

Environmental Study Report

Erb Street Water Supply Iron
and Manganese Upgrades
Municipal Class Environmental
Assessment (EA)



Prepared for:
Region of Waterloo

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May 2021

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1	Final	M.Davidson	S.Lang/P.Hohner	N.Harvey

Sign-off Sheet

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ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)

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Executive Summary

Introduction and Background

In May 2019, Health Canada released the “Manganese in Drinking Water” document, which recommends changing the concentration limits for Manganese in drinking water. The Region of Waterloo retained Stantec Consulting Ltd. to complete a Schedule C Municipal Class Environmental Assessment (Class EA) study to review existing conditions, assess alternatives and provide recommendations for the implementation of treatment upgrades for Iron and Manganese removal to the Region’s drinking water treatment infrastructure located in the Township of Wilmot. This Environmental Study Report (ESR) documents the planning process used to identify and evaluate solutions for treatment upgrades to the Erb Street Water Supply System.

Study and Service Area

The study area, shown in **Figure 1-1**, is located primarily in the Township of Wilmot, with some of the study area located in the City of Waterloo. The study area includes the existing Erb Street Reservoir, located at 990 Erb Street West, and the existing well sites, located at 1226 B Erbs Road and 1211 Erbs Road. Wells W6A/B (existing) and W6C (future) are located at 1226 B Erbs Road, while W7 and W8 are located at 1211 Erbs Road. Well W6A is currently out of service due to excessive sand production therefore Wells W6B, W7 and W8 currently supply water to a three celled treated reservoir located at 990 Erb Street West in Waterloo. W6C was constructed as a replacement well for W6A in 2015 but will not come online until late 2021.

Class Environmental Assessment Process

This Study was completed in accordance with the planning and design process for Schedule C projects, as outlined in the Municipal Class Environmental Assessment document (October 2000, as amended in 2007, 2011 and 2015), which is an approved process under the Ontario Environmental Assessment Act.

The publication of this ESR represents the conclusion of Phase 4 of the Class EA, including public and agency consultation. The purpose of the ESR document is to report all the activities undertaken to date through Phases 1, 2, and 3 of the Municipal Class EA process.

This ESR will be placed on the public record for a period of 30 days, after which time any comments or requests from stakeholders, agencies, or concerned parties will be addressed according to the procedures outlined in the Municipal Class EA.

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Problem Statement

Treatment for the Erb Street Water Supply currently consists of four supply wells (W6A, W6B, W7, W8) with chlorination (sodium hypochlorite) injection at each well house. The wells pump to the Erb Street Reservoir with primary disinfection achieved in the upstream transmission main. Ammonia is injected at the Reservoir inlet to form chloramines for residual disinfection.

Manganese treatment will require the consolidation of well raw water flows to a new treatment building which will contain filtration and associated chemical dosing for manganese removal; an on-site backwash tank with backwash pumps; chemical and filter panels; and ancillary process piping and valving. A new on-site clearwell tank was also recommended in the System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines to provide Contact Time (CT) disinfection time and to provide backwash volume. The new equipment will require construction of a new treatment facility which is expected to require land acquisition.

Study Objectives

The objectives of the Erb Street Water Supply Iron and Manganese Upgrades Schedule C Class EA are to:

- Selection of the preferred technology for iron and manganese filtration;
- Preferred location for a new water treatment facility;
- Conceptual layout of the proposed treatment facility to determine site footprint;
- Conceptual design of the site, including the proposed treatment facility and support infrastructure;
- Allow for public, agency, stakeholder, and Indigenous community consultation to satisfy the Municipal Class EA process; and,
- Complete Phases 1 through 4 of the Municipal Class EA.

Justification and Need for Project

The Class EA study reviewed existing conditions and provided recommendations for the implementation of treatment upgrades for Iron and Manganese removal. The decision for treatment upgrades was triggered by Health Canada's "Manganese in Drinking Water" document (May 2019). The Health Canada document recommends changing the concentration limits for Manganese in drinking water. The existing and recommended concentrations for Manganese are summarized below. It is anticipated that the new Health Canada limits will be adopted in the Ontario regulations in the near future.

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Existing and Recommended Concentrations for Manganese

Source	Maximum Acceptable Concentration (MAC)	Aesthetic Objective (AO)
Ontario Drinking Water Quality Standard (mg/L)	n/a	0.05
Health Canada Guideline Value (mg/L)	0.12	0.02

In response to Health Canada's "Manganese in Drinking Water" draft document released June 2016, a study¹ was undertaken to assess if Region of Waterloo (Region) groundwater facilities would comply with a proposed finished water Manganese goal of less than 0.015 mg/L.

The study included recommendations for process upgrades at Erb Street to reduce Manganese from the current treated water average of 0.027 mg/L to the Region's finished water target of 0.015 mg/L.

This project provides an opportunity further review and implement the recommendations of the Region's June 2016 Study.

Alternatives Development and Evaluation

The EA reviewed and evaluated both potential treatment technologies as well as locations to site the proposed new treatment plant. The following long list of treatment technology alternatives for manganese mitigation in municipal drinking water applications were reviewed. The alternatives included:

1. Alternative 1 – Do Nothing.
2. Alternative 2 - Chemical oxidation + catalytical media filtration.
3. Alternative 3 - Biological oxidation + filtration.
4. Alternative 4 - Ion exchange.
5. Alternative 5 – Sequestration.
6. Alternative 6 – Lime or Soda Softening.
7. Alternative 7 – Membrane Filtration.

The long list of potential treatment technology alternatives for manganese mitigation were reviewed against pre-determined criteria and based on the evaluation of the

¹ System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines, Stantec 2017

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alternatives against the criteria Alternative 2 - Chemical Oxidation + Filtration was determined to be the preferred alternative.

The study then assessed the preferred backwash management alternatives for the preferred treatment technology. Based on the selection of oxidation and filtration as the preferred treatment technology, the following backwash management alternatives were considered:

- Alternative 1 – Do Nothing.
- Alternative 2 – Lagoon with settled backwash supernatant discharge to environment.
- Alternative 3 - Direct discharge to a sewer.
- Alternative 4 - Equalization tank and discharge to sewer.
- Alternative 5 - Equalization tank with supernatant recycling and solids discharge to sanitary sewer.
- Alternative 6 - Equalization Tank with Supernatant Recycling and Solids Removal by Vacuum Truck.

The long list of potential backwash management alternatives was reviewed against pre-determined criteria and it was concluded that an equalization tank with supernatant recycling and solids discharge to sewer is the preferred alternative.

Following the selection of the preferred treatment and backwash management technology, a long list of potential locations for the new facility were reviewed against selected criteria and reduced to a short list of seven (7) properties. These properties were further evaluated based on the potential impacts to the natural and social/cultural environments, the ability to meet regulatory/legal requirements, potential limitations associated with constructability, extent of required servicing needs and utilities, and cost. Based on the evaluation, Alternative Location 3, located adjacent to the existing reservoir on the corner of Wilmot Line and Erb Street within the City of Waterloo, was identified as the Preliminary Preferred Alternative.

Description of Preferred Design Concept

Based on the evaluation, an equalization tank with supernatant recycling and discharge to the sanitary sewer system alternative was identified as the recommended alternative for the following reasons:

- less natural environmental impact;
- less overall community and property impact; and,
- lower long-term operation costs.

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The construction of a new water treatment facility will be undertaken at Alternative Location 3, located directly adjacent to the existing reservoir site at 960 Erb Street West. This treatment facility will utilize traditional oxidation and filtration technology to treat iron and manganese from the Erb Street Wells, and the facility will discharge leftover wastewater into the sanitary sewer to be treated along with municipal wastewater at the downstream Waterloo Wastewater Treatment Plant.

The property selected as the preferred location for the new facility is currently owned by the City of Waterloo as part of the Draft Approved Subdivision (30T-18401); however, the Region of Waterloo intends to pursue the purchase of Block 12 as part of the final registration of the subdivision.

Proposed Mitigation Measures

Measures are proposed to mitigate community impacts by minimizing noise, dust, vibration, systems interruptions, and traffic during construction of the new WTP facility. The construction of the wastewater forcemain from the site to a gravity sewer manhole on Platinum Drive can be constructed through open cut methods with minimal impact to the Traffic in the area. A traffic management plan will also be developed and adhered to. A sediment and erosion control plan will be prepared and followed, and excavations will be performed in an orderly and efficient manner to minimize disturbances from noise, vibration and dust. Construction hours will be limited to normal working hours, Monday to Friday and construction vehicles will maintain muffling devices to minimize noise and vibration impacts. To minimize interruptions to system operations, the Erb Street Supply will be maintained until the new Erb Street WTP construction has been completed and commissioned.

Completion of Class EA

The Region has determined through this Schedule C Class EA that the most cost effective and environmentally sound approach for iron and manganese upgrades to the Erb Street Water Supply includes chemical oxidation and filtration of manganese as the preferred alternative, with the preferred alternative for manganese removal identified as oxidation using sodium hypochlorite followed by filtration with catalytic media pressure filters. Alternative Location 3 has been identified as the Preliminary Preferred Alternative. This was further confirmed by public, agency, and stakeholder review.

Public, Agency, Stakeholder and Indigenous Community Consultation

Members of the public and those on the project mailing list, which included agencies, stakeholders, and representatives from Indigenous Communities, were provided with project notifications through direct mail outs and via email at key points in the Class EA process. These notifications were also published in local newspapers and on the Region of Waterloo Current Projects webpage. Residents/Property Owners located within the Study Area, were also mailed project notifications.

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Federal, provincial and municipal agencies, as well as utilities and special interest groups, were consulted during the course of the Class EA process. Additions were made to the project mailing list upon request. In addition, the consultation program consisted of the following:

- The posting of key project information such as notifications and Public Consultation Centre (PCC) materials (i.e., guided PowerPoint presentation, transcript, video) on the Region's web site.
- A Notice of Commencement published in New Hamburg Independent on October 16, 2019 and in the Waterloo Chronicle on October 17, 2019.
- Two sets of PCCs (June 27, 2020 and December 11, 2020) were held virtually, due to the COVID-19 restrictions. The PCCs provided an opportunity for members of the public to obtain information on the Class EA process, the evaluation of alternative methods and sites, as well as the alternative design concepts and the evaluation of these alternatives.
- A Notice of Completion published in the Waterloo Chronicle and in the New Hamburg Independent.
- An opportunity for members of the public to review and provide comments on the ESR.

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1.0 Introduction

The Region of Waterloo retained Stantec Consulting Ltd. to complete a Schedule C Municipal Class Environmental Assessment (Class EA) study to assess alternatives for upgrades to the Region's drinking water treatment infrastructure located in the Township of Wilmot. Existing infrastructure includes four well houses, located at 1226 B Erbs Road (W6A, W6B, W6C) and 1211 Erbs Road (W7, W8), and the associated Erb Street Reservoir, located at 990 Erb Street West.

The Class EA study reviewed existing conditions and provided recommendations for the implementation of treatment upgrades for Iron and Manganese removal. The decision for treatment upgrades was triggered by Health Canada's "Manganese in Drinking Water" document (May 2019). The Health Canada document recommends changing the concentration limits for Manganese in drinking water. The existing and recommended concentrations for Manganese are summarized in **Table 1-1**. It is anticipated that the new Health Canada limits will be adopted in the Ontario regulations in the near future.

Table 1-1: Existing and Recommended Concentrations for Manganese

Source	Maximum Acceptable Concentration (MAC)	Aesthetic Objective (AO)
Ontario Drinking Water Quality Standard (mg/L)	n/a	0.05
Health Canada Guideline Value (mg/L)	0.12	0.02

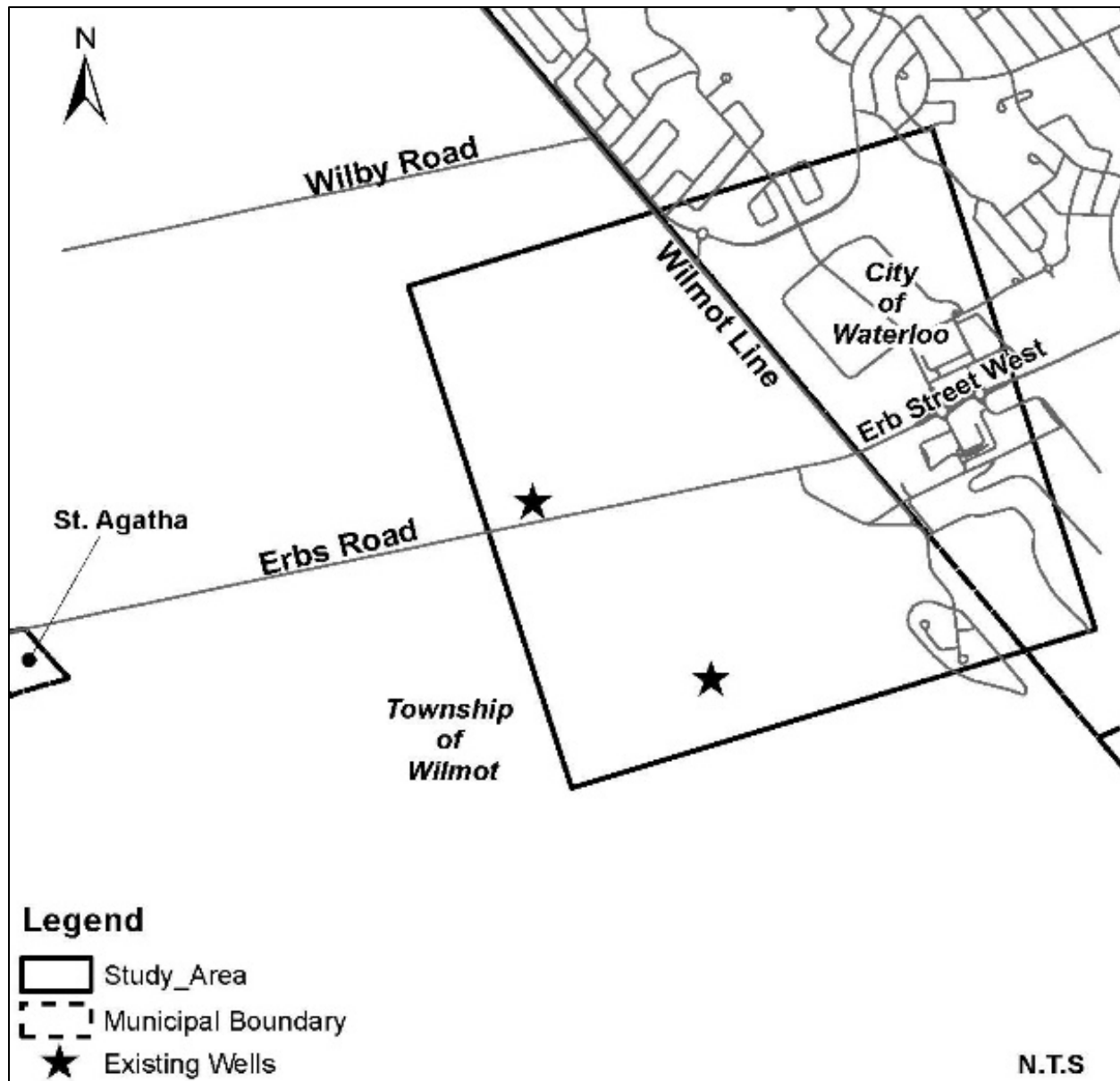
1.1 Study Area

The study area, shown in **Figure 1-1**, is located primarily in the Township of Wilmot, with some of the study area located in the City of Waterloo. The study area includes the existing Erb Street Reservoir, located at 990 Erb Street West, and the existing well sites, located at 1226 B Erbs Road and 1211 Erbs Road.

Wells W6A/B (existing) and W6C (future) are located at 1226 B Erbs Road, while W7 and W8 are located at 1211 Erbs Road. Well, W6A is currently out of service due to excessive sand production therefore Wells W6B, W7 and W8 currently supply water to a three celled treated reservoir located at 990 Erb Street West in Waterloo. W6C was constructed as a replacement well for W6A in 2015. It is not currently connected to the water supply system, but there are plans to connect the well by 2021. Water from the Erb Street reservoir is fed by gravity into the Region's Integrated Urban System (IUS) Zone 5 (Z5) for distribution.

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Figure 1-1: Study Area



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2.0 Background

In response to Health Canada's "Manganese in Drinking Water" draft document released June 2016, a study² was undertaken to assess if Region of Waterloo (Region) groundwater facilities would comply with a proposed finished water Manganese goal of less than 0.015 mg/L.

Manganese sampling data for the Erb Street Supply Wells is summarized in **Table 2-1**.

Table 2-1: Erb Street Wells Manganese Data

	Manganese Concentration by Well (mg/L) ¹					
	W06A	W06B	W07	W08	W6C ²	Treated Water
Minimum	0.017	0.023	0.024	0.010	No data available	0.020
Average	0.029	0.028	0.052	0.028		0.027
Maximum	0.050	0.032	0.094	0.048		0.039

Table Notes:

¹ Results are grab samples collected between January 2006 and August 2016

² W6C is a future replacement for W06A. W6C has been constructed adjacent to W6A but has not yet been connected to the municipal system

The study included recommendations for process upgrades at Erb Street to reduce Manganese from the current treated water average of 0.027 mg/L to the Region's finished water target of 0.015 mg/L.

2.1 Ontario Environmental Assessment Act

All municipalities in Ontario, including the Region of Waterloo, are subject to the provisions of the *Environmental Assessment Act (EA Act)* and its requirements to prepare an Environmental Assessment (EA) for applicable public works projects.

The Ontario Municipal Engineers Association (MEA) Class EA document (October 2000 as amended in 2007, 2011, and 2015) provides a framework by which projects are classified as Schedule A, A+, B, or C. Classification of a project is based on a variety of factors including the general complexity of the project, level of investigation required, and the potential impacts on the natural and social environments that may occur. Considering the MEA Class EA framework, the study for the Erb Street Water Supply Class EA is classified as a Schedule C project. Schedule C projects have the potential

² System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines, Stantec 2017

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for significant environmental and/or social impacts and must follow the full planning and documentation procedures specified in the Class EA document (Phases 1 to 4). An Environmental Study Report (ESR) must be prepared and filed for review by the public, review agencies and Indigenous communities.

Interested persons may provide written comments to the Region of Waterloo for a response using the following contact information:

Kevin Dolishny, P. Eng., Senior Engineer
Water Services, Region of Waterloo
519-575-4400 extension 3862
kdolishny@regionofwaterloo.ca

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks 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 ministry.

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 ministry is able to efficiently begin reviewing the request.

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

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

and

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

Requests should also be sent to the Region of Waterloo.

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2.1.1 Municipal Class EA Process

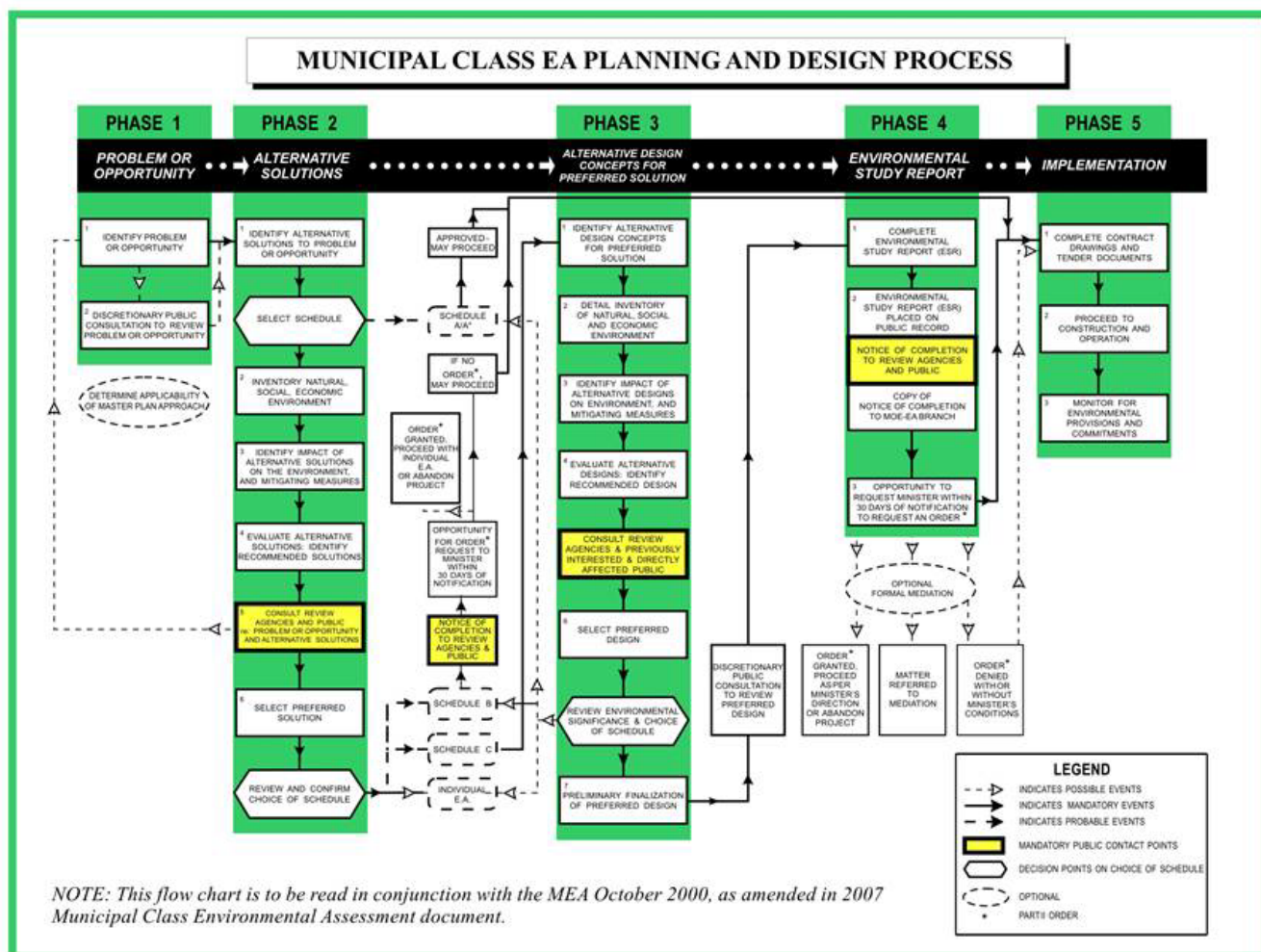
Figure 2-1 illustrates the process followed in the planning and design of projects covered by a Municipal Class EA. The figure incorporates steps considered essential for compliance with the requirements of the *EA Act* discussed below.

