Assessment Act

ESC – Erosion and Sediment Control

GHG – Greenhouse Gas

HDSB – Halton District School Board

LTSSC – Long Term Stable Slope Crest

MCEA – Municipal Class Environmental Assessment

MEA – Municipal Engineers Association

MECP - Ministry of the Environment, Conservation and Parks

MHSTCI – Ministry of Heritage, Sport, Tourism, and Culture Industries

MCFN - Mississauga of the Credit First Nation

PIC – Public Information Centre

PFR – Project File Report

PPS – Provincial Policy Statement

ROW – Right-of-Way

SAR – Species at Risk

SNGR – Six Nations of the Grand River

TPF – Tree Protection Fencing

TPZ – Tree Protection Zone

WWPS – Wastewater Pumping Station

1 INTRODUCTION

Associated Engineering (Ont.) Ltd. (Associated) was retained by the Regional Municipality of Halton (Halton Region) to assist with the completion of a Municipal Class Environmental Assessment (MCEA) for the Aldershot Creek wastewater main in the City of Burlington (the Study). The Study developed and evaluated servicing alternatives to address deficiencies, capacity needs, accessibility and environmental impacts. In accordance with the Municipal Engineers Association’s (MEA) Municipal Class Environmental Assessment (MCEA) process, this Study follows the planning process for a Schedule B project.

1.1 Description of Study Area

The study area, as shown in **Figure 1-1** includes the West Aldershot Creek corridor between Fairwood Place West and North Shore Boulevard and surrounding area in the City of Burlington. The surrounding area consists of a mix of single residential dwellings, townhomes and apartment/condominium properties and Aldershot High School. The study area is located within the North Shore Watershed, West Aldershot Creek subwatershed, under the jurisdiction of the Conservation Halton (CH). The existing wastewater main traverses along property owned by Halton District School Board (HDSB), private property and City of Burlington property via existing easements and ultimately discharges to the LaSalle Park Wastewater Pumping Station (WWPS).

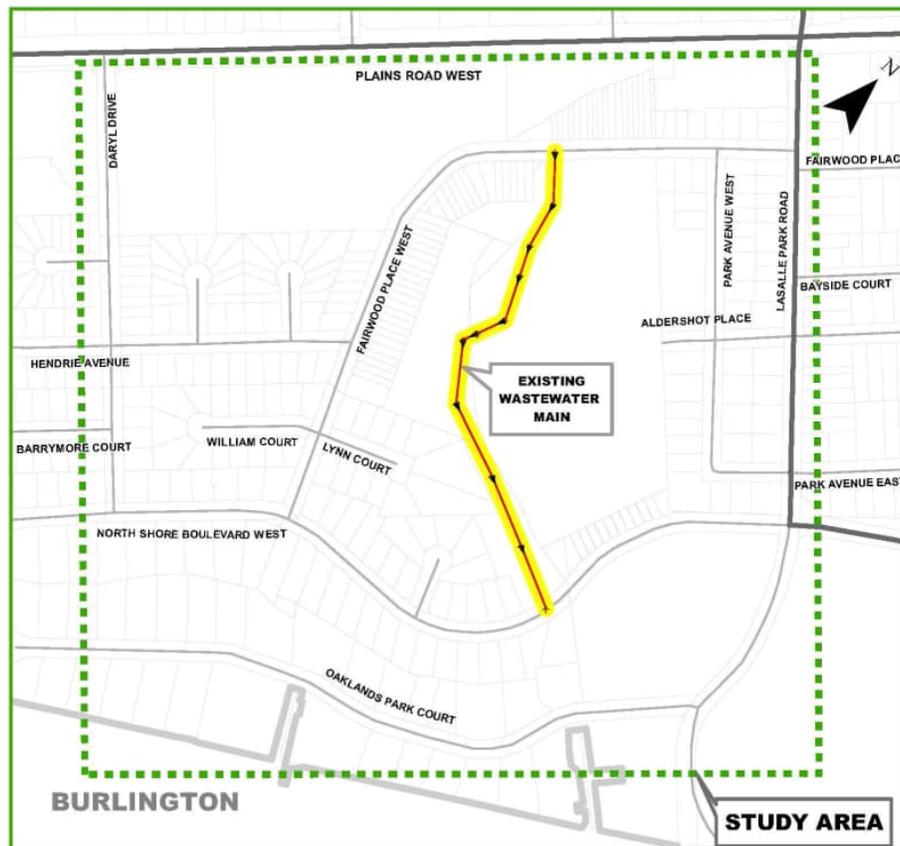


Figure 1-1: Aldershot Creek Wastewater Main Study Area

1.2 Study Objectives

The purpose of this study is to determine the preferred servicing alternative for the relocation, rehabilitation and/or replacement of the Aldershot Creek wastewater main. In developing these alternatives, the Study Team took into consideration the objectives of the Study:

- Address existing deficiencies and the condition of the wastewater infrastructure;
- accommodation of future capacity requirements;
- improvement of accessibility of wastewater infrastructure by Regional Operations staff;
- minimize impact on the natural environment and creek corridor; and
- minimize construction impact, timing and cost.

The alternatives proposed to achieve the study objectives are outlined in **Section 5** as are the evaluation of the alternatives and the identification of the preferred alternative.

1.3 Related Studies and Adjacent Projects

The study area is outside of key Ontario policy areas, including the Oak Ridges Moraine Conservation Plan, Niagara Escarpment Plan and Greenbelt Plan. There are numerous studies and projects reviewed by the study team because of their significance to the Aldershot Creek wastewater main study area.

Provincial Policy Statement (2020)

The Provincial Policy Statement (PPS) 2020 sets out the policy direction to guide land use planning and development in Ontario that support three key areas: building strong communities, wise use and management of resources, and protecting public health and safety. Infrastructure shall be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs. Planning for infrastructure shall be coordinated and integrated with land use planning and growth management so that they are financially viable over their life cycle, and available to meet current and projected needs.

The Study Area is located within a Settlement Area under the PPS for the City of Burlington.

Halton Region Water and Wastewater Master Plan (2011)

The *Sustainable Halton – Water and Wastewater Master Plan* for Halton Region provides sustainable growth and servicing strategies to meet the population and employment needs to the year 2031. The Master Plan identified key background information and projects in and around the study area that were reviewed and considered during the MCEA.

Burlington West Wastewater Servicing Feasibility Study

The Servicing Feasibility Study (Black & Veatch, 2016) completed for Halton Region evaluates four different growth scenarios in the Burlington West area and provides recommendations for each scenario as well as providing the preferred servicing strategy. The recommended solutions increase pump station and linear capacity to meet future flows while minimizing the disruption due to construction. Part of the recommended solution includes the upsizing of the LaSalle Park WWPS pumps and the upsizing of gravity sewers in the LaSalle Park WWPS catchment area. The Servicing Feasibility Study provides background information and detail regarding future expansion plans in the Burlington West area. Due to its relevance to this Study, the Feasibility Study findings were reviewed and taken into consideration.

West Aldershot Creek Revitalization Project

Ongoing excessive erosion in West Aldershot Creek was identified between Fairwood Place and Lake Ontario. Continuous down-cutting of the creek bed and undercutting of the banks presents a risk to public and private property, municipal infrastructure, and aquatic and riparian habitats.

The localized stabilization and restoration of West Aldershot Creek soon to be implemented as a key outcome of the City of Burlington's Erosion Control MCEA will improve channel conditions and mitigate erosion in the long-term. However, the design was forced to work within the constraints of existing wastewater infrastructure, including the significant constraint of the existing maintenance hole locations and cover over the existing wastewater main. The draft design proposes protection and hardening for the existing wastewater infrastructure along with rehabilitation of the existing channel.

In Spring 2021, the City of Burlington agreed to put the rehabilitation works on hold (currently in the 90% design phase) until the Region completed the MCEA to determine the preferred solution for the wastewater infrastructure within the Creek corridor. Based on the outcome of the MCEA, the creek rehabilitation design will be reassessed and updated. Conservation Halton (CH) has indicated that the creek rehabilitation works, and the Region's wastewater works shall be coordinated to ensure construction and restoration works within the creek valley are consolidated.

Sewer Upsizing (Region Project ID: 7527)

Future development is anticipated in the area and will need to be considered with respect to system capacity. Halton Region anticipates capacity issues related to intensification in its existing wastewater mains along Fairwood Place to the LaSalle Park WWPS. An upgrade of the wastewater infrastructure along Fairwood Place, from Hendrie Avenue to North Shore Boulevard and along North Shore Boulevard to LaSalle Park WWPS, is planned to address capacity issues with respect to 2031 growth projections. Coordination and consolidation (if feasible) between the planned sewer upsizing and the Aldershot Creek wastewater main improvements will be considered during the MCEA.

2 STUDY PROCESS

The *Replacement, Rehabilitation or Relocation of the Aldershot Creek Wastewater Main* MCEA is considered to be a Schedule 'B' undertaking pursuant to the Municipal Class Environmental Assessment (MCEA) document (MEA, 2000 as amended in 2007, 2011, and 2015). The MCEA process is a process used for the planning of municipal infrastructure projects (roads, water and wastewater, and transit) to ensure that project planning and predesign proceeds in accordance with the *Environmental Assessment Act* (EAA). A Schedule 'B' project includes public and review agency consultation, an evaluation of alternatives, an assessment of the impacts of the preferred solution, and identification of measures to mitigate any adverse impacts. **Figure 2-1** is an excerpt from the MCEA document and illustrates the process followed in the typical planning and design of projects covered by a MCEA. A further description of the MCEA process is provided in subsequent sections.

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA

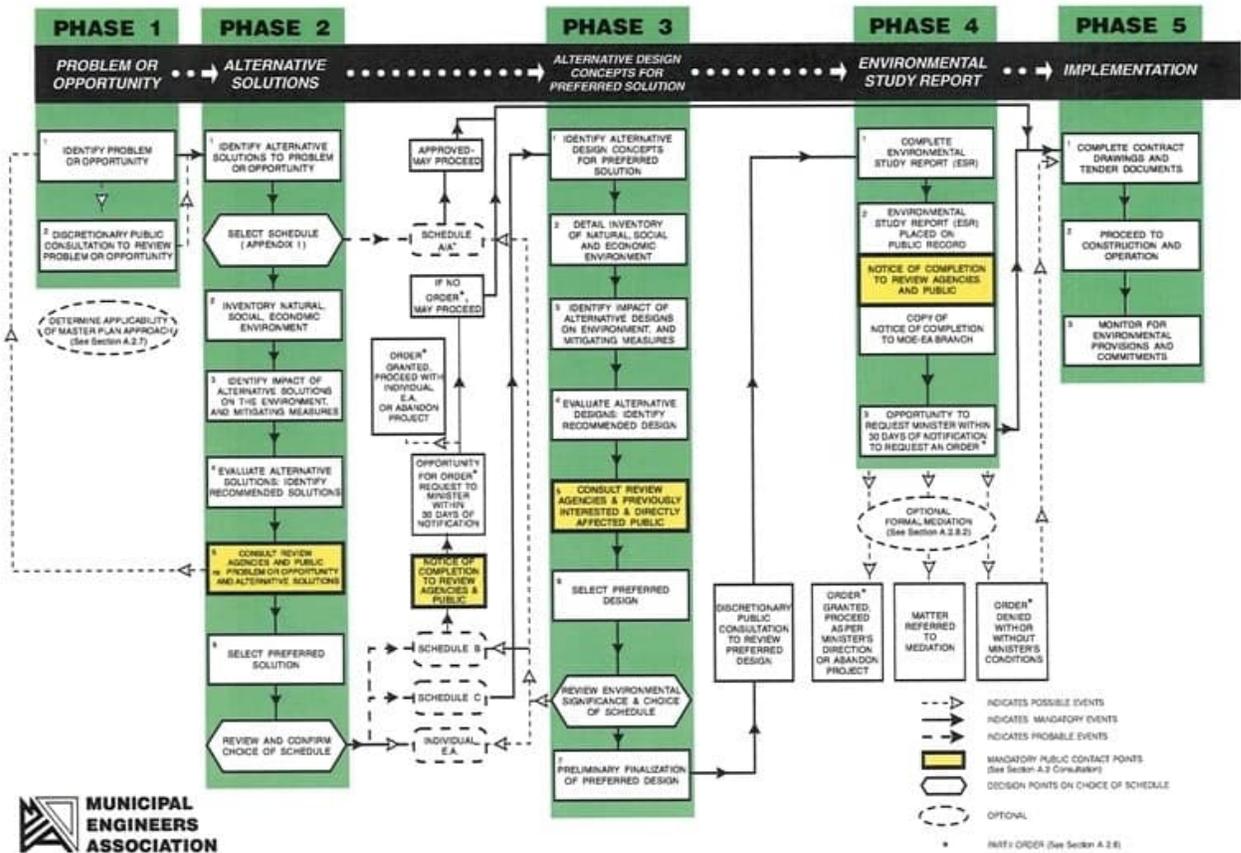


Figure 2-1: MEA MCEA Process

2.1 The Municipal Class Environmental Assessment Process

Every municipality in Ontario is subject to the provisions of the EAA and its requirements to conduct an Environmental Assessment for most public works projects. The MEA's MCEA document provides municipalities with a five-phase planning procedure approved under the EAA which provides direction on how to plan and undertake all municipal projects that recur frequently, are usually limited in scale, and have a predictable range of environmental impacts. Projects considered by the MCEA process include municipal roads and bridges, wastewater, storm water management, water, and transit. The MCEA document also requires that the decision-making process followed by the municipalities in the planning and implementation of infrastructure is transparent and provides opportunity for public and stakeholder involvement.

Table 2-1 illustrates the steps followed in the planning and design of projects covered under the MCEA process. This table summarizes steps considered essential for compliance with the requirements of the EAA. With increasing complexity and higher likelihood for adverse environmental impacts, projects are required to complete additional planning steps, termed 'Phases' by the MCEA document, prior to obtaining approval to proceed with a proposed project. The MCEA document provides the following description of the five phases potentially requiring completion before MCEA projects can be approved.

Table 2-1: Phases of the MCEA Process

Phase	Description
Phase 1	Identify the problem (deficiency) or opportunity.
Phase 2	Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment and establish the preferred solution considering public and review agency input.
Phase 3	Examine alternative methods of implementing the preferred solution, based upon the existing environment, public and review agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effects.
Phase 4	Document, in an Environmental Study Report a summary of the rationale, and the planning, design and consultation process of the project as established through the above phases and make such documentation available for scrutiny by review agencies and the public.
Phase 5	Complete contract drawings and documents and proceed to construction and operation; monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facilities.

Based on the MCEA document, projects are classified as either Schedule 'A', 'A+', 'B' or 'C' projects. Each of these classifications requires a different level of review to complete the requirements of the MCEA, and thus comply with the EAA, as noted below.

Schedule 'A' projects are limited in scale, have minimal adverse environmental effects, and include a number of municipal maintenance and operational activities. These projects are pre-approved and may be implemented without following the MCEA process.

Schedule 'A+' projects are limited in scale and have minimal adverse environmental effects. These projects are pre-approved and may proceed directly to Phase 5 for implementation without following the other phases. However, the public is to be advised prior to project implementation.

Schedule 'B' projects have the potential for some adverse environmental effects. The proponent (i.e. Halton Region in the case of this MCEA) is required to undertake a screening process involving mandatory contact with directly affected public, Indigenous groups and relevant government agencies to ensure that they are aware of the project and that their concerns are addressed. A Schedule 'B' activity requires the proponent to conduct two mandatory points of public contact during Phase 2. Additionally, the proponent may elect to undertake a discretionary public consultation at the end of Phase 1 to present the problem or opportunity identified.

Phases 1 and 2 of the MCEA process must be followed and a Project File Report (PFR) must be prepared and submitted for review by the public. A Notice of Completion must be submitted to review agencies and the public and a period of 30 calendar days are provided for comment and input on the PFR.

As long as there are no outstanding concerns raised by the public and/or relevant government agencies, the proponent may proceed to project implementation. However, should a person or party have a concern or objection, they are expected to consult with the proponent to try to resolve the concern.

Schedule 'C' projects are those that have the potential for significant adverse environmental impact and must proceed under the full planning and documentation procedures (Phases 1 to 5) specified in the MCEA document. A Schedule 'C' project is required to complete an Environmental Study Report (ESR), as opposed to a Project File Report for Schedule 'B' undertakings.

The proponent is required to undertake consultation during multiple phases during the MCEA involving mandatory contact with directly affected public, Indigenous groups and relevant government agencies to ensure that they are aware of the project and that their concerns are addressed. Schedule 'C' projects involve 4 points of mandatory public contact: twice during Phase 2, once during Phase 3 and again during Phase 4 after the ESR document is placed on public record. Schedule 'C' projects require that an ESR be prepared and submitted for review by the public. Similar to Schedule 'B' undertakings, should a person or party have a concern or objection, they are expected to consult with the proponent to try to resolve the concern.

2.2 Study Documentation

This Project File Report (PFR) documents the planning and design process followed to determine the recommended undertaking and environmentally significant aspects for the *Replacement, Rehabilitation or Relocation of the Aldershot Creek Wastewater Main* MCEA Study, in accordance with the procedures for Schedule 'B' projects, setting out the planning and decision-making process, including consultation with interested and affected parties and technical agencies, which has been followed to arrive at the preferred solution. The PFR also sets out the mitigating measures proposed to avoid or minimize environmental impacts.

The PFR is organized chronologically in such a way as to clearly demonstrate that the appropriate steps in Phases 1 and 2 have been followed. The report is intended to be a traceable and easily understood record of the proponent's decision-making process. The PFR generally describes the following:

- The problem or opportunity and other background information;
- A description/inventory of the environment;
- The alternative solutions considered, and the evaluation process followed to select the preferred solution;
- The mitigating measures and follow-up commitments, which will be undertaken to minimize environmental impacts including any monitoring necessary during construction; and
- The consultation process and an explanation of how concerns raised by interested and affected parties have been addressed in developing the project.

2.3 30 Day Public Review and Section 16(6) Order

Public, review agency and Indigenous consultation is a key part of the MCEA process. In a Schedule 'B' project, such as the wastewater infrastructure improvements considered under this MCEA Study, the proponent is required to provide opportunity for the public to be consulted about the proposed project. Consultation is intended to inform interested and affected parties about the proposed project, the various alternative solutions considered and their anticipated environmental impacts, as well as the preliminary preferred solution. It is also intended that the public be given opportunity to provide input or raise concerns prior to completion of the MCEA process. It is intended that issues be identified early into the project by means of public involvement and that resolutions between the proponent and the person or party with the objection be achieved through consultation.

It is incumbent on the public that concerns about the environmental effects of a proposed project, or the planning process being followed are brought to the attention of the proponent early in the planning process, when the

proponent has greater flexibility to accommodate changes in the project development and the process. Interested persons may provide written comments to the proponent at any point during the study process and up to 30 calendar days from issuance of Notice of Completion.

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks (MECP) for an order requiring a higher level of study (i.e.: requiring an individual/comprehensive EA 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 should include the requester contact information and full name for the MECP.

Requests should specify what kind of order is being requested (request for additional conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate or remedy those potential adverse impacts, and any information in support of the statements in the request. This will ensure that the MECP is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to:

Minister of the Environment, Conservation and Parks
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto, ON M7A 2J3
minister.mecp@ontario.ca

Director, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Ave. West, 1st Floor
Toronto, ON M4V 1P5
EABDirector@ontario.ca

Mark Bajor
Project Manager
Halton Region
1151 Bronte Road
Oakville, ON L6M 3L1
mark.bajor@halton.ca

Visit the MECP's website for more information on requests for orders under Section 16 of the Environmental Assessment Act at: <https://www.ontario.ca/page/class-environmental-assessments-section-16-order>

2.4 Study Organization and Study Team

Halton Region retained Associated to conduct the *Replacement, Rehabilitation or Relocation of the Aldershot Creek Wastewater Main* MCEA study. The Study Team, as outlined in **Table 2-2** consisted of Halton Region staff, Associated staff sub-consultants providing specific knowledge and expertise to address the requirements for this project in accordance with the *Environmental Assessment Act*.

Table 2-2: Study Team

Team Member	Role	Organization
Mark Bajor	Proponent (Project Manager)	Halton Region
Andrea LaPlante, P.Eng	Prime Consultant (Project Manager)	Associated Engineering (Ont.)
Austin Adams	Senior Ecologist	Palmer
Dennis Tseng, P.Eng.	Geotechnical Engineer	Palmer
Lisa Merritt, M.Sc.	Archaeologist	Archaeologist Services Inc.

2.5 Study Schedule and Consultation Process

As part of the planning process, several steps have been completed to inform government agencies, Indigenous groups, affected landowners and the local community/general public of the nature and scope of the project and to solicit any comments.

The following table (**Table 2-3**) outlines the key milestone dates of the project to date and projected to completion, including dates of notification to interested and affected parties and agencies. Further consultation process details are provided within **Section 6** of this report.

Table 2-3: Key Milestone Dates

Schedule Item	Date
Initiate MCEA Study	October 2021
Notice of Study Commencement	April 14, 2022
Notice of Public Information Centre	March 30, 2023
Public Information Centre	March 30 – April 20, 2023
Completion of Project File Report	July 2023
Notice of Study Completion	August 3, 2023
Project File Report 30 Day Review Period	August 3 to September 3, 2023
Detailed Design	2023 – 2024
Construction	2025

PHASE I: IDENTIFICATION OF PROBLEMS AND OPPORTUNITIES

3 PROBLEM AND OPPORTUNITY STATEMENT

The Problem and Opportunity Statements provide a clear statement of the problem and opportunities that need to be addressed for a specific undertaking. The various analyses (e.g. geotechnical investigation, archaeological assessment, natural environment) and existing conditions provide input for and contribute to the identification and description of the problem or opportunity. The prevailing deficiencies within the study area can be summarized by the following statements.

Problem Statement

This study evaluates the existing (200mm to 300mm diameter) wastewater main servicing an area in south Burlington including Aldershot High School, Fairwood Place condominiums and growth areas to the west of the West Aldershot Creek valley. The wastewater main was constructed in 1961 and has an alignment which runs along the West Aldershot Creek from Fairwood Place West to North Shore Boulevard. The existing wastewater main is nearing the end of its useful life and is threatened by severe erosion within the West Aldershot Creek valley, including the sewer section crossing the creek and several maintenance holes which are located within the creek banks and bed. Planned creek rehabilitation works by the City of Burlington poses a risk to the existing wastewater main being damaged during construction and continued impacts to the creek environment after rehabilitation works are completed. Inaccessibility of the system by Regional Operations staff makes inspection, cleaning and maintenance works on the sewer and maintenance holes extremely difficult.

Opportunity Statement

Due to these identified problems with the existing wastewater main, Halton Region has initiated a Municipal Class Environmental Assessment (MCEA) to develop and evaluate servicing alternatives for the Aldershot Creek wastewater main. Servicing alternatives will address capacity needs, improve accessibility for Regional Operations staff to complete maintenance and repair works, and reduce the environmental impacts on the West Aldershot Creek corridor while considering property impacts and requirements, alignment and coordination with ongoing and future capital projects in the proximity of Fairwood Place West and North Shore Boulevard, and financial implications of constructing and maintaining the system. The final servicing alternative has the opportunity to coordinate creek rehabilitation works by the City of Burlington with the wastewater main works, including the relocation of wastewater infrastructure to improve the final creek rehabilitation design.

PHASE II: IDENTIFICATION & EVALUATION OF ALTERNATIVE SOLUTIONS

4 EXISTING CONDITIONS

4.1 Wastewater Infrastructure

The existing Aldershot Creek wastewater main was built in 1961. The sewer that runs parallel to and crosses West Aldershot Creek is assumed to be a combination of vitrified clay and concrete pipe and ranges in size from 200mm to 300mm in diameter as shown in **Figure 4-1**. The wastewater main conveys flow to the LaSalle Park WWPS directly downstream of North Shore Boulevard.

As per Halton Region Asset Planning Risk Register, the wastewater main has been identified for replacement within the easement of the creek from Fairwood Place West to North Shore Boulevard. Root intrusion, debris, surcharging and exposure of maintenance hole structures due to erosion have been observed by Region staff. There have also been multiple surcharges of the wastewater main into the creek.



Figure 4-1: Existing Wastewater Infrastructure Within West Aldershot Creek Corridor

4.1.1 Creek Erosion

West Aldershot Creek has meandered in its path over time and experienced erosion, resulting in a loss of the cover over the wastewater main. Several sections of sewer are buried under steep, high banks of the creek and are also at

risk of being exposed and undermined should the banks collapse further. The wastewater main crosses the uppermost reach of the creek with approximately 1.15 m of cover directly over the pipe. However, there is a scour point immediately downstream where only 0.45 m of cover remains over the pipe running adjacent to the creek bank.

Two maintenance holes are already situated within the bankfull channel itself, placing them at risk and exacerbating erosion of the adjacent and opposite banks. Due to creek erosion, one wastewater maintenance hole is nearly exposed along the outer (east) bank approximately 100m downstream of the main stormwater outfall; immediately opposite, another maintenance hole is at risk of impact due to severe (~2 m) bank undercutting. **Figure 4-2** below shows at-risk maintenance holes within the creek banks.



Figure 4-2: Exposed Maintenance Holes in Creek Corridor

4.1.2 Remaining Service Life

Due to the conditions and locations of the wastewater main, Halton Region has not been able to complete maintenance activities or CCTV inspection, so the level of service of the wastewater main is not guaranteed. The section of sewer running underneath Aldershot High School property was built in 1963, while the wastewater main running to North Shore Boulevard was built in 1961. This section of sewer is now approximately 60 years old. The services from the Fairwood Place Townhouses were built in 1986 and 1988 and are approximately 35 years old.

In general, concrete sanitary sewers have a service life of 50 years or less, while vitrified clay has a service life of 50 to 60 years. The significant pipe degradation and erosion show that the pipe is beyond its service life and in disrepair. The maintenance holes show significant signs of cracking and aging which shows they are at or exceeding their service life, exacerbated by exposure due to creek erosion.

4.1.3 Capacity

It is expected that the sewers and maintenance holes along the creek will not provide sufficient capacity for the future development in the area and will likely require upgrades within the next ten years.

Surcharging has been observed downstream of Aldershot High School in the wastewater main running along the Aldershot High School property. Halton Region noted surcharging into the creek from a maintenance hole in the valley corridor downstream. The conditions of the existing maintenance holes relevant to surcharging were unknown as Halton Region was unable to access the maintenance holes to confirm.

The two sewer sections downstream of the creek crossing have experienced capacity issues and are expected to present capacity issues for growth beyond 2031. Upsizing of sewers along Fairwood Place West, from Hendrie Avenue to North Shore Boulevard and along North Shore Boulevard to LaSalle Park WWPS is listed in future Region projects.

4.1.4 Maintenance

Halton Region has been unable to complete required maintenance activities or CCTV inspection due to the location and condition of the wastewater main. The wastewater maintenance holes are located within steep slopes and areas of large trees and shrubs which has impeded access. Any maintenance and repair work would be dangerous and require significant tree clearing as well as the creation of specific access routes.

There are four maintenance holes within the easement that Halton Region has noted were completely inaccessible due to the large tree growth. There are another four maintenance holes that can only be accessed through private property or if the existing easement trees were cleared. The steep slopes would prevent standard construction and maintenance vehicles from accessing the area.

A portion of the existing wastewater main adjacent to the Aldershot High School is running underneath a portion of the building. If repairs were to be required, any open-cut repairs or maintenance would not be feasible without risk to the building structure.

4.2 Utilities and Other Services

The study area contains numerous storm sewer outfalls outletting to West Aldershot Creek. There is an existing storm outlet structure located at the upstream end of the creek, which contains 350mm diameter and 900mm diameter storm outlets which convey storm runoff from Fairwood Place West. The creek crosses North Shore Boulevard through a 1900mm diameter CSP culvert. There are minimal utilities within the West Aldershot Creek corridor; however, typical utilities and infrastructure services exist along Fairwood Place and North Shore Boulevard, including storm and sanitary sewers, watermains, hydro, bell, gas and cable.

4.3 Natural Environment

4.3.1 Existing Environmental Conditions

An analysis of the natural environment was completed by Palmer that draws from and builds on the *Terrestrial and Aquatic Ecology Report* completed by Palmer in 2019 for the same study area for the City of Burlington's West Aldershot Creek Erosion MCEA. The Existing Environmental Conditions Technical Memo prepared by Palmer is provided in **Appendix A** and summarized below.

Palmer ecologists undertook field investigations to inventory the flora and fauna of the study area, assess physical terrain characteristics, and to provide an assessment of the terrestrial and aquatic ecological features and functions within the study area. This information was used to verify and complement the background review and to document current site conditions. Field investigations were undertaken between 2018 and 2022 within the study area to complete an ecological overview and confirmation survey.

Vegetation Communities and Flora

Vegetation communities were mapped and described following the Ecological Land Classification (ELC) System for Southern Ontario; and the wetland characterization and limit was determined using the Ontario Wetland Evaluation

System (OWES). Twelve (12) vegetation community types were recorded within the study area, including forests, meadow, open water and anthropogenic areas, specifically:

- Fresh – Moist Sugar Maple – Hardwood Deciduous Forest
- Dry – Fresh Sugar Maple – Oak Deciduous Forest
- Dry – Fresh Red Oak Deciduous Forest
- Dry – Moist Old Field Meadow
- Mineral Cultural Thicket
- Anthropogenic ELC Types:
 - Parkland
 - Education
 - Low Density Residential
 - High Density Residential
 - Single Family Residential
 - Transportation
 - Open Water

Botanical surveys were completed by traversing the study area and recording species observed in each vegetation community. Identified plants were compiled and their status at local (i.e. Halton) and provincial levels (i.e. S-Rank) were verified. Provincial rarity status was based on the SARO list.

The majority of native species observed have a provincial “S5 - Secure” NHIC ranking, indicating that they are common within Ontario, and the remaining species are “S4 – Apparently Secure”. Honey Locust (*Gleditsia triacanthos*) is an exception with an “S2?” ranking, meaning imperiled due to very restricted range or very few populations, but this ranking remains to be verified. However, the Honey Locust within the study area are planted cultivars, as evidenced by the lack of thorns found on native varieties and would not be subject to this ranking.

One provincial Species at Risk (Endangered) was recorded – American Chestnut (*Castanea dentata*). A single individual of this tree was observed on the east side of West Aldershot Creek between North Shore Boulevard and Oaklands Park Court. A complete list of plant species recorded is provided in the *Existing Environmental Conditions Technical Memo* located in **Appendix A**.

Wildlife Observations

Breeding Birds: A total of 11 bird species were documented in the study area. Most of the birds recorded in the study area are considered common to southern Ontario. No Species at Risk (SAR) or area-sensitive species were observed in the study area.

Bat Habitat: Following the Significant Wildlife Criteria for Ecoregion 7E, maternity colonies can potentially be located in mature deciduous or mixed forest stands with >10 wildlife trees (snags) per hectare that are >25 cm DBH. The study area has the potential to match the SWH criteria for bat maternity roost habitat. The results from the survey identified several trees as potential maternity roost habitat for SAR bat species, as standing snags were scattered within the forested community.

Incidental Wildlife: The presence of West Aldershot Creek itself and adjacent thicket and forest communities provide wildlife habitat opportunities. A Downy Woodpecker (*Picoides pubescens*) and at least 11 Monarch butterflies (*Danaus plexippus*) were observed during the July 31, 2018, field visit. A Green Frog (*Lithobates clamitans*) and Eastern Cottontail (*Sylvilagus floridanus*) were observed during the breeding bird surveys. Ruby-throated Hummingbird (*Archilochus colubris*) and an Eastern Chipmunk (*Tamias striatus*) were observed during the September 17, 2018, site visit. Additional incidental observations from the 2022 site visit include common woodland and woodland edge bird species such as Cedar Waxwing (*Bombycilla cedrorum*), Song Sparrow (*Melospiza melodia*), American Goldfinch (*Spinus*

tristis), Carolina Wren (*Thryothorus ludovicianus*), Red-eyed Vireo (*Vireo olivaceus*), and American Robin (*Turdus migratorius*).

Aquatic and Fish Habitat

Three fish species have been captured in the study area and recorded by Conservation Halton: Creek Chub (*Semotilus atromaculatus*), Blacknose Dace (*Rhinichthys obtusus*) and Spottail Shiner (*Notropis hudsonius*). All three fish species are minnows and are considered common coolwater species, native to Ontario, and of intermediate tolerance to environmental perturbations and/or anthropogenic stresses. Creek Chub are tolerant of pollution and low dissolved oxygen and moderately intolerant of turbidity. Spottail Shiner are tolerant of turbidity and high-water temperatures.

Species at Risk

A habitat suitability assessment for SAR was conducted as part of the pre-field information gathering efforts in order to determine whether SAR habitat is present, potentially present, or absent within the study area. The screening of SAR habitat suitability within the study area was compiled based on background information and existing conditions and observations recorded in the study area.

Based on the screening, one SAR (American Chestnut) was observed during field surveys and as many as five (5) additional species have suitable habitat or are potentially present within the deciduous forests of study area. No wildlife SAR (e.g., Eastern Wood-pewee) or evidence (e.g., nests) of their presence was observed during field surveys.

4.3.2 Geology, Hydrogeology and Slope Stability

The previously completed geotechnical investigation by Palmer, *Integrated Geotechnical and Hydrogeological Assessment Report* (Palmer, 2019), for the City of Burlington's West Aldershot Creek Erosion Control MCEA was used to support the development and evaluation of the servicing alternatives. An additional geotechnical investigation and slope stability assessment will be completed as part of conceptual design, with full detailed geotechnical, hydrogeological and slope stability assessments being completed during detailed design. The previously completed geotechnical report is provided in **Appendix B**.

Geology

The study area originates below the Niagara Escarpment and Highway 403 corridor and flows south through the Iroquois Plain physiographic region before emptying into Lake Ontario. The surficial geology within the study area is dominated by coarse-to-fine-textured glaciolacustrine sediments, deposited downstream along the Plains Road corridor. The underlying bedrock is the Queenston Formation shale.

Soil Conditions

Soil conditions in the study area were assessed through advancement of four (4) boreholes (refer to **Figure 4-3**) to depths of 9.8m to 14.3m below the existing ground surface at strategic locations alongside the valley. The soil stratigraphy was recorded, groundwater conditions were observed in the boreholes, and the soil samples were tested for moisture content and grain size analysis. A summary of the subsurface conditions in the boreholes is provided below.

Topsoil: A 100 to 130mm thick layer of surficial topsoil was encountered in all boreholes.

Fill Materials: Fill materials consisting of clayey silt, sandy silt, and sand were encountered below the topsoil in all boreholes and extended to depths ranging from about 1.0 to 2.6m below the existing ground surface. For the cohesive clayey silt fill materials, SPT 'N' value of 3 blows per 300mm penetration indicated a soft consistency. For the

cohesionless sandy silt and sand fill materials, SPT 'N' values ranging from 5 to 26 blows per 300mm penetration indicated a loose to compact compactness condition. The in-situ moisture contents measured in the fill samples ranged from approximately 2% to 30%.

Silt, Sandy Silt, Silty Sand, and Sand: Silt, sandy silt, silty sand, and sand deposits were encountered below the fill materials in Boreholes BH18-1 to BH18-3, and extended to depths ranging from about 8.0 to 9.5m below the existing ground surface. SPT 'N' values ranged from 6 to 43 blows per 300mm penetration indicating a loose to dense compactness condition. The natural moisture contents measured in the soil samples ranged from approximately 3% to 23%.

Upper Clayey Silt: An upper clayey silt deposit was encountered between layers of silt, sandy silt, silty sand, and sand deposits in Boreholes BH18-1 and BH18-3. In Borehole BH18-1, this deposit extended from 7.7 to 7.9m below the existing ground surface. In Borehole BH18-3, this deposit extended from 3.0 to 6.3m below the existing ground surface. SPT 'N' values ranging from 16 to 43 blows per 300 mm penetration indicated a very stiff to hard consistency. The natural moisture contents measured in the soil samples ranged from approximately 13% to 21%.

Clayey Silt to Silty Clay: Clayey silt to silty clay deposits were encountered below the fill materials or silt, sandy silt, silty sand, and sand deposits in all boreholes, and extended to depths ranging from 9.8 to 14.3m below the existing ground surface. SPT 'N' values ranging from 7 to 43 blows per 300 mm penetration indicated a firm to hard consistency. All boreholes were terminated in these deposits. The natural moisture contents measured in the soil samples ranged from approximately 18% to 26%.

Groundwater

Groundwater condition observations were made in the boreholes during drilling and upon completion of drilling. Monitoring wells were installed in three (3) boreholes to allow determination of stabilized groundwater levels. The monitoring well installation and groundwater data are summarized in the individual borehole logs (refer to *Integrated Geotechnical and Hydrogeological Assessment Report* located in **Appendix B**).

Slope Stability

A detailed slope stability analysis was completed on four (4) cross-sections across the upstream portion of West Aldershot Creek based on borehole drilling and measured water levels in groundwater monitoring wells. The slope stability analysis focused on the potential for long-term deep-seated failure.

At the upstream portion of the creek, the detailed slope stability analysis indicated instability is limited to the over-steepened toe region of the creek slopes, which are expected to continuously slough until attaining a relatively stable 2H:1V slope. The long-term stable slope crest (LTSSC) is delineated on **Figure 4-3**.