- **Phase 1: Problem or Opportunity** - Identify the problem (deficiency) or opportunity, which may include public consultation to confirm/review the problem or opportunity.
- **Phase 2: Alternative Solutions** - Identify a reasonable range of alternative solutions to address the problem or opportunity. This Phase also includes an inventory of the existing environment in order to identify potential mitigation measures, and to assist in the evaluation of alternatives in terms of the identified evaluation criteria. A preferred solution is chosen based on the results of the evaluation and considers input from the public, review agencies, and Indigenous Communities. It is at this point that the appropriate Schedule (B or C) is chosen for the undertaking. If Schedule B is chosen, the process and decisions are then documented in a Project File. Schedule C projects proceed through the following additional phases.
- **Phase 3: Alternative Design Concepts for the Preferred Solution** (Schedule C projects only) - Examine the alternative methods for implementing the preferred solution, which typically involves design alternatives. A detailed inventory of the natural, social, economic, and technical environments is undertaken in order to assess the impacts of the alternative designs, in an attempt to minimize negative effects and maximize positive effects.
- **Phase 4: Environmental Study Report** (Schedule C projects only) - Document the Class EA study in an ESR, which includes a summary of the rationale and the planning, design, and consultation process followed for the project and make the documentation available for consideration by review agencies, Indigenous communities, and the public through a mandatory 30-day review period.
- **Phase 5: Implementation** - Complete contract drawings and documents and proceed to construction and operation with monitoring to ensure adherence to environmental provisions and commitments.

The Municipal Class EA process and associated documentation serves as a public statement of the decision-making process followed by municipalities for the planning and implementation of necessary infrastructure.

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Figure 2-1: Municipal Class EA Process



2.2 Project Approach

At the outset of the project, a review of background studies/reports and policies was undertaken; initial comments from the public and other stakeholders were compiled; and assessment of the current capacity and flow data of the Erb Street Water Supply System was completed. Alternatives and recommendations were presented to the public and other stakeholders and modified based on comments received. Throughout the process, direction was provided by the Region of Waterloo staff based on current policies and guidelines. The following chapters document the study process, following the guidelines for Phases 1 through 4 within the Municipal Class EA process.

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2.2.1 Project Team

The study was undertaken by a Stantec Consulting Ltd. team which included engineers, planners, designers, and other industry specialists in coordination with Region of Waterloo staff. The following is a list of project team members and their respective roles:

Kevin Dolishny, Region of Waterloo Project Manager
Neil Harvey, Stantec Project Manager
Garry McCarthy, Process Design and Technical Advisor
Mike Kocher, Process Design QAQC
Paula Hohner, Environmental Assessment QAQC
Danielle Hamara, Project Controls & Coordination
Moir Davidson, Class EA & Communications
Simon Horsley, Process Design Lead and Water Quality
Katie Chamberlain, Process Design Support
Jadran Milovanovic, Electrical Design Lead
Zhaonan Mei, Mechanical Design Lead
Susan Alarcon, Structural/Architectural Design
Al Mueller, Linear Design Lead / Traffic Management
Michael Bennett, Fathom Hydraulic Modelling of Wells
Brian Campbell, Property Evaluation
Roger Freymond, Hydrogeology
Jeff Dietz, Geotechnical
Julie Carpentier, Site Plan Development
Sean Spisani, Natural Environment
Landon Black, Arborist

2.2.2 Consultation Plan

A well-organized communications program is imperative to improving the public's awareness of opportunities to voice their concerns and take part in the planning process in order to reduce conflict and build consensus. The project team developed a proactive approach to stakeholder communications for the Class EA study, one that was based on:

- Informing, consulting and collaborating with the local landowners, key agencies and the public;

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- Identifying and understanding stakeholders' critical issues; and,
- Providing up-to-date information on project progress and impacts.

The Consultation Plan developed for the Erb Street Water Supply Iron and Manganese Upgrades Municipal Class Environmental Assessment (Class EA) outlined the consultation goals for the project, assessed the various stakeholders and issues that may be involved in the project, as well as the various communication techniques to be used during outreach with the public, stakeholders and indigenous communities. The complete Consultation Plan can be found in Appendix A.

3.0 Background Documentation

3.1 Relevant Municipal Policies

3.1.1 Region of Waterloo Official Plan

The Region of Waterloo is an upper-tier municipality, which encompasses seven local municipalities. The Regional Official Plan is a guiding document for directing growth and change throughout the Region for the next 20 years. The plan also implements the main growth goals identified by the Regional Growth Management Strategy and sets out actions to achieve a sustainable and livable Waterloo Region. Policy intended to address local issues, unique characteristics, and objectives and goals are discussed below.

Land within the eastern portion of the study area is located within the Urban Area Boundary for the City of Waterloo and is designated Urban Greenfield Area, which requires the land to achieve a certain minimum density for residents and jobs per hectare. This designation indicates that this portion of the study area is proposed for growth.

The remainder of the study area is located within the countryside and designated Prime Agricultural, which identifies areas with soils ideal for agriculture; Rural Areas, which identifies areas that are non-farm lots; and, Protected Countryside, which represents a continuous band of environmental features and agricultural lands surrounding the north, west and south sides of the Urban Area designation that is to be permanently protected.

Lands surrounding existing wells within the study area are designated as Wellhead Protection Sensitivity Area (WPSA) 6 and 7 within Regional Official Plan Map 6a, which delineate low sensitivity areas. However, these areas must still comply with Significant Threat policies within the Source Protection Plan (SPP) during the construction process should these areas be chosen for a proposed facility. Section 3.1.4 of this report provides more detail on the relevant SPP policies.

The Official Plan also provides recommendations on the Region should manage infrastructure planning and water supply. It is an objective of the Region to plan and manage municipal drinking-water supply systems using a comprehensive, integrated approach that reduces water demand, achieves efficiency of water use and protects, improves or restores the water quality and quantity. To achieve such, the Region shall undertake infrastructure planning, development and asset management which optimizes the use of existing infrastructure, accommodates forecast growth, and promotes sustainability and a healthy population.

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3.1.2 Township of Wilmot Official Plan

The Township of Wilmot is one of the seven local municipalities within the Region of Waterloo. Lands within the western portion of the study area are subject to the Township of Wilmot Official Plan policies.

The western portion of the study area is designated Countryside within the Official Plan. The Countryside designation includes all rural and agricultural lands within the Township and further designates the various areas within the western portion of the study area as Rural Area, Prime Agricultural, and Protected Countryside. Within Rural Areas and Prime Agricultural Areas, the primary land uses permitted include agricultural uses, agriculture-related uses and on-farm diversified uses. Protected Countryside on the other hand, identifies and protects sensitive environmental features and unique concentration of productive farmland and or mineral aggregate deposits from urban development and other incompatible activities.

Lands surrounding the existing well sites within the study area are designated as Wellhead Protection Sensitivity Areas WSPA-1, WSPA-5, WSPA-6, WSPA-7. This classification allows for varying degrees of management relative to the vulnerability of contamination for the underlying groundwater and requires all activities within these areas, including construction of utility facilities, to comply with the Significant Threat polices outlined within the SPP for the Grand River Source Protection Area.

Although the lands within the study area are subject to specific land use polices of the Township Official Plan, public utilities such as local water supply, sewage, and drainage facilities have specialized policies and are permitted in all designations within the Township. Relating to any public utility use within the Township, said utility will be subject to any regulatory requirements, such as the provisions of the EA Act, through which the location of such use will be justified, and the utility will be determined to be compatible with the surrounding uses.

3.1.3 City of Waterloo Official Plan

The City of Waterloo is also one of the seven local municipalities within the Region of Waterloo. Lands within the eastern portion of the study area are subject to the policies of the City of Waterloo Official Plan.

The 2016 consolidation of the Official Plan brought the City Official Plan into conformity with the Regional Official Plan (2015) and includes all amendments. Lands within the eastern portion of the study area are designated Employment, Commercial, Open Space and Low-Density Residential on Schedule 'A' of the Official Plan. Areas designated Employment provide space for a broad range of employment uses while maintaining a diverse and balanced employment land supply. Residential and Commercial designations speak to maintaining a primarily residential or commercial function while defining and providing a mix of supporting uses near residents. Lastly, the

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Open Space designation is intended to protect ecologically significant natural features and to provide a comprehensive and connected open space system that balances community and environmental management.

To manage all of the lands within the City, the Official Plan also requires the City to plan for the provision and maintenance of the municipal services, as well as utilities, needed to support the community, including adequate water supply, sanitary sewers and storm drainage across the City. The Official Plan requires the City to collaborate with the Region to enable the provision of an adequate supply of potable water within the City limits by supporting water infrastructure upgrades to meet future requirements.

It should be noted that the City will operate and maintain a network of local watermain to meet its obligations for the distribution of potable water supplied by the Region, which is relevant to the Erb Street Water Supply Upgrades Class EA should the recommended location for the new water treatment plant be located within the City of Waterloo Urban Boundary.

3.1.4 Grand River Source Protection Plan

In accordance with Ontario's Clean Water Act (CWA), the Region of Waterloo has enacted policies through the Grand River SPP to protect groundwater sources within the Region. The SPP policies work to reduce risk by regulating proposed and existing activities which have been identified as posing significant threats to drinking water safety. Depending on the hydrology and geology of an area, as well as potential risks posed by activities onsite, different policies under the SPP may apply to the study area.

The Class EA planning process must have regard for the CWA and the policies set out in the approved SPPs. Impacts to the SPP policies will be identified through the evaluation of alternative solutions.

The Region's SPP policies will need to be reviewed during the design and construction phases of the project to ensure the preferred alternative does not involve activities which are deemed significant threats under Ontario's CWA and the Grand River SPP. Such significant threats include, but are not limited to, the storage of salt over 1 ton, storage and handling of organic solvents and/or dense non-aqueous phase liquids. However, for these policies to apply, they must occur in relevant vulnerable areas within the study area, as identified by the 2015 Grand River Assessment Report and the SPP.

Apart from the development of new groundwater sources, which would result in the creation of new vulnerable areas, it is not anticipated that other alternatives developed as part of the Erb Street EA would have significant implications regarding the Region's SPP policies.

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3.2 Relevant Municipal Studies/Projects

Relevant elements of the following studies are summarized in the following sections:

- Erb Street Municipal Class EA, 2013
- Water Supply and Distribution Operations Master Plan, 2015
- W6C Well Construction and Testing Report, 2015
- William Street and Strange Street Water Supply Systems Municipal Class EA, 2016
- System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines 2017

3.2.1 Erb Street Municipal Class EA, 2013

In 2013, Stantec was retained by the Region to complete a Municipal Class EA study for the Erb Street Water Supply System (WSS). The study included a capacity needs assessment, as a review of water quality and existing operations. The recommendation from the study was that no further treatment was required as the combined treated water supply, with the exception of hardness, met all of the Ontario Drinking Water Standards (ODWS) at that time, including aesthetic objectives. Following the study recommendations, operational modifications were implemented. Modifications included:

- Relocation of the ammonium sulfate dose point from the outlet of the reservoir to the inlet of the reservoir to reduce the potential for metals to oxidize and precipitate within the reservoir; and,
- Minor electrical and control modifications to improve reliability, redundancy, and reduce the energy usage at the well houses.

3.2.2 Water Supply and Distribution Operations Master Plan

The 2015 Water Supply and Distribution Operations Master Plan was created to develop both short and long-term strategies for optimization of the operating efficiency of the Integrated Urban System (IUS) and to create a system that is sustainable for long-term population growth. To maintain such, the Master Plan recommends a variety of reconfigurations, which included the facility capacity restoration and facility/site upgrades of the Erb Street Wells. Specifically, the Master Plan proposed solutions to restore the capacity and improve the operation of the WSS including electrical and pump upgrades, modifications to the chemical injection systems, and an updated operating strategy for the Erb Street control valve.

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The Master Plan referenced the requirement for a Class EA to optimize the pre-approved changes to the supply and distribution system, which this study is aiming to achieve for the Erb Street Wells.

3.2.3 W6C Well Construction and Testing Report

Figure 3-1: W6C Well Construction and Testing Report Study Area



In 2015, Golder Associates Ltd. was retained by the Region to construct and test a new monitoring well at the Well W6A/B site, located at 1226A Erbs Road in Wilmot Township (refer to **Figure 3-1**), as both Wells W6A and W6B were operating below expectations due to excessive sand production. Due to limited space on the property, it was decided that in lieu of a new test well, a test production well would be built and would be increased in size so that it could be used as a stand-alone well or in conjunction with either Well W6A or W6B. As a result, a test production well W6C was constructed and was pumped at a rate of 25 L/s for 72 hours. Additionally, a new monitoring well WT-

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EB-TW02-16 was installed adjacent to well nest OW3A/B-08, located 125 m southeast of the W6 well site in a deep confined aquifer.

3.2.4 William Street and Strange Street Water Supply Systems Municipal Class EA

As a result of the March 2014 Regional Water Supply and Distribution Operations Master Plan, it was recommended that source water from the William Street WSS be directed to the Strange Street WSS, where the combined flow could undergo treatment allowing the treated water to have further flexibility to supply either Kitchener or Waterloo. A Class EA was initiated following the completion of the Master Plan to determine the most cost effective and environmentally sound approach for servicing the two water supply systems. The Class EA identified the following preferred solution:

- combine the William Street and Strange Street WSS.
- construct a raw water transmission main to connect the two well fields.
- construct a new WTP at the Strange Street site.
- install an iron and manganese removal process for the William Street and Strange Street WSSs, consisting of pre-oxidization followed by filtration. This treatment method is like that provisionally recommended for Erb Street in the System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines.

The Strange Street project was awarded in 2018, and construction has commenced.

3.2.5 System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines

The Region completed a System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines (2017) to assess potential impacts for Region treated water facilities. The Erb Street Wells, referred to as the Erb Street Supply, were identified as requiring treatment upgrades to achieve the finished water recommended operational objective of less than 0.015 mg/L of manganese. The conceptual treatment approach recommended in the study was pre-oxidation using sodium hypochlorite oxidation followed by pressure greensand filtration. The study recommended that improvements to the Erb Street Supply shall be based on further development under the Municipal Class EA process.

4.0 Existing Conditions

4.1 Existing Water Infrastructure

4.1.1 Wells 6B and 6A

Well 6B was constructed with a 300 mm diameter steel casing which terminates at a depth of 47.9m. The remainder of the well is constructed with a 300 mm stainless steel screen that terminates at a depth of 53.8 m. The permitted capacity of Well 6B is 53.0 litres per second (lps). Well 6B is a standby well, however, is generally used for supply due to the issues with Well 6A (lead well and located at the same site). It should be noted that the electrical service at the site is only suitable to operate one motor.

Each well is housed within a small masonry building equipped with submersible well pumps, motors, variable frequency drives (VFD), sodium hypochlorite storage and dosing equipment, flow meter, pressure transducer and associated electrical panel. Sodium hypochlorite is dosed on the discharge header and is flow-paced off the raw water flow meter.

4.1.2 Wells 7 and 8

Well 7 was constructed in 1966 with a 650 mm diameter outer steel casing set to a depth of 15.2 m. The inner 400 mm diameter steel casing is set to a depth of 33.4 m and the remainder of the well is screened with a 400 mm diameter stainless steel screen with #6 openings set to a depth of 42.5 m.

Well 8 was constructed in 1969 as a naturally developed well with a 400 mm steel casing and a 400 mm diameter telescopic style stainless steel wire wrapped screen extending from 34.3 m to the well's completed depth of 43.4 m.

W7 and W8 are currently operated at roughly 89 and 28 lps respectively for a total combined pumping rate of 117 lps. The wells typically run simultaneously and produce subtle impacts to one another. When increasing the flow at one well there is a corresponding impact to the other. This is due to a change in the pumping water levels produced from pumping as well as change in discharge pressure as both wells pump into a common transmission main.

Each well is housed within a small masonry building equipped with submersible well pumps, motors, variable frequency drives (VFD)s, sodium hypochlorite storage and dosing equipment, flow meter, pressure transducer and associated electrical panel. Sodium hypochlorite is dosed on the discharge header and is flow-paced off the raw water flow meter.

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4.1.3 Existing Reservoir

The existing reservoir is a three-celled 18,000 m³ capacity storage facility and is associated with a masonry building which houses process piping, valves, and a chemical room containing an ammonia sulphate dosing system and storage tank. Chlorinated water from all well houses is pumped to the Erb Street reservoir via the 400 mm Erb Street transmission main. Primary disinfection is met within the transmission main upstream of the Erb Street reservoir.

Ammonium sulfate is dosed at the influent to the Reservoir to form chloramines. Chloraminated water flows from the Reservoir to Waterloo Z5 by gravity (with subsequent supply to Waterloo Zones 4C, 4B and 4) and to the Zone 7 (Z7) booster station to supply St. Agatha, Waterloo Zone 7, and the Regional Landfill Fire Systems Facilities. The Z7 pumping station is located directly across Erb Street from the Reservoir.

4.2 Natural Heritage

The information contained in this section describes the natural environment features, functions, and context in proximity to the study area based on a review of existing natural heritage policy enforced through Provincial and Regional planning policy.

A review of provincial policy, and conservation authority regulation data, revealed that there are a variety of Natural Heritage features within the study area. The Natural Heritage System is made up of features, areas, and linkages that are intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. The Natural Heritage System is further broken down into Natural Heritage features, such as woodlands or wetlands, that cater to a specific ecosystem within the overall Natural Heritage System.

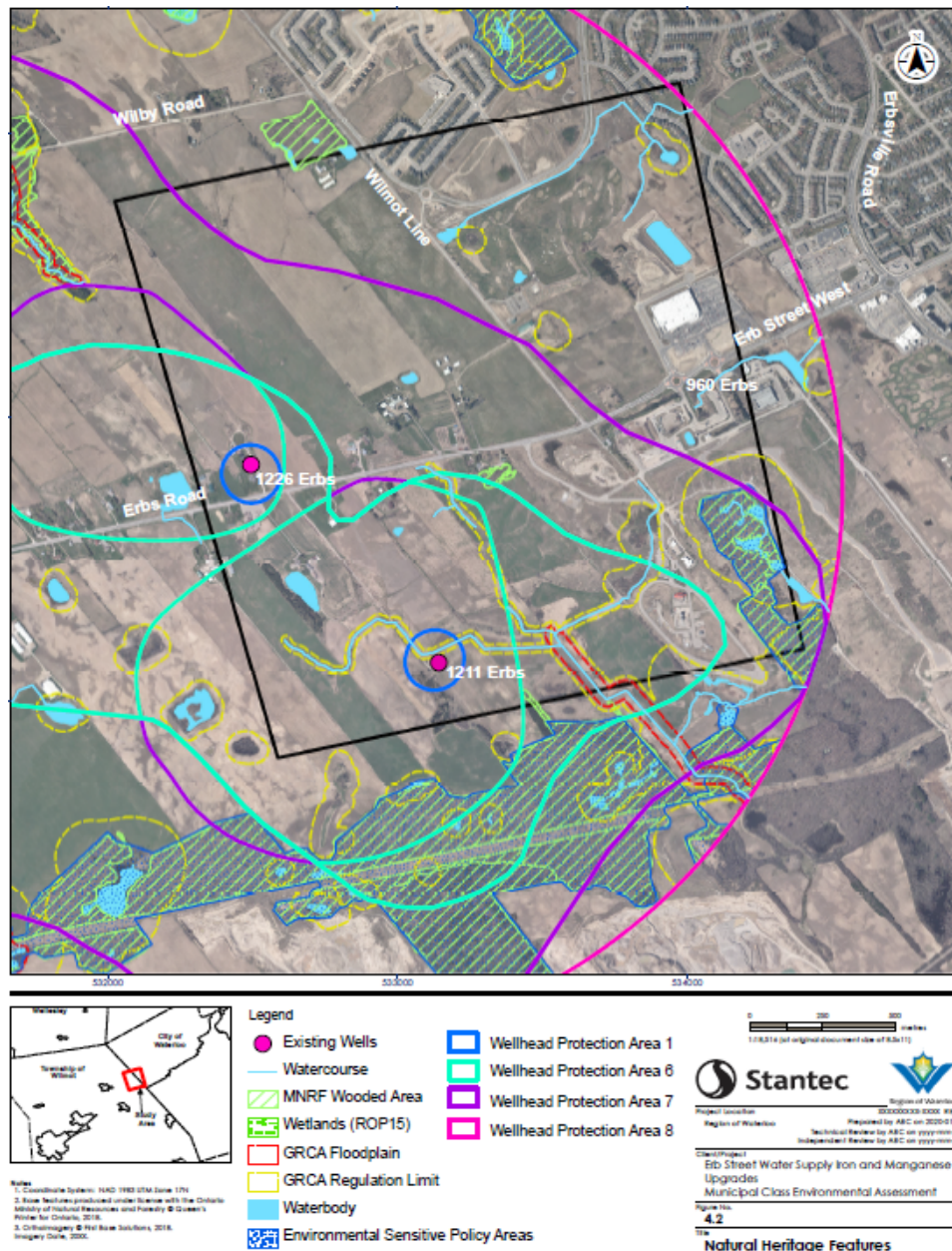
The Natural Heritage Information Center (NHIC) was accessed on May 12, 2020 to search for records of species at risk (SAR) and species of special conservation concern (SOCC) that overlap with the Study Area. No species records were identified in the 1km x 1km NHIC assessment squares that overlapped with the study area.

A site assessment was completed to identify terrestrial natural heritage features and fish habitat in the study area. The site assessment was completed from roadside with binoculars from Erb Street West and Wilmot Line. The assessment included documenting vegetation communities and potential wildlife habitat, searching for potential suitable SAR and SOCC habitat, as well as candidate significant wildlife habitat (SWH) features. Candidate SWH was assessed in accordance with the SWH Criteria Schedules for EcoRegion 6E (MNRF 2015). The results of the assessments can be found in **Appendix B. Figure 4-1** illustrates that the south-eastern corner of the

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study area, as well as a portion of land near the middle of the study area, is designated Ministry of Natural Resources and Forestry (MNRF) Wooded Area, also provincially known as Woodland. Woodland includes treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products.

Figure 4-1: Natural Environment Features



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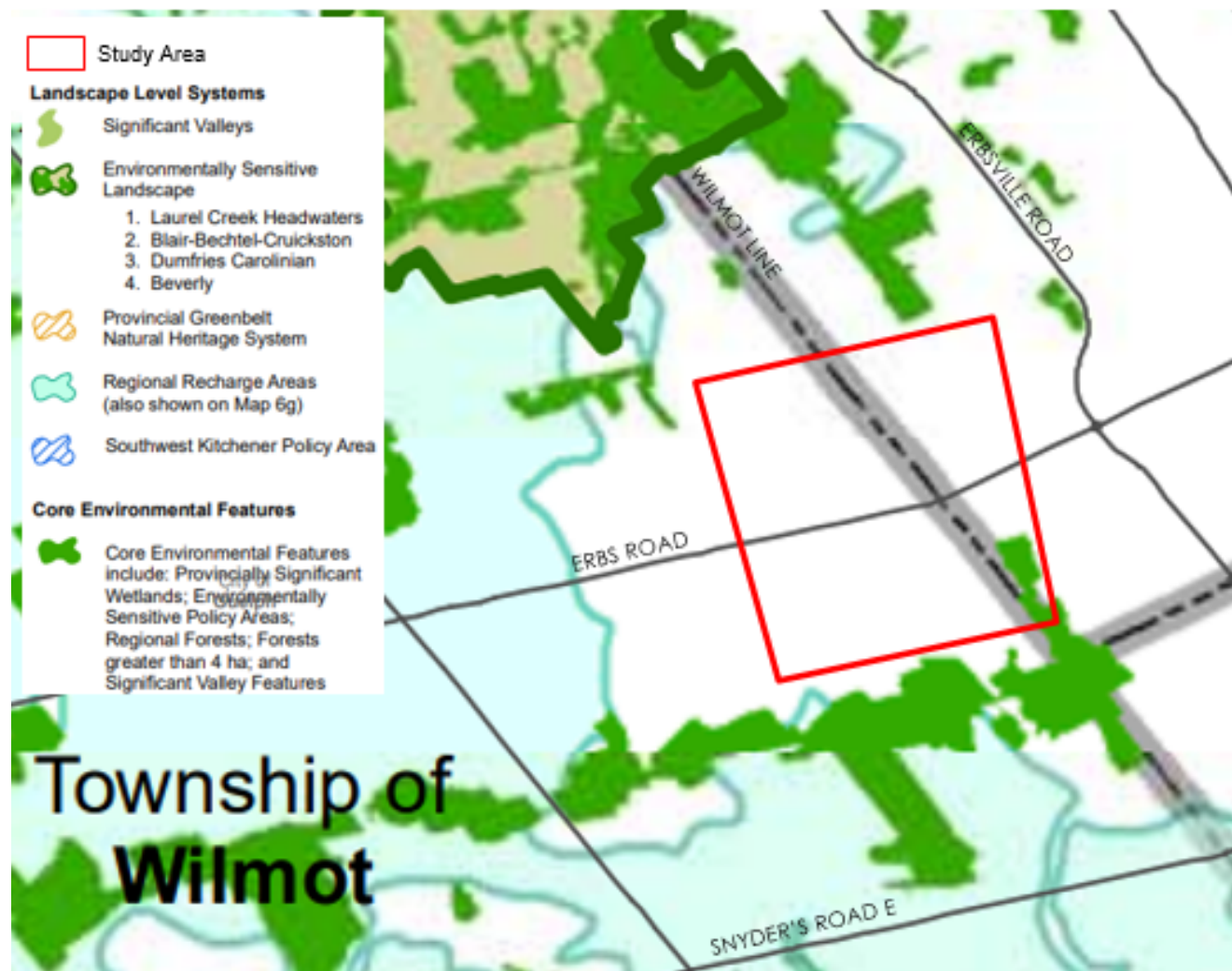
The south-eastern corner of the study area also includes multiple Evaluated Wetlands (Non-Provincially Significant) that form part of the Waldau East Wetland Complex. Non-Provincially Significant Evaluated Wetlands are lands that are seasonally or permanently covered by shallow water, where the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water-tolerant plants. Wetlands are further identified and managed by the MNRF and the local conservation authority. Grand River Conservation Authority (GRCA) requires that, although the Waldau East Wetland Complex is a non-Provincially Significant Wetland Complex, protecting the wetland feature with a 30-metre buffer is still required. Further features within the site are regulated by the GRCA as Figure 4.2 illustrates large portions of the southern half of the study area as being within GRCA regulation limit, with some, as shown by the red dotted line, being within the GRCA floodplain.

The Region of Waterloo Official Plan Schedule 4 (**Figure 4-2**) identifies a small area of Core Environmental Features as being located within the south-eastern corner of the study area. The Regional Official Plan defines core environmental features as areas that form key habitat for native flora and fauna and represent the most significant elements of the regional landscape in terms of maintaining biodiversity and important ecological functions. Core environmental features can include areas identified as Provincially Significant Wetlands, Environmentally Sensitive Policy Areas, Regional Forests, Forests greater than 4 ha, and/or Significant Valley Features.

The Regional Official Plan permits Infrastructure Projects, such as groundwater taking projects or watermain expansions, within Core Environmental Features subject to the completion of an Environmental Impact Statement, and/or other appropriate study, prior to construction. Criteria for the evaluation alternative solutions and designs as part of this Class EA shall have regard for potential impacts on these natural heritage features and the extent to which impacts can be mitigated.

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Figure 4-2: Region of Waterloo Official Plan Schedule 4



4.3 Cultural Heritage

4.3.1 Archaeological Resources

A Stage 1 Archaeological Assessment (AA) (PIF P439-0087-2020) was completed on July 22, 2020 by consultant archaeologist Kassandra Aldridge (P439) for Part of Lots 40-41, German Company Tract Geographic Township of Waterloo Within Part of Lot 1, German Block North of Erbs Road and Lot 1, German Block South of Erbs Road Geographic Township of Wilmot Former County of Waterloo Now the Township of Wilmot and City of Waterloo Regional Municipality of Waterloo, Ontario.

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Stage 1 AA background research established elevated potential for the recovery of archaeologically significant materials within the study area. To determine if the archaeological potential classification of the study area is relevant, a desktop review of ground conditions was undertaken using historical mapping, 20th century topographic maps and satellite imagery. The desktop review identified parts of the study area as having archaeological potential removed, parts of the study area as having no or low archaeological potential and parts having been previously assessed. The remaining balance of the study area was identified as retaining archaeological potential and requires further archaeological assessment.

With respect to the seven (7) short-listed sites, Site 1 and Site 3 have been previously assessed and no further assessment is recommended. Site 4 was identified as previously disturbed, but a Stage 2 Assessment is recommended to confirm the extent and confirm if archaeological potential exists. A Stage 2 Archaeological Assessment is also recommended for Sites 5, 6, and 7 to further investigate the potential for archaeological resources.

Prior to disturbance at Sites 4 through 7, further Archaeological Assessment is required to confirm the potential for archaeological resources. A copy of the Stage 1 AA is included in Appendix D.

4.3.2 Built Heritage Resources and Cultural Heritage Landscapes

The following resources were consulted in identifying cultural heritage resources within the study area:

- City of Waterloo Inventory of Designated Heritage Resources
- Township of Wilmot Inventory of Designated Heritage Resources
- Directory of Federal Heritage Designations (http://www.pc.gc.ca/apps/dfhd/default_eng.aspx)
- Ontario Heritage Trust Online Plaque Guide (<http://www.heritagetrust.on.ca/>)
- Canadian Cemeteries Project (<http://cemetery.canadagenweb.org/map/>).

The screening checklist (Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes) developed by the Ministry of Heritage, Sport, Tourism and Culture Industries were completed and are included in Appendix C.

There are no properties listed or designated under Part IV or V of the Ontario Heritage Act within or adjacent to the study area and there were no cultural heritage resources located within or adjacent to the seven (7) alternative facility locations. The study area was therefore determined to have low potential for built heritage resources and cultural

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heritage landscapes and no further technical cultural heritage studies were required to be undertaken.

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5.0 Problem Statement

The first step in the Class EA planning process is to identify the problem or opportunity that has led to the undertaking of the Class EA. The Problem and Opportunity Statement for the Erb Street Water Supply Iron and Manganese Upgrades Municipal Class EA is as follows:

Treatment for the Erb Street Water Supply currently consists of four supply wells (W6A, W6B, W7, W8) with chlorination (sodium hypochlorite) injection at each well house. The wells pump to the Erb Street Reservoir with primary disinfection achieved in the upstream transmission main. Ammonia is injected at the Reservoir inlet to form chloramines for residual disinfection.

Manganese treatment will require the consolidation of well raw water flows to a new treatment building which will contain filtration and associated chemical dosing for manganese removal; an on-site backwash tank with backwash pumps; chemical and filter panels; and ancillary process piping and valving. A new on-site clearwell tank was also recommended in the System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines to provide Contact Time (CT) disinfection time and to provide backwash volume. The new equipment will require construction of a new treatment facility which is expected to require land acquisition.

5.1 Project Objectives

The purpose of this Class EA is to confirm equipment upgrades required to provide iron and manganese treatment for the existing Wells W6A, W6B, W7, W8, and future Well W6C (collectively referred to as the Erb Street Water Supply System) in order to meet anticipated changes to the Ontario Drinking Water Standards related to manganese. Specifically, the Class EA is intended to provide recommendations on the following:

- Selection of the preferred technology for iron and manganese filtration;
- Preferred location for a new water treatment facility;
- Conceptual layout of the proposed treatment facility to determine site footprint; and,
- Conceptual design of the site, including the proposed treatment facility and support infrastructure.

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6.0 Evaluation Criteria

Based on the review of background information and characterization of the study area, the following criteria were identified for this study.

Table 6-1: Evaluation Criteria

Environmental Component	Evaluation Criteria	Description
Natural Environment	Potential effects to water resources, including: • Fisheries/aquatic habitat • Species at Risk • Wetlands • Floodplains • Groundwater recharge areas and wellhead protection areas • Groundwater/water quality	Reduction or deterioration of habitat Effects of construction timing on spawning periods Changes or impacts to groundwater quality Impacts to GRCA regulated areas should be minimized <i>Aligns with Clean Water Act requirements</i>
	Potential effects to natural heritage features, including: • Significant woodlands • Significant wetlands • Environmentally sensitive areas • Environmental protection areas • Environmental conservation areas • Species at Risk	Removal or disturbance of significant trees and/or ground flora Changes in vegetation composition Reduction or deterioration of habitat Steep slopes
	Potential impacts to wildlife/migratory birds	Reduction or deterioration of habitat Effects of timing of construction on nesting periods Effects of construction timing on breeding periods Changes in vegetation composition
	Potential climate change impacts	Minimizes greenhouse gases

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Environmental Component	Evaluation Criteria	Description
Social/Cultural	Effect on existing residences, businesses (e.g., agricultural operations) and community features	Amount and duration of disruption (e.g., noise, vibration, traffic management, access, detours) during construction. Post-construction disruption due to truck chemical deliveries/vacuum truck operations.
	Potential effects on known or potential significant archaeological resources and built heritage resources and cultural landscape features	Disruption of site having significant archaeological, historical, or architectural value Protection of heritage features
	Potential effect on approved/planned land uses	Compliance with Official Plan
	Public Health and Safety	Impacts to health and safety for each alternative during construction
Regulatory/Legal	Potential land requirements including land purchase and temporary/permanent easements	Number and type of properties required; amount of land required
Technical	Constructability	Location, depth of excavation, soil conditions, rock removal, groundwater control, construction duration
	Effect on existing utilities and infrastructure (number and type of potential conflicts)	Number and type of potential conflicts
	Planned infrastructure improvements	Ability to coordinate with existing and planned infrastructure improvements Sewer and WWTP capacity impacts from any backwash flows sent to the sanitary system.
	Meets existing and future needs	

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Environmental Component	Evaluation Criteria	Description
Cost	Estimated capital cost	Total project costs (design/construction)
	Property acquisition cost	Costs associated with any required property acquisitions
	Operation and maintenance costs	Costs associated with operations and maintenance

6.1 Evaluation Methodology

As part of Phase 2 of the Class EA process, the framework and criteria for assessing alternative solutions were identified to determine the advantages and disadvantages with respect to the natural, social/cultural, technical and economic components of the project. A detailed assessment of each alternative was completed based on the criteria outlined above. A comparative evaluation matrix was further prepared and used to present the evaluation of treatment options as well as siting options.

Each treatment option and siting option was evaluated based on the above criteria and given a score of 1 to 5 as well as a symbol indicating the scoring, as per **Table 6-2**. A rating of 1 indicates a low alignment with the criteria while a rating of 5 indicates that the alternative is very well aligned with the criteria. The following table outlines the scoring matrix.

Table 6-2: Evaluation Criteria Scoring

Graphic	Rating/Description
	5 – Very well aligned with criteria
	4 – Well aligned with criteria
	3 – Somewhat aligned with criteria
	2 – Not well aligned with criteria
	1 – Low alignment with criteria

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6.2 Treatment Technology Review

As part of this EA, a treatment technology review was completed to determine alternative solutions required to implement water treatment components that will assist in addressing the preferred treatment approach and preferred location and layout of the new water treatment facility. The treatment technology review considered the following municipal drinking water treatment technologies:

- Chemical oxidation followed by filtration using catalytic media;
- Biological oxidation and filtration using biologically active filter media; and,
- Ion exchange.

A qualitative evaluation and comparison of manganese removal treatment technologies and associated backwash residual waste management needs was completed to inform the development and evaluation of alternative solutions. The conclusion of the evaluation was that chlorine oxidation of manganese using sodium hypochlorite followed by removal through pressure greensand filters was the preferred treatment technology. Rationale for this process selection is as follows:

- Greensand filtration provides operational flexibility to achieve manganese discharge limits and Region operators are familiar with this technology; and,
- Sodium hypochlorite is technologically simple, already in use for disinfection at the WTP, and Region operators are familiar with handling and using this chemical.

Further detail on the treatment technology and backwash residual waste management review including an evaluation of treatment technologies for the Erb Street Water Supply Iron and Manganese Upgrades Class EA can be found in Sections 7.0 and 8.0 of this report.

7.0 Selection of Technology Alternatives

This section reviews treatment technology alternatives for manganese mitigation.

7.1 Technology Alternatives Review

The Municipal Class EA process requires proponents to consider the “Do Nothing” alternative as a comparative benchmark for the other identified alternatives. The “Do Nothing” alternative maintains the status quo. In order to address the Problem/Opportunity statement, the following treatment technology alternatives for manganese mitigation in municipal drinking water applications were reviewed:

- Alternative 1 – Do Nothing
- Alternative 2 - Chemical oxidation + catalytical media filtration
- Alternative 3 - Biological oxidation + filtration
- Alternative 4 - Ion exchange
- Alternative 5 – Sequestration
- Alternative 6 – Lime or Soda Softening
- Alternative 7 – Membrane Filtration

The above alternatives are reviewed below.

7.1.1 Alternative 1 – Do Nothing

The “Do Nothing” alternative requires to be evaluated under the EA process. The current treatment process (status quo) does not meet the Region’s target manganese concentration objective and is therefore not eligible to be carried forward under this evaluation.

7.1.2 Alternative 2 - Chemical Oxidation + Filtration

The oxidation, precipitation and filtration of manganese is the most common treatment approach in the industry. The filter media removes manganese both through physical straining and through direct catalytic oxidation/adsorption onto the catalytic media surface. Various oxidants can be used to precipitate manganese, however the most used are chlorine (gas or sodium hypochlorite) or permanganate. Other oxidants could include ozone and chlorine dioxide. The key process variables as relates to oxidation are:

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- pH - metals oxidation is increased with increasing pH.
- Total oxidation demand – oxidation demand from the presence of non-Manganese (Mn) parameters (e.g., iron, sulphide, nitrate, ammonia, organics) also needs to be satisfied.
- Reaction time – reaction time is required to oxidize soluble manganese to particulate form. Reaction time varies as a function of pH, temperature and non-Manganese (Mn) oxidant demands but typically 15-20 minutes is provided between the point of oxidation and the filter. Once oxidized, particulate manganese is removed by the downstream filters.

An oxidant can be fed using one of two approaches; continuous regeneration (CR) or intermittent regeneration (IR). In CR, the oxidant is continuously fed into the filter influent. For IR, once the oxidative capacity of the media has been sufficiently consumed, it is regenerated in a batch mode approach in which a high concentration of oxidant is introduced following a normal backwash and allowed to remain in contact with the media for several minutes, following which the filter is rinsed until the excess oxidant is removed. The decision to employ CR, IR or a hybrid approach is a function of iron and manganese loading and would be assessed during the design stage.

Oxidation-filtration has been well demonstrated to be capable of reducing filtered water manganese to < 0.015 mg/L provided the process is suitably optimized. Typical loading rates range from 12-25 m/hr (requires piloting to confirm). Equipment generally includes chemical bulk and day tank(s); chemical transfer and metering pump(s); filters; control panels; online instrumentation; backwash air blower; ancillary process piping, valving etc. The footprint is mostly determined by the filters. Pressure filters are common for groundwater systems and can be configured either horizontally or vertically.

Backwash of the filter media generates backwash waste that may be discharged to a lagoon, discharged to a sanitary sewer, or collected in a backwash holding tank for disposal by vacuum truck. Backwashing can be automated to occur at a certain headloss or based on a certain amount of time. Settled backwash supernatant is sometimes returned to the front end of the process to reduce backwash waste and increase water production. Once optimized, the process operation is generally consistent and requires minimal day-to-day operator input. Operator health and safety issues generally relate to the handling and use of any new chemical oxidants.

7.1.3 Alternative 3 - Biological Oxidation + Filtration

Biological filtration is considered an emerging technology for manganese removal relative to oxidation-filtration. In biological filtration microorganisms remove dissolved manganese via direct intracellular oxidation, extracellular adsorption, and / or extracellular catalysis of Mn^{2+} oxidation. The process generally involves aeration of the

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water followed by filtering the water through a high-surface-area media (e.g., GAC or anthracite) and allowing the filter to become colonized by manganese oxidizing bacteria in a process called filter acclimation or filter conditioning. While chemical pre-oxidation is not required for biological filtration, pre-aeration is required and the addition of nutrients (e.g., phosphorous) is common to help optimize and maintain biological performance. Source water compatibility depends in part on the presence of other nutrients that could create competing bacteriological communities within the filter, for example iron oxidizing bacteria. If competing biological communities exist, this will result in loss of performance due to loss of filter 'real estate' by manganese oxidizers and potentially accelerated headloss. If iron is present in the source water, biological oxidation and filtration of iron must be placed upstream of biological manganese oxidation and filtration.

While the biological process has been shown to be capable of removing manganese to < 0.02 mg/L, the performance of biological filters can be less consistent than the physio-chemical processes, and significant disruption to filter operations can cause extended (days or weeks) disruption to filter performance. The process is less amenable to start-stop operations than physio-chemical processes due to acclimation period for biofilm activity to re-establish after any significant hydraulic or chemical disturbance, and certain filter backwash and filter-to-waste procedures may be required to bring dormant filters back online. In the case of single-stage biological filtration (i.e., no iron biological filtration is required), footprint requirements are generally comparable to conventional oxidation-filtration process. The process produces backwash waste that can be sent to onsite residuals lagoons or a sanitary sewer or stored in a backwash holding tank for periodic removal by vacuum truck.

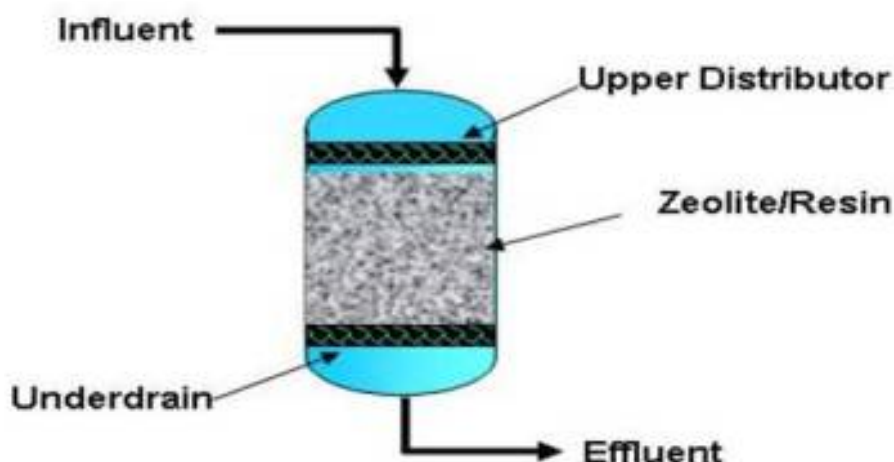
7.1.4 Alternative 4 - Ion Exchange

As dissolved manganese (Mn^{2+}) is a divalent cation, it is amenable to removal by ion exchange (IX). In this process monovalent cations (i.e., Sodium Ion (Na^+) or Hydrogen Ion (H^+)) are released from a cationic ion exchange resin (or media, such as zeolite) in exchange for Mn^{2+} . As water flows through the IX medium, cationic exchange occurs.

The most common exchange resin is made from zeolite. Backwashing the zeolite is commonly conducted using a strong brine solution prepared from sodium chloride ($NaCl$) to remove the Mn^{2+} that has accumulated and regenerate the Na^+ ; the brine may be reused or used only once and then disposed of. After regeneration, the zeolite medium is rinsed with clean water to remove residual brine prior to returning the process to service. The process is amenable to start-stop operations.

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Figure 7-1: Typical Ion Exchange Configuration



Source: USEPA Drinking Water Treatability Database

In terms of raw water compatibility, the presence of other cations (e.g., Fe^{2+} , Ca^{2+} etc.) at the point of IX will compete with Mn^{2+} for the exchange capacity of the resin and will accumulate within the media. In addition, IX only targets soluble manganese and is not a suitable technology for sources that contain an elevated fraction of particulate manganese, which can clog and plug the ion exchange medium. IX is considered capable of reliably removing soluble Mn to meet a 0.015 mg/L treated water target. The principal process footprint results from the IX vessels. Waste is generated in the form of IX backwash, which in the most common case of Sodium Chloride (NaCl) regeneration is a highly concentrated brine solution that can create disposal challenges. Once optimized, the process operation is generally consistent and requires minimal day-to-day operator input.

7.1.5 Alternative 5 - Sequestration

Sequestration refers to the addition of sequestering agents that form strong (ionic or covalent) complexes with soluble iron and / or manganese to prevent their oxidation/precipitation and the associated discolouration within the distribution system.