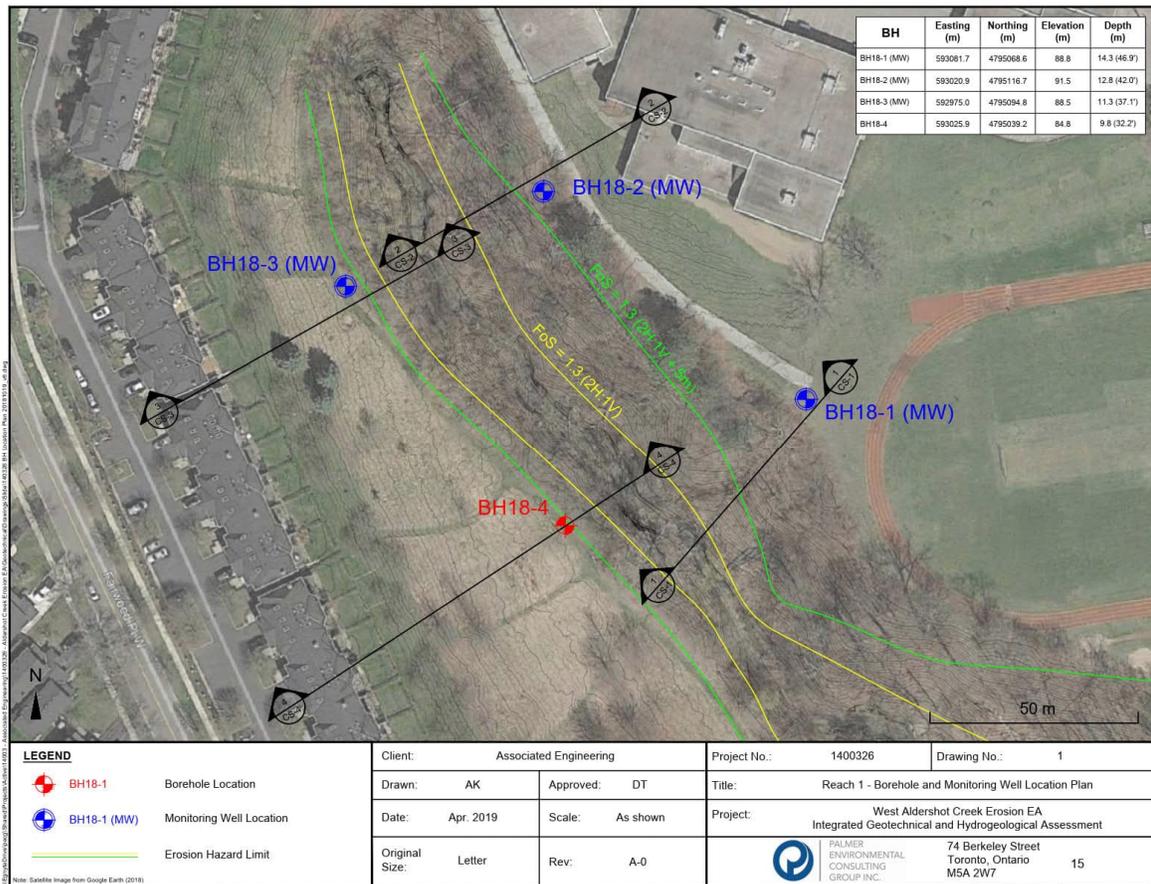


Figure 4-3: Borehole and Monitoring Well Location Plan (Part 1)

Generally, the slopes within the downstream portion of the creek flatten out significantly when compared to the upstream portion, indicating comparatively stable conditions. Analysis also indicates the creek channel widens significantly in the downstream portion, indicating a lowest risk of erosive potential and reduced need for mitigative measures. Given that no boreholes were drilled within the downstream portion as part of the original geotechnical investigation completed in 2019, as per MNR guidelines, in the absence of site-specific geotechnical information, a 3H:1V stable slope inclination has been assumed. The LTSSC is delineated on **Figure 4-4**.

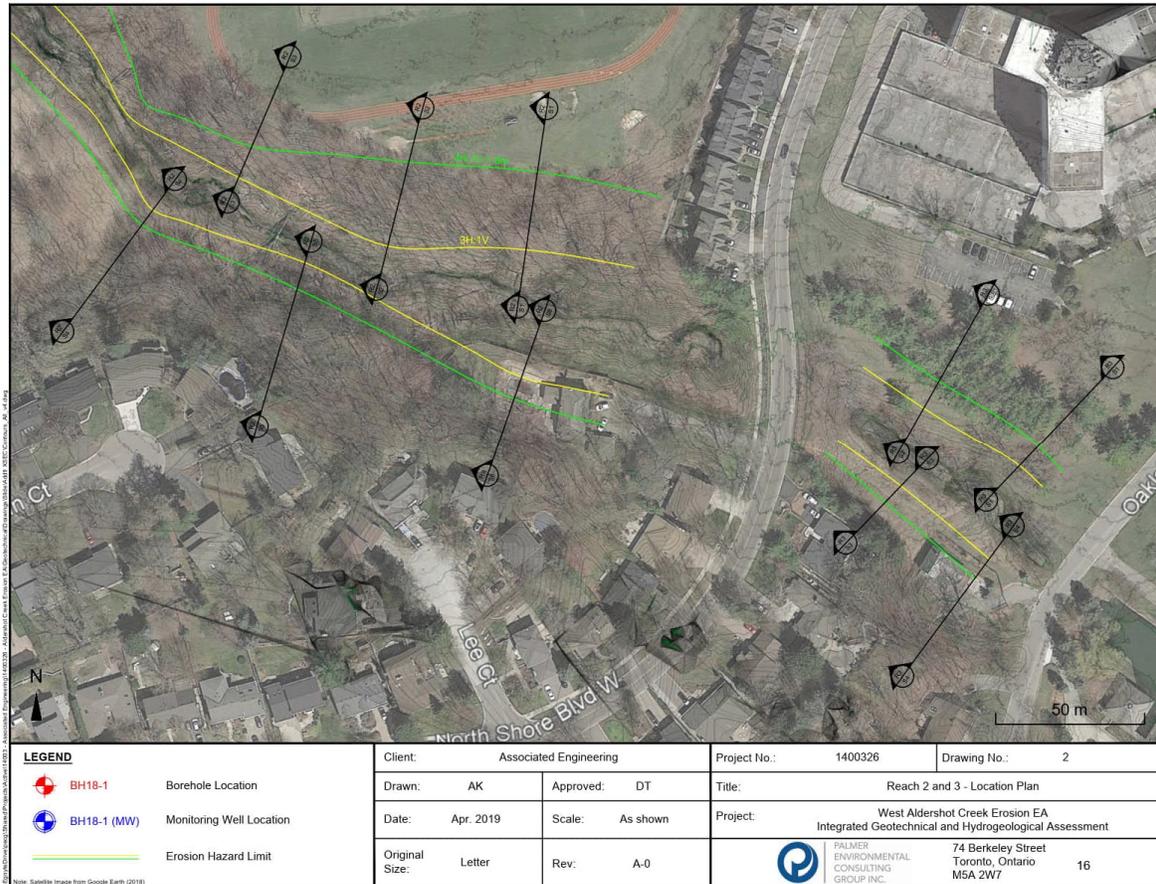


Figure 4-4: Borehole and Monitoring Well Location Plan (Part 2)

Toe Erosion Allowance: The LTSSC is supplemented by a toe erosion allowance as delineated on **Figure 4-3** and **Figure 4-4**. The required toe erosion allowance has been determined based on consideration of MNR guidelines, rates of bank erosion estimated over the historical record, and an understanding of site-specific fluvial processes. A toe erosion allowance of 5m has been applied along the upstream portion of the creek based on documentation of a time-averaged erosion rate of approximately 0.05 m/year since 1962, which is consistent with MNR’s toe erosion allowance range of 5 to 8m for cohesive clay/silt soils. Application of the lower limit of the range is also appropriate because most of the erosive energy along this ravine-like reach is attenuated through down-cutting as opposed to lateral erosion, more typical of the meandering watercourses on which MNR’s empirical ranges are based.

A toe erosion allowance of 8m has been applied to the downstream portion of the creek, where meanders are better developed and locally separated from the cohesive valley walls by alluvial terraces and sand/silt fill (range of 8 to 15m, MNR).

4.3.3 Fluvial Geomorphology

A fluvial geomorphological assessment of West Aldershot Creek was completed by Palmer. The assessment characterized erosional processes along the creek and helped inform the development of servicing alternatives for the wastewater main. The assessment built off of the previously completed assessment of West Aldershot Creek by Palmer in 2019 for the City of Burlington’s West Aldershot Creek Erosion Control MCEA. The *Fluvial Geomorphological Assessment Report* prepared by Palmer is provided in **Appendix C**.

Channel Morphology

Erosion is extensive and locally severe along West Aldershot Creek, particularly where the channel is confined along the bottom of a nearly V-shaped ravine, with little to no floodplain to attenuate flow energy. Significant degradation (down-cutting) along the bed paired with continuous scour along the banks has led to the development of severe undercuts (up to 2 m) along the base of the confining terraces and valley walls themselves as illustrated in **Figure 4-5**. Several mass movement failures have occurred recently along the lower valley walls in response to the fluvial erosion. Trees have fallen into the channel once their root masses are sufficiently undermined, which, in turn, has exacerbated erosion by forcing flows over, under and around the woody debris jams that form.



Figure 4-5: Upstream view of severe degradation, scour along the banks, and large woody debris jam

Wastewater Infrastructure

Halton Region's wastewater main crosses and parallels the creek within a deep ravine. Natural topography and dense surrounding residential development complicate access to the wastewater infrastructure for routine repairs, inspection, and cleanouts. Severe bank and bed erosion has resulted in the exposure of maintenance holes MH1, MH5, and MH-6 (as shown in **Figure 4-6**) and poses a risk to buried pipes. At the existing creek crossing, the wastewater main has approximately 1.15m of cover directly over the pipe but only 0.45 m of cover considering the presence of a knickpoint immediately downstream. As-built drawings indicate that the original depth of cover was approximately 3.3m. A 6m-long concrete encasement protects the pipe beneath the creek between MH-6 and MH-5.

Several additional sections of sewer that encroach alongside the creek are also at risk of being exposed and undermined following collapse of the steep, high banks below which they are buried. The localized stabilization and restoration of West Aldershot Creek, to be implemented as a key outcome of the City of Burlington's Erosion Control MCEA, will improve channel conditions and moderate erosion, in the long-term. However, the design was forced to work within the constraints of existing wastewater infrastructure (most awkwardly the maintenance holes) and may leave this infrastructure and the surrounding natural environment vulnerable to impact in the future. Furthermore, construction activity within the creek bed, as part of the creek rehabilitation works, poses a risk of potential pipe collapse of the existing wastewater main crossing.



Figure 4-6: Study Area and Historical Changes

Channel Morphology

Upstream Portion (Reach 1): Reach 1 originates at the stormwater outfall (SWO-1) south of Fairwood Place and extends 200m downstream to the outflanked outfall projects into the creek from the west bank (**Figure 4-6**). The reach is confined along both banks by high terraces or valley walls, punctured by gullies and erosion scars where affected by fluvial erosion. The channel has become entrenched due to active degradation and is disconnected from what little floodplain once existed. Bed degradation, undercut banks (up to 2m), and localized creek widening have created an anomalously deep and narrow cross-sectional shape. Infrastructure owned by Halton Region and the City of Burlington is at risk at a number of locations along Reach 1.

Reach 2: Reach 2 extends from an outflanked and perched outfall to the crossing of North Shore Boulevard (**Figure 4-6**). The upstream limit of Reach 2 is marked by an abrupt transition from the ravine-like channel of Reach 1 to a more typical, sinuous channel along the bottom of a broad valley (Reach 2). The reach exhibits evidence of anthropogenic modification (i.e. straightening) with a low embankment along the west bank creating a discontinuous and moderately accessible floodplain. Erosive energy is more effectively distributed across the wider channel cross-section and floodplain, such that erosion is less extensive and severe than along Reach 1. Anthropogenic influences on channel morphology, include several small, CSP culverts, mostly draining immediately adjacent land (if at all still functional), that discharge into the channel. A maintenance hole (MH-1) is outflanked along the outer (west) bank.

4.3.4 Source Water Protection

The *Clean Water Act* (2006) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the *Clean Water Act* include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

The study area is located within the Halton Region Source Protection Area. The source protection plan for the Halton Region Source Protection Area does not include any policies applicable to this Study.

4.4 Socio-Economic Environment

4.4.1 Land Use and Ownership

The study area occurs within the City of Burlington's urban boundary with high-density residential and low-density residential land uses. Within the study area is Aldershot High School which is part of the Halton District School Board (HDSB). The remaining land uses are a mix of single residential dwellings, townhomes, and apartment/condominium properties.

The existing wastewater main is located within easements owned by the City of Burlington (City) and Halton Region, as well as on private property, as shown in **Figure 4-7**. Portions of the wastewater main reside within property owned by the Fairwood Place Condominiums and Halton District School Board (HDSB). Depending on the preferred servicing alternative identified as part of this Study, Halton Region may need to obtain additional temporary and/or permanent easements. There may also be an opportunity to dissolve existing easements, if no longer required for the wastewater main servicing.



Figure 4-7: Easements and Surrounding Property

4.5 Cultural Environment

4.5.1 Archaeological Assessment (Stage 1)

Archaeological Services Inc. (ASI) was contracted to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the *Replacement, Rehabilitation or Relocation of the Aldershot Creek Wastewater Main MCEA Study*. The Stage 1 Archaeological Assessment report prepared by ASI is provided in **Appendix D**.

The archaeological field work was completed on April 26, 2022, in order to gain first-hand knowledge of the geography, topography, and current conditions and to evaluate and map archaeological potential of the study area. The study area meets the following criteria indicative of archaeological potential:

- water sources: primary, secondary, or past water source (Lake Ontario, West Aldershot Creek);
- early historic transportation routes (Plains Road West, Brown's Wharf);
- proximity to early settlements (Aldershot); and
- well-drained soils (Grimsby)

The property inspection determined that parts of the study area exhibit archaeological potential and these areas will require Stage 2 archaeological assessment, prior to any land disturbing activities, as identified in **Figure 4-8** and **Figure**

4-9 (green shaded areas indicate archaeological potential). The remainder of the study area was determined not to retain archaeological potential and do not require further survey.

In light of the results, ASI recommended:

- Parts of the study area exhibit archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals prior to any proposed construction activities on these lands;
- The remainder of the study area does not retain archaeological potential on account of deep and extensive land disturbance, slopes in excess of 20 degrees, or being previously assessed. These lands do not require further archaeological assessment; and
- Should the proposed work extend beyond the current study area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.



Figure 4-8: Stage 1 Archaeological Assessment Results (Part 1)

5 ALTERNATIVE SOLUTIONS

5.1 Identification of Alternative Solutions

Under Phase 2 of the MCEA planning and design process, reasonable and feasible solutions to address the needs, opportunities, and problem (as summarized in **Section 3**) are identified and examined. Alternative solutions are different ways of potentially solving the problem or addressing the opportunity.

The Alternative Solutions that have been developed for the *Replacement, Rehabilitation or Relocation of the Aldershot Creek Wastewater Main* Study include:

- Alternative 1 – Do Nothing
- Alternative 2 – Re-routing of Sewers to the Eastern Side of the Creek
- Alternative 3 – Two Sewer Systems and Pumping Station
- Alternative 4 – Two Sewer Systems and Gravity Sewers
- Alternative 5 – Re-routing of Sewers to the Eastern Side of the Creek via Trenchless Crossing
- Alternative 6 – Two Sewer Systems and Gravity Sewers with Townhouse Complex Flows to East
- Alternative 7 – Replace the Existing Wastewater Main along a Similar Alignment including Trenchless Creek Crossing

Each of these alternatives are described in further detail below to understand technical feasibility and potential limitations. **Figure 5-1** summarizes the existing wastewater system including manhole identifiers and existing pipe sizes, which will be referenced throughout the alternative descriptions.

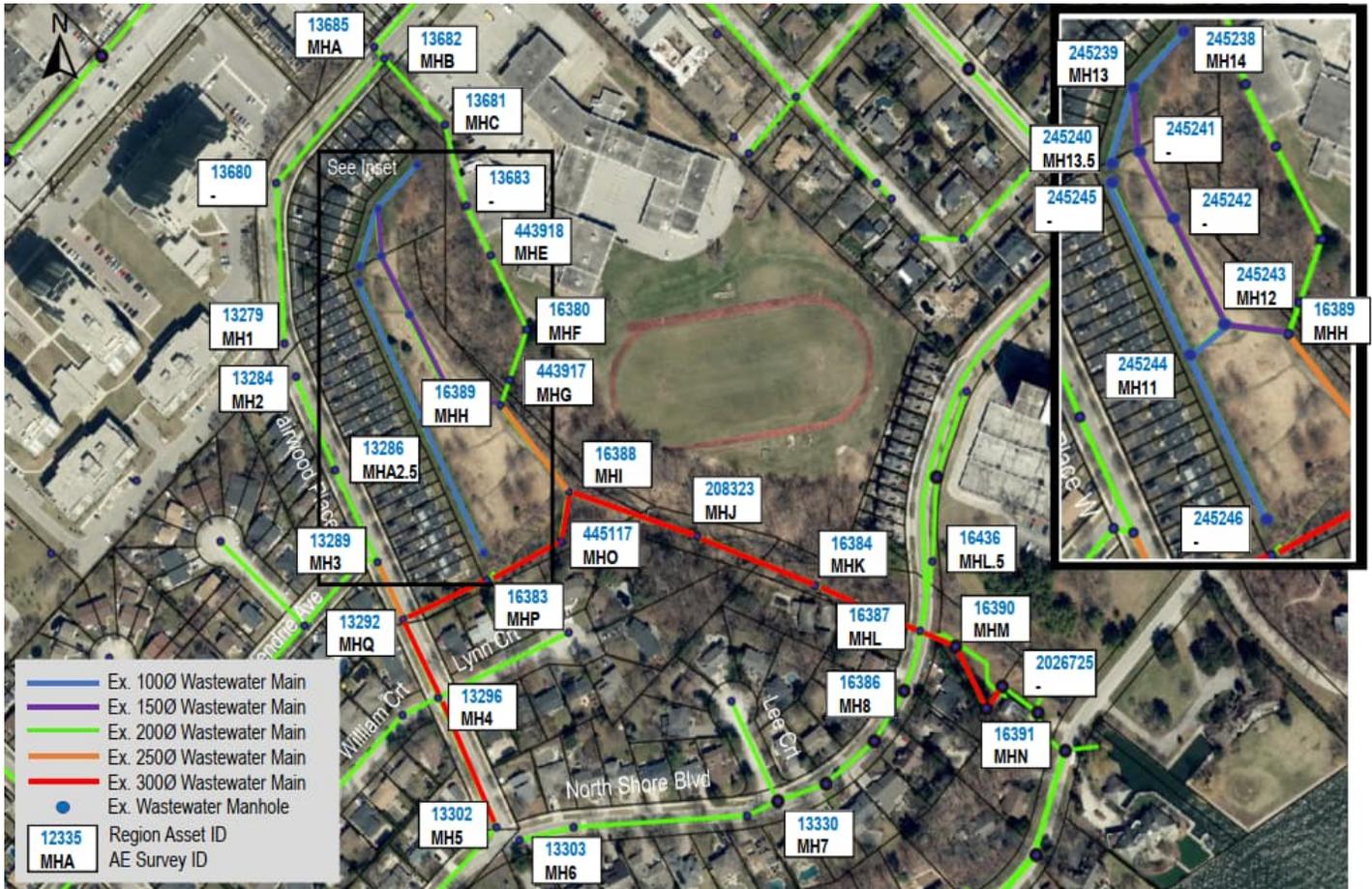


Figure 5-1: Existing Wastewater System

5.1.1 Alternative 1: Do Nothing

The *Environmental Assessment Act* (EAA) requires the consideration of the 'Do Nothing' alternative. This alternative is included to serve as a benchmark condition for which to evaluate the other alternatives and consider what will happen if no action is taken to improve the wastewater system. This assumes that the wastewater system will remain as it exists at the present time with no improvements proposed to remedy the existing issues or accommodate the future (2031) projected flows.

5.1.2 Alternative 2: Re-Routing of Sewers to the Eastern Side of the Creek

Alternative 2 (Figure 5-2) replaces the existing wastewater system with a new 375mm diameter sewer running from MH3 (existing MH #13289), along the existing easement beside the Fairwood Place Townhouses to approximately MHP (existing MH #16383), to a new sewer connecting the services of the Townhouse complex, and (trenchless) crossing to the east side of the creek upstream under the storm outlet (900mm diameter) to MHC (existing MH #13681). The private minor wastewater system associated with the Fairwood Place Townhouses will remain as-is. The wastewater flows from MH11 (existing MH #245244) and MH13 (existing MH #245239) will be conveyed to the new regional system via 100mm and 150mm diameter mains connecting at two new manholes, MH11_E and MH13_S, respectively.