The choice of sequestrant for mitigation of manganese would be polyphosphate; the other common sequestrant - sodium silicate - is not effective in the sequestration of manganese³.

³ Sequestering Methods of Iron and Manganese Treatment, AWWARF 1990

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However, as the driver for the project is the removal of manganese to comply with a future health-based Maximum Acceptable Concentration rather than the mitigation of discolouration events, sequestration will not meet the project water quality objectives and therefore this alternative is not viable.

7.1.6 Alternative 6 – Lime or Soda Softening

At very high pH, the oxidation reduction potential (ORP) requirement to precipitate iron or manganese is significantly reduced. The use of lime to raise the pH to the range 10-11 can therefore convert various metals - including calcium, magnesium, iron and manganese – into carbonate or hydroxide precipitates. As the Erb Street supply has a relatively high concentration of calcium carbonate, solids removal would most likely be achieved by gravity settling through a sedimentation basin followed by gravity media filtration. Due to the precipitation and removal of calcium carbonate species, the resulting water quality requires re-carbonation in order to re-introduce carbonate for the purposes of pH buffering and corrosion control. As lime is typically batched on site, the process would require lime storage, a hopper-type lime make-up system, and residual management for the large volume of associated solids.

This alternative is associated with high capital cost and operational complexity due to the need for large quantities of lime or soda ash dosing, the associated handling of the large solids generated through the process, and re-carbonation after softening to protect against corrosivity.

7.1.7 Alternative 7 – Membrane Filtration

Iron and manganese can be removed by pumping water under pressure through a physical membrane (i.e., microfiltration or ultrafiltration membranes). In the case of manganese removal, pre-oxidation is required to achieve effective removal⁴. Chemicals (caustics and acids) are required to clean the membranes, and the removal of oxidized manganese also contributes to membrane fouling rates⁵. In addition, groundwater systems such as those supplying the Erb Street water treatment plant (WTP), have elevated levels of mineral hardness (calcium and magnesium carbonates and hydroxides), which also accelerate membrane fouling rates. For the filter loading rates required for Erb Street, the footprint of the membrane system itself may be comparable to traditional pressure filter systems, though space would be required for additional chemical storage. Membrane systems also require backwash pumps and supply, and disposal of membrane backwash residuals would be required.

⁴ Iron and manganese removal and membrane fouling during UF in conjunction with prechlorination for drinking water treatment, Journal of Membrane Science, Journal of Membrane Science, Volume 267, Issues 1–2, 15 December 2005, Pages 18-26

⁵ Iron and manganese removal and membrane fouling during UF in conjunction with prechlorination for drinking water treatment, Journal of Membrane Science, Journal of Membrane Science, Volume 267, Issues 1–2, 15 December 2005, Pages 18-26

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In general, membrane systems are mechanically complex and introduce operational complexity associated with performance monitoring and the regulation of cleaning cycles and associated waste stream management.

7.2 Technology Alternatives Evaluation

From the long list of alternatives, the following were carried forward for detailed evaluation:

- Alternative 2 - Chemical Oxidation + Filtration;
- Alternative 3 - Biological Oxidation + Filtration; and
- Alternative 4 - Ion Exchange.

The short-listed alternatives were assessed against the evaluation criteria described in **Section 6.0** of this report. Table 7-1 on the following page summarizes the evaluation of alternative technology alternatives⁶. It is noted that all evaluation criteria are weighted equally at this time.

⁶ Evaluation criteria were previously confirmed in Table 6-2 of TM #1/TM #2.

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Table 7-1: Evaluation of Technology Alternatives

Environmental Component	Evaluation Criteria	Description	Alternative 1: Chemical Oxidation + Filtration	Alternative 2: Biological Oxidation + Filtration	Alternative 3: Ion Exchange
Natural Environment	Potential effects to water resources, including: - Fisheries/aquatic habitat - Species at Risk - Wetlands - Floodplains - Groundwater recharge areas and wellhead protection areas - Groundwater/water quality	Reduction or deterioration of habitat	No new chemicals required	New chemicals required; increase in risk of chemical spill to environment	New chemicals required; increase in risk of chemical spill to environment
		Impacts to GRCA regulated areas should be minimized Aligns with <i>Clean Water Act</i> requirements Effects of construction timing on spawning periods Changes or impacts to groundwater quality			
	Potential effects to natural heritage features, including: - Significant woodlands - Significant wetlands - Environmentally sensitive areas - Environmental protection areas - Environmental conservation areas - Species at Risk	Removal or disturbance of significant trees and/or ground flora	Medium site building footprint (est. 900m²) will impact local flora	Large footprint (est. 1000-1300m²; range due to potential for multi-stage filtration) will impact local flora	Large footprint (est. 1000-1100m²; range due to potential for non-target cation competition) will impact local flora
		Changes in vegetation composition Reduction or deterioration of habitat Steep slopes			
	Potential impacts to wildlife/migratory birds	Reduction or deterioration of habitat	- Medium site footprint (est. 900m²) will impact habitat and site vegetation - No significant difference between construction durations and impacts to breeding periods	- Large footprint (est. 1000-1300m²) will impact habitat and site vegetation - No significant difference between construction durations and impacts to breeding periods	- Large footprint (est. 1000-1100m²) will impact habitat and site vegetation - No significant difference between construction durations and impacts to breeding periods
		Effects of timing of construction on nesting periods Effects of construction timing on breeding periods Changes in vegetation composition			
	Potential climate change impacts	Minimizes greenhouse gases	No significant difference between alternatives with regards climate change	No significant difference between alternatives with regards climate change	No significant difference between alternatives with regards climate change
					

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Environmental Component	Evaluation Criteria	Description	Alternative 1: Chemical Oxidation + Filtration	Alternative 2: Biological Oxidation + Filtration	Alternative 3: Ion Exchange
Social/ Cultural	Effect on existing residences, businesses (e.g., agricultural operations) and community features	Amount and duration of disruption (e.g., noise, vibration, traffic management, access, detours) during construction.	- No significant difference between construction durations and impacts to local community - Improved water quality to community through removal of manganese	- No significant difference between construction durations and impacts to local community - Improved water quality to community through removal of manganese - In long-term, more chemical delivery trucks	- No significant difference between construction durations and impacts to local community - Improved water quality to community through removal of manganese; however, sodium will be increased - In long-term, more chemical delivery trucks
		Post-construction disruption due to truck chemical deliveries/vacuum truck operations.			
	Potential effects on known or potential significant archaeological resources and built heritage resources and cultural landscape features	Disruption of site having significant archaeological, historical, or architectural value	None of the alternatives will negatively impact local cultural features	None of the alternatives will negatively impact local cultural features	None of the alternatives will negatively impact local cultural features
		Protection of heritage features			
	Potential effect on approved/planned land uses	Compliance with Official Plan	Alternatives are similar; no changes or impacts to planned land uses	Alternatives are similar; no changes or impacts to planned land uses	Alternatives are similar; no changes or impacts to planned land uses
					
	Public Health and Safety	Impacts to health and safety for each alternative during construction	No significant difference between alternatives for construction health and safety considerations	No significant difference between alternatives for construction health and safety considerations	No significant difference between alternatives for construction health and safety considerations
					
Regulatory/ Legal	Potential land requirements including land purchase and temporary/permanent easements	Number and type of properties required; amount of land required	Alternatives are similar. Noted that if new land is required, parcel size may be slightly less due to reduced technology footprint	Alternatives are similar. If new land is required, parcel size may be slightly larger due to larger technology footprint	Alternatives are similar. If new land is required, parcel size may be relatively larger due to larger technology footprint
					
Technical	Constructability	Location, depth of excavation, soil conditions, rock removal, groundwater control, construction duration	All alternatives are equivalent in requiring new standalone building	All alternatives are equivalent in requiring new standalone building	All alternatives are equivalent in requiring new standalone building
					

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Environmental Component	Evaluation Criteria	Description	Alternative 1: Chemical Oxidation + Filtration	Alternative 2: Biological Oxidation + Filtration	Alternative 3: Ion Exchange
	Effect on existing utilities and infrastructure (number and type of potential conflicts)	Number and type of potential conflicts	Alternatives are similar; however, if filters constructed at existing Region facility, smaller footprint infers less potential for conflicts	Alternatives are similar; however, if filters constructed at existing Region facility, larger footprint infers more potential for conflicts	Alternatives are similar; however, if filters constructed at existing Region facility, larger footprint infers more potential for conflicts
					
	Planned infrastructure improvements	Ability to coordinate with existing and planned infrastructure improvements	Iron and manganese loading to sewer	Iron, manganese and phosphate loading to sewer	Iron, manganese and brine loading to sewer
		Sewer and WWTP capacity impacts from any backwash flows sent to the sanitary system.			
	Ability to reliably meet existing and future needs		- Produces consistent and reliable water quality - Region staff have prior experience in operation of this technology	- Generally reliable water quality; however, biological filters may be subject to operational disruption under some conditions - Region staff have no prior experience in operation of this technology	- Generally reliable water quality; however, manganese can be displaced off the resin - Region staff have no prior experience in operation of this technology
					
Cost	Estimated capital cost	Total project costs (design/construction)	Lowest estimated capital cost (approximately \$14M)	Highest estimated capital cost (approximately \$17M)	Medium estimated capital cost (approximately \$15M)
					
	Property acquisition cost	Costs associated with any required property acquisitions	Relatively smaller footprint may reduce land acquisition costs	Relatively larger footprint may increase land acquisition costs	Relatively larger footprint may increase land acquisition costs
					
	Operation and maintenance costs	Costs associated with operations and maintenance	- Relatively less complex technology to operate - Alternatives have similar energy and chemical costs	- Relatively more complex technology to operate - Alternatives have similar energy and chemical costs	- Relatively less complex technology to operate - Alternatives have similar energy and chemical costs
					

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7.3 Preferred Technology Alternative

Based on the criteria overview provided in Section 6.1 and the treatment technology review presented in **Table 7-1**, it is concluded that oxidation and filtration of manganese is the preferred alternative as summarized in **Table 7-2**.

It is anticipated that oxidation will be by sodium hypochlorite injection and filtration will be by pressure greensand filters. The rationale for this process selection is as follows:

- Sodium hypochlorite is technologically simple, already in use for disinfection at the WTP, and Region operators are familiar with handling and using this chemical.
- Greensand filtration provides operational flexibility to achieve manganese discharge limits and Region operators are familiar with this technology.

Table 7-2: Summary of Evaluation of Technology Alternatives

Evaluation Criteria	Alternative 1: Chemical Oxidation + Filtration	Alternative 2: Biological Oxidation + Filtration	Alternative 3: Ion Exchange
Natural Environment			
Social / Cultural			
Regulatory/Legal			
Technical			
Cost			
Overall Score			

8.0 Selection of Residuals Management Approach

This section reviews backwash management alternatives for the preferred treatment technology.

8.1 Backwash Supply Volume, Frequency and Flow Rates

Based on the preferred treatment technology approach, estimates were prepared for backwash supply volume, frequency and flow rate. The design and operational assumptions for the backwash analysis were as follows:

- Average blended raw water iron and manganese is 0.04 and 0.03 mg/L, respectively.
- Filter surface area developed based on a target filter loading rate of 9.9 m/h⁷ at design flow rate of 245 L/s.
- Low-Rate Backwash Flow Rate is 7.3 m/hr for 2 minutes.
- Air Scour Water Flow Rate is 7.3 m/hr for 10 minutes.
- High-Rate Backwash Flow Rate is 24.4 m/hr for 3 minutes.
- Filter to Waste Flow Rate is 9.9 m/hr for 4 minutes.
- Enough backwash supply storage to backwash n+1 filters.

Based on the above:

- The estimated backwash supply volume is 336 m³.
- The minimum required backwash pump capacity is 76 L/s (assumes backwash of one cell of a dual cell filter).
- Backwash frequency due to filter headloss is estimated at every 400-500 hours. Because of the extremely long time it will take for headloss to build up in the filters, it is anticipated that the filters will instead backwash on a time-based limit rather than headloss limit. It is noted that the filter backwash will ultimately be determined based on the filtered water volume, while also taking into

⁷ Based on all three filters (2 x duty filters + 1 x standby filter) in operation

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consideration the filter head loss buildup, filtered water quality, and filter run time. The filters will be designed such that the backwash can be controlled manually or automatically (i.e., triggered by headloss in the filters, total run time, and/or filtered water volume).

8.2 Backwash Management Alternatives

Based on the selection of oxidation and filtration as the preferred treatment technology, the following backwash management alternatives were considered:

- Alternative 1 – Do Nothing
- Alternative 2 – Lagoon with settled backwash supernatant discharge to environment
- Alternative 3 - Direct discharge to a sewer
- Alternative 4 - Equalization tank and discharge to sewer
- Alternative 5 - Equalization tank with supernatant recycling and solids discharge to sanitary sewer
- Alternative 6 - Equalization Tank with Supernatant Recycling and Solids Removal by Vacuum Truck

Residual management strategies are described below.

8.2.1 Alternative 1 – Do Nothing

The “Do Nothing” alternative requires to be evaluated under the EA process. The proposed treatment alternative will generate backwash waste that will require handling; therefore, this option is not eligible to be carried forward under this evaluation.

8.2.2 Alternative 2 – Lagoon with Settled Supernatant Discharge to Environment

The backwash waste can be disposed of onsite using lagoons; typically backwash waste will be via gravity flow to two (2) lined lagoons (in parallel) where the solids accumulate at the bottom of the lagoon and the settled supernatant then overflows via a weir to an infiltration lagoon to allow the water to recharge into the environment. While sizing of lagoons can be variable, it is estimated that a lagoon for Erb Street may require an approximate area of 25,000 m² (e.g., 200 m by 125 m).

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8.2.3 Alternative 3 – Direct Discharge to a Sewer

If the site has suitable proximity to the Town/City sanitary sewer system and if the downstream sanitary infrastructure has capacity to accept instantaneous backwash flow rate, a forcemain could be constructed to allow direct discharge of backwash waste to sewer. The estimated instantaneous flow rate would be 76 L/s. This option would represent the smallest footprint and lowest cost alternative for backwash waste management, assuming the sanitary system could accept these flows. A hydraulic analysis would be required to determine if backwash could be via gravity flow or if a wet well structure and pumps would be required.

8.2.4 Alternative 4 – Equalization Tank and Discharge to Sewer

If the site has suitable proximity to the Town/City sanitary sewer system but the downstream sanitary infrastructure does not have sufficient capacity to accept instantaneous backwash flow rate, a backwash waste equalization tank could be constructed to allow pumping to the sanitary sewer at a flow rate compatible with the available downstream sewer infrastructure capacity. The sizing (footprint, cost) of the backwash waste equalization tank would be commensurate with the extent of equalization required. As an example, assuming the backwash waste tank was sized for one (1) filter backwash plus 20 percent safety factor the required volume would be 80 m³; for an inground tank, example internal dimensions for this storage volume would be 8.2 m depth, 4.6 m length and 4.6 m width (21 m² area) excluding freeboard. This option would likely represent the next most cost-effective alternative, after direct discharge to sanitary.

8.2.5 Alternative 5 – Equalization Tank with Supernatant Recycling and Solids Discharge to Sanitary Sewer

A backwash equalization and holding tank could be designed for decanting and recycling of supernatant back to the head of the plant with settled solids pumped to the sewer. Supernatant water quality and settleability would require to be assessed through pilot testing, to quantify the impact of recycling of supernatant on iron, manganese and turbidity to the plant influent; typical supernatant flows are between 5 and 10 percent of total plant capacity. This alternative would reduce the volume of backwash waste sent to a sanitary sewer or to onsite lagoons. The design would require a dual-compartment backwash waste tank separated by a weir and dedicated supernatant and sludge pumps.

8.2.6 Alternative 6 – Equalization Tank with Supernatant Recycling and Solids Removal by Vacuum Truck

A backwash equalization and holding tank could be designed for decanting and recycling of supernatant back to the head of the plant with settled solids pumped to a

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backwash waste tank for periodic removal by vacuum truck. Similar to Alternative 5, this would require supernatant settleability testing.

8.3 Backwash Management Alternatives Evaluation

From the long list of Backwash Management Alternatives, the following were carried forward for detailed evaluation:

- Alternative 5 - Equalization Tank with Supernatant Recycling and Solids Discharge to Sanitary Sewer
- Alternative 6 - Equalization Tank with Supernatant Recycling and Solids Removal by Vacuum Truck

The short-listed alternatives were assessed against the evaluation criteria described in Section 6.2 of this report. **Table 8-1** summarizes the evaluation of alternative technology alternatives. It is noted that all evaluation criteria are weighted equally at this time.

Table 8-1: Evaluation of Backwash Management Alternatives

Environmental Component	Evaluation Criteria	Description	Alternative 5: Equalization Tank with Supernatant Recycling and Solids Discharge to Sanitary Sewer	Alternative 6: Equalization Tank with Supernatant Recycling and Solids Removal by Vacuum Truck
Natural Environment	Potential effects to water resources, including: - Fisheries/aquatic habitat - Species at Risk - Wetlands - Floodplains - Groundwater recharge areas and wellhead protection areas - Groundwater/water quality	Reduction or deterioration of habitat	Both alternatives are equivalent	Both alternatives are equivalent
		Impacts to GRCA regulated areas should be minimized		
		Aligns with <i>Clean Water Act</i> requirements		
	Potential effects to natural heritage features, including: - Significant woodlands - Significant wetlands - Environmentally sensitive areas - Environmental protection areas - Environmental conservation areas - Species at Risk	Effects of construction timing on spawning periods		
		Changes or impacts to groundwater quality		
		Removal or disturbance of significant trees and/or ground flora	Relatively lower footprint/land impact	Relatively higher footprint/land impact
		Changes in vegetation composition		
	Potential impacts to wildlife/migratory birds	Reduction or deterioration of habitat	- Relatively lower footprint/land impact - No significant difference between construction durations and impacts to breeding periods	- Relatively higher footprint/land impact - No significant difference between construction durations and impacts to breeding periods
		Effects of timing of construction on nesting periods		
		Effects of construction timing on breeding periods		
	Potential climate change impacts	Changes in vegetation composition		
		Minimizes greenhouse gases	Supernatant recycling would reduce net water wastage and sewer system loading	Supernatant recycling would reduce net water wastage and sewer system loading
				



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Environmental Component	Evaluation Criteria	Description	Alternative 5: Equalization Tank with Supernatant Recycling and Solids Discharge to Sanitary Sewer	Alternative 6: Equalization Tank with Supernatant Recycling and Solids Removal by Vacuum Truck
Social/ Cultural	Effect on existing residences, businesses (e.g., agricultural operations) and community features	Amount and duration of disruption (e.g., noise, vibration, traffic management, access, detours) during construction.	No significant difference between construction durations and impacts to local community	- No significant difference between construction durations and impacts to local community - Periodic vacuum truck transportation
		Post-construction disruption due to truck chemical deliveries/vacuum truck operations.		
	Potential effects on known or potential significant archaeological resources and built heritage resources and cultural landscape features	Disruption of site having significant archaeological, historical, or architectural value	None of the alternatives will negatively impact local cultural features	None of the alternatives will negatively impact local cultural features
		Protection of heritage features		
	Potential effect on approved/planned land uses	Compliance with Official Plan	Alternatives are similar; no changes or impacts to planned land uses	Alternatives are similar; no changes or impacts to planned land uses
				
	Public Health and Safety	Impacts to health and safety for each alternative during construction	No significant difference between alternatives for construction health and safety considerations	No significant difference between alternatives for construction health and safety considerations
				
Regulatory/ Legal	Potential land requirements including land purchase and temporary/permanent easements	Number and type of properties required; amount of land required	Alternatives are similar. Noted that if new land required, parcel size may be less due to reduced technology footprint	Alternatives are similar. If new land required, parcel size may be slightly larger due to additional solids holding tank
				



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Environmental Component	Evaluation Criteria	Description	Alternative 5: Equalization Tank with Supernatant Recycling and Solids Discharge to Sanitary Sewer	Alternative 6: Equalization Tank with Supernatant Recycling and Solids Removal by Vacuum Truck
Technical	Constructability	Location, depth of excavation, soil conditions, rock removal, groundwater control, construction duration	Alternatives are similar.	Alternatives are similar.
				
	Effect on existing utilities and infrastructure (number and type of potential conflicts)	Number and type of potential conflicts	Alternatives are similar	Alternatives are similar
				
	Planned infrastructure improvements	Ability to coordinate with existing and planned infrastructure improvements	Increased solids loading to the sewer	Reduced solids loading to the sewer
		Sewer and WWTP capacity impacts from any backwash flows sent to the sanitary system.		
	Ability to reliably meet existing and future needs		Both alternatives will effectively manage solids handling	Both alternatives will effectively manage solids handling
				
Cost	Estimated capital cost	Total project costs (design/construction)	Alternatives are similar	Alternatives are similar
				
	Property acquisition cost	Costs associated with any required property acquisitions	Both alternatives will have similar property size requirements	Both alternatives will have similar property size requirements
				
	Operation and maintenance costs	Costs associated with operations and maintenance	Pumping costs	Higher ongoing operational costs associated with ongoing vacuum truck solids removal
				



8.4 Selection of Preferred Backwash Management Alternative

Based on the criteria overview provided in Section 6.1 and the backwash management alternatives review presented in **Table 8-1**, it is concluded that an equalization tank with supernatant recycling and solids discharge to sewer is the preferred alternative. It is noted that all evaluation criteria are weighted equally at this time.

Table 8-2: Summary of Evaluation of Backwash Management Alternatives

Evaluation Criteria	Alternative 5: Equalization Tank with Supernatant Recycling and Solids Discharge to Sanitary Sewer	Alternative 6: Equalization Tank with Supernatant Recycling and Solids Removal by Vacuum Truck
Natural Environment		
Social / Cultural		
Regulatory / Legal		
Technical		
Cost		
Overall Score		

8.5 Description of the Preferred Backwash Management Alternative

The preferred alternative for manganese removal is oxidation using sodium hypochlorite followed by filtration with catalytic media pressure filters. Backwash water will be sent to an equalization tank, with settled supernatant pumped to the front end of the treatment facility for recycle. Settled solids will be pumped to the sanitary sewer.



9.0 Screening of Long List of Alternative Locations

A long list of alternative treatment facility locations was developed based on a review of available background documents, land use, general parcel size, and input received from the Region, and screened using the following criteria:

- Municipally serviced sites or proximity to municipal servicing (within 1km)
- In proximity to other site services (i.e., gas, hydro, communications) (within 1km)
- Preference for municipally owned sites to reduce impact on, and need for, land acquisition of adjacent land uses/properties
- Located outside of prime agricultural land
- Available access to the site from all-weather roadways
- Proximity to sensitive land uses (e.g., residential, NHS, etc.)
- Located outside of any significant or sensitive natural heritage features.

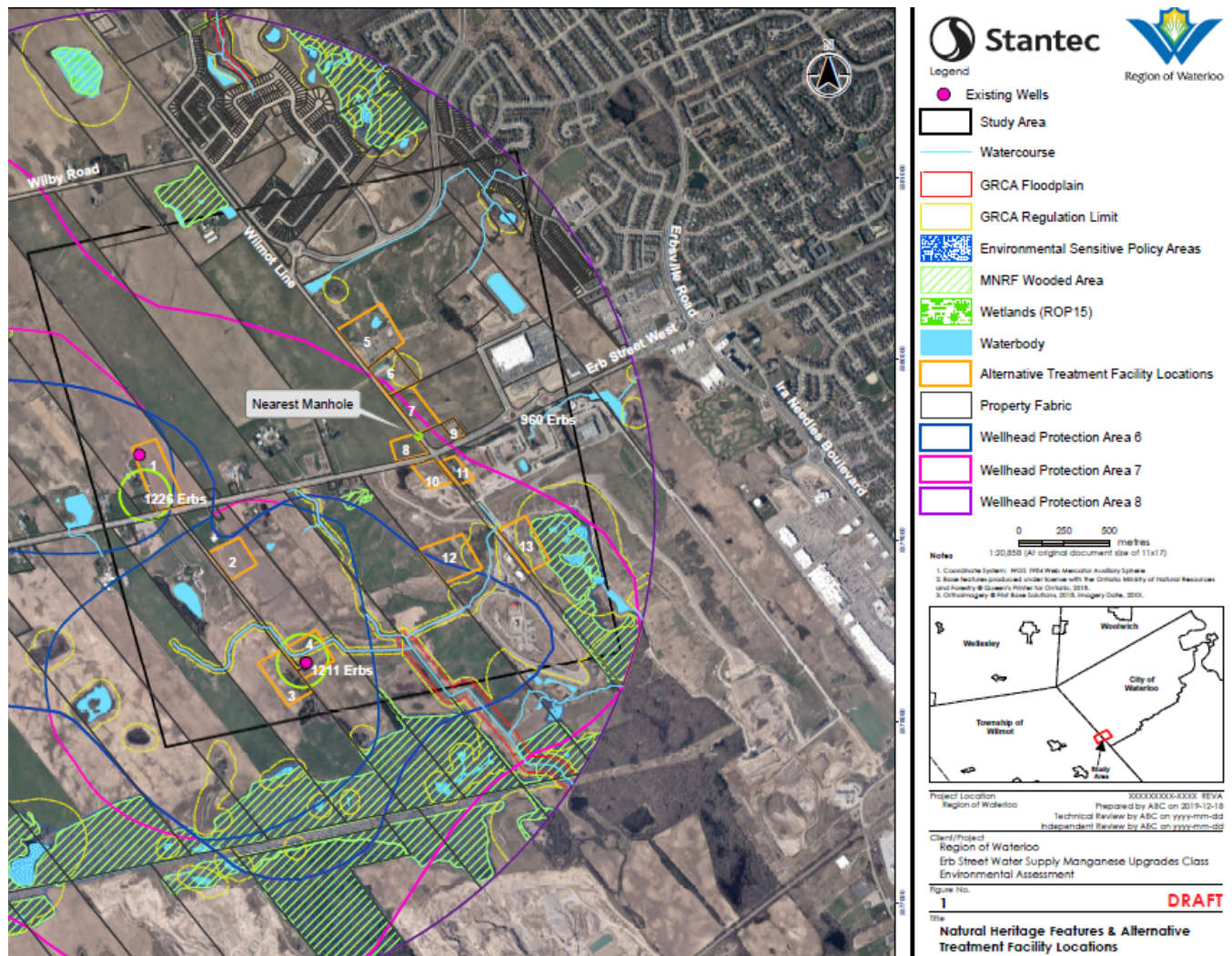
Figure 9-1 provides an overview map of the proposed long list of alternative treatment facility locations.

Table 9-1 provides a screening of the long list of alternative solutions based on the general criteria identified above.



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Figure 9-1: Alternative Treatment Facility Locations



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Table 9-1: Screening of the Long List of Alternative Treatment Facility Locations

Siting Option	Long List Screening
1	✓ Existing well site ✗ Very limited property onsite ✗ Privately owned ✗ Adjacent a residence and agricultural field ✓ Access to site is off of Erbs Road ✗ Site is municipally serviced (water). Presence of sanitary sewer is unlikely, but needs to be confirmed ✓ No regulated natural environmental features within the site Not carried forward due to property limitations and impacts.
2	✗ Privately owned ✓ Access site via Region owned driveway ✗ Adjacent to a residence and agricultural field ✗ Site is not municipally serviced ✗ No regulated natural environmental features within the site Not carried forward due to property limitations and lack of servicing.
3	✗ Privately owned ✓ Access to site via Region owned driveway ✓ Adjacent to agricultural field ✗ Site is not municipally serviced, difficult to service ✓ No regulated natural environmental features within the site Not carried forward due to servicing limitations.
4	✗ Partially privately and municipally (well site) owned ✗ Very limited property onsite ✓ Access via Region owned driveway ✓ Adjacent to agricultural field ✗ Site is not municipally serviced. Presence of sanitary sewer is unlikely but needs to be confirmed. ✗ GRCA regulated watercourse runs through the site Not carried forward due to property limitations and environmental features.
5	✓ Municipally owned (City of Waterloo) ✗ Access to site via Wilmot Line, may not be possible ✗ Potential negative aesthetic impacts to the adjacent golf course ✗ Site is municipally serviced, but would require a longer watermain to connect to the existing reservoir and sewer extension ✓ No regulated natural environmental features within the site ✗ Site is going to be under development Not carried forward due to site access and servicing constraints.



**ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)**

Siting Option	Long List Screening
6	✗ Privately owned ✓ Access to site via Wilmot Line ✓ Adjacent to agricultural field ✗ Site is not municipally serviced presently but is close to the existing services ✗ Site partially within GRCA regulated area Not carried forward due to servicing constraints and existing private use.
7	✗ Privately owned ✓ Access to site via Wilmot Line ✓ Adjacent to Region reservoir ✗ Site is not municipally serviced ✓ No regulated natural environmental features within the site Carried forward for further analysis and evaluation.
8	✗ Privately owned ✓ Access to site via Wilmot Line or Erbs Road ✓ Adjacent to agricultural field ✓ Site is not municipally serviced, but can easily be with utilities close by ✓ No regulated natural environmental features within the site Carried forward for further analysis and evaluation.
9	✓ Municipally owned ✓ Access to site via Erb Street ✓ Adjacent to Region reservoir ✓ Site is not municipally serviced, but can easily be ✓ No regulated natural environmental features within the site Carried forward for further analysis and evaluation.
10	✓ Municipally owned ✓ Access to site via Erbs Road ✓ Near Waterloo Region Emergency Services ✓ Site is not municipally serviced, but easily can be. Piping to and from the new treatment facility will connect to the existing reservoir across the street ✗ Partially within an MNRF wetland Carried forward for further analysis and evaluation.
11	✓ Municipally owned ✓ Access to site via Erb Street West ✓ Site is not municipally serviced but can easily be. Piping to and from the new treatment facility will connect to the existing reservoir across the street piping located to the north of the existing pump station. ✓ No regulated natural environmental features within the site Carried forward for further analysis and evaluation.



ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)

Siting Option	Long List Screening
12	✓ Municipally owned ✓ Access to site is via Fire Tower Road ✓ Adjacent to Waterloo Region Emergency Services ✓ Site is not municipally serviced, but can easily be ✗ Partially within GRCA regulated area Carried forward for further analysis and evaluation.
13	✓ Municipally owned ✓ Access to site is via Fire Tower Road ✓ Adjacent to Waterloo Region Emergency Services, and Regional landfill, Environmental Sensitive Policy Areas and MNRF wooded area ✓ Site is not municipally serviced, but can easily be ✗ Partially within GRCA regulated area Carried forward for further analysis and evaluation.

Based on the above screening, alternative treatment facility locations 7 to 13 were carried forward based on the key features as outlined above. Generally, the sites carried forward were:

- For the most part municipally owned;
- In close proximity to municipal servicing;
- Accessible from a main road (e.g., Wilmot Line or Erbs Road); and
- Avoided natural environment features or GRCA regulated areas (for the most part).



ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)

10.0 Assessment of Short List of Alternative Locations

A detailed environmental inventory and impact assessment was completed for the seven (7) alternative treatment facility locations, as illustrated in **Figure 10-1**. The inventory and assessment are detailed in **Table 10-1** on the following page.

Figure 10-1: Alternative Facility Locations



**ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)**

Table 10-1: Evaluation of Alternative Facility Location

	Evaluation Criteria	Description	Treatment Facility Location 1	Treatment Facility Location 2	Treatment Facility Location 3	Treatment Facility Location 4	Treatment Facility Location 5	Treatment Facility Location 6	Treatment Facility Location 7
Natural Environment	Potential effects to water resources, including: - Fisheries/aquatic habitat - Species at Risk - Wetlands - Floodplains - Groundwater recharge areas and wellhead protection areas - Groundwater/water quality	Reduction or deterioration of habitat	- No impacts as there are no water resources present - Wellhead Protection Area (WPSA) 8 is located on the site, however proposed infrastructure will not impact groundwater quality or source protection policies.	- No impacts as there are no water resources present - WPSA-7 is located on the site. Proposed infrastructure will not impact groundwater quality or source protection policies.	- No water resources present - WPSA-8 is located on the site, however proposed infrastructure will not impact groundwater quality or source protection policies.	- Potential impact on wetlands and fish habitat - A GRCA permit may be required prior to work adjacent to the wetland - WPSA-7 located on the site, however proposed infrastructure will not impact groundwater quality or source protection policies.	- No water resources present - WPSA-7 is located on the site; however, proposed infrastructure will not impact groundwater quality or source protection policies.	- Potential to impact adjacent fish habitat - Overlaps with the GRCA regulation limit so a permit would likely be required - WPSA-6 is located on the site, however proposed infrastructure will not impact groundwater quality or source protection policies.	- Potential to impact adjacent wetlands and fish habitat - Environmental Impact Study likely required to assess potential impact to the adjacent wetland - Within the GRCA regulation limit so a permit would likely be required - WPSA-7 is located on the site, however proposed infrastructure will not impact groundwater quality or source protection policies.
		Effects of construction timing on spawning periods							
		Changes or impacts to groundwater quality							
		Impacts to GRCA regulated areas should be minimized							
Natural Environment	Potential effects to natural heritage features, including: - Significant woodlands - Significant wetlands - Environmentally sensitive areas - Environmental protection areas - Environmental conservation areas - Species at Risk	Removal or disturbance of significant trees and/or ground flora	There are no significant natural heritage features identified on the site	There are no significant natural heritage features identified on the site	There are no significant natural heritage features identified on the site	There are no significant natural heritage features identified on the site	Further studies are recommended to determine suitability of the building for SAR bats	There are no significant natural heritage features identified on the site	There is potential for impact to adjacent Environmentally Sensitive Policy Area (ESPA)
		Changes in vegetation composition							
		Reduction or deterioration of habitat							
		Steep slopes							

ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
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	Evaluation Criteria	Description	Treatment Facility Location 1	Treatment Facility Location 2	Treatment Facility Location 3	Treatment Facility Location 4	Treatment Facility Location 5	Treatment Facility Location 6	Treatment Facility Location 7
	Potential impacts to wildlife/migratory birds	Reduction or deterioration of habitat	There are no impacts identified due to no significant features identified	There are no impacts identified due to no significant features identified	- Will require the removal of several mid-aged trees from the hedgerow bordering the site - No suitable bat tree roost habitat was identified - Vegetation removal, if required, should be avoided during breeding bird window (April 1-August 31)	- There is potential for deterioration of adjacent wetland habitat - Will require removal of disturbed meadow habitat - Vegetation removal, if required, should be avoided during breeding bird window (April 1-August 31)	- Removal of several young trees from the hedgerow will be required - Vegetation removal, should be avoided during breeding bird window (April 1-August 31) - Further studies are recommended to determine suitability of the existing building for SAR bats	- Removal of trees, shrubs and meadow habitat will be required - Vegetation removal should be avoided during breeding bird window (April 1-August 31)	- There is potential for deterioration of adjacent ESPA - Removal of trees, shrubs and meadow habitat will be required - Vegetation removal, should be avoided during breeding bird window (April 1-August 31)
		Effects of timing of construction on nesting periods							
		Effects of construction timing on breeding periods							
	Potential climate change impacts	Changes in vegetation composition							
		Minimizes greenhouse gases	No difference between alternatives with regards climate change	No difference between alternatives with regards climate change	No difference between alternatives with regards climate change	No difference between alternatives with regards climate change	No difference between alternatives with regards climate change	No difference between alternatives with regards climate change	No difference between alternatives with regards climate change
									
	Natural Summary								

**ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)**

	Evaluation Criteria	Description	Treatment Facility Location 1	Treatment Facility Location 2	Treatment Facility Location 3	Treatment Facility Location 4	Treatment Facility Location 5	Treatment Facility Location 6	Treatment Facility Location 7
Social/Cultural	Effect on existing residences, businesses (e.g., agricultural operations) and community features	Amount and duration of disruption (e.g., noise, vibration, traffic management, access, detours) during construction.	- There are no significant differences in disruption to surrounding areas – existing barns located north of the property, and current subdivision construction to the east - Minor and temporary traffic impacts are expected along Erb Street and Wilmott Line during construction of raw watermain connection from existing wells.	- There are no significant differences in disruption to surrounding areas – adjacent to farmland - Minor and temporary traffic impacts are expected along Erb Street and Wilmott Line during construction of raw watermain connection from existing wells.	- There are no significant differences in disruption to surrounding areas – adjacent to existing subdivision construction - Minor and temporary traffic impacts are expected along Erb Street.	- There are no significant differences in disruption to surrounding areas – adjacent to existing subdivision construction - Minor and temporary traffic impacts are expected along Erb Street and Wilmott Line intersection during construction of raw watermain connection from existing wells.	- There are no significant differences in disruption to surrounding areas – existing water booster pumping station located on the site. - Minor and temporary traffic impacts are expected along Erb Street and Wilmott Line intersection during construction of raw watermain connection from existing wells.	- There are no significant differences in disruption to surrounding areas – located within the Region of Waterloo Emergency Services Training Centre complex. - Minor and temporary traffic impacts are expected along Erb Street and Wilmott Line intersection during construction of raw watermain from existing wells.	- There are no significant differences in disruption to surrounding areas – located within the Region of Waterloo Emergency Services Training Centre complex. - Minor and temporary traffic impacts are expected along Erb Street and Wilmott Line intersection during construction of raw watermain from existing wells.
		Post-construction disruption due to truck chemical deliveries/vacuum truck operations.							
	Potential effects on known or potential significant archaeological resources and built heritage resources and cultural landscape features	Disruption of site having significant archaeological, historical, or architectural value	- Cleared of archaeological potential – no additional study required	Retains archaeological potential – additional studies required	Cleared of archaeological potential – no additional study required	Retains archaeological potential – additional studies required	Retains archaeological potential – additional studies required	Retains archaeological potential – additional studies required	Retains archaeological potential – additional studies required
		Protection of heritage features							

**ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)**

	Evaluation Criteria	Description	Treatment Facility Location 1	Treatment Facility Location 2	Treatment Facility Location 3	Treatment Facility Location 4	Treatment Facility Location 5	Treatment Facility Location 6	Treatment Facility Location 7
	Potential effect on approved/planned land uses	Compliance with Official Plan	Identified as an employment Block within the Waterloo Employment Lands Subdivision (draft approved).	- Lands are designated as Prime Agricultural and Protected Countryside in the Township of Wilmot Official Plan. Proposed water infrastructure is permitted within these areas. - There are no current development applications on the site.	Parcel is adjacent to the existing reservoir, and retained by the Region of Waterloo through the Employment Lands Subdivision process for future water upgrades	- Lands are designated as Rural Areas and Protected Countryside within the Township of Wilmot Official Plan. Proposed water infrastructure is permitted within these areas. - Lands are associated with the newly constructed Paramedic Services Headquarters owned by the Region.	- Designated as Open Space/Landfill within the Waterloo Official Plan. Proposed water infrastructure permitted within these areas. - Site is owned by the Region and is also home to a water booster pumping station	- Lands are designated as Rural Areas and Protected Countryside within the Township of Wilmot Official Plan. Proposed water infrastructure is permitted within these areas. - Site is owned by the Region and is adjacent to the new Paramedic Services Headquarters.	Designated as Open Space/Landfill, and Natural System areas associated with ESPA within the Waterloo Official Plan. Further environmental study required to confirm impacts on adjacent features in accordance with Official Plan policies for Natural System areas.
		Impacts to current plans of subdivisions, site plans, etc.							
	Public Health and Safety	Impacts to health and safety for each alternative during construction	There is no significant difference between alternatives for construction health and safety considerations.	There is no significant difference between alternatives for construction health and safety considerations.	There is no significant difference between alternatives for construction health and safety considerations.	There is no significant difference between alternatives for construction health and safety considerations.	There is no significant difference between alternatives for construction health and safety considerations.	There is no significant difference between alternatives for construction health and safety considerations.	There is no significant difference between alternatives for construction health and safety considerations.
									
		Social/Cultural Summary							

**ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
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	Evaluation Criteria	Description	Treatment Facility Location 1	Treatment Facility Location 2	Treatment Facility Location 3	Treatment Facility Location 4	Treatment Facility Location 5	Treatment Facility Location 6	Treatment Facility Location 7
Regulatory/Legal	Potential land requirements including land purchase and temporary/permanent easements	Number and type of properties required; amount of land required	• Site can accommodate the approx. 900 m² building and 110 m² backwash holding tank plus boundary perimeter and access. • Site would need to be acquired and accommodated within future site plans within Employment Lands Subdivision	• Site can accommodate the approx. 900 m² building and 110 m² backwash holding tank plus boundary perimeter and access. • Private property acquisition required	• Site can accommodate the approx. 900 m² building and 110 m² backwash holding tank plus boundary perimeter and access. • Site would need to be acquired	• Site can accommodate the approx. 900 m² building and 110 m² backwash holding tank plus boundary perimeter and access. • Site is currently owned by the Region and associated with new Paramedic Headquarters.	• Site can accommodate the approx. 900 m² building and 110 m² backwash holding tank plus boundary perimeter and access. • Site also houses a water booster pumping station and is owned by the Region.	• Site can accommodate the approx. 900 m² building and 110 m² backwash holding tank plus boundary perimeter and access. • Site is currently owned by the Region and associated with the new Paramedic Headquarters.	• Site can accommodate the approx. 900 m² building and 110 m² backwash holding tank plus boundary perimeter and access. • Site is currently owned by the Region and associated with recycling centre.
									
	Regulatory/Legal Summary								
Technical	Constructability	Location, depth of excavation, soil conditions, rock removal, groundwater control, construction duration	• No significant constructability challenges	• No significant constructability challenges	• No significant constructability challenges	• No significant constructability challenges, however surface drainage feature located along site frontage may require additional staging/ protection	• No significant constructability challenges, however, proximity to existing booster station and narrow parcel may create minor challenges during construction	• No significant constructability challenges	• No significant constructability challenges
							 		

ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)

	Evaluation Criteria	Description	Treatment Facility Location 1	Treatment Facility Location 2	Treatment Facility Location 3	Treatment Facility Location 4	Treatment Facility Location 5	Treatment Facility Location 6	Treatment Facility Location 7
	Effect on existing utilities and infrastructure (number and type of potential conflicts)	Number and type of potential conflicts	• Site will require three-phase power and gas, which is available, but further away than other sites. • No conflicts identified.	• Site will require three-phase power and gas, which is available nearby. • No conflicts identified.	• Site will require three-phase power and gas, which is available nearby, and closest of all the alternative sites. • No conflicts identified.	• Site will require three-phase power and gas, which is available nearby. • No conflicts identified.	• Site will require three-phase power and gas, which is available nearby. • No conflicts identified.	• Site will require three-phase power and gas, which is available nearby. Located further from the Erb Street right of way, so will require longer connection. • No conflicts identified.	• Site will require three-phase power and gas, which is available nearby. Located further from the Erb Street right of way, so will require longer connection. • No conflicts identified.
									

**ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)**

	Evaluation Criteria	Description	Treatment Facility Location 1	Treatment Facility Location 2	Treatment Facility Location 3	Treatment Facility Location 4	Treatment Facility Location 5	Treatment Facility Location 6	Treatment Facility Location 7
	Planned infrastructure improvements	Ability to coordinate with existing and planned infrastructure improvements Sewer and WWTP capacity impacts from any backwash flows sent to the sanitary system.	- Construction of approximately 200m of raw water main extension required along Wilmot Line to connect to existing wells. - Sanitary connection may be identified via a servicing easement through the rear of the property through the adjacent Employment Lands Subdivision. If easement not possible then approximately 500m of sewer will be constructed. - Construction of approximately 200m of new treated watermain to connect to the existing reservoir along Wilmot Line. - Additional wastewater flows can be accommodated within the downstream WWTP.	- Raw watermain connection available on Erb Street to connect to existing wells. - Nearest sanitary sewer connection is approximately 500m to the east (Platinum Drive north of Erb Street) - Approximately 30m of new treated watermain will be required to connect to the reservoir. - Additional flows can be accommodated within the downstream WWTP for backwash water discharge.	- Raw watermain connection available on Erb Street at the adjacent reservoir site to connect to existing wells. Approximately 130m of main will be needed to bring it to the location. - Approximately 80m of new treated watermain will be required to connect to the reservoir. - Sanitary sewer connection available at Platinum Drive (approximately 200m), or through easement to Street C within Employment Lands subdivision. - Additional flows can be accommodated within the downstream WWTP for backwash water discharge.	- Raw watermain connection available on Erb Street at the adjacent reservoir site to connect to existing wells. This will require approximately 40m of new raw watermain. - Approximately 80m of new treated watermain will be required to connect to the reservoir. - Sanitary connection available at Platinum Drive (approximately 500m). - Additional flows can be accommodated within the downstream WWTP for backwash water discharge.	- Raw watermain connection available on Erb Street at the adjacent reservoir site to connect to existing wells. This will require approximately 150m of new raw watermain. - Approximately 150m of new treated watermain will be required to connect to the reservoir. - Sanitary connection available at Platinum Drive (approximately 500m), or through easement through Employment Lands Subdivision – may require easement. - Additional flows can be accommodated within the downstream WWTP for backwash water discharge.	- Located further from Erb Street right of way, so additional raw watermain required to connect to existing wells. This will require approximately 300m of new raw watermain. - Approximately 500m of new treated watermain will be required to connect to the reservoir. - Sanitary sewer connection available at Platinum Drive (approximately 1200+m), however would require additional pipe construction through easement or along Fire Tower Road. - Additional flows can be accommodated within the downstream WWTP for backwash water discharge.	- Located further from Erb Street right of way, so additional raw watermain required to connect to existing wells. This will require approximately 700m of new raw watermain. - Approximately 1000m of new treated watermain will be required to connect to the reservoir. - Sanitary connection available at Platinum Drive (approximately 900m). - Additional flows can be accommodated within the downstream WWTP for backwash water discharge.
									