The portion of sewer from MHB (existing MH #13682) to MHC (existing MH #13681) will undergo rehabilitation. During detailed design, CCTV investigations of this portion of sewer will need to be completed to confirm the pipe is suitable for rehabilitation. At MHC (existing MH #13681) the sewer will then convey flows south along Aldershot High School to North Shore Boulevard, predominately along the top of bank of West Aldershot Creek and ultimately to the LaSalle Park WWPS. The sewer between MHC (existing MH #13681) and MHF (existing MH #16380) will be reconstructed to eliminate the portion of sewer currently located under the High School building. At North Shore Boulevard, the new sewer will cross the roadway (trenchless) and convey flows along the east side of West Aldershot Creek to the LaSalle Park WWPS. The new sewer crossing North Shore Boulevard will be deeper than the existing wastewater sewer from MHL.5 (existing MH #16436) to MHL (existing MH #16387); therefore, that sewer will remain.

Key tie-in locations to the existing system include:

- MH 3 (existing MH #13289)
- MHQ (existing MH #13292)
- Fairwood Place Townhouse West Servicing (MH11/existing MH #245244)
- MHC (existing MH #13681)
- Aldershot High School Lateral #1 at MHE (existing MH #443918)
- Aldershot High School Lateral #2 at MHF (existing MH #16380)
- LaSalle Park WWPS

Alternative 2 consists of approximately 945m of new sewer, and 60m of rehabilitated sewer. Based on proposed manhole rim elevations and inverts and consideration for key tie-in elevations, no sewer lengths will have cover greater than 10m (considered to be very deep), with approximately 275m of sewer having a depth between 5m and 10m (considered deep). Of the deep sewers, the maximum depth is approximately 9.3m at MHC (existing MH #13681), with the deep sewers predominately occurring along the Aldershot High School property between MHC (existing MH #13681) and MHF (existing MH #16380). Of the 945m of new sewer, it is estimated that 670m may be installed via open-cut method, while 275m may be installed via trenchless method.

This alternative will address capacity issues and eliminate the need for Project ID 7527 (refer to **Section 1.3** for more details), as the planned upsizing of the wastewater main will be incorporated into the infrastructure of this alternative. Construction within the road right-of-way (ROW) will be required along Fairwood Place W (MH3 to easement).

Based on Conservation Halton (CH) mapping, the alignment will be within CH regulated lands and require approval and permitting from CH. It also has portions of sewer that may not be able to be located outside of the stable top of slope of West Aldershot Creek, predominately along the Aldershot High School building and at the downstream section connecting to North Shore Boulevard. Detailed slope stability assessment will be completed as part of the geotechnical investigation to confirm location and impact on proposed sewer alignment.

New easements are anticipated from the Fairwood Place Townhouses, Halton District School Board (HDSB) and City of Burlington; while existing easements along the west side of Aldershot Creek associated with the existing wastewater main may be dissolved.

Halton Region may also consider the new sewer from MH3 (existing MH #13289) to MHQ (existing MH #13292) be extended further north along Fairwood Place to beyond existing MH #13279. This would replace the full length of the

existing wastewater main (circa 1973), pick up one of the westerly apartment blocks, and eliminate the future need for WWM RMOHID #11700. The proposed works are shown on **Figure 5-2** as dashed lines. This additional wastewater work is considered future works that would need to be considered for further review by the Region’s System Services/Asset Management prior to inclusion in this assignment’s scope of works. Preliminary review of as-built inverts of this system indicates feasibility of suggested works.

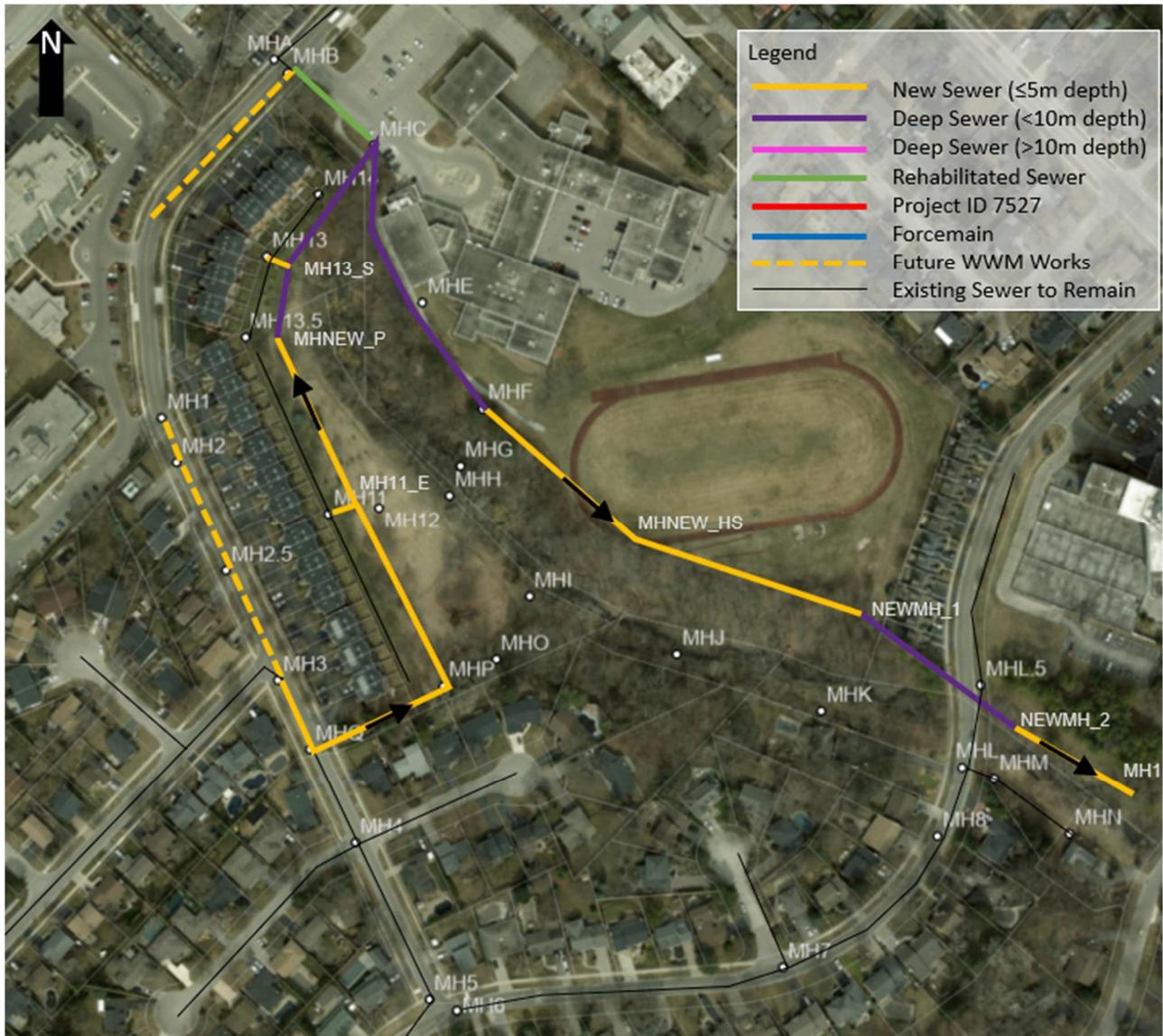


Figure 5-2: Alternative 2 Proposed Alignment

5.1.3 Alternative 3: Two Sewer Systems and Pumping Station

Alternative 3 (**Figure 5-3**) involves separating the existing sewer system, maintaining wastewater flows on the east and west side of West Aldershot Creek, and implementing Project ID 7527. On the west side, a new WWPS and forcemain will carry the wastewater flows from Fairwood Place Townhouses to the new sewer associated with Project ID 7527 on Fairwood Place W at MHQ (existing MH #13292). The private minor wastewater system associated with the Fairwood Place Townhouses will remain as-is to existing MH #245241 and MH11 (existing MH #245244). From

existing MH #245241 the sewer will be reconstructed to improve depth and collect flows from MH 11 (existing MH #245244). The new sewer from new MH11_E will convey flows to the new WWPS. The new WWPS at MHP (existing MH #16383) will include a small submersible pump to convey flows from the Townhouses to the regional wastewater system, with flows anticipated to be less than 1L/s. The chosen location of the WWPS will provide ease of access to the facility for future maintenance.

The new 375mm diameter sewer from MH3 (existing MH #13289) will convey flows along Fairwood Place W and North Shore Boulevard to LaSalle Park WWPS. Preliminary inverts indicate that the existing 200mm and 300mm diameter wastewater mains (along North Shore Boulevard and Fairwood Place W, respectively) can be replaced with the new upsized main including connection of laterals. The new sewer from MHL (existing MH #16387) to new MHNEW_2 will cross under the existing 1900mm diameter CSP culvert. The existing 300mm diameter wastewater main from MHL (existing MH #16387) to the LaSalle Park WWPS can be abandoned.

On the east side, the portion of sewer from MHB (existing MH #13682) to MHC (existing MH #13681) will undergo rehabilitation. During detailed design, CCTV investigations of this portion of sewer will need to be completed to confirm the pipe is suitable for rehabilitation. At MHC (existing MH #13681) a new 300mm diameter sewer will then convey flows south along Aldershot High School to North Shore Boulevard, predominately along the top of bank of West Aldershot Creek and ultimately to the LaSalle Park WWPS. The sewer between MHC (existing MH #13681) and MHF (existing MH #16380) will be reconstructed to eliminate the portion of sewer currently located under the High School building. At North Shore Boulevard, the new sewer will cross the roadway (trenchless) and convey flows along the east side of West Aldershot Creek to LaSalle Park WWPS. A new sewer segment from MHL.5 (existing MH #16436) will tie into the new MHNEW_2.

Key tie-in locations to the existing system include:

- MH #245241
- Fairwood Place Townhouse West Servicing (MH11/existing MH #245244)
- MH 3 (existing MH #13289)
- MHC (existing MH #13681)
- Aldershot High School Lateral #1 at MHE (existing MH #443918)
- Aldershot High School Lateral #2 at MHF (existing MH #16380)
- MHL.5 (existing MH #16436)
- LaSalle Park WWPS

Alternative 3 consists of approximately 1270m of new sewer, 60m of rehabilitated sewer, and 70m of forcemain. Based on proposed manhole rim elevations and inverts and consideration for key tie-in elevations, no sewer lengths will have a cover greater than 10m (considered to be very deep), with approximately 360m of sewer having a depth between 5m and 10m (considered deep). Of the deep sewers, the maximum depth is approximately 7.5m at the new manhole (NEWMH_1) south of Aldershot High School, with the remaining deep sewers under 7m depth at the new WWPS and North Shore Boulevard between MH8 (existing MH #16386) and existing MH1 (at LaSalle Park WWPS). Of the 1270m of new sewer, it is estimated that 1120m may be installed via open-cut method, while 150m may be installed via trenchless method.

This alternative will address capacity issues through the separation of flows and inclusion of Project ID 7527. Wastewater flows from the west area (of West Aldershot Creek) will now be redirected along Fairwood Place W and

North Shore Boulevard, including flows from the Fairwood Place Townhouses. Wastewater flows from the east area (of West Aldershot Creek) will now remain on the east side and be conveyed along the Aldershot High School field to North Shore Boulevard. Construction within the road right-of-way (ROW) will be required along Fairwood Place W and North Shore Boulevard.

Based on Conservation Halton (CH) mapping, portions of the alignment will be within CH regulated lands and require approval and permitting from CH. It also has portions of sewer that may not be able to be located outside of the stable top of slope of West Aldershot Creek; predominately at the downstream section connecting to North Shore Boulevard. Detailed slope stability assessment will be completed as part of the geotechnical investigation to confirm location and impact on proposed sewer alignment. Coordination with the Fairwood Place Townhouses will be required to confirm ownership, maintenance, and operation requirements of the proposed WWPS.

New temporary easements are anticipated from the Fairwood Place Townhouses. Permanent easements will be required from Halton District School Board (HDSB) and City of Burlington; while portions of the existing easements along the west side of West Aldershot Creek associated with the existing wastewater main may be dissolved.

Halton Region may also consider the new sewer from MH3 (existing MH #13289) to MHQ (existing MH #13292) be extended further north along Fairwood Place to beyond existing MH #13279. This would replace the full length of the existing wastewater main (circa 1973), pick up one of the westerly apartment blocks, decrease flows through the easement wastewater main and eliminate the future need for WWM RMOHID #11700. The proposed works are shown on **Figure 5-3** as dashed lines. This additional wastewater work is considered future works that would need to be considered for further review by the Region's System Services/Asset Management prior to inclusion in this assignment's scope of works. Preliminary review of as-built inverts of this system indicates feasibility of suggested works.

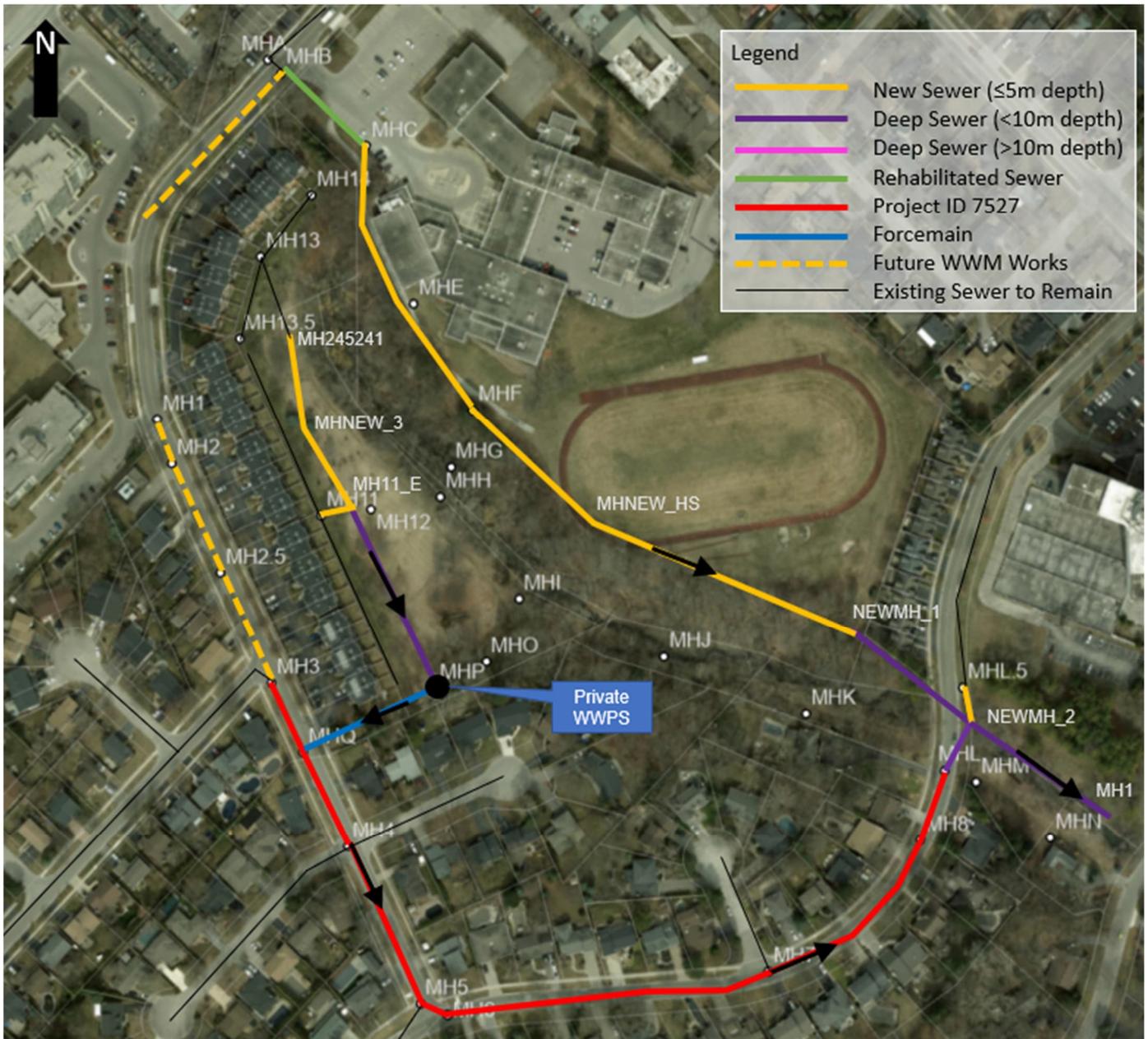


Figure 5-3: Alternative 3 Proposed Alignment

5.1.4 Alternative 4: Two Sewer Systems and Gravity Sewers

Alternative 4 (Figure 5-4) involves separating the existing sewer system, maintaining wastewater flows on the east and west side of West Aldershot Creek, and implementing Project ID 7527. On the west side, the private minor wastewater system associated with Fairwood Place West Townhouses will remain as-is. The wastewater flows from MH11 (existing MH #245244) and MH13 (existing MH #245239) will be conveyed to the new regional system via 150mm diameter main connecting at new manholes, MH11_E and MH13_S, respectively. MH11_E will convey flows to approximately MHP (existing MH #16383). Flows will then be conveyed along the easement, Fairwood Place W and North Shore Boulevard to LaSalle Park WWPS.

Preliminary inverts indicate the new sewer along the existing easement and along Fairwood Place W and North Shore Boulevard, to approximately Lee Court, will be deep. Due to the depth, trenchless installation of the deeper sewer sections is required. Decommissioning of the existing wastewater mains and connecting laterals to the new deep sewer along Fairwood Place West and North Shore Boulevard is not recommended; rather the existing wastewater mains will remain and be connected to the deep sewer at key tie-in locations. The new sewer from MHL (existing MH #16387) to new MHNEW_2 will cross under the existing 1900mm diameter CSP culvert. The existing 300mm diameter wastewater main from MHL (existing MH #16387) to the LaSalle Park WWPS can be abandoned.

On the east side, the portion of sewer from MHB (existing MH #13682) to MHC (existing MH #13681) will undergo rehabilitation. During detailed design, CCTV investigations of this portion of sewer will need to be completed to confirm the pipe is suitable for rehabilitation. At MHC (existing MH #13681) a new 300mm diameter sewer will convey flows from along Aldershot High School to North Shore Boulevard, predominately along the top of the bank of West Aldershot Creek and ultimately to the LaSalle Park WWPS. The sewer between MHC (existing MH #13681) and MHF (existing MH #16380) will be reconstructed to eliminate the portion of sewer currently located under the High School building. At North Shore Boulevard, the new sewer will cross the roadway (trenchless) and convey flows along the east side of West Aldershot Creek to LaSalle Park WWPS. A new sewer segment from MHL.5 (existing MH #16436) will tie into the new MHNEW_2.

Key tie-in locations to the existing system include:

- Fairwood Place Townhouse East Servicing (MH13/existing MH #245239)
- Fairwood Place Townhouse West Servicing (MH11/existing MH #245244)
- MH 3 (existing MH #13289)
- MHC (existing MH #13681)
- Aldershot High School Lateral #1 at MHE (existing MH #443918)
- Aldershot High School Lateral #2 at MHF (existing MH #16380)
- MHL.5 (existing MH #16436)
- LaSalle Park WWPS

Alternative 4 consists of approximately 1380m of new sewer, and 60m of rehabilitated sewer. Based on proposed manhole rim elevations and inverts and consideration for key tie-in elevations, approximately 220m of sewer will have cover greater than 10m (considered to be very deep), with approximately 320m of sewer having a depth between 5m and 10m (considered deep). Of the very deep sewers, the maximum depth is approximately 10.5m at the manhole at the intersection of Fairwood Place W and North Shore Boulevard (MH5_6), with very deep sewers between MHQ (existing MH #13292) and MH5_6, along Fairwood Place W. Of the deep sewers, the maximum depth is approximately 9.8m from the new manhole MH5_6 along North Shore Boulevard and from the new manhole (NEWMH_1) to existing MH1 (at LaSalle Park WWPS) crossing North Shore Boulevard. Of the 1380m of new sewer, it is estimated that 840m may be installed via open-cut method, while 540m may be installed via trenchless method.

This alternative will address capacity issues through the separation of flows and inclusion of Project ID 7527. Wastewater flows from the west area (of West Aldershot Creek) will now be redirected along Fairwood Place W and North Shore Boulevard, including flows from the Fairwood Place Townhouse complex. Wastewater flows from the east area (of West Aldershot Creek) will now remain on the east side and be conveyed along the Aldershot High School field to North Shore Boulevard. Construction within the road right-of-way (ROW) will be required along Fairwood Place W and North Shore Boulevard.

Based on Conservation Halton (CH) mapping, portions of the alignment will be within CH regulated lands and require approval and permitting from CH. It also has portions of sewer that may not be able to be located outside of the stable top of slope of West Aldershot Creek; predominately along the Aldershot High School building and at the downstream section connecting to North Shore Boulevard. Detailed slope stability assessment will be completed as part of the geotechnical investigation to confirm location and impact on proposed sewer alignment.

New temporary easements are anticipated from the Fairwood Place Townhouses. Permanent easements will be required from Halton District School Board (HDSB) and City of Burlington; while portions of the existing easements along the west side of West Aldershot Creek associated with the existing wastewater main may be dissolved.

Halton Region may also consider the new sewer from MH3 (existing MH #13289) to MHQ (existing MH #13292) be extended further north along Fairwood Place to beyond existing MH #13279. This would replace the full length of the existing wastewater main (circa 1973), pick up one of the westerly apartment blocks, decrease flows through the easement wastewater main and eliminate the future need for WWM RMOHID #11700. The proposed works are shown on **Figure 5-4** as dashed lines. This additional wastewater work is considered future works that would need to be considered for further review by the Region's System Services/Asset Management prior to inclusion in this assignment's scope of works. Preliminary review of as-built inverts of this system indicates feasibility of suggested works.

The new sewer will continue to run south to North Shore Boulevard, predominately along the top of bank of West Aldershot Creek and ultimately to the LaSalle Park WWPS. At North Shore Boulevard, the new sewer will cross the roadway (trenchless) and convey flows along the east side of West Aldershot Creek to LaSalle Park WWPS. The new sewer crossing North Shore Boulevard will be deeper than the existing wastewater sewer from MHL.5 (existing MH #16436) to MHL (existing MH #16387); therefore, that sewer will remain.

The portion of sewer from MHB (existing MH #13682) to MHC (existing MH #13681) will undergo rehabilitation. During detailed design, CCTV investigations of this portion of sewer will need to be completed to confirm the pipe is suitable for rehabilitation.

Key tie-in locations to the existing system include:

- MH 3 (existing MH #13289)
- MHQ (existing MH #13292)
- Fairwood Place Townhouse Servicing (MH12/existing MH #245243)
- MHC (existing MH #13681)
- Aldershot High School Lateral #1 at MHE (existing MH #443918)
- Aldershot High School Lateral #2 at MHF (existing MH #16380)
- LaSalle Park WWPS

Alternative 5 consists of approximately 840m of new sewer, and 60m of rehabilitated sewer. Based on proposed manhole rim elevations and inverts and consideration for key tie-in elevations, approximately 300m of sewer will have a cover greater than 10m (considered to be very deep), with approximately 75m of sewer having a depth between 5m and 10m (considered deep). Of the very deep sewers, the maximum depth is approximately 13.9m at the new manhole along the Aldershot High School (NEWMH_1) prior to North Shore Boulevard, while the deep sewers are between 5m and 7m along the easement along the Fairwood Place Townhouses and between NEWMH_2 and LaSalle Park WWPS. Of the 840m of new sewer, it is estimated that 540m may be installed via open-cut method, while 300m may be installed via trenchless method.

This alternative will address capacity issues and eliminate the need for Project ID 7527, as the planned upsizing of the wastewater main will be incorporated into the infrastructure of this alternative. Construction within the road right-of-way (ROW) will be required along Fairwood Place W (MH3 to easement).

Based on Conservation Halton (CH) mapping, the alignment will be within CH regulated lands and require approval and permitting from CH. It also has portions of sewer that may not be able to be located outside of the stable top of slope of West Aldershot Creek, predominately at the downstream section connecting to North Shore Boulevard. Detailed slope stability assessment will be completed as part of the geotechnical investigation to confirm location and impact on proposed sewer alignment. Concerning the crossing of West Aldershot Creek, for feasibility of existing tie-in elevations within the system, 2.15m of cover is proposed over the new wastewater main crossing. Therefore, CH will likely require a scour assessment to ensure the crossing will not have negative impacts on the creek bed.

New easements are anticipated from the Fairwood Place Townhouses, Halton District School Board (HDSB) and City of Burlington; while portions of the existing easements along the west side of West Aldershot Creek associated with the existing wastewater main may be dissolved.

Halton Region may also consider the new sewer from MH3 (existing MH #13289) to MHQ (existing MH #13292) be extended further north along Fairwood Place to beyond existing MH #13279. This would replace the full length of the existing wastewater main (circa 1973), pick up one of the westerly apartment blocks, and eliminate the future need for WWM RMOHID #11700. The proposed works are shown on **Figure 5-5** as dashed lines. This additional wastewater work is considered future works that would need to be considered for further review by the Region’s System Services/Asset Management prior to inclusion in this assignment’s scope of works. Preliminary review of as-built inverts of this system indicates feasibility of suggested works.

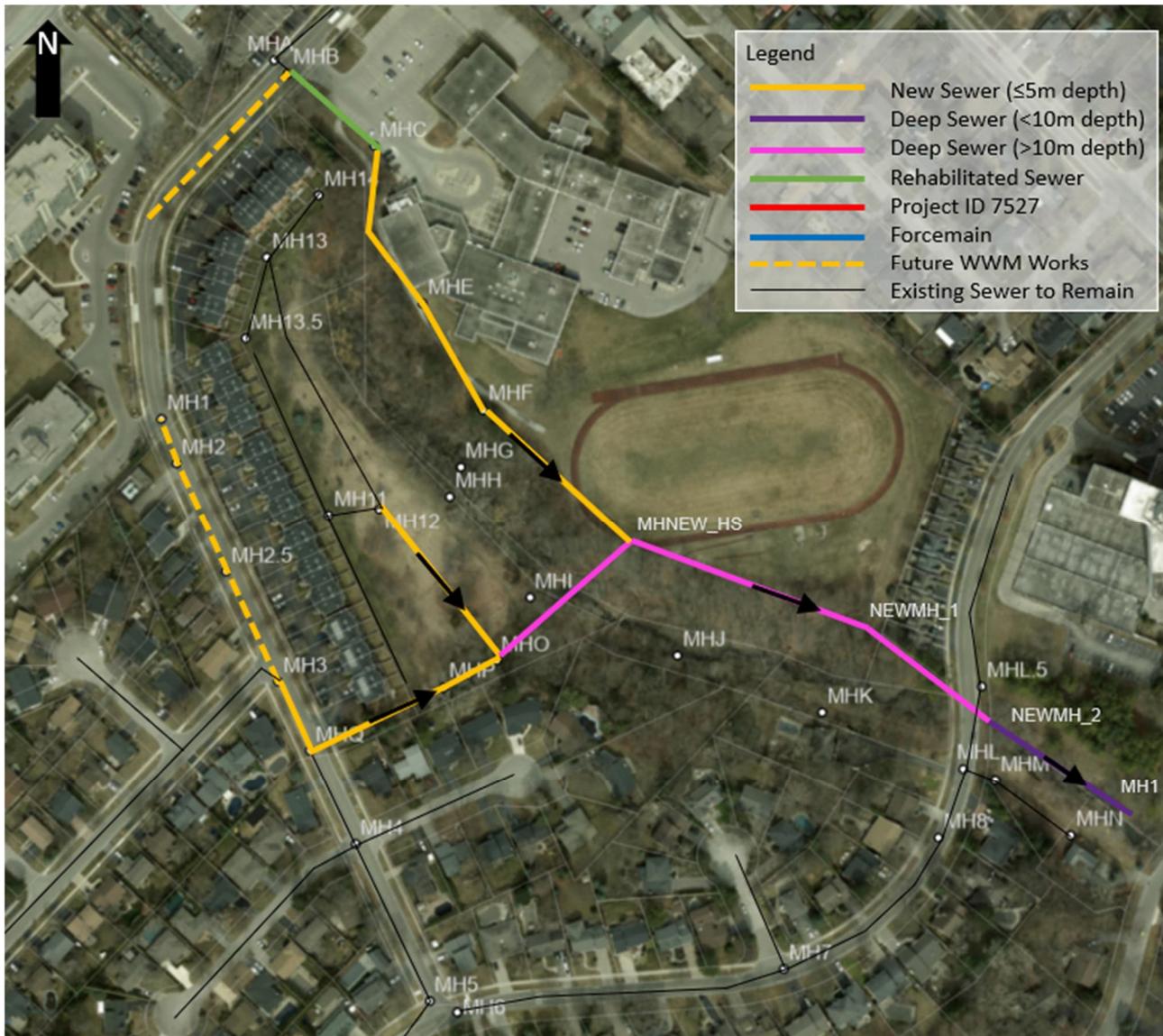


Figure 5-5: Alternative 5 Proposed Alignment

5.1.6 Alternative 6: Two Sewer Systems and Gravity Sewers (Townhouse Complex Flows to East)

Alternative 6 (**Figure 5-6**) involves separating the existing sewer system, maintaining wastewater flows on the east and west side of West Aldershot Creek, and implementing Project ID 7527. On the east side, the private sewers associated with both Fairwood Place Townhouse complexes will be redirected to convey flows to MHC (existing MH

#13681). The private minor wastewater system associated with the Townhouses will remain as-is. The wastewater flows from MH11 (existing MH #245244) and MH13 (existing MH #245239) will be conveyed to the new regional system via 150mm diameter main connecting at new manholes, MH11_E and MH13_S, respectively. MH13_S will convey flows to MHC (existing MH #13681) over the storm outlet (900mm diameter). In order to mitigate the depth of sewers behind the Townhouse complex and further downstream, this alternative will require the regrading of the lands behind the Fairwood Place Townhouse West complex to raise the ground elevation approximately 1m for approximately 10m beyond the existing top of bank at the basement walkouts. This regrading is not anticipated to impact the floodplain of West Aldershot Creek.

The portion of sewer from MHB (existing MH #13682) to MHC (existing MH #13681) will undergo rehabilitation. During detailed design, CCTV investigations of this portion of sewer will need to be completed to confirm the pipe is suitable for rehabilitation. At MHC (existing MH #13681) a new 300mm diameter sewer will convey flows south along Aldershot High School to North Shore Boulevard, predominately along the top of the bank of West Aldershot Creek and ultimately to the LaSalle Park WWPS. The sewer between MHC (existing MH #13681) and MHF (existing MH #16380) will be reconstructed to eliminate the portion of sewer currently located under the High School building. At North Shore Boulevard, the new sewer will cross the roadway (trenchless) and convey flows along the east side of West Aldershot Creek to LaSalle Park WWPS. A new sewer segment from MHL.5 (existing MH #16436) will tie into the new MHNEW_2.

On the west side, the new 375mm diameter sewer from MH3 (existing MH #13289) will convey flows along Fairwood Place W and North Shore Boulevard to LaSalle Park WWPS. Preliminary inverts indicate that the existing 200mm and 300mm diameter wastewater mains (along North Shore Boulevard and Fairwood Place W, respectively) can be replaced with the new upsized main including connection of laterals. The new sewer from MHL (existing MH #16387) to new MHNEW_2 will cross under the existing 1900mm diameter CSP culvert. The existing 300mm diameter wastewater main from MHL (existing MH #16387) to the LaSalle Park WWPS can be abandoned.

Key tie-in locations to the existing system include:

- MH 3 (existing MH #13289)
- Fairwood Place Townhouse East Servicing (MH13/existing MH #245239)
- Fairwood Place Townhouse West Servicing (MH11/existing MH #245244)
- MHC (existing MH #13681)
- Aldershot High School Lateral #1 at MHE (existing MH #443918)
- Aldershot High School Lateral #2 at MHF (existing MH #16380)
- MHL.5 (existing MH #16436)
- LaSalle Park WWPS

Alternative 6 consists of approximately 1275m of new sewer, and 60m of rehabilitated sewer. Based on proposed manhole rim elevations and inverts and consideration for key tie-in elevations, no sewer lengths will have cover greater than 10m (considered to be very deep), with approximately 440m of sewer having a depth between 5m and 10m (considered deep). Of the deep sewers, the maximum depth is approximately 7.8m at MHC (existing MH #13681), with the remaining deep sewers adjacent to the Aldershot High School building between MHC (existing MH #13681) and MHF (existing MH #16380), and between MHL (existing MH #16387) and existing MH1 (at LaSalle Park WWPS). Of the 1275m of new sewer, it is estimated that 1125m may be installed via open-cut method, while 150m may be installed via trenchless method.

This alternative will address capacity issues through the separation of flows and inclusion of Project ID 7527. Wastewater flows from the west area (of West Aldershot Creek) will now be redirected along Fairwood Place W and North Shore Boulevard. Wastewater flows from the east area (of West Aldershot Creek) will now remain on the east side and be conveyed along the Aldershot High School field to North Shore Boulevard, including flows from the Fairwood Place East and West Townhouse complexes. Construction within the road right-of-way (ROW) will be required along Fairwood Place W and North Shore Boulevard.

Based on Conservation Halton (CH) mapping, portions of the alignment will be within CH regulated lands and require approval and permitting from CH. It also has portions of sewer that may not be able to be located outside of the stable top of slope of West Aldershot Creek; predominately along the Aldershot High School building and at the downstream section connecting to North Shore Boulevard. Detailed slope stability assessment will be completed as part of the geotechnical investigation to confirm location and impact on proposed sewer alignment.

New temporary easements are anticipated from the Fairwood Place Townhouses. Permanent easements will be required from Halton District School Board (HDSB) and City of Burlington; while portions of the existing easements along the west side of West Aldershot Creek associated with the existing wastewater main may be dissolved.

Halton Region may also consider the new sewer from MH3 (existing MH #13289) to MHQ (existing MH #13292) be extended further north along Fairwood Place to beyond existing MH #13279. This would replace the full length of the existing wastewater main (circa 1973), pick up one of the westerly apartment blocks, decrease flows through the easement wastewater main and eliminate the future need for WWM RMOHID #11700. The proposed works are shown on **Figure 5-6** as dashed lines. This additional wastewater work is considered future works that would need to be considered for further review by the Region's System Services/Asset Management prior to inclusion in this assignment's scope of works. Preliminary review of as-built inverts of this system indicates feasibility of suggested works.

A new 375mm diameter sewer will run from MH3 (existing MH #13289), along the existing easement beside the Fairwood Place Townhouses to MHI (existing MH #16388). Flows from the Fairwood Place Townhouses will continue to convey south to MH 12 (existing MH #245243) and tie into MHH (existing MH #16389) with a new sewer. The new 375mm diameter sewer will continue to run south from MHI (existing MH #16388) to North Shore Boulevard, replacing the existing sewer along the creek valley, ultimately to the LaSalle Park WWPS.

Key tie-in locations to the existing system include:

- MH 3 (existing MH #13289)
- MHQ (existing MH #13292)
- Fairwood Place Townhouse Servicing (MH12/existing MH #245243)
- MHC (existing MH #13681)
- Aldershot High School Lateral #1 at MHE (existing MH #443918)
- Aldershot High School Lateral #2 at MHF (existing MH #16380)
- LaSalle Park WWPS

Alternative 7 consists of approximately 795m of new sewer, and 60m of rehabilitated sewer. Based on proposed manhole rim elevations and inverts and consideration for key tie-in elevations, approximately 50m of sewer will have a cover greater than 10m (considered to be very deep), with approximately 120m of sewer having a depth between 5m and 10m (considered deep). Of the very deep sewers, the maximum depth is approximately 11.7m at MHF (existing MH #16380) at the upstream end of the creek crossing, while the deep sewers are between 5m and 7.5m along the easement along the Fairwood Place Townhouses and between MHH (existing MH #16389) and MHI (existing MH #16388). Of the 795m of new sewer, it is estimated that 745m may be installed via open-cut method, while 50m may be installed via trenchless method.

This alternative will address capacity issues and eliminate the need for Project ID 7527, as the planned upsizing of the wastewater main will be incorporated into the infrastructure of this alternative. Construction within the road right-of-way (ROW) will be required along Fairwood Place W (MH3 to easement).

Based on Conservation Halton (CH) mapping, the alignment will be within CH regulated lands and require approval and permitting from CH. It also has portions of sewer that may not be able to be located outside the stable top of slope of West Aldershot Creek, predominately at the Aldershot High School. Detailed slope stability assessment will be completed as part of the geotechnical investigation to confirm location and impact on proposed alignment. Concerning the crossing of West Aldershot Creek, for feasibility of existing tie-in elevations within the system, 2.15m of cover is proposed over the new wastewater main crossing. Therefore, CH will likely require a scour assessment to ensure the crossing will not have negative impacts on the creek bed.

No new permanent easements will be required as all new infrastructure would be within the existing easements. To ensure accessibility of the new wastewater main by Region's Operations staff into the future, the Region would require a permanent access road be provided (approximately 3m wide) along the west side of the creek from North Shore Boulevard to MHH (existing MH #16389). This permanent access road would be in the same location as the proposed temporary construction access route for the City of Burlington's West Aldershot Creek restoration project with the new wastewater main alignment also generally following under this access route.

Halton Region may also consider the new sewer from MH3 (existing MH #13289) to MHQ (existing MH #13292) be extended further north along Fairwood Place to beyond existing MH #13279. This would replace the full length of the

existing wastewater main (circa 1973), pick up one of the westerly apartment blocks, decrease flows through the easement wastewater main and eliminate the future need for WWM RMOHID #11700. The proposed works are shown on **Figure 5-7** as dashed lines. This additional wastewater work is considered future works that would need to be considered for further review by the Region’s System Services/Asset Management prior to inclusion in this assignment’s scope of works. Preliminary review of as-built inverts of this system indicates feasibility of suggested works.