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	Evaluation Criteria	Description	Treatment Facility Location 1	Treatment Facility Location 2	Treatment Facility Location 3	Treatment Facility Location 4	Treatment Facility Location 5	Treatment Facility Location 6	Treatment Facility Location 7
	Meets existing and future needs		All sites can provide treatment for existing and future needs.	All sites can provide treatment for existing and future needs.	All sites can provide treatment for existing and future needs.	All sites can provide treatment for existing and future needs.	All sites can provide treatment for existing and future needs.	All sites can provide treatment for existing and future needs.	All sites can provide treatment for existing and future needs.
									
	Technical Summary								
Cost	Estimated capital cost	Total project costs (design/construction)	Est. \$12.8m capital cost	Est. \$12.6m capital cost	Est. \$12.6m capital cost	- Est. \$12.7m capital cost - Potential for additional costs associated with residuals management approach	- Est. \$12.7m capital cost - Potential for additional costs associated with residuals management approach	- Est. \$13.2m capital cost - Potential for additional costs due to residuals management approach	- Est. \$13.3m capital cost - Potential for additional costs due to residuals management approach
									
	Property acquisition cost	Costs associated with any required property acquisitions	Potential for higher property acquisition costs due to current Employment Lands designation.	Property acquisition costs associated with agricultural land use designation.	Property acquisition costs	No property acquisition costs identified	No property acquisition costs identified	No property acquisition costs identified	No property acquisition costs identified.
									
	Operation and maintenance costs	Costs associated with operations and maintenance	No difference in operation and maintenance costs between the sites.	No difference in operation and maintenance costs between the sites.	No difference in operation and maintenance costs between the sites.	No difference in operation and maintenance costs between the sites.	No difference in operation and maintenance costs between the sites.	No difference in operation and maintenance costs between the sites.	No difference in operation and maintenance costs between the sites.
									
	Cost Summary								

11.0 Preliminary Preferred Alternative Treatment Facility Locations

The Alternative Facility Locations were assessed based on the potential impacts to the natural and social/cultural environments, the ability to meet regulatory/legal requirements, potential limitations associated with constructability, extent of required servicing needs and utilities, and cost. The legend for evaluation scoring is identified in Section 6.1 for reference. A summary of the evaluation is identified in **Table 11-1** and the full evaluation is included in **Table 10-1**. It is noted that environmental categories have been weighted equally. Based on the evaluation, **Alternative Location 3** is identified as the Preferred Alternative for the following reasons:

- Located directly adjacent to the existing reservoir
- Region intends to pursue the purchase of this property
- Closest to the available sanitary sewer outlet and utility connections
- Requires a short extension of the existing raw watermain, and a short section of new treated watermain
- Results in less overall cost and constructability considerations
- No significant environmental features impacted
- Tree removal can be minimized during design through the preparation of a Tree Preservation Plan.

Table 11-1: Summary of Alternative Location Evaluation

Evaluation Criteria	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Natural Environment							
Social / Cultural							
Regulatory/ Legal							
Technical							
Cost							
Overall Score							



12.0 Implementation of the Preferred Design Concept

Based on the evaluation, Alternative 1 – Equalization tank with supernatant recycling and discharge to the sanitary sewer system was identified as the recommended alternative for the following reasons:

- less natural environmental impact
- less overall community and property impact
- lower long-term operation costs

The construction of a new water treatment facility will be undertaken at Alternative Location 3, located directly adjacent to the existing reservoir site at 960 Erb Street West. This treatment facility will utilize traditional oxidation and filtration technology to treat iron and manganese from the Erb Street Wells, and the facility will discharge leftover wastewater into the sanitary sewer to be treated along with municipal wastewater at the downstream Waterloo Wastewater Treatment Plant.

12.1 Construction and Phasing

The property is currently owned by the City of Waterloo as part of the Draft Approved Subdivision (30T-18401); however, the Region of Waterloo intends to pursue the purchase of Block 12 as part of the final registration of the subdivision.

To minimize interruptions to system operations, the Erb St Supply will be maintained until the new Erb Street WTP construction has been completed and commissioned.

It is recommended that distribution pressure monitoring in the service area supplied by the Erb St supply be conducted before and after the commissioning of the new WTP to confirm no adverse impacts.

12.2 Cost Estimate

Table 12-1 provides a summary of the conceptual level capital cost estimate for each component of the preferred design concept. The accuracy of these preliminary cost estimates is within +30%/-25%.

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Table 12-1: Cost Estimate - Preferred Design Concept

Cost Item	Estimated Costs
Existing well modifications	\$170,000
Greensand Filters (x3)	\$1,300,000
Chemical Systems (chlorine, ammonia)	\$140,000
New Filter Building (inc. clearwell and backwash solids holding tank)	\$6,980,000
Pumps (inc. high lift pumps, backwash pumps, backwash supernatant recycle pumps, backwash solids pumps)	\$340,000
Yard Piping	\$110,000
Electrical and I&C	\$375,000
Standby Power	\$350,000
Sub-Total	\$9,765,000
Contingency (25%)	\$2,441,250
Total Capital	\$12,206,250
Engineering Services (15%)	\$1,830,950
Total Project Capital Cost (+30%/-25%)	\$14,037,200

12.3 Additional Approval Requirements

The proposed works for this project will require approvals and permits from various agencies and Region departments. Pre-consultation meetings and design submissions should be coordinated as needed during detailed design with the following Agencies, Regional and Municipal Departments where appropriate:

- Ministry of the Environment, Conservation and Parks (MECP)
- Ministry of Natural Resources and Forestry (MNRF)
- Grand River Conservation Authority (GRCA)
- Township of Wilmot – Planning Division (Site Plan Approvals)
- City of Waterloo – Building Division (Site Plan Approvals)
- Region of Waterloo – Planning Department

Prior to construction of the preferred design, the following approvals will be required:

- Site plan approval and building permit(s)
- Drinking Water Works Permit (DWWP) amendment
- Municipal Drinking Water License (MDWL) amendment
- Stage 2 Archaeological Assessment

It should be noted that no alterations to the existing Permits to Take Water (PTTW) for either of the two well fields are required, provided the existing wells are maintained.

12.4 Mitigation Measures

All construction associated with the new WTP will occur on the recommended site adjacent to the existing Erb Street reservoir. There will be a requirement to extend the existing well system transmission main to the new facility as well as construct a new treated water line back to the reservoir; there will also be a pipe from the on-site backwash waste tank to the local sanitary sewer for pumping settled backwash solids. It is anticipated that construction work can be conducted during normal working hours. Tie-ins into the existing piping could be done once all the new piping is installed and commissioned with little impact to the system.

The construction of the wastewater forcemain from the site to a MH on Platinum Drive can be constructed through open cut methods with minimal impact to traffic in the area.

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Construction will have some potential short-term environmental and social impacts including noise, vibration, dust, and traffic. During construction, mitigating measures will be employed wherever possible to minimize impacts, some of which may include:

- Preparing and following a sediment and erosion control plan.
- Limiting construction activities to normal working hours, Monday to Friday.
- Maintaining muffling devices on construction vehicles and heavy equipment.
- Developing and adhering to an approved traffic management plan which minimizes local traffic disruptions during the construction period.
- Performing excavation in an orderly and efficient manner to minimize disturbances from noise, vibration, and dust.

A pre-construction public meeting could be held to inform the public of the scale of the proposed construction, the schedule, and to receive comments.

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13.0 Consultation

The following outlines the public, agency, stakeholder, and Indigenous community consultation that was undertaken during the Class EA process. A Consultation Plan was developed to guide the consultation program for the Class EA. A copy of this Consultation Plan is provided in Appendix A. A project contact list was maintained throughout the Class EA study. The contact list was developed at the Notice of Commencement stage and was updated in response to requests from agencies, stakeholders and members of the public. A copy of the project contact list is provided in Appendix F. This list was used for the mailing of all study notifications. In addition, key project information such as notifications and PCC materials were posted on the Region's website. A copy of all notices and correspondence is provided in Appendix E.

13.1 Notifications

As discussed below, notifications included a Notice of Commencement, Notice of Public Consultation Centre (PCC) #1, Notice of PCC #2, and a Notice of Study Completion.

13.1.1 Notice of Study Commencement

The Notice of Study Commencement for the Erb Street Water Supply Class EA was published as follows:

- New Hamburg Independent, October 16, 2019
- Waterloo Chronicle, October 17, 2019

The Notice was distributed to the Project Stakeholder List and Internal Region Departments and was posted on the Region's web site. The Project Stakeholder List includes federal, provincial, and municipal agencies, as well as utilities, Indigenous communities, special interest groups, and adjacent residents/property owners. In addition, the Project Information Form and Notice was sent to the MECP via email (eanotification.wcregion@ontario.ca).

The Notice provided a general overview of the project and objectives, identified opportunities for public involvement, illustrated the project website link and key project contacts. An agency comment form was included with the Notice to solicit initial study information.

13.1.2 Public Consultation Centres

Two Public Consultation Centres (PCCs) were held during the study and served as forums for two-way communication between the project team and members of the public. The objective of each PCC was to convey project information in a clear, concise

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way. Information was graphically focused and was consistent with/built upon similar projects underway by the Region (e.g., Shingletown Wells Iron and Manganese Upgrades Class EA). Final PDFs of information presented at PCC events were provided to the Region in accessible PDF format for posting on the Region's website.

Due to the COVID-19 Pandemic, it became unviable to host PCC events in-person.

13.1.2.1 Public Consultation Centre #1

The first PCC was posted to the Region of Waterloo website and YouTube page on June 17, 2020. The Notice of PCC#1 was published as follows:

- New Hamburg Independent, June 24, 2020 & July 1, 2020
- Waterloo Chronicle, June 25, 2020 & July 2, 2020

A copy of this notification is included as Appendix E and was also posted on the Region's website on June 17, 2020. In addition, the notification was also distributed to the Project Stakeholder List and Internal Region Departments on June 17, 2020. Comments were encouraged to be submitted by July 17, 2020.

A summary of comments can be found in Section 13.1.2.1 below.

13.1.2.2 Public Consultation Centre #2

The second PCC was posted to the Region of Waterloo website and YouTube page on December 11, 2020. The Notice of PCC#2 was published as follows:

- New Hamburg Independent, [November 25, 2020 & December 5, 2020]
- Waterloo Chronicle, [November 26, 2020 & December 3, 2020]

A copy of this notification is included as Appendix E and was also posted on the Region's website on December 11, 2020. In addition, the notification was also distributed to internal Region Departments on December 11, 2020 and to the Project Stakeholder List on March 8, 2021. Comments were encouraged to be submitted by January 15, 2020 and March 19, 2021 respectively.

A summary of comments can be found in Section 13.4.2 below.

13.1.3 Notice of Study Completion

The Notice of Study Completion was published in the New Hamburg Independent and Waterloo Chronicle. The purpose of the Notice was to advise members of the public of the opportunity to review and provide comments on the ESR. A period of 30 days was provided for the public review of the ESR. Contact information for the Region and consulting team project manager was noted. The ESR was made available for review

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on the Region's website. The Notice was posted on the Region's website on and sent to those on the Project Stakeholder List.

13.2 Agency and Stakeholder Consultation

The following agencies, utilities, special interest groups, and stakeholders were included on the project contact list, were provided with project notifications, and asked to provide comments regarding the study:

Federal

- Department of Fisheries and Oceans Canada

Provincial

- Ministry of Environment, Conservation and Parks
- Ministry of Agriculture, Food, and Rural Affairs
- Ministry of Ministry of Municipal Affairs & Housing
- Ministry of Natural Resources and Forestry
- Ministry of Heritage, Sport, Tourism, and Culture Industries
- Infrastructure Ontario
- Ministry of Health and Long-Term Care
- Grand River Conservation Authority

Regional and Municipal

- Region of Waterloo: Building Maintenance - Facilities & Fleet, Corporate Services, Ecological and Environmental Advisory Committee, Transportation Program Development, Transit Development, and Heritage Planning Advisory Committee
- City of Kitchener: Infrastructure Service
- City of Waterloo: Integrated Planning and Public Works and Municipal Heritage Committee
- Township of Wilmot: Public Works and Heritage Wilmot

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Utilities

- Allstream
- Atria Networks Inc
- Bell Canada
- Enbridge Gas Distribution Inc.
- Hydro One Network
- Kitchener-Wilmot Hydro Inc.
- Rogers Cable Systems Inc.
- TELUS
- Union Gas Ltd.
- Waterloo-North Hydro Inc.
- Kitchener Utilities

Special Interest Groups and Stakeholders

- Waterloo Region Home Builders Association
- WaterMD

Table 13-1 provides a summary of comments received from agencies, utilities, and stakeholders, along with the response to these comments. Appendix E contains correspondence received throughout the course of the Class EA Process, as well as responses to this correspondence.

**ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES
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Table 13-1: Summary of Agency and Stakeholder Comments and Responses

Contact Information	Comment	Response/ Commitment to Carry Forward
Trevor Heywood Resource Planner Grand River Conservation Authority 400 Clyde Road, PO Box 729, Cambridge ON, N1R 5W6 519-621-2763 x2292 theywood@grandriver.ca	Received Notice of Commencement Response Letter October 21, 2019 indicating that GRCA wishes to stay involved as the EA process moved forward – no further concerns.	GRCA to be kept updated with EA project process.
Barbara Slattery EA/Planning Coordinator Ministry of Environment 119 King Street West, 12 th Floor Hamilton ON, L8P 4Y7 (905) 521-7864 Barbara.slattery@ontario. ca	Received Notice of Commencement - Notes other wells in area (any potential impacts?) - Provided info on ESA/Species at Risk including government contacts - Delegation of procedural aspects of FN consultation	Updated tracking table with contacts. MECP to be kept updated with EA project process.
Secondary Land Use Asset Optimization Strategy & Integrated Planning Hydro One Networks Inc. 483 Bay St. Toronto, ON	Confirmed that Hydro One has existing high voltage transmission facilities within the study area. If the upgrades result in a Hydro One expansion or transmission line replacement and/or relocation, an EA will be required under the Class EA for Minor Transmission Facilities.	No action required. The hydro corridor runs along the south side of Erb Road and then at the intersection with Wilmot Line moves to the north side of the road heading west.

13.3 Indigenous Community Engagement

The following Indigenous communities were engaged during the Class EA study:

- Mississaugas of the New Credit First Nation;
- Mississaugas of the New Credit First Nation Department of Consultation and Accommodation;
- Six Nations of the Grand River Territory;
- Six Nations of the Grand River Territory, Land and Resource Department;
- Six Nations of the Grand River Territory Wildlife Management Office; and,
- Six Nations Haudenosaunee Confederacy Council.

13.3.1 Correspondence with Indigenous Community

Comments were not received as a result of Notices provided to the above listed Indigenous communities.

13.4 Public Consultation Centres

13.4.1 Public Consultation Centre #1

The first PCC was held virtually. A guided PowerPoint presentation, as well as the PowerPoint slides and the presentation transcript were provided on the Region of Waterloo's project website. A Comment Sheet for Virtual PCC #1 was also made available on the Region's website. The guided PowerPoint provided information on:

- Project description and project overview;
- Need for the project;
- Iron and Manganese in drinking water;
- Changes in drinking water standards;
- The Municipal Class EA process;
- Existing conditions of the Erb Street wells and reservoir;
- Alternative options to address Iron and Manganese treatment requirements;
- Alternative Treatment facility locations being considered;

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- Alternative water treatment technologies being considered;
- Evaluation and recommended treatment technology;
- Residuals management; and,
- Next steps and contact information for questions.

Table 13-1 summarizes the comments received. No Comment Sheets were completed, and 1 e-mail was submitted to the Region (see Appendix E).

Table 13-2: Summary of PCC #1 Comments and Responses

Question	Response
The Erb St well field, wells 6A/B and 7/8, seems to have the Sanico Landfill upgradient of their water flow. Will your assessment be looking into anything other than iron and manganese and if not I ask why not?	The Sanico landfill was a privately run landfill located on private property; it operated between 1964 and 1969. The Region of Waterloo (Water Services division) is monitoring the Erb Street wells, to make sure there continues to be no unacceptable impact to the drinking water from this closed landfill. This includes testing the groundwater for 1,4-dioxane, which is a chemical of concern at the former Sanico landfill. The drinking water at the Erb Street wells is safe and meets all Ontario drinking water standards for health. Of the three Erb Street supply wells, one of the wells has groundwater containing trace levels of 1,4-dioxane (approximately 1 part per billion). The other two supply wells have non-detectable results for 1,4- dioxane. The trace levels detected in the one supply well are far below the proposed Health Canada 1,4-dioxane drinking water guideline of 50 part per billion. For long-term protection of the wellfield, Region staff are working with the Ontario Ministry of the Environment, Conservation and Parks, to ensure that the responsible parties continue with their studies of the Sanico landfill and, if needed, that they put in place measures to protect local groundwater.

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13.4.2 Public Consultation Centre #2

The second PCC was held virtually. A guided PowerPoint presentation, as well as the PowerPoint slides and the presentation transcript were provided on the Region of Waterloo's project website. A Comment Sheet for Virtual PCC #2 was also made available on the Region's website. The guided PowerPoint provided information on:

- Project update since PCC #1;
- Project Overview;
- Iron and Manganese in drinking water;
- Changes in drinking water standards;
- The Municipal Class EA process;
- Overview of outcomes from PCC #1;
- Existing conditions of the Erb Street wells and reservoir;
- Alternative facility locations;
- Evaluation Criteria;
- Summary of evaluation of alternative treatment facility locations;
- Residuals management;
- Preliminary recommendations; and,
- Next steps and contact information for questions.

No Comment Sheets or e-mails were submitted to the Region following PCC #2.

ERB STREET WATER SUPPLY IRON AND MANGANESE UPGRADES MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA)

14.0 Completion of Class EA

The Region has determined through this Schedule C Class EA that the most cost effective and environmentally sound approach for iron and manganese upgrades to the Erb Street Water Supply includes the following components:

- Chemical oxidation and filtration of manganese is the preferred alternative. It is anticipated that oxidation will be by sodium hypochlorite injection and filtration will be by pressure greensand filters. The rationale for this process selection is as follows:
 - Sodium hypochlorite is technologically simple, already in use for disinfection at the WTP, and Region operators are familiar with handling and using this chemical.
 - Greensand filtration provides operational flexibility to achieve manganese discharge limits and Region operators are familiar with this technology.
- The preferred alternative for manganese removal is oxidation using sodium hypochlorite followed by filtration with catalytic media pressure filters. Backwash water will be sent to an equalization tank, with settled supernatant pumped to the front end of the treatment facility for recycle. Settled solids will be pumped to the sanitary sewer.
- Based on the evaluation, Alternative Location 3 is identified as the Preliminary Preferred Alternative. This was further confirmed by public, agency, and stakeholder review. The site is located directly adjacent to the existing reservoir and the Region intends to pursue the purchase of this property. The site is closest to the available sanitary sewer outlet as well as utility connections and requires a short extension of the existing raw watermain and a short section of new treated watermain, which results in less overall cost and constructability considerations. No significant environmental features have been identified at this location, and tree removal can be minimized on the site during design through the preparation of a Tree Inventory and Tree Preservation Plan.

Interested persons may provide written comments to the Region of Waterloo for a response using the following contact information:

Kevin Dolishny, P. Eng., Senior Engineer
Water Services, Region of Waterloo
519-575-4400 extension 3862
kdolishny@regionofwaterloo.ca

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an

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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 ministry.

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 ministry is able to efficiently begin reviewing the request.

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

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

and

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

Requests should also be sent to the Region of Waterloo.

Appendix A: Consultation Plan

Consultation Plan

Erb Street Water Supply Iron and
Manganese Upgrades
Municipal Class Environmental
Assessment (EA)



Prepared for:
The Regional Municipality of
Waterloo

Prepared by:
Stantec Consulting Ltd.

August 27, 2019

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1.0 ROLE OF COMMUNICATIONS PLAN

A well-organized communications program is imperative to improving the public's awareness of opportunities to voice their concerns and take part in the planning process in order to reduce conflict and build consensus. The project team has developed a proactive approach to stakeholder communications for the Erb Street Water Supply Iron and Manganese Upgrades Municipal Class Environmental Assessment (Class EA), one that is based on:

- Informing, consulting and collaborating with the local landowners, key agencies and the public;
- Identifying and understanding stakeholders' critical issues; and
- Providing up-to-date information on project progress and impacts.

2.0 CONSULTATION GOALS

Effective consultation is driven by project goals. The following goals represent a commitment by the Region of Waterloo (Region) to proactively engage the local landowners, key agencies, Indigenous communities, and the general public, recognizing their input is critical to the project's overall success:

- Open and inclusive, ensuring a broad level of communication within the study area and throughout the Region;
- Transparent, making certain that stakeholders and residents clearly understand the decision-making process;
- Traceable, ensuring that consultation documentation is a comprehensive summary of how and why the public and stakeholders are consulted and informed, how their comments and concerns have been addressed at the Class EA stage, and the commitments to carry forward into design and construction;
- Frequent, occurring early and often to ensure the public is informed of important milestones in the project;
- Reliant on honest and open communication;
- Easy to understand and communicate. Technical details should be communicated clearly in plain language, and public information materials should be graphically focused; and
- Communication material and messaging should be consistent with the information presented through other Region initiatives, including concurrent Iron and Manganese Water Treatment projects.