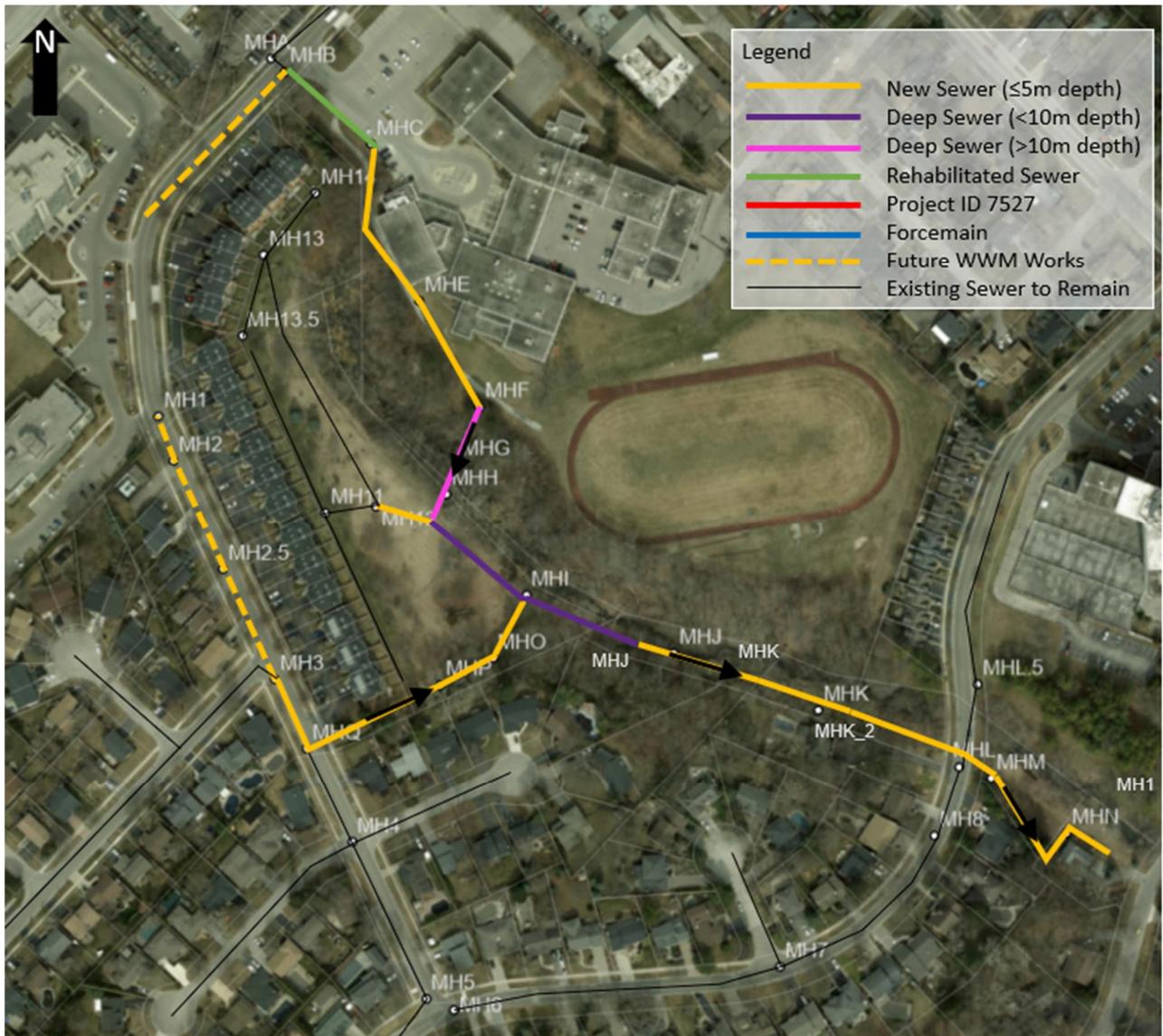


Figure 5-7: Alternative 7 Proposed Alignment

5.2 Costing Summary of Alternatives

A high level, order of magnitude, construction costing summary was prepared for each of the seven (7) alternative solutions. The costing was prepared considering major costing items such as open cut and trenchless installation, manhole structures, and shaft construction. The cost associated with property acquisition and/or easements was not

included in the capital costing. Using Halton Region’s costing tool, consideration for additional construction costs, design and engineering costs and contingencies were incorporated into the costing summary of each alternative.

Table 5-1 provides a summary of unit costs used to generate capital cost estimates for each alternative, while **Table 5-2** provides the capital cost of each alternative. Refer to **Appendix E** for costing summary for each alternative.

Table 5-1: Summary of Unit Prices

Item	Unit Cost	Unit
200mm Sewer Rehabilitation*	\$2,500	per metre
Manhole Rehabilitation	\$4,425	per MH
Open-cut Installation (≤5m) including pipe, backfill and restoration – soft surface	\$2,000	per metre
Open-cut Installation (≤10m) including pipe, backfill and restoration – soft surface	\$4,000	per metre
Open-cut Installation (≤5m) including pipe, backfill and restoration – hard surface	\$2,500	per metre
Open-cut Installation (≤10m) including pipe, backfill and restoration – hard surface	\$4,500	per metre
Open-cut Installation of Forcemain	\$1,500	per metre
New 1200mm Precast Manhole Structures		
Depth = 3 to 4m	\$19,500	per MH
Depth = 4 to 5m	\$23,500	per MH
Depth= 5 to 8m	\$30,000	per MH
Depth = greater than 8m	\$50,000	per MH
Trenchless Installation	\$12,000	per metre
Shaft Installation		
Depth = max 8m	\$500,000	per shaft
Depth = max 13m	\$1,000,000	per shaft
Trenchless Installation – Jack & Bore	\$8,000	per metre
Entry Shaft	\$200,000	per shaft
Exit Shaft	\$65,000	per shaft
Minor Creek/Pipe Crossing (20m)	\$250,000	each
Major Crossing (150m)	\$1,300,000	each
WWPS – Fairwood Townhouses	\$150,000	lump sum
Wastewater Laterals		
Transfer Lateral	\$2,100	each
New Lateral	\$13,000	each

*rehabilitation unit cost same as open cut installation in the event rehabilitation is not feasible

Table 5-2: Capital Cost Summary

Alternative	Capital Cost Estimate
Alternative 1 – Do Nothing	\$0
Alternative 2 – Re-Routing of Sewers to the Eastern Side of the Creek	\$17,494,494
Alternative 3 – Two Sewer Systems and Pumping Station	\$10,743,691
Alternative 4 – Two Sewer Systems and Gravity Sewers	\$25,122,310
Alternative 5 – Re-routing of Sewers to the Eastern Side of the Creek via Trenchless Crossing	\$15,695,299
Alternative 6 – Two Sewer System and Gravity Sewers (Townhouse Complex Flows to East)	\$11,227,274
Alternative 7 – Replace the Existing Wastewater Main along a Similar Alignment including Trenchless Creek Crossing	\$9,190,537

5.3 Evaluation Process

5.3.1 Evaluation Criteria

A comprehensive evaluation matrix was developed to assess the seven (7) alternative solutions and identify the preliminary recommended preferred solution. The evaluation categories and their respective criteria are summarized in **Table 5-3**.

Table 5-4 expands on the criteria consideration.

Table 5-3: Category and Evaluation Criteria

Category	Evaluation Criteria
Natural Environment	<ul style="list-style-type: none"> • Terrestrial Environment Impacts • Aquatic Environment Impacts • Geotechnical Considerations • Climate Change Considerations
Socio-Cultural Environment	<ul style="list-style-type: none"> • Impact on Existing Land Use • Short-term/Construction Impact to Local Residents/Community • Short-term/Construction Impact to School Community • Long-term Impact on Local Residents/Community • Impact on Archaeological Resources, Indigenous Lands, Treaty Rights
Legal/Jurisdictional Environment	<ul style="list-style-type: none"> • Land Acquisition/Easement Requirements

Category	Evaluation Criteria
	<ul style="list-style-type: none"> • Complexity of Approval Processes/Regulatory Constraints • Accessibility and Ownership Considerations
Technical/Operational Environment	<ul style="list-style-type: none"> • Complexity of Construction • Ability to Meet Region Design Standards/CH Requirements • Implementation Phasing • Impact to Utilities • Complexity of Operation and Maintenance
Economic Environment	<ul style="list-style-type: none"> • Capital Construction Costs • Land Acquisition Costs • Operation & Maintenance Costs

Table 5-4: Criteria Definitions

	Evaluation Criteria	Weight	Definition
Natural Environment (20%)	Terrestrial Environment Impacts	5%	<ul style="list-style-type: none"> • Impacts on existing trees and vegetation community; need for tree removal; impact on Regional Natural Heritage System • Impacts on identified or potential Species at Risk
	Aquatic Environment Impacts	5%	<ul style="list-style-type: none"> • Impacts on existing aquatic environment within West Aldershot Creek • Impacts to existing surface water quality and drainage patterns; risk of flooding
	Geotechnical Considerations	5%	<ul style="list-style-type: none"> • Disturbance of soil/subsurface conditions; slope stability considerations
	Climate Change Considerations	5%	<ul style="list-style-type: none"> • Potential for adaptation and mitigation measures to be implemented to minimize climate change impacts on infrastructure and surrounding area
Socio-Cultural Environment (25%)	Impact on Existing Land Use	5%	<ul style="list-style-type: none"> • Impact/compatibility of proposed works with existing land use
	Short-term/Construction Impact to Local Residents/Community	5%	<ul style="list-style-type: none"> • Impact of construction and implementation of proposed works to local residents/ community including road closures, dust, noise, access to property and amenities

	Evaluation Criteria	Weight	Definition
	Short-term/Construction Impact to School Community	5%	<ul style="list-style-type: none"> Impact of construction and implementation of proposed works to school community including field closures, access to parking lot/building, dust, and noise
	Long-term Impact on Local Residents/Community	5%	<ul style="list-style-type: none"> Impact of maintenance and operation of proposed works to local residents/community
	Impact on Archaeological Resources, Indigenous Lands, Treaty Rights	5%	<ul style="list-style-type: none"> Impact of proposed works on lands with archaeological potential (as per Stage 1 Archaeological Assessment); need for additional archaeological assessments Impact on Indigenous lands, treaty rights, land claims, archaeological sites
Legal/Jurisdictional Environment (15%)	Land Acquisition/Easement Requirements	5%	<ul style="list-style-type: none"> Required land acquisition and easements required for the proposed works
	Complexity of Approval Processes/ Regulatory Constraints	5%	<ul style="list-style-type: none"> Complexity of approval processes and ability to meet regulatory constraints
	Accessibility and Ownership Considerations	5%	<ul style="list-style-type: none"> Considerations for accessibility of Region's Operation staff to provide regular maintenance; ownership of WW infrastructure
Technical/Operational Environment (25%)	Complexity of Construction	5%	<ul style="list-style-type: none"> Consideration for open-cut versus trenchless installation, depth of sewers, conflict with existing infrastructure
	Ability to Meet Region Design Standards/CH Requirements	5%	<ul style="list-style-type: none"> Ability to implement in accordance with latest Region Design Standards and CH Design requirements
	Implementation Phasing	5%	<ul style="list-style-type: none"> Length of construction; considerations for timing of construction
	Impacts to Utilities	5%	<ul style="list-style-type: none"> Consideration for conflict and relocation of utilities
	Complexity of Operation and Maintenance	5%	<ul style="list-style-type: none"> Consideration of ease of operation and maintenance of WW infrastructure, coordinating with stakeholders on on-going basis
Ec on	Capital Construction Costs	5%	<ul style="list-style-type: none"> Cost to Region to complete construction (order of magnitude has

Evaluation Criteria	Weight	Definition
		been used; refer to Section 5.2 and Appendix E for costing information)
Land Acquisition Costs	5%	<ul style="list-style-type: none"> • Cost consideration to secure property acquisition/easements
Operation and Maintenance Costs	5%	<ul style="list-style-type: none"> • Cost consideration to Region to maintain new works

5.3.2 Summary of Evaluation Process

To provide an impartial, traceable and consistent evaluation, as required by the MCEA process, the following method was used to illustrate the highest and lowest impact of each alternative relative to the evaluation criteria. The seven (7) alternatives were evaluated against the twenty (20) evaluation criteria (**Table 5-3**) using a five-point scale as summarized below (**Table 5-5**), ranging from most desirable/least impact (shown as a black solid circle) to least desirable/greatest impact (shown as a white circle). Alternatives considered intermediate between the most desirable/least impact and least desirable/greatest impact options were shown as partially filled circles.

Table 5-5: Evaluation Scale

	(0)	Least Desirable/Greatest Impact
	(1)	Worse Choice
	(2)	Adequate Choice
	(3)	Better Choice
	(4)	Most Desirable/Least Impact

5.3.3 Evaluation Matrix

The evaluation matrix (**Table 5-6**) compares the seven (7) study alternatives utilizing the evaluation criteria to determine the preferred solution. A weighted sum was determined for each alternative for each of the five (5) categories and then totalled to determine an overall score for each alternative. The alternatives were ranked, with the highest scoring alternative deemed to be the preferred. A detailed evaluation matrix has been provided in **Appendix F**.

5.4 Preferred Solution

Based on the evaluation completed and summarized in **Table 5-6**, *Alternative 7 – Replace the Existing Wastewater Main along a Similar Alignment including Trenchless Creek Crossing* is identified as the preferred solution for the Aldershot wastewater main. Alternative 7 was determined to be the most preferred with key considerations including:

- It accommodates capacity requirements.
- It has minimal impact to the community.
- It has minor impact on existing vegetation and need for tree removal.
- It will remove at-risk wastewater infrastructure from the sensitive creek corridor.

Table 5-6: Evaluation Matrix

	CRITERIA FOR EVALUATING ALTERNATIVES	Alternative 1: Do Nothing	Alternative 2: Re-Routing of Sewers to the Eastern Side of the Creek	Alternative 3: Two Sewer Systems and Pumping Station	Alternative 4: Two Sewer Systems and Gravity Sewers	Alternative 5: Re-routing of Sewers to the Eastern Side of the Creek via Trenchless Crossing	Alternative 6: Two Sewer Systems and Gravity Sewers (Townhouse Complex Flows to East)	Alternative 7: Replacing the Existing WWM along a Similar Alignment with Trenchless Crossing
A	NATURAL ENVIRONMENT							
1	Terrestrial Environment Impacts	●	●	●	●	●	●	●
2	Aquatic Environment Impacts	○	●	●	●	●	●	●
3	Geotechnical Considerations	●	●	●	●	●	●	●
4	Climate Change Considerations	●	●	●	●	●	●	●
	SUMMARY NATURAL ENVIRONMENT	0.40	0.50	0.65	0.70	0.70	0.55	0.70
	CRITERIA FOR EVALUATING ALTERNATIVES	Alternative 1: Do Nothing	Alternative 2: Re-Routing of Sewers to the Eastern Side of the Creek	Alternative 3: Two Sewer Systems and Pumping Station	Alternative 4: Two Sewer Systems and Gravity Sewers	Alternative 5: Re-routing of Sewers to the Eastern Side of the Creek via Trenchless Crossing	Alternative 6: Two Sewer Systems and Gravity Sewers (Townhouse Complex Flows to East)	Alternative 7: Replacing the Existing WWM along a Similar Alignment with Trenchless Crossing
B	SOCIO-CULTURAL ENVIRONMENT							
5	Impact on Existing Land Use	●	●	●	●	●	●	●
6	Short-term/Construction Impact to Local Residents/Community	●	●	●	○	●	●	●
7	Short-term/Construction Impact to School Community	●	●	●	●	●	●	●
8	Long-term Impact on Local Residents/Community	●	●	○	●	●	●	●
9	Impact on Archaeological Resources, Indigenous Lands, Treaty Rights	●	●	●	●	●	●	●
	SUMMARY SOCIO-CULTURAL ENVIRONMENT	0.70	0.45	0.50	0.50	0.80	0.40	0.95
	CRITERIA FOR EVALUATING ALTERNATIVES	Alternative 1: Do Nothing	Alternative 2: Re-Routing of Sewers to the Eastern Side of the Creek	Alternative 3: Two Sewer Systems and Pumping Station	Alternative 4: Two Sewer Systems and Gravity Sewers	Alternative 5: Re-routing of Sewers to the Eastern Side of the Creek via Trenchless Crossing	Alternative 6: Two Sewer Systems and Gravity Sewers (Townhouse Complex Flows to East)	Alternative 7: Replacing the Existing WWM along a Similar Alignment with Trenchless Crossing
C	LEGAL AND JURISDICTIONAL ENVIRONMENT							
10	Land Acquisition/Easement Requirements	●	●	●	●	●	●	●
11	Complexity of Approval Processes/Regulatory Constraints	●	●	●	●	●	●	●
12	Accessibility and Ownership Considerations	○	●	●	●	●	●	●
	SUMMARY LEGAL AND JURISDICTIONAL ENVIRONMENT	0.35	0.25	0.25	0.35	0.40	0.50	0.50
	CRITERIA FOR EVALUATING ALTERNATIVES	Alternative 1: Do Nothing	Alternative 2: Re-Routing of Sewers to the Eastern Side of the Creek	Alternative 3: Two Sewer Systems and Pumping Station	Alternative 4: Two Sewer Systems and Gravity Sewers	Alternative 5: Re-routing of Sewers to the Eastern Side of the Creek via Trenchless Crossing	Alternative 6: Two Sewer Systems and Gravity Sewers (Townhouse Complex Flows to East)	Alternative 7: Replacing the Existing WWM along a Similar Alignment with Trenchless Crossing
D	TECHNICAL/OPERATIONAL ENVIRONMENT							
13	Complexity of Construction	●	●	●	●	●	●	●
14	Ability to Meet Region Design Standards/CH Requirements	○	●	●	●	●	●	●
15	Implementation Phasing	○	●	●	●	●	●	●
16	Impact to Utilities	●	●	●	●	●	●	●
17	Complexity of Operation and Maintenance	○	○	●	●	●	●	●
	SUMMARY TECHNICAL/OPERATIONAL ENVIRONMENT	0.40	0.55	0.50	0.35	0.70	0.45	0.90
	CRITERIA FOR EVALUATING ALTERNATIVES	Alternative 1: Do Nothing	Alternative 2: Re-Routing of Sewers to the Eastern Side of the Creek	Alternative 3: Two Sewer Systems and Pumping Station	Alternative 4: Two Sewer Systems and Gravity Sewers	Alternative 5: Re-routing of Sewers to the Eastern Side of the Creek via Trenchless Crossing	Alternative 6: Two Sewer Systems and Gravity Sewers (Townhouse Complex Flows to East)	Alternative 7: Replacing the Existing WWM along a Similar Alignment with Trenchless Crossing
E	ECONOMIC ENVIRONMENT							
18	Capital Construction Costs	●	●	●	●	●	●	●
19	Land Acquisition Costs	●	●	●	●	●	●	●
20	Operation & Maintenance Costs	○	●	●	●	●	●	●
	SUMMARY ECONOMIC ENVIRONMENT	0.40	0.40	0.50	0.35	0.40	0.50	0.50
	OVERALL EVALUATION SUMMARY	2.25	2.15	2.40	2.25	3.00	2.40	3.55

6 CONSULTATION AND COMMUNICATIONS

Public and stakeholder consultation is a key feature of the MCEA process. Through an effective consultation program, the proponent can generate meaningful dialogue between the project planners and the public, property owners, Indigenous communities, conservation authorities, and government agencies allowing an exchange of ideas and the broadening of the information base, leading to better decision-making.

6.1 Summary of Consultation Activities

Throughout the project, stakeholders, including the public and property owners, Indigenous communities, conservation authorities, government agencies and utilities, were given a variety of opportunities to review and comment on the project process, key findings, proposed alternatives, and recommended solution. Numerous consultation activities were undertaken as part of the Study, including:

- Development of a stakeholder contact list, which was updated throughout the Study;
- Communication with Indigenous communities by mail and/or email;
- Development of a page on Halton Region's website with Study updates and contact information (<https://www.halton.ca/For-Residents/Roads-Construction/Municipal-Class-Environmental-Assessment-Studies/Aldershot-Creek-Wastewater-Main-Study>);
- Project notices;
- Online Public Information Centre (PIC);
- Consultation with key stakeholders; and
- Public release of this Project File Report.