3.0 STAKEHOLDER AND ISSUES ASSESSMENT

Table 1 provides a list of key stakeholders anticipated to participate in the project, their potential issues or views relevant to the project and the consultation strategies specifically tailored to engage them in the planning process. The initial stakeholder list is included in **Appendix A** and was developed based on the master contact list provided by the Region and refined based on the study area. The stakeholder list will be continually updated as the study progresses with those that have attended public consultation centres (PCCs) and others who express an interest in the study. Email will be used, where available or requested, to distribute project notifications.

Table 1: Stakeholder and Issues Analysis

Key Stakeholders	Potential Concerns	Key Messages/Strategies
Public/Local		
Township of Wilmot <i>Dawn Mittelholtz (Clerk)</i> <i>Jeff Molenhuis (Public Works Director)</i>	Existing Region of Waterloo wells are located within the Township, and alternative treatment plant locations will be also be considered within the Township.	Project notifications, and individual meeting to discuss site options.
City of Waterloo <i>Olga Smith (Clerk)</i> <i>Cameron Rapp (Integrated Planning & Public Works Commissioner)</i>	- Identify ongoing development approvals; - Consider site plan considerations for the alternative design concepts, to support a smooth planning process with the City during the design and site plan stage.	Project notifications and individual meetings to discuss site options.
The Wilmot community/residents	Concerns that the Region may be coming in to "steal Wilmot's water".	- Project notifications to be distributed to property owners within 120 of alternative site locations. - Focus on a clear description of this project (i.e. to improve water quality). Provide context for the Region's Integrated Urban System. Address existing-future water taking.
Region of Waterloo Operations Division	Will ultimately be responsible for operating the plant.	Operations Team to be directly involved in process through staff representative on the project team.
Agencies/Local Governments/ Utilities		
Provincial agencies including the MECP, MTCS, etc.	- Compliance with the Municipal Class EA process, including: - consultation with First Nations	Project notifications, initial comment form,

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Key Stakeholders	Potential Concerns	Key Messages/Strategies
	– Consideration for Climate Change in the Class EA process (how infrastructure will impact climate change – e.g. greenhouse gases [mitigation]– and how it might be impacted by climate change [adaptation/resiliency]), as well as Drinking Water Source Protection. – Cultural heritage – archaeological/build cultural heritage.	and complying with Class EA best practices.
Regional and local municipal staff including: • Region of Waterloo Ecological and Environmental Advisory Committee • Region of Waterloo Heritage Planning Advisory Committee • City of Waterloo Municipal Heritage Committee • Heritage Wilmot • Township of Wilmot Public Works • City of Kitchener • City of Waterloo • Region of Waterloo • Township of Wilmot	• Utility impacts (can impact timing and cost). • Environmental impacts. • Heritage impacts.	• Project notifications and initial comment form.
Grand River Conservation Authority Trevor Heywood (Conservation Planner) Beth Brown (Supervisor of Resources Planning)	• Regulated Areas. • Habitats for Species at Risk. • Water course impacts.	• Project notifications, initial comment form, individual meeting when necessary.
Indigenous Communities		
• Six Nations of the Grand River Territory • Six Nations Haudenosaunee Confederacy Council • Mississaugas of the Credit First Nation	• Potential for archaeological resources. • Impacts to water courses and natural heritage features • Compliance with EA Act – need to show due diligence in consulting with Indigenous communities.	• Based on new ministry process, MECP to confirm which FNs should be contacted. • Project notifications. • Email copies of PCC information, archaeological assessments, and natural heritage reports. • 1 Follow-up phone call to confirm receipt of project information. • Maintaining Indigenous consultation log.

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All correspondence will be documented in TRACER tables discussed below in order to track issues and their resolutions throughout the project. Tables are included in **Appendix C**.

4.0 COMMUNICATION TECHNIQUES

Project notifications will include:

- Notice of Commencement – to provide general project overview and objectives, identify opportunities for public involvement, project website link, and key project contacts. An agency comment form will be included with the Notice of Commencement to agency stakeholders to confirm contact information and solicit initial study information (See **Appendix B**). Distribution:
 - Stakeholder list (**Stantec**); Internal Region Departments (**Region**); Wilmot/Waterloo Newspaper (New Hamburg Independent; Waterloo Chronicle) (**Region**)
 - Project Information Form and Notice of Commencement to be sent to MECP: eanotification.wcregion@ontario.ca
- Notice of PCC 1 – to provide date and location for PCC 1. Distribution:
 - Stakeholder list (**Stantec**); Internal Region Departments (**Region**); Wilmot/Waterloo Newspaper (New Hamburg Independent; Waterloo Chronicle) (**Region**)
- Notice of PCC 2 – to provide date and location for PCC 2. Distribution:
 - Stakeholder list (**Stantec**); Internal Region Departments (**Region**); Wilmot/Waterloo Newspaper (New Hamburg Independent; Waterloo Chronicle) (**Region**)
- Notice of Completion – To provide an overview of recommendations, 30-day review information, and Part II Order information. Distribution:
 - Stakeholder list (**Stantec**); Internal Region Departments (**Region**); Wilmot/Waterloo Newspaper (New Hamburg Independent; Waterloo Chronicle) (**Region**)
 - Project Information Form and Notice of Completion to be sent to MECP: eanotification.wcregion@ontario.ca

Notices must be provided to the Region ~4 weeks in advance for publication in the newspapers identified. Stantec will distribute via mail (or email where requested) to contact list 3 weeks prior to events.

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Notices will also be posted on the Region's website:

<https://www.regionofwaterloo.ca/en/regional-government/region-news.aspx>

4.1 PUBLIC CONSULTATION CENTRES

A minimum of two (2) Public Consultation Centres (PCCs) will be held during the study and will serve as forums for two-way communication between the project team and members of the public. The objective of the PCC will be to convey project information in a clear, concise way. Information should be graphically focused and should be consistent with/build upon similar projects underway by the Region (e.g. Shingletown Wells Iron and Manganese Upgrades Class EA). Final PDFs will be provided to the Region in accessible PDF format for posting on the website.

Table 2 provides a general schedule and outline for each of the PCCs.

Table 2: PCC Timing

PCC	PROPOSED TIMING	Overview
PCC 1	Spring 2020	PCC Open House Overview: • Project description and need for project • Existing conditions • Water treatment recommendations (this should draw on material prepared and messaging from recently completed Class EA projects) • Treatment facility alternative locations being considered • Draft evaluation criteria for alternative locations Anticipated input from the public/agencies will include: • Input on existing conditions for consideration during site selection.
PCC 2	Fall 2020	The following information will be made available for public review and comment: • Overview of study process • Alternative Water Treatment Facility (WTF) sites and evaluation • Preliminary site recommendations/WTF concept • Preliminary environmental (socio-economic, cultural, natural) impacts and mitigation • Next steps Anticipated input from the public will include: • Input on alternative sites, including visual impacts (site layout, screening, etc.).

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It is anticipated that the PCCs will be held in a location that is easily accessible to the community. The project team may consider holding each PCC in a location within the City of Waterloo/Township of Wilmot, in close proximity to the existing well sites.

4.2 TRACER TABLES/STAKEHOLDER ISSUES MATRIX

To maintain accurate and up-to-date records of input received from ministries/agencies and the public, we will use a system we refer to as TRACER (Team Response and Commitment to Environmental Requirements). This system makes use of tables which include contact information and an issues matrix in which the following records are kept current: contact names, addresses, telephone numbers, issues raised, action taken by the project team, and commitments to carry forward.

Since the TRACER is set up at the start of a project and kept up to date throughout the study, it is a useful tool to make sure that issues are addressed, accounted for and responded to. The system continues the accountability of the EA process, and tracks commitments made during the Class EA stage through to design. The TRACER tables are included in **Appendix C** and will be updated as the study progresses.

5.0 INDIGENOUS COMMUNITY CONSULTATION

Indigenous community consultation is an important component of the Class EA process. We have identified the following communities that may be interested in this project; however, we will confirm these communities with the local MECP office through the Notice of Commencement.

- Six Nations of the Grand River Territory
- Six Nations Haudenosaunee Confederacy Council
- Mississaugas of the New Credit First Nation

Based on our experience with similar Class EAs, it is important to show due diligence in consulting with Indigenous communities through the Class EA process. This includes regular project notifications, but also includes providing project information (such as PCC material), and follow-up phone calls to ensure information is received and that opportunities are provided to discuss project concerns. All points of contact with Indigenous communities, including follow up phone calls, will be documented in the Indigenous TRACER table.

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6.0 CLOSING

This Communications and Consultation Plan is a living document and should be updated as the study progresses as new issues arise, and communication techniques evolve.

APPENDIX A: PROJECT CONTACT LIST

APPENDIX B: DRAFT NOTICE OF COMMENCEMENT

APPENDIX C: STAKEHOLDER TRACER TABLE

Appendix B: Natural Heritage Memo

To:	Stephanie Bergman	From:	Janice Ball
	London Office		Waterloo Office
File:	165640287	Date:	June 11, 2020

Reference: Natural Heritage Assessment to Evaluate Alternative Treatment Facility Locations for the Erb Street Water Supply Iron and Manganese Upgrades Municipal Class Environmental Assessment

This memo summarizes the natural heritage background review and site visit that were conducted in order to evaluate alternative treatment facility locations for the *Environmental Study Report for the Erb Street Wells Municipal Class EA* in Waterloo and the Township of Wilmot, Ontario. The natural heritage assessment was conducted for seven different treatment facility locations (Figure 1), and the Study Area extended up to 120 m from the locations.

BACKGROUND REVIEW

The Natural Heritage Information Center (NHIC) database was accessed on May 12, 2020 to search for records of species at risk (SAR) and species of conservation concern (SOCC) that overlap with the Study Area (MNR 2020a). No species records were identified in the 1 km x 1 km NHIC assessment squares that overlapped with the Study Area.

Two wetlands that are part of the Waldau East Non-Provincially Significant Wetland Complex were identified in the Study Area on the Ministry of Natural Resources and Forestry's (MNR) Land Information Ontario (LIO) website (MNR 2020b). A small wetland that was part of the complex was identified in Location 10 (although it appears to have shifted west of Location 10 due to extensive soil excavation in the area) and another larger wetland was located immediately west of Location 13 (Figure 1). The wetland east of Location 13 was also located within a woodlot designated as a Core Environmental Feature (Environmental Sensitive Policy Area, ESPA) on Map 4 of the 2015 Region of Waterloo Official Plan (Figure 2).

There are two mapped watercourses located in the Study Area (MNR 2020b). On the north side of Erbs Road within Location 8 there is a mapped watercourse that is identified as a constructed drain. There are no thermal regime or flow regime data for this watercourse, and it drains in a northerly direction. On the south side of Erbs Road there is a tributary of Alder Creek located between Location 12 and Location 13. It originates approximately 100 m north of Location 13 and flows southwest through the Study Area. The watercourse has a coldwater thermal regime, a permanent flow regime, and is identified as a constructed drain (MNR 2020b). Fish community data for the Alder Creek watershed include baitfish species (MNR 2020b). The Grand River Conservation Authority's (GRCA) Grand River Information Network indicates that the watercourse has a warmwater thermal regime. The reason for differences in the assigned thermal regime is not known; however, the fish community data do not include records of coldwater species. The GRCA Regulation Limit is associated with the mapped watercourse and the Waldau East Non-PSW Complex wetland east of Location 13.

Wellhead Protection Areas WPSA-6, WPSA-7 and WPSA-8 were identified in the Study Area on Map 6a of the 2015 Region of Waterloo Official Plan, consistent with the Grand River Source Protection Plan and Assessment Report. These features will be further discussed in the *Environmental Study Report*.

Reference: Natural Heritage Assessment to Evaluate Alternative Treatment Facility Locations for the Erb Street Water Supply Iron and Manganese Upgrades Municipal Class Environmental Assessment

SITE VISIT

Two Stantec ecologists, Janice Ball and Mitch Ellah, conducted a roadside site assessment on May 21, 2020 to identify terrestrial natural heritage features and fish habitat in the Study Area. Weather was sunny, calm and 18°C. The assessment was completed from roadside with binoculars from Erb Street West and Wilmot Line.

The terrestrial habitat assessment included documenting vegetation communities and potential wildlife habitat in the Study Area. Vegetation communities were identified using Ecological Land Classification (ELC) for southern Ontario (Lee et. al. 1998). Areas that could not be observed from Erb Street were assessed via desktop. The wildlife habitat assessment included searching for potential suitable SAR and SOCC habitat as well as candidate significant wildlife habitat (SWH) features. Candidate SWH was assessed in accordance with the SWH Criteria Schedules for EcoRegion 6E (MNR 2015).

The fish habitat assessment included a roadside investigation to determine if there are surface water features with the potential to provide fish habitat.

The results of the terrestrial habitat assessment and fish habitat assessment are summarized below and in Table 1 and delineated ELC communities are shown on Figure 1.

Treatment Facility Location 7

Location 7 has recently been graded to accommodate a new commercial development. There were no terrestrial natural heritage features or fish habitat present.

Treatment Facility Location 8

Location 8 and the surrounding 120m Study Area was comprised of agricultural lands. There were no terrestrial natural heritage features or fish habitat present.

Treatment Facility Location 9

Location 9 is located on an old homestead property with buildings removed. Vegetation was comprised of culturally influenced meadow and bordered by a hedgerow of mid-aged trees (weeping willow, sugar maple, silver maple, Norway spruce). The trees did not contain potential habitat for SAR bats. The on-site terrestrial natural heritage features have not been identified as significant. There was no fish habitat present.

Treatment Facility Location 10

Location 10 was comprised of a mixed meadow community that has been established on multiple recently excavated soil piles. A small shallow marsh (MASM1) was located immediately west of the Facility. Figure 1 shows a wetland that is part of the Waldau East Non-PSW Complex overlapping with Location 10; however, previous disturbance in this area has caused a shift in the location of this feature to the west. A Phragmites ditch (MASM1-12) occurred in the northeast corner of the feature. This feature may have also become established during previous disturbance that caused a shift in the Waldau East Non-PSW Complex. An American Toad was calling in the feature during the site visit. Siting the treatment facility at Location 10 has the potential to impact wetland habitat. There is the potential for fish habitat in the unmapped wetland west of Location 10 and in the Phragmites dominated ditch observed in Location 10.

Reference: Natural Heritage Assessment to Evaluate Alternative Treatment Facility Locations for the Erb Street Water Supply Iron and Manganese Upgrades Municipal Class Environmental Assessment

Treatment Facility Location 11

Location 11 was assessed from Erb Street. It was comprised of a young, naturalized hedgerow with Scot's pine, Colorado spruce and deciduous tree species. A portion of this alternative Location is already developed. There is an onsite building that has a potential to provide bat roost habitat. The other on-site natural heritage features have not been identified as significant. There was no fish habitat present.

Treatment Facility Location 12

Location 12 was assessed via desktop due to lack of property access. The site appears to be comprised of meadow with some slight overlap with what appears to be deciduous thicket habitat (or a regenerating woodland) at the north end of the Facility, and a young to mid-aged deciduous woodland at the east edge of the Facility. Potential fish habitat occurs in a mapped watercourse east of Location 12, and it overlaps with the GRCA Regulation Limit. The flow regime and thermal regime of the watercourse could not be determined.

Treatment Facility Location 13

Location 13 was assessed via desktop due to lack of property access. The site appears to be comprised of meadow with some overlap with a gravel parking lot/storage area. Siting the Facility at this Location has the potential to impact adjacent wetlands and the Region of Waterloo designated ESPA. An Environmental Impact Study would likely be required to assess potential impact to the adjacent wetland and ESPA. The site is within the GRCA regulation limit so a permit would likely be required. There is potential fish habitat in the mapped wetland east of Location 13; however, the flow regime and thermal regime of the watercourse could not be determined.

SUMMARY

The natural heritage information summarized above will be incorporated into the *Environmental Study Report*, and the suitability of each treatment location will be rated as a measure of how the locations align with the evaluation criteria listed in Table 1.

The natural heritage summary results identify Locations 7 and 8 as the most suitable locations since they are completely outside of natural features. Location 9 would be the next most suitable, and although some tree removal would be required, there are no adjacent natural features that have the potential to be impacted.

Locations 10, 12 and 13 are adjacent to natural heritage features that have the potential to be impacted, and are therefore considered less suitable than Locations 7, 8 and 9. There is a small shallow marsh (MASM1) adjacent to Location 10 and a Phragmites ditch within the site boundary of Location 10, both of which have the potential to provide fish habitat. There is a watercourse adjacent to Location 12 that may provide fish habitat and Location 13 is adjacent to a Region of Waterloo designated ESPA and associated wetlands. Each of these locations would likely require a GRCA permit and there is also some tree removal that would be required for Locations 12 and 13.

June 11, 2020

Stephanie Bergman

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Reference: Natural Heritage Assessment to Evaluate Alternative Treatment Facility Locations for the Erb Street Water Supply Iron and Manganese Upgrades Municipal Class Environmental Assessment

Location 11 would require further studies to determine whether building provides SAR bat habitat and some tree removal would be required also making this feature less suitable than Locations 7, 8 and 9.

Stantec Consulting Ltd.



Janice Ball B.Sc.
Terrestrial Ecologist

Phone: 519 585 7287

Janice.Ball@stantec.com

Attachments: Figure 1: Erb Street Waterloo ELC Map
Figure 2: Natural Heritage Features
Table 1: Natural Heritage Evaluation of Alternative Treatment Facility Locations

c. Neil Harvey, Project Manager, Stantec

REFERENCES

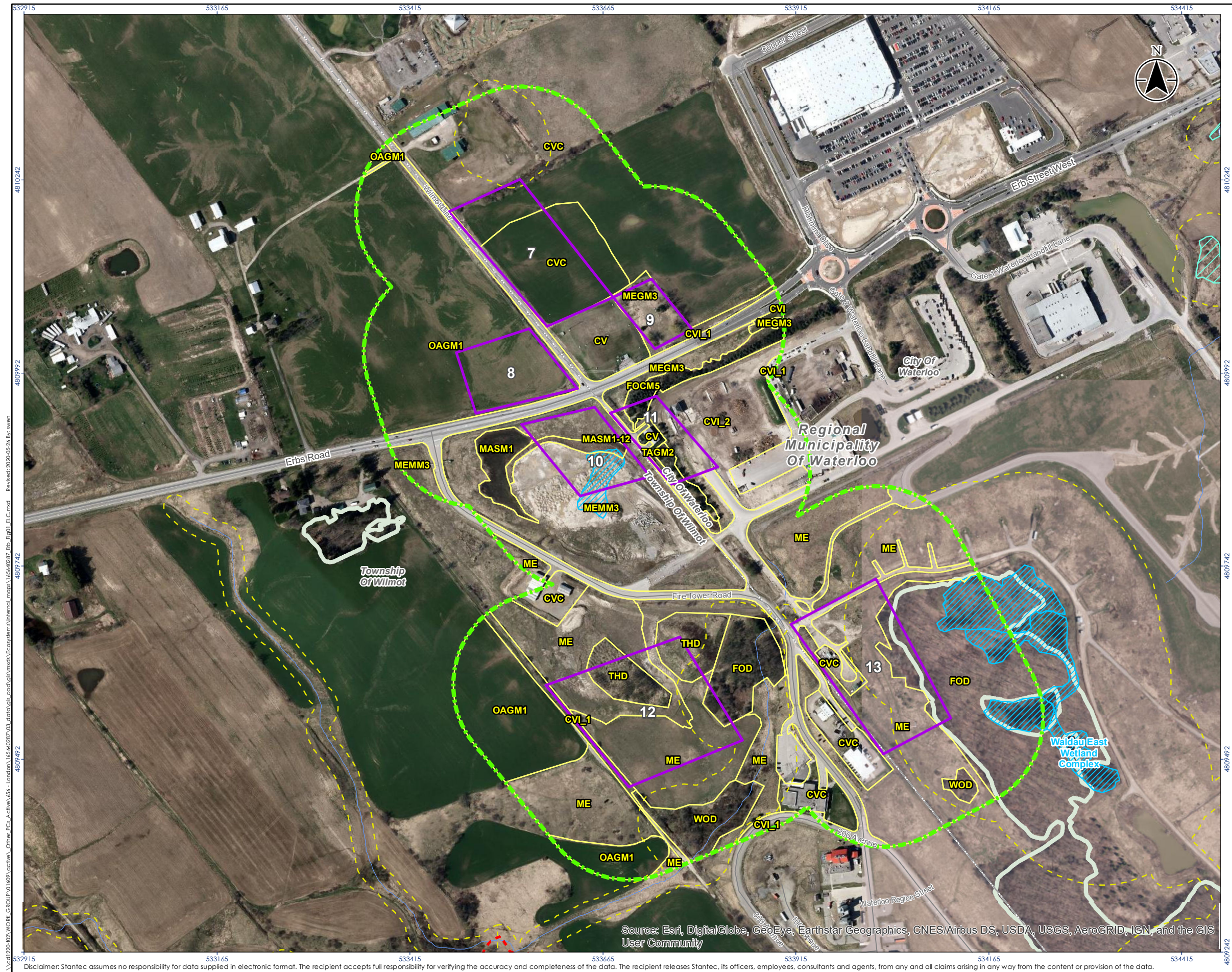
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(MNRF) Ontario Ministry of Natural Resources and Forestry. 2020a. Natural Heritage Information Centre (NHIC) Data on the Land Information Ontario mapping website. Ontario Ministry of Natural Resources and Forestry. Available Online: http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US

(MNRF) Ontario Ministry of Natural Resources and Forestry. 2020b. Land Information Ontario Digital mapping of natural heritage features, Ontario Ministry of Natural Resources. Available Online: http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US

(MNRF) Ontario Ministry of Natural Resources and Forestry. 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E. January, 2015. Ontario Ministry of Natural Resources and Forestry Regional Operations Division, Peterborough, Ontario. 40 pp.