6.2 Project Notices

6.2.1 Notice of Study Commencement

The Notice of Study Commencement was prepared and issued on April 14, 2022. The Notice was published in the *Burlington Post* on April 14 and 21, 2022, and posted on Halton Region's website. Contact letters including the Notice were mailed/emailed directly to relevant stakeholders including Indigenous communities, regulatory agencies, conservation authorities, utilities and local interest groups. In addition, the Notice was mailed to all residents and property owners in the vicinity of the study area.

The purpose of the Notice was to introduce the project (purpose and objectives), outline the MCEA process, request public involvement and identify contact persons. Contact information for Halton Region's Project Manager and Associated's Project Manager were made available to the public to elicit any initial feedback on the project. Several comments were received from interested parties following the distribution of the Notice (refer to **Table 6-1**).

A summary list of the stakeholder register, Notice of Commencement published and mailed to all residents/property owners, and a sample copy of the cover letter sent to stakeholders are provided in **Appendix G**. Received comments and study team responses are summarized in **Table 6-1** and provided in **Appendix H**.

6.2.2 Notice of Online Public Information Centre

A Notice of Online Public Information Centre (PIC) was prepared and issued on March 30, 2023. The Notice was published in the *Burlington Post* on March 30 and April 6, 2023, and posted on Halton Region's website. Contact letters

including the Notice were mailed/emailed directly to relevant stakeholders including Indigenous communities, regulatory agencies, conservation authorities, utilities and local interest groups. In addition, the Notice was mailed to all residents and property owners in the vicinity of the study area.

The Notice provided a description of the project, details of the Online PIC, and included a request for comments and input. Contact information for Halton Region's Project Manager and Associated's Project Manager were made available to the public to encourage the submission of comments.

The Notice of Online PIC published and mailed to all residents/property owners, and a sample copy of the cover letter sent to stakeholders are provided in **Appendix G**.

6.2.3 Notice of Study Completion

The Notice of Study Completion was prepared and issued on August 3, 2023. The Notice was published in the *Burlington Post* on August 3 and August 10, 2023, and posted on Halton Region's website. Contact letters including the Notice were mailed/emailed directly to relevant stakeholders including Indigenous communities, regulatory agencies, conservation authorities, utilities and local interest groups. In addition, the Notice was mailed to all residents and property owners in the vicinity of the study area.

The Notice informs the public and stakeholders of the completion of the MCEA and provides the locations where interested parties can review the completed Project File Report (PFR). The notice also informs the public of the 30-day review period associated with the conclusion of the MCEA process.

Subject to comments received as a result of the Notice and the receipt of all necessary approvals, Halton Region intends to proceed with the detailed design and construction as documented in this PFR.

The Notice of Completion published and mailed to all residents/property owners, is provided in **Appendix G**.

6.3 Public Engagement

The main opportunities for consultation during Phases 1 and 2 of the Study process included:

- Online Public Information Centre (PIC);
- Release of information on project website; and
- Distribution of notices, letters, and emails at key milestones.

Comments received from the public were compiled and considered in the completion of the Study. Comments received and study team responses are summarized in **Table 6-1** and provided in **Appendix H**.

6.3.1 Online Public Information Centre (PIC)

An online PIC took place between March 30 and April 20, 2023, with material uploaded to Halton Region's website (<https://www.halton.ca/For-Residents/Opportunities-to-Participate/Online-Public-Engagement-Aldershot-Creek-Wastewat>). The online PIC consisted of display material, transcripts and recorded presentation being provided for a period of three (3) weeks. During the three (3) week review period members of the public and stakeholders could view the study material and submit questions and comments to the study team via online comment sheet or direct email to a member of the study team.

The online PIC presented the following elements:

- Information on the MCEA process;
- Problem/Opportunity being considered for the Study;
- Description of the existing conditions and key project requirements;
- Description of servicing alternative options;
- Evaluation criteria and process;
- Recommended preferred solution; and
- Next steps in the MCEA process.

A copy of the online PIC material is provided in **Appendix I**.

Received comments during the comment period are summarized in **Table 6-1** and provided in **Appendix H**.

6.3.2 Comment Summary

Received comments and study team responses during the course of the Study are summarized in **Table 6-1** and provided in **Appendix H**.

Table 6-1: Comment Summary for Study

Public/Stakeholder Group	Comment/Question	Study Team Response
MHSTCI	<ul style="list-style-type: none"> • Acknowledgement letter received indicating the requirement to determine a project’s potential impact on known and potential cultural heritage resources 	<ul style="list-style-type: none"> • Archaeological assessment will be completed for the study area and submitted to Ministry for consideration
Various utilities (Bell, hydro, Cogeco, Rogers)	<ul style="list-style-type: none"> • Confirmation of existing infrastructure and plant within study area including record drawings, if available 	<ul style="list-style-type: none"> • Acknowledged; included on base plan mapping for consideration
Fairwood Place Townhouse Resident	<ul style="list-style-type: none"> • Provided commentary on existing issues in creek area with erosion and infrastructure • Provided recommendations/ brain storming options for consideration by the team 	<ul style="list-style-type: none"> • Acknowledged comments and confirmed further communication as study progressed
HDSB	<ul style="list-style-type: none"> • Interested in being kept informed on next steps and impacts to HDSB property 	<ul style="list-style-type: none"> • Acknowledged comments and confirmed further communication as study progressed
Resident	<ul style="list-style-type: none"> • Indicated erosion issues along West Aldershot Creek • Suggested wastewater main be installed on east side of creek; preferred alternative 5 	<ul style="list-style-type: none"> • Confirmed the City was completing a project to address erosion issues along the creek • Acknowledged preference with alternative 5; indicated depth of

Public/Stakeholder Group	Comment/Question	Study Team Response
		sewer, implications to maintenance and capital cost of alternative 5 resulted in alternative 7 as preferred <ul style="list-style-type: none"> Confirmed sewer alignment for alternative 7 would be well away from creek banks and within stable ground away from erosion risk
Resident	<ul style="list-style-type: none"> Requested more information on construction methods for new sewer Concerned with potential impact on trees and vegetation in the area 	<ul style="list-style-type: none"> Confirmed both open cut and trenchless methods will be employed with final sections of each being confirmed during detailed design Confirmed tree and vegetation removal will be required for both Region and City projects; will aim to minimize disturbance and removals as much as possible
Fairwood Place Townhouse Boards	<ul style="list-style-type: none"> Provided summary letter indicating support with preferred solution and key considerations when moving to detailed design and construction including coordination with City project, minimizing impacts to trees, landscaping, and the need for quality restoration 	<ul style="list-style-type: none"> Acknowledged comments and confirmed considerations will be carried forward into detailed design and implementation Ongoing communication with Boards will occur to discuss impacts, mitigation measures and restoration requirements

6.4 Stakeholder Consultation

Several key stakeholder groups were identified for this Study including Conservation Halton (CH), City of Burlington, Halton District School Board (HDSB) and Fairwood Place Townhouse Condominium Boards. These stakeholders were notified of the Study and provided the opportunity to give feedback and input on the existing issues in the study area, study alternatives and the evaluation process.

Stakeholder correspondence and comments are provided in **Appendix H** and summarized below.

6.4.1 Consultation with Conservation Halton

As noted previously, the study area is within the jurisdiction of Conservation Halton (CH). Consultation with CH occurred at various points during the Study, including:

- At project initiation with the Notice of Commencement;
- At a consultation meeting on June 9, 2022, to review the short-list of alternatives developed and receive initial feedback with respect to key considerations;
- At a study review meeting on January 30, 2023, prior to the Public Information Centre, to review study information and finalize alternatives; and

- Prior to finalizing the Study to review our draft Project File Report including our evaluation process and preferred solutions.

Additional consultation with CH during detailed design will be required to secure permitting for the proposed works. Key considerations to carry forward into detailed design include:

- Any grading within floodplain will need to be cut-fill or demonstrate no loss to riparian storage;
- Geotechnical analysis will be required to establish long term stable top of slope;
- Consideration for bank protection may be required depending on toe erosion allowance and proposed location of sewer;
- Coordination with City of Burlington’s West Aldershot Creek erosion rehabilitation project is strongly recommended; and
- Sewer crossing of West Aldershot Creek shall have 3m of cover; if 3m of cover is not achievable a scour analysis and adequate erosion protection must be completed.

Meeting minutes, review notes and correspondence from CH consultation are provided in **Appendix H**.

6.4.2 City of Burlington

Consultation with the City of Burlington (City) occurred at various points during the Study, including:

- At project initiation with the Notice of Commencement;
- At a study review meeting on December 12, 2022, to review study information, alternatives and evaluation process; and
- At project completion with the Notice of Completion and review of the Project File Report.

Continued communication between Halton Region and the City in detailed design and construction will be necessary to coordinate Halton’s wastewater works and planned creek rehabilitation works by the City. Opportunities to consolidate the works under one contract or ensure coordination of construction timing of both projects is planned to minimize disturbances to the local public will be important. Furthermore, the City’s creek rehabilitation project will require the redesign of some elements based on the preferred solution and final design of the wastewater works. Finally, permanent and/or temporary easements may be required from the City to facilitate the installation of the new wastewater main, which will be secured during detailed design prior to construction.

Meeting minutes and correspondence from the City consultation are provided in **Appendix H**.

6.4.3 Halton District School Board

Aldershot High School, located adjacent to the study area, is operated by the Halton District School Board (HDSB). There are existing permanent easements from HDSB which the existing wastewater main is located within. Recognizing the likelihood of requiring new permanent and/or temporary easements from HDSB and the impacts construction will have to Aldershot High School property and population, consultation with HDSB occurred at various points during the Study, including:

- At project initiation with the Notice of Commencement;
- At a study review meeting on January 31, 2023, to review study information, alternatives and evaluation process;

- At a study review meeting on April 19, 2023 to review the preliminary preferred solution; and
- At project completion with the Notice of Completion and review of the Project File Report.

Continued communication between Halton Region and HDSB will occur during detailed design to secure necessary easements, as well as coordinate access requirements, timing considerations, and restoration requirements. Key considerations to carry forward into detailed design include:

- Prefer major construction works to occur during summer months to minimize impacts to school population;
- Restoration requirements on school property including planned parking lot upgrade works; and
- Inclusion of building condition assessment and vibration monitoring during construction to monitor and minimize impacts to school building.

Meeting minutes and correspondence from HDSB consultation are provided in **Appendix H**.

6.4.4 Fairwood Place Townhouse Condominium Boards

The Fairwood Place Townhouse complex is governed by two Condominium Boards, for the West and East complex. The Fairwood Place Townhouse property backs on to the West Aldershot Creek area, with private property likely to be impacted by the wastewater main works. Therefore, consultation with Condominium Boards occurred at various points during the Study, including:

- At project initiation with the Notice of Commencement;
- At a study review meeting on December 19, 2022, to review study information, alternatives and evaluation process; and
- At project completion with the Notice of Completion and review of the Project File Report.

Continued communication between Halton Region and the Condominium Boards will occur during detailed design to secure necessary easements, as well as coordinate access and restoration requirements. Key considerations to carry forward into detailed design include:

- Careful consideration of construction methods used to install the new wastewater main along the south side of West complex to minimize disruption to trees and landscaping and potential vibration impacts;
- Quality restoration of meadowlands behind Townhouse complex if used for construction staging and laydown; and
- Consideration of consolidating construction activities for both the Region and City works to mitigate drawn out construction impacts.

Meeting minutes and correspondence from Fairwood Place Townhouse Condominium Boards consultation are provided in **Appendix H**.

6.5 Consultation with the Ministry of the Environment, Conservation and Parks

An acknowledgement letter was provided from the Ministry of the Environment, Conservation and Parks (MECP) in response to the Notice of Commencement provided to the MECP Central Region. Several areas of interest were provided for consideration and have been included in this Project File Report.

The draft Project File Report was circulated to the MECP for review and comment prior to finalizing the MCEA Study.

MECP correspondence is provided in **Appendix H**.

6.6 Indigenous Communities Consultation

As required as part of the MCEA process, to satisfy the Crown’s legal duty to consult Aboriginal communities, Indigenous communities were contacted at project initiation with the Notice of Commencement. As per the acknowledgement letter provided by the MECP, First Nations contacted included the Haudenosaunee Confederacy Chiefs Council, Mississauga of the New Credit (MCFN), Metis Nation of Ontario, and the Six Nations of the Grand River (SNGR).

Table provides a summary of consultation with Indigenous Communities for the study.

Table 6-2: Indigenous Communities Consultation Summary

Indigenous Community	Comment/Question	Study Team Response
MCFN	<ul style="list-style-type: none"> Request for summary of project details and status of environmental and archaeological works Indication of required involvement for Stage 2 through 4 archaeological fieldwork No comments or questions regarding Stage 1 archaeological assessment report findings 	<ul style="list-style-type: none"> Response letter provided including summary of project works Draft Stage 1 archaeological assessment report provided for review
SNGR	<ul style="list-style-type: none"> Indicated interest in the study and Stage 1 archaeological assessment completed Request for meeting to discuss study 	<ul style="list-style-type: none"> Provided Stage 1 archaeological assessment report for review Meeting held on May 15, 2023 to provide overview of study, discuss completed archaeological assessment and natural environment works, future Stage 2 archaeological works and next steps, future communication and commitments

Correspondence with Indigenous Communities did not lead to the identification of any specific or comprehensive claims or litigation that materially affected the project. The identified communities will be notified of the PFR release, and Halton Region is committed to working with Indigenous Communities during future archaeological assessment works and maintaining communications to provide project updates and address issues should any arise.

All correspondence to the Indigenous Communities is provided in **Appendix J**.

7 IMPLEMENTATION OF THE PREFERRED SOLUTION

Based on the feedback received during the Online PIC and from stakeholder groups, the recommended preferred solution was confirmed and will be progressed to detailed design and construction. This section provides a summary of the key design features and considerations of the preferred solution.

7.1 Conceptual Design Features of Preferred Solution

Replacing the existing wastewater main along a similar alignment will include the following:

- Rehabilitation/replacement of approximately 60m of sewer from MHB (existing MH #13682) to MHC (existing MH #13681);
- Approximately 255m of 300mm diameter sewer along Aldershot High School, across West Aldershot Creek to MHI (existing MH #16388);
- Trenchless crossing (50m approx. length) of West Aldershot Creek with a minimum cover of 2m (depth to be confirmed during detailed design) including 600mm casing pipe;
- Connection of existing laterals from Aldershot High School to new sewer;
- Approximately 515m of 375mm diameter sewer from Fairwood Place West to MHI (existing MH #16388) and from MHI to LaSalle Park WWPS;
- Approximately 30m of 150mm diameter sewer from Fairwood Place Townhouse complex MH12 (existing MH #245243) to MHH (existing MH #16389); and
- Permanent access road (3m wide) along the west side of West Aldershot Creek from North Shore Boulevard to MHH (existing MH #16389).

Conceptual design drawings of the preferred solution are provided in **Appendix K**.

7.2 Property Requirements

As identified in Section 4.4.1, there are permanent easements along the existing wastewater main alignment. These easements will remain, with additional permanent easement area being secured, as required to meet Halton Region easement standards. Temporary construction easements will also be required to facilitate construction of the wastewater main works. These easements will be identified during detailed design and secured with the appropriate entity (HDSB, City and/or Fairwood Place Townhouses).

7.3 Permits and Approvals

Table 7-1 below summarizes anticipate approval and permitting requirements prior to implementation of the proposed works.

Table 7-1: Approval Requirements

Agency	Approval Mechanism	Details
Conservation Halton (CH)	Permit under O.Reg. 162/06	<ul style="list-style-type: none"> • Pre-consultation with CH has been undertaken as discussed in Section 6.4.1 • Further consultation and permitting application will follow detailed design completion

Agency	Approval Mechanism	Details
MECP	Species at Risk	<ul style="list-style-type: none"> • Consultation with MECP with respect to potential mitigation of risks to Species at Risk (SAR) may be required • Details to be confirmed during detailed design • May have opportunity to consolidate SAR requirements with City’s creek rehabilitation works
Halton Region	CLI-ECA	<ul style="list-style-type: none"> • Completion of Form SS2 to support wastewater works
City of Burlington	Public Tree By-law	<ul style="list-style-type: none"> • A permit to remove trees on public lands will be required for removals required to facilitate construction • May have opportunity to consolidate with City’s creek rehabilitation works

7.4 Proposed Construction Schedule and Cost Estimate

Upon completion of the MCEA study, the following schedule has been tentatively identified:

- Detailed design – 2023/2024
- Property Acquisition and Permitting/Approvals – 2024
- Project Tendering – late 2024/early 2025
- Construction – 2025

The preliminary cost estimate to implement the preferred solution is approximately \$9.2 Million, as identified in Section 5.2. This estimate includes major infrastructure works; however, excludes property acquisitions. See **Appendix E** for cost estimate.

7.5 Detailed Design Commitments and Considerations

This section provides a list of specific commitments to be carried forward into Phase 5 of the MCEA process – Implementation Phase (i.e. completion of contract drawings and tender documents, construction and operation and the monitoring for environmental provisions and commitments). Additional works to be completed during the detail design phase of this project, prior to construction, include but are not limited to, the following:

- Confirm design criteria for wastewater main;
- Complete detailed topographical survey of project area;
- Finalize wastewater main alignment;
- CCTV of existing sewer to confirm if rehabilitation is viable between MHB (existing MH #13682) to MHC (existing MH #13681);
- Scour analysis of trenchless creek crossing to confirm stability of creek bed and identify necessary erosion protection;

- Complete further geotechnical investigation, stable top of bank assessment, toe erosion allowance determination along west side of creek, excess soil planning (as per Ontario Regulation 406/19 *On-Site and Excess Soil Management*) and groundwater conditions identifications, as required;
- Confirm preferred construction methodologies and viable trenchless technologies to be utilized;
- Complete Stage 2 archaeological assessment for areas impacted with archaeological potential, as per Stage 1 archaeological findings;
- Continue to engage with interested Indigenous Communities throughout the Stage 2 Archaeological Assessment and subsequent stages, if necessary;
- Complete Arborist Report to support development of a Tree Preservation and Removal Plan;
- Continue consultation with CH to confirm permitting requirements and secure permit;
- Discuss with HDSB impacts to Aldershot High School property and confirm restoration and access requirements;
- Review final design with Fairwood Place Townhouse Condominium Boards to confirm restoration and access requirements;
- Continue coordination with the City of Burlington to explore options to consolidate wastewater works and creek rehabilitation works under one contract and/or coordinate timing of all works within West Aldershot Creek corridor;
- Secure all necessary permits and approvals to facilitate construction;
- Confirm all utility infrastructure and identify potential conflicts and need for relocations, if required;
- Finalize property needs (permanent and temporary easements) and secure prior to construction;
- Finalize capital construction cost estimates of proposed works; and
- Ensure construction is coordinated with other planned and ongoing activities in the vicinity of the project are by the Region, City, HDSB and others.

In addition to the above, Halton Region may also want to consider the new sewer from MH3 (existing MH #13289) to MHQ (existing MH #13292) be extended further north along Fairwood Place to beyond existing MH #13279. This would replace the full length of the existing wastewater main (circa 1973), pick up one of the westerly apartment blocks, decrease flows through the easement wastewater main and eliminate the future need for WWM RMOHID #11700. Internal discussion with the Region's System Services/Asset Management prior to or during detailed design will be required to confirm inclusion of this scope in the Aldershot wastewater main project.

8 POTENTIAL ENVIRONMENTAL IMPACTS & PROPOSED MITIGATION MEASURES

This section describes the potential effects on the environment as a result of the undertaking and the mitigation measures and commitments made to either minimize or offset these effects. Mitigation of potential effects was considered throughout the MCEA process; however, despite efforts to reduce effects, not all can be avoided. It is expected that the recommended mitigation measures will be further refined during detailed design of the project.

8.1 Natural Environment

8.1.1 Potential Effects on Terrestrial Environment

The most adverse effects to terrestrial ecology come from the removal of vegetation. Vegetation provides habitat and helps maintain the ecological integrity of West Aldershot Creek. Vegetation adjacent to construction zones may be mechanically damaged. Removal of vegetation may also impact habitat for breeding and migratory birds and/or SAR bats. Exposed soils during construction may promote establishment of invasive species.

8.1.2 Potential Effects on Aquatic Habitat

The proposed works are not predicted to cause any adverse effects to aquatic habitat or communities as there will be no in-water works associated with the wastewater infrastructure installation.

8.1.3 Erosion and Sediment Control

During construction, there is risk of potential erosion and siltation impacts that could release sediment into the watercourse. This impact would degrade the water quality of the creek and affect the habitat of wildlife. Therefore, an erosion and sediment control plan will be developed to help mitigate this risk. Possible measures include, but not limited to, the use of biodegradable erosion control media, siltation fences or biodegradable 'logs', mud mats, etc. These mitigation measures will be confirmed during the detailed design phase of the project before implementation and will be reviewed and approved by CH as part of its permit process.

8.1.4 Air Quality, Dust and Noise

There is one sensitive receptor, Aldershot High School, located in close proximity to the study area. It is not anticipated that the school or any of the adjacent properties will be negatively impacted, including air quality, noise or dust, after the implementation of this project. There will be construction noise generated during the installation works due to the required use of heavy machinery and other construction equipment. Measures will be taken to manage construction noise including maintaining equipment to prevent unnecessary noise. Any initial noise complaint will trigger verification that noise control measures are in effect. If persistent noise complaints occur, alternative noise control measures will be considered.

Impacts of air quality during project construction are not considered to be significant. Although dust impacts from heavy construction equipment may impact air quality, this is not a recurring activity as it will be limited to the construction period. Contract provisions will minimize impacts to adjacent properties during construction. Therefore, the impacts from construction on air quality are not considered significant.

Provisions to minimize air quality impacts during construction include removal of construction-caused debris and dust through regular cleaning and maintenance of construction sites and access roads; dust suppression using non-chloride

dust suppressants on unpaved areas, subject to the area being free of sensitive plant, water, or other ecosystems that may be affected by dust suppression chemicals; and prompt cleaning of paved streets/roads where tracking of soil, mud or dust has occurred.

8.2 Socio-Economic and Cultural Environment

8.2.1 Utilities

During detailed design utility companies will be contacted to confirm the presence and location of existing infrastructure within the study area. It is not anticipated that the proposed works will impact any utility locations.

The existing storm sewers and outfalls located within the study area will require protection during construction to ensure the infrastructure is not damaged by construction works.

8.2.2 Potential Effects on Adjacent Land Use

During construction there will be some nuisance effects, such as noise, odour and dust. As well, construction access will be required via property owned by the City of Burlington, HDSB and Fairwood Place Townhouse. During detailed design, property owners will be contacted to discuss potential construction impacts. Halton Region will secure permanent and/or temporary easements along the wastewater main alignment to facilitate construction. Impacts to these properties will be minimized with all restoration requirements agreed upon with the owner and included in the contract package.

8.2.3 Archaeological Potential

The Stage 1 Archaeological Assessment determined that parts of the study area exhibited archaeological potential. If impacted, these areas will require a Stage 2 archaeological assessment by test pit prior to any proposed impacts to the property. During design, consideration will be given to avoid impacting these areas; however, if impacts are confirmed a Stage 2 archaeological assessment will be completed including coordination with interested Indigenous Communities.

During construction, in the event that archaeological resources or remains are found, alteration of the site must cease immediately, and a licenced consultant archaeologist must be notified to carry out archaeological fieldwork, in compliance with sec. 48(1) of the *Ontario Heritage Act*. The contract for this work should include a provisional item for Archaeological findings and the Contractor must be aware of the protocol to be followed should resources be encountered.

More information is provided in the completed Stage 1 Archaeological Assessment report in **Appendix D**.

8.3 Climate Change Considerations

Climate change is an issue that has and continues to evolve on a global scale. Governments at all levels are acknowledging the need to take actions that reduce carbon emissions into the atmosphere to mitigate the effects of climate change. There is also a recognition that climate change is impacting community infrastructure systems. This requires a consideration of adaption measures to mitigate the impact of climate change on levels of service these systems were originally designed to deliver.

Project impacts and resiliency to climate change were taken into consideration during the Study. Considering how a project contributes to climate change, through its greenhouse gas (GHG) emissions or its effects on the natural environment, is important to the planning process as it allows proponents to consider climate mitigation measures to avoid, minimize, or offset such effects. As well, considering how climate change may affect a project, such as through increased flooding or drought, is also critical to the planning process through enabling proponents to make informed decisions around how to design a project to withstand such environmental conditions. Approaches for considering and addressing climate change in project planning are through 1) Reducing a project's effect on climate change; and 2) Increasing the project's resilience to climate change.

Upon review of this Study's undertaking it is determined that the project is minor in scale and will not have significant climate change impact. Although it is likely that tree removal will be necessary to facilitate the replacement works, and recognizing that trees are a carbon sink, measures will be taken to compensate for the removals through planting of new trees and/or native vegetation within the study area. Furthermore, GHG reduction initiatives including reduced use of GHG producing materials, specifying local materials to reduce related fuel consumption, and inclusion of recycled materials, will be considered where feasible.

8.4 Construction Considerations

Potential environmental effects during and following construction were discussed in Sections 8.1 and 8.2. The following measures are proposed to mitigate adverse impacts.

SAR Bat Protection

Tree removal will be completed between November 1 to March 31, outside of the maternity roosting period. Should pre-construction tree screening identify that trees with maternity roost potential must be removed, the installation of artificial roosts (e.g. "bat boxes") is recommended at a 1:1 ratio, as these structures can provide alternative habitat opportunities. Such structures should be erected during the November 1 to March 31 period after tree removal, so they are available to bats prior to the following maternity roost period.

Terrestrial Ecology Protection

Mitigation measures to alleviate any potential harmful effects on terrestrial ecology by completion of the proposed works include:

- A 3m tree protection zone (TPZ) should be established around the American Chestnut tree. Fencing should be erected, and no construction activities should be permitted within the TPZ.
- The proposed location of construction and access routes should be identified in disturbed areas comprising non-native vegetation, where possible.
- Incidental wildlife observations will be made during construction.
- Restoration planting should comprise non-invasive species entirely and be adapted to the soil and moisture conditions of the site.
- All landscaping and rehabilitation works within CH's regulated area are to be completed to the greater of either CH's guidelines or City of Burlington's By-Law requirements.
- A tree protection plan and compliance with the *Migratory Bird Convention Act* should be included.
- Where feasible and necessary, trees proposed to be retained will be protected by tree protection fencing (TPF), which is to be placed at the dripline or in a location to minimize encroachment into the root zone and protect the trunk. Fencing provides protection from potential damage during construction activities such as the use of machinery near trees and branches, and stockpiling of materials over the root zone. ESC fencing can be combined with TPF.

- Trees with a 15cm or greater DBH that are removed for construction will be replaced at a ratio of 3:1.
- City of Burlington Forestry criteria will be met through the proposed works.
- Post construction, any exposed soils should be re-vegetated as soon as possible with native seed mixes to reduce erosion. If stabilization is not possible by plantings, then other appropriate erosion controls should be applied in the interim.
- Removal of woodland vegetation should take place outside of the breeding bird window and bat spring roosting activity through fall swarming and migration (April 1 to October 31) in order to avoid disturbance of migratory breeding birds and bat species protected by the *Migratory Birds Convention Act* and/or *Endangered Species Act*.
- If vegetation removal is necessary during the period of April 1 to October 31, a pre-construction sweep of the area for bird and bat nesting activities should be undertaken.
- In the unlikely event that SAR are encountered, work will stop and the MECP will be contacted for direction.

Tree Removal

Tree root systems play a large role in the stabilization of soils and slopes. The large network of roots provided by trees and shrubs help hold soils and materials together. Tree root death degrades this function and compromises soil stability. As such, erosion control measures and construction access routes within the valley should minimize tree disturbance and injury, and incorporate new, native plantings to the extent possible. Should removals be required, routes that take advantage of the removal of Ash (*Fraxinus*) species should be considered, as these species are already heavily impacted by Emerald Ash Borer (EAB) in southern Ontario.

Erosion and Sediment Control

A comprehensive Erosion and Sediment Control (ESC) plan will be implemented to prevent migration of sediment laden runoff (or other contaminants) from the construction zone to the creek. The ESC measures are recommended to include adequate control measures constructed to Ontario Provincial Standard Drawing (OPSD) standards in accordance with the *Erosion & Sediment Control Guidelines for Urban Construction* (Greater Golden Horseshoe Conservation Authorities, 2006). This plan will include inspection and maintenance of the measures until final cover is established. Specific aspects include:

- ESC measures are to be installed prior to beginning work and maintained in working order throughout all stages of construction activities;
- Perimeter silt fence will be installed between the work areas and the watercourses to isolate the work areas and ensure that deleterious substances do not enter the creek at any time;
- The fencing will be properly installed and inspected daily, including after every rainfall, and cleaned, maintained and/or adjusted accordingly. It will be left in place and maintained until all surfaces contributing drainage to the watercourse are fully stabilized;
- All exposed and newly constructed surfaces will be stabilized using appropriate means in accordance with the characteristics of the soil material;
- These surfaces will be fully stabilized and re-vegetated as quickly as possible following completion of the proposed works;
- No sediment, sediment-laden water or deleterious substances are to be discharged into West Aldershot Creek at any time;
- Contingency procedures, materials and notification procedures will be readily available in the event of a silt release and for general application in regular maintenance and repair.

Construction Access, Site Controls and Operational Constraints

The construction access and work areas will be confined to the extent required for the construction activities, and these areas are then defined in the field using appropriately installed protective fencing or other suitable barriers. Removal of riparian vegetation, particularly woody vegetation, will be kept to a minimum necessary for the proposed works. The woody vegetation that will likely require removal will be replaced with appropriate native species.

Any temporarily stock piled material, construction or related materials will be properly contained in areas separated a minimum of 30m from any watercourse. All construction materials and debris will be removed and appropriately disposed of following construction. Every effort will be made to retain as much of the natural vegetation as reasonably possible to control erosion and expedite the re-colonization of vegetative cover. All vegetation clearing required for access will be conducted using proper clearing techniques and appropriate construction timing windows as may be defined by other legislation (ie: *Migratory Birds Convention Act*).

All activity will be controlled to prevent entry of any petroleum products, debris or other potential contaminants or deleterious substances, in addition to sediment as outlined above, to any watercourse. Storage, maintenance and refueling of equipment will be conducted a minimum of 30m from the watercourse. A Spills Prevention and Response Plan will be developed and kept on site at all times. Appropriate machinery for construction use will be selected on the basis to minimize impact to the surrounding environment.

Waste Disposal and Excess Soils

During construction, all waste removed from the site must be directed to the appropriate facility for disposal. If any hazardous/biological waste is discovered, the appropriate agencies should be notified, and the waste should be directed to the required facility. The waste management plan will be confirmed during the detailed design phase of the project.

During design and construction excess soil planning and disposal will be required in accordance with Ontario Regulation 406/19 *On-Site and Excess Soil Management*. All excess soils generated by construction activities will be managed in a manner consistent with the provisions of the regulation.

Rehabilitation Following Construction

All of the areas disturbed during construction will be restored, stabilized and re-vegetated as soon as the works are complete to prevent migration of fine material to the watercourse during runoff events, as well as minimizing the opportunity for colonization of the area by invasive species. Only native plants, compatible with site conditions will be used. For the best chances of success, planting events should target spring or fall, when trees are focused on growth and establishment activities. Summer periods should be avoided as trees are often focused on maintenance during high-heat periods, which may over-stress newly planted stock. Winter periods should also be avoided as trees are largely dormant during this time and root growth would be delayed, potentially inhibiting establishment. All landscaping and rehabilitation works within CH's regulated area will be completed to the greater of either CH's guidelines or City of Burlington's By-Law requirements.

Site Inspection and Monitoring

Environmental monitoring will be conducted to inspect environmental protection measures (ESCs, containment measures, etc.) and to identify deficiencies. The inspector will ensure all environmental mitigation and design measures are properly installed, constructed and maintained, and appropriate contingency and response plans are in place and implemented, if required.

8.5 Monitoring and Maintenance

The mitigation measures identified in this report shall be written into the contract specifications. During construction, the Region's contract administrator shall ensure that full-time monitoring/inspection of the project works be undertaken to ensure that all environmental commitments identified in this report are adhered to by the Contractor(s) and other subsequent agency approvals are met. After a period of one year following completion of the construction (i.e. post construction), a final inspection should be undertaken to ensure the effectiveness of the identified mitigation measures.

Recommended effects monitoring during the construction period includes:

- Public complaints monitoring and follow-up regarding construction disturbances;
- Monitoring of vegetation removal; and
- Monitoring of the effectiveness of stormwater controls to ensure erosion and sedimentation effects are minimized.

9 CONCLUSION AND RECOMMENDATIONS

This study was carried out as a Schedule B project under the Municipal Class Environmental Assessment (MCEA) for Municipal Water and Wastewater Projects and is subject to the requirements of the *Environmental Assessment Act*. This document provides relevant information with respect to Phases I and II of the Environmental Assessment Process. Subsequent phases of the process will involve completion of contract drawings and documents for all proposed works together with appropriate monitoring requirements.

9.1 Conclusions

The existing Aldershot wastewater main (200mm to 300mm diameter) services an area in south Burlington including Aldershot High School, Fairwood Place condominiums and growth areas to the west of the West Aldershot Creek valley. The wastewater main was constructed in 1961, is nearing the end of its useful life and is threatened by severe erosion within the West Aldershot Creek valley, including the sewer section crossing the creek and several maintenance holes which are located within the creek banks and bed. Inaccessibility of the system by Regional Operations staff makes inspection, cleaning and maintenance works on the sewer and maintenance holes extremely difficult. Furthermore, capacity issues have been identified with respect to servicing future flows beyond 2031.

Halton Region initiated a MCEA to develop and evaluate servicing alternatives for the Aldershot Creek wastewater main. The optimal servicing solution must address capacity needs, improve accessibility for Regional Operations staff to complete maintenance and repair works, and reduce the environmental impacts on the West Aldershot Creek corridor while considering property impacts and requirements, alignment and coordination with ongoing and future capital projects in the proximity of Fairwood Place West and North Shore Boulevard, and financial implications of constructing and maintaining the system.

The preferred solution includes replacing the existing wastewater main along a similar alignment. Key features of the preferred solution include:

- Rehabilitation/replacement of approximately 60m of sewer;
- Approximately 255m of 300mm diameter sewer along Aldershot High School and across West Aldershot Creek;
- Trenchless crossing (50m approx. length) of West Aldershot Creek with a minimum cover of 2m (depth to be confirmed during detailed design) including 600mm casing pipe;
- Connection of existing laterals from Aldershot High School to new sewer;
- Approximately 515m of 375mm diameter sewer from Fairwood Place West, along West Aldershot Creek to LaSalle Park WWPS;
- Approximately 30m of 150mm diameter sewer from Fairwood Place Townhouse complex to the new regional main; and
- Permanent access road (3m wide) along the west side of West Aldershot Creek from North Shore Boulevard.

Conceptual design of the new wastewater main has been prepared for the preferred solution. Following the completion of the MCEA study, preliminary and detailed design, permitting, land acquisition and construction will be undertaken to implement the preferred solution and remedy the identified problems.

9.2 Recommendations

During the MCEA study, recommendation for additional works and implementation measures were identified. These

items should be taken into consideration during the detailed design and include, but are not limited to, the following items:

- Confirm design criteria for wastewater main;
- Complete detailed topographical survey of project area;
- Finalize wastewater main alignment;
- CCTV of existing sewer to confirm if rehabilitation is viable between MHB (existing MH #13682) to MHC (existing MH #13681);
- Scour analysis of trenchless creek crossing to confirm stability of creek bed and identify necessary erosion protection;
- Complete further geotechnical investigation, stable top of bank assessment, toe erosion allowance determination along west side of creek, excess soil planning (as per Ontario Regulation 406/19 *On-Site and Excess Soil Management*) and groundwater conditions identifications, as required;
- Confirm preferred construction methodologies and viable trenchless technologies to be utilized;
- Complete Stage 2 archaeological assessment for areas impacted with archaeological potential, as per Stage 1 archaeological findings;
- Continue to engage with interested Indigenous Communities throughout the Stage 2 Archaeological Assessment and subsequent stages, if necessary;
- Complete Arborist Report to support development of a Tree Preservation and Removal Plan;
- Continue consultation with CH to confirm permitting requirements and secure permit;
- Discuss with HDSB impacts to Aldershot High School property and confirm restoration and access requirements;
- Review final design with Fairwood Place Townhouse Condominium Boards to confirm restoration and access requirements;
- Continue coordination with the City of Burlington to explore options to consolidate wastewater works and creek rehabilitation works under one contract and/or coordinate timing of all works within West Aldershot Creek corridor;
- Secure all necessary permits and approvals to facilitate construction;
- Confirm all utility infrastructure and identify potential conflicts and need for relocations, if required;
- Finalize property needs (permanent and temporary easements) and secure prior to construction;
- Finalize capital construction cost estimates of proposed works; and
- Ensure construction is coordinated with other planned and ongoing activities in the vicinity of the project are by the Region, City, HDSB and others.

During detail design, a final Public Information Centre (PIC) will be held to inform the public and adjacent landowners of the upcoming construction works including construction schedule, construction staging and implementation details.

CLOSURE

This report was prepared for Halton Region to satisfy the requirements of the MCEA process and *Environmental Assessment Act* and to set the stage for the detailed design and construction of the Preferred Solution for the Study Area discussed herein.

The services provided by Associated Engineering (Ont.) Ltd. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,
Associated Engineering (Ont.) Ltd.

A handwritten signature in black ink, appearing to read 'A. LaPlante', is enclosed in a light gray rectangular box.

Andrea LaPlante, P.Eng.
Project Manager

REFERENCES

- Aecom. (2011). *Halton Region Sustainable Halton Water and Wastewater Master Plan*. Retrieved from:
<https://www.halton.ca/For-Residents/Roads-Construction/Infrastructure-Master-Plans/Sustainable-Halton-Water-Wastewater-Master-Plan>
- Associated Engineering. (2019). *West Aldershot Creek Erosion Control Municipal Class Environmental Assessment Project File Report*.
- Black & Veatch. (2016). *Burlington West Wastewater Servicing Feasibility Study*.
- Halton-Hamilton Source Protection Region. (2022). *Source Protection Plan*. Retrieved from:
https://www.protectingwater.ca/wp-content/uploads/sites/2/2023/02/HHSPP-clean_221104.docx.pdf
- Ministry of Municipal Affairs and Housing. (2020). *Provincial Policy Statement, 2020*. Retrieved from:
<https://www.ontario.ca/page/provincial-policy-statement-2020>
- Municipal Engineers Association. (2018). *Companion Guide for the Municipal Class Environmental Assessment Manual*.
- Municipal Engineers Association. (2015). *Municipal Class Environmental Assessment*.
- Palmer Environmental. (2019). *Aldershot Creek Erosion EA – Terrestrial and Aquatic Ecology Report*.
- Palmer Environmental. (2019). *West Aldershot Creek Erosion EA – Fluvial Geomorphological Assessment*.