Legend

 Alternative Treatment Facility Locations	 Waterbody
 Alternative Sites 120 m Buffer	 Wetland, Other Evaluated
 ELC Boundary	 Wetland, Not evaluated per OWES
 GRCA Regulation Limit	 Wooded Area
 GRCA Regulatory Floodplain	 Municipal Boundary, Upper
 Watercourse (Permanent)	 Municipal Boundary, Lower

ELC Communities

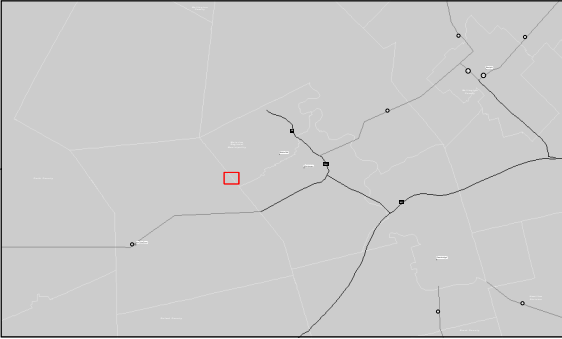
- CV - Constructed
- CVC - Commercial and Institutional
- CVI - Transportation and Utilities
- CVI_1 - Transportation
- CVI_2 - Disposal and Recycle
- FOCM5 - Naturalized Coniferous Hedge-row Ecosite
- FOD - Deciduous Forest
- MASM1-12 - Common Reed Mineral Shallow Marsh Type
- MASM1 - Graminoid Mineral Shallow Marsh Ecosite
- ME - Meadow
- MEGM3 - Dry - Fresh Graminoid Meadow Ecosite
- MEMM3 - Dry - Fresh Mixed Meadow Ecosite
- OAGM1 - Annual Row Crops
- TAGM2 - Mixed Plantation
- THD - Deciduous Thicket
- WOD - Deciduous Woodland

0 250 m

1:5,000 (At original document size of 11x17)

Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
- Orthoimagery © First Base Solutions, 2020. Imagery Date, 2017 and 2019.



Project Location	XXXXXXXX-XXXX REV4
Region of Waterloo	Prepared by SW on 2020-05-26
	Technical Review by DH on 2020-05-26

Client/Project

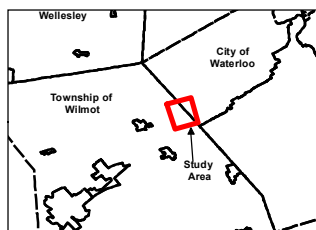
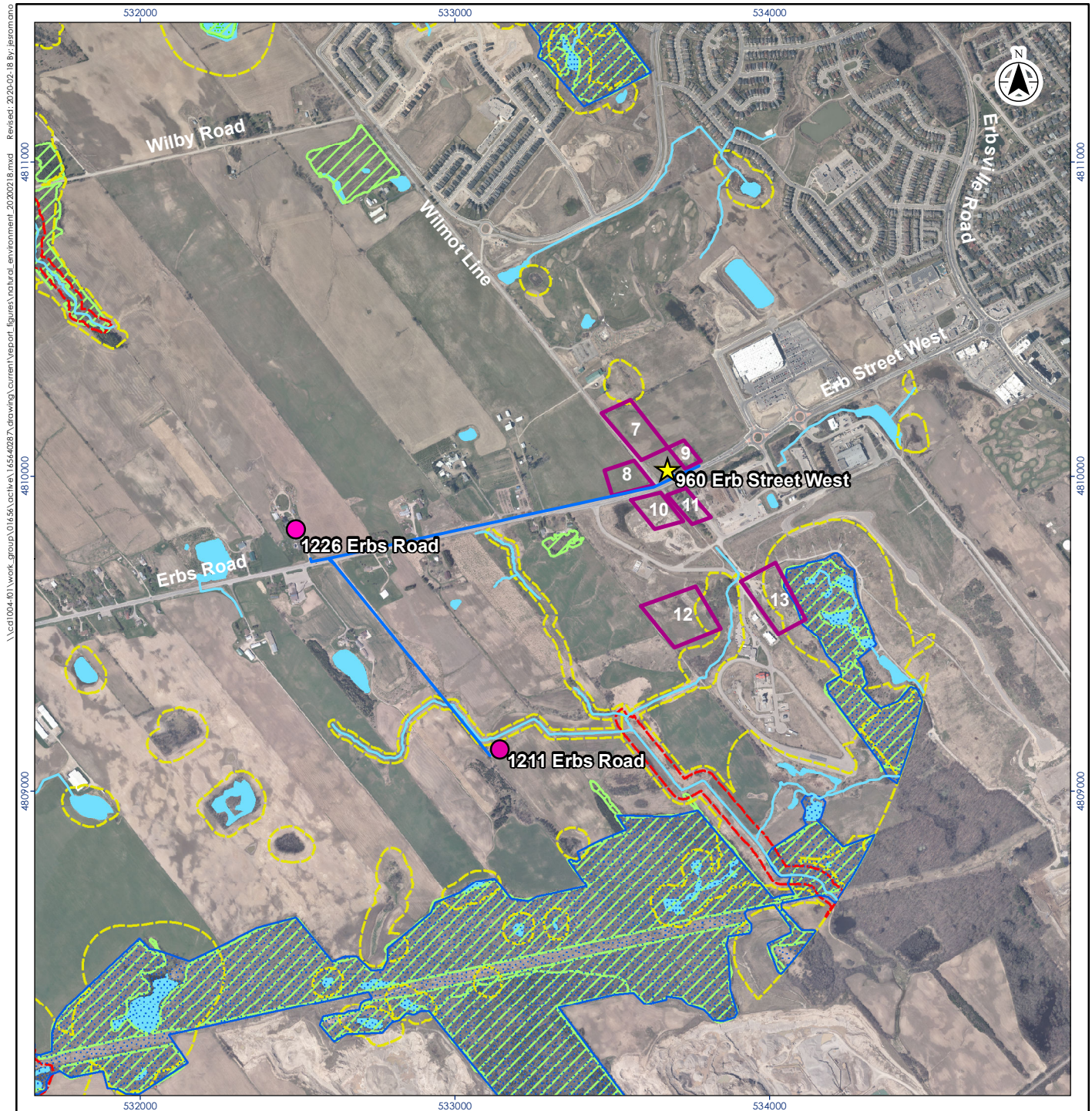
ERB STREET WATERLOO CLASS EA

Figure No.

1

Title

Erb Street Waterloo ELC Map



Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Orthoimagery © First Base Solutions, 2018. Imagery Date, 20XX.

Legend

- Existing Wells
- Watercourse
- ▨ MNRF Wooded Area
- ▨ Wetlands (ROP15)
- ▨ GRCA Floodplain
- ▨ GRCA Regulation Limit
- Waterbody
- Short List - Alt. Treatment Facility Locations
- Raw Water Transmission Main
- Environmental Sensitive Policy Areas
- ★ Existing Reservoir

0 250 500 metres
1:18,516 (at original document size of 8.5x11)



Project Location: Region of Waterloo
 Prepared by ABC on 2020-02-18
 Technical Review by ABC on yyyy-mm-dd
 Independent Review by ABC on yyyy-mm-dd

Client/Project: Erb Street Water Supply Iron and Manganese Upgrades
 Municipal Class Environmental Assessment

Figure No.

2

Natural Heritage Features

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Table 1: Natural Heritage Evaluation of Alternative Treatment Facility Locations

Environmental Component	Evaluation Criteria	Description	Treatment Facility Location 7	Treatment Facility Location 8	Treatment Facility Location 9	Treatment Facility Location 10	Treatment Facility Location 11	Treatment Facility Location 12	Treatment Facility Location 13
Natural Environment	Potential effects to water resources, including: - Fisheries/aquatic habitat - Aquatic Species at Risk - Wetlands - Floodplains - Groundwater recharge areas and wellhead protection areas - Groundwater/water quality	Reduction or deterioration of habitat Effects of construction timing on spawning periods Changes or impacts to groundwater quality Impacts to GRCA regulated areas should be minimized Aligns with <i>Clean Water Act</i> requirements	- No water resources present - WPSA-8	- No water resources present - WPSA-7	- No water resources present - WPSA-8	- Potential impact on wetlands and fish habitat - A GRCA permit may be required prior to work adjacent to the wetland - WPSA-7	- No water resources present - WPSA-7	- Potential to impact adjacent fish habitat - Overlaps with the GRCA regulation limit so a permit would likely be required - WPSA-6	- Potential to impact adjacent wetlands, fish habitat - Environmental Impact Study likely required to assess potential impact to the adjacent wetland - Within the GRCA regulation limit so a permit would likely be required - WPSA-7
	Potential effects to natural heritage features, including: - Significant woodlands - Significant wetlands - Environmentally sensitive areas - Environmental protection areas - Environmental conservation areas - Terrestrial Species at Risk	Removal or disturbance of significant trees and/or ground flora Changes in vegetation composition Reduction or deterioration of habitat Steep slopes	No significant natural heritage features	No significant natural heritage features	No significant natural heritage features	No significant natural heritage features	Further studies recommended to determine suitability of the building for SAR bats	No significant natural heritage features	Potential to impact adjacent ESPA
	Potential impacts to wildlife/migratory birds	Reduction or deterioration of habitat Effects of timing of construction on nesting periods Effects of construction timing on breeding periods Changes in vegetation composition	None	None	- Removal of several mid-aged trees from the hedgerow - No suitable bat tree roost habitat observed - Avoid vegetation removal during breeding bird window (April 1-August 31), if possible	- Potential deterioration of adjacent wetland habitat - Removal of disturbed meadow habitat - Avoid vegetation disturbance during breeding bird window (April 1 - August 31), if possible	- Removal of several young trees from the hedgerow - Avoid vegetation removal during breeding bird window (April 1-August 31), if possible - Further studies recommended to determine suitability of the building for SAR bats	- Removal of trees, shrubs and meadow habitat - Avoid vegetation removal during breeding bird window (April 1-August 31), if possible	- Potential deterioration of adjacent ESPA - Removal of trees, shrubs and meadow habitat - Avoid vegetation removal during breeding bird window (April 1-August 31), if possible

Appendix C: MHSTCI Checklist

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
 - is a recognized heritage property
 - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
 - the main project area
 - temporary storage
 - staging and working areas
 - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – [separate checklist](#)
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

Project or Property Name

Erb Street Wells Iron and Manganeses Treatment Upgrades Municipal Class EA

Project or Property Location (upper and lower or single tier municipality)

City of Waterloo/Township of Wilmot, Waterloo Region

Proponent Name

Regional Municipality of Waterloo

Proponent Contact Information

Kevin Dolishny, P. Eng., Region of Waterloo - KDolishny@regionofwaterloo.ca

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☒

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?	☐	☒

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the <i>Ontario Heritage Act</i> as being of cultural heritage value?	☐	☒
b. a National Historic Site (or part of)?	☐	☒
c. designated under the <i>Heritage Railway Stations Protection Act</i> ?	☐	☒
d. designated under the <i>Heritage Lighthouse Protection Act</i> ?	☐	☒
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?	☐	☒
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	☐	☒

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	☐	☒
b. has or is adjacent to a known burial site and/or cemetery?	☐	☒
c. is in a Canadian Heritage River watershed?	☐	☒
d. contains buildings or structures that are 40 or more years old?	☐	☒

Part C: Other Considerations

	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	☐	☒
b. has a special association with a community, person or historical event?	☐	☒
c. contains or is part of a cultural heritage landscape?	☐	☒

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act*, *Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
 - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's [Ontario Heritage Toolkit](#) or [Standards and Guidelines for Conservation of Provincial Heritage Properties](#).

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's [Standards & Guidelines for Conservation of Provincial Heritage Properties](#) [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

- i. designated under the *Ontario Heritage Act*
 - individual designation (Part IV)
 - part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note:** To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- [Ontario Heritage Trust](#)
- local land registry office (for a title search)

ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- [Ontario Heritage Trust](#) - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act*. **Note:** To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- [Ontario Heritage Trust](#)

- v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the [National Historic Sites website](#).

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the [Directory of Designated Heritage Railway Stations](#).

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the [Heritage Lighthouses of Canada](#) website.

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the [Federal Heritage Buildings Review Office](#).

See a [directory of all federal heritage designations](#).

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – [World Heritage Site website](#).

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- [municipal heritage committees](#) or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's [Heritage directory](#) – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a [list of plaques](#) commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a [list of plaques](#) commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a [database of registered cemeteries](#)
- Ontario Genealogical Society (OGS) – to [locate records of Ontario cemeteries](#), both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to [locate early cemeteries](#)

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the [Canadian Heritage River System](#).

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide [Heritage Property Evaluation](#).

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- [municipal heritage committees](#) or local heritage organizations
- Ontario Historical Society's "[Heritage Directory](#)" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through [Ontario Trails](#).

Appendix D: Archaeology Assessment

ARCHEOWORKS INC.

**Stage 1 Archaeological Assessment for the
Erb Street Water Supply Manganese Upgrades
Class Environmental Assessment
Within Part of Lots 40-41, German Company Tract
Geographic Township of Waterloo
Within Part of Lot 1, German Block North of Erbs Road
and Lot 1, German Block South of Erbs Road
Geographic Township of Wilmot
Former County of Waterloo
Now the Township of Wilmot and City of Waterloo
Regional Municipality of Waterloo
Ontario**

**Project #: 020-WA6356-19
Licensee (#): Kassandra Aldridge (P439)
PIF#: P439-0087-2020**

Original Report

July 22, 2020

**Presented to:
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**Prepared by:
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T: 416.676.5597
F: 647.436.1938**

EXECUTIVE SUMMARY

Changes are anticipated in the near future for the Ontario Drinking Water Standards (ODWS) regarding manganese concentrations. With the anticipated changes to the ODWS, the Erb Street Water Supply System will not meet the proposed aesthetic objective for manganese. The existing sites for the Erb Street Wells do not have sufficient space for additional treatment equipment, and therefore new treatment for manganese is expected to require land acquisition for new alternative treatment facilities.

To address the Municipal Class Environmental Assessment requirements, *Archeoworks Inc.* was retained by *Stantec Consulting Ltd.* to conduct a Stage 1 AA in support of the Erb Street Water Supply Manganese Upgrade Class Environmental Assessment of seven locations:

- 1.) Alternative Treatment Facility Location #1: in the western part of municipal address 960 Erb Street West, fronting on Wilmot Line.
- 2.) Alternative Treatment Facility Location #2: at the immediately northwest corner of Wilmot Line and Erbs Road, at municipal address 1074 Erbs Road.
- 3.) Alternative Treatment Facility Location #3: at municipal address 980 Erb Street West.
- 4.) Alternative Treatment Facility Location #4: at the immediately southwest corner of Wilmot Line and Erbs Road, at municipal address 1001A Erbs Road.
- 5.) Alternative Treatment Facility Location #5: near the southwest corner of Wilmot Line and Erbs Road, at municipal address 925 Erb Street West.
- 6.) Alternative Treatment Facility Location #6: north of the extant building of the Waterloo Region Emergency Services Training and Research Centre (WRESTRC), at municipal address 1001 Erbs Road.
- 7.) Alternative Treatment Facility Location #7: northeast of the extant buildings of the WRESTRC, on the east side of Fire Tower Road, and south of municipal address 925 Erb Street West.

All seven alternative treatment facility locations will be the subject of the report documented herein and referred to as the “study area.” The study area is located in part of Lots 40-41, German Company Tract, in the Geographic Township of Waterloo and in part of Lot 1, Concession 1 North of Erbs Road and Concession 1 South of Erbs Road, in the Geographic Township of Wilmot, former County of Waterloo, now in the City of Waterloo and Township of Wilmot, Regional Municipality of Waterloo, Ontario.

Stage 1 AA background research established elevated potential for the recovery of archaeologically significant materials within the study area. To determine if the archaeological potential classification of the study area is relevant, a desktop review of ground conditions was undertaken using historical mapping, 20th century topographic maps and satellite imagery. The desktop review identified parts of the study area as having archaeological potential removed, parts of the study area as having no or low archaeological potential and parts having been previously assessed. The remaining balance of the study area was identified as retaining archaeological potential and requires further archaeological assessment.

Considering the findings detailed in the following sections, the following recommendations are presented:

1. With previous assessments by *AECOM* (2017), *ASI Archaeological and Cultural Heritage Services* (2015), *Stantec Consulting Ltd.* (2018a, 2018b and 2019) having fulfilled the Stage 1 AA, Stage 2 AA and Stage 3 AA requirements within their respective portions of the current study area, it is recommended that these areas be exempt from further assessment within the scope of this project.
2. Parts of the study area that were identified as having archaeological potential removed are exempt from requiring Stage 2 AA (extents of these areas to be confirmed during the Stage 2 AA).
3. Parts of the study area that were identified as having no or low archaeological potential are exempt from requiring Stage 2 AA (extents of these areas to be confirmed during the Stage 2 AA).
4. All areas identified as retaining archaeological potential must be subjected to a Stage 2 AA. These areas must be subjected to pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.
5. Should construction activities extend beyond the assessed limits of the study area, further archaeological investigation will be required to assess the archaeological potential of these lands.

No construction activities shall take place within the study area prior to the *Ministry of Heritage, Sport, Tourism and Culture Industries* (Archaeology Program Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

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PROJECT PERSONNEL

Project Director Kassandra Aldridge – MHSTCI licence P439

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1.0 PROJECT CONTEXT

1.1 Objective

The objectives of a Stage 1 Archaeological Assessment (AA), as outlined by the 2011 *Standards and Guidelines for Consultant Archaeologists* ('2011 S&G') published by the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)* (2011), are as follows:

- To provide information about the property's geography, history, previous archaeological fieldwork and current land condition;
- To evaluate in detail the property's archaeological potential, which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

1.2 Development Context

Changes are anticipated in the near future for the Ontario Drinking Water Standards (ODWS) regarding manganese concentrations. With the anticipated changes to the ODWS, the Erb Street Water Supply System will not meet the proposed aesthetic objective for manganese. The existing sites for the Erb Street Wells do not have sufficient space for additional treatment equipment, and therefore new treatment for manganese is expected to require land acquisition for new alternative treatment facilities.

To address the Municipal Class Environmental Assessment requirements, *Archeoworks Inc.* was retained by *Stantec Consulting Ltd.* to conduct a Stage 1 AA in support of the Erb Street Water Supply Manganese Upgrade Class Environmental Assessment of seven locations:

- 1.) Alternative Treatment Facility Location #1: in the western part of municipal address 960 Erb Street West, fronting on Wilmot Line.
- 2.) Alternative Treatment Facility Location #2: at the immediately northwest corner of Wilmot Line and Erbs Road, at municipal address 1074 Erbs Road.
- 3.) Alternative Treatment Facility Location #3: at municipal address 980 Erb Street West.
- 4.) Alternative Treatment Facility Location #4: at the immediately southwest corner of Wilmot Line and Erbs Road, at municipal address 1001A Erbs Road.
- 5.) Alternative Treatment Facility Location #5: near the southwest corner of Wilmot Line and Erbs Road, at municipal address 925 Erb Street West.

- 6.) Alternative Treatment Facility Location #6: north of the extant building of the Waterloo Region Emergency Services Training and Research Centre (WRESTRC), at municipal address 1001 Erbs Road.
- 7.) Alternative Treatment Facility Location #7: northeast of the extant buildings of the WRESTRC, on the east side of Fire Tower Road, and south of municipal address 925 Erb Street West.

All seven alternative treatment facility locations will be the subject of the report documented herein and referred to as the “study area.” The study area is located in part of Lots 40-41, German Company Tract, in the Geographic Township of Waterloo and in part of Lot 1, Concession 1 North of Erbs Road and Concession 1 South of Erbs Road, in the Geographic Township of Wilmot, former County of Waterloo, now in the City of Waterloo and Township of Wilmot, Regional Municipality of Waterloo, Ontario (*see Appendix A – Map 1*).

This study is being conducted in accordance with the Schedule C of the *Environmental Assessment Act* under the Municipal Class EA regulatory process. It was conducted under the project direction of Ms. Kassandra Aldridge under archaeological consultant licence number P439, in accordance with the *Ontario Heritage Act* (2009). Permission to investigate the study area was granted by *Stantec Consulting Ltd.* on July 4th, 2019.

The Region of Waterloo has an *Archaeological Facilities Master Plan* (AFMP) which documents archaeological resources and evaluates archaeological potential within the region (Region of Waterloo, 1989). This resource “allows for the modification of development plans at an early stage of planning by allowing developers to arrange for an archaeological assessment of properties which exhibit moderate to high archaeological potential and arrange for the appropriate stage of mitigation or selecting an alternative area for development” (p.1). According to this resource, numerous portions of the study area require archaeological assessment. Further correspondence with the Principal Planner, Cultural Heritage at the Regional Municipality of Waterloo determined that based on the Region's Archaeological Potential Model, portions of the study area require archaeological assessment.

1.3 Historical Context

To establish the historical context and archaeological potential of the study area, *Archeoworks Inc.* conducted a review of Aboriginal and Euro-Canadian settlement history, and a review of available historical mapping and aerial imagery.

The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research**.

1.3.1 Pre-Contact Period

The Pre-Contact Period of Southern Ontario includes numerous Aboriginal groups that continually progressed and developed within the environment they inhabited. **Table 1** includes a brief overview and summary of the Pre-Contact Aboriginal history of Southern Ontario (Ferris, 2013, p.13).

Table 1: Pre-Contact Period

Periods	Date Range	Overview and Attributes
PALEO-INDIAN		
Early	ca. 11000 to 8500 BC	Small groups of nomadic hunter-gathers who utilized seasonal and naturally available resources; sites are rare; hunted in small family groups who periodically gathered into larger groups/bands during favourable periods in the hunting cycle; campsites used during travel episodes and found in well-drained soils in elevated situations; sites found primarily along glacial strandlines due to current understanding of regionals geological history; artifacts include fluted and lanceolate stone points, scrapers, dart heads. - Gainey, Barnes, Crowfield Fluted Points (Early Paleo-Indian) - Holcombe, Hi-Lo, Lanceolates (Late Paleo-Indian) (Ellis and Deller, 1990, pp.37-64; Wright, 1994, p.25; Ellis, 2013, p.37).
Late	ca. 8500 to 7500 BC	
ARCHAIC		
Early	ca. 7800 to 6000 BC	Descendants of Paleo-Indian ancestors; lithic scatters are the most commonly encountered site type; trade networks appear; artifacts include reformed fluted and lanceolate stone points with notched bases to attach to wooden shaft; ground-stone tools shaped by grinding and polishing; stone axes, adzes and bow and arrow; Shield Archaic in Northern Ontario introduced copper tools. - Side-notched, corner-notched, bifurcate projectile points (Early Archaic). - Stemmed, Otter Creek/Other Side-notched, Brewerton side and corner-notched projectile points (Middle Archaic). - Narrow Point, Broad Point, Small Point projectile points (Late Archaic). (Ellis et al., 1990, pp.65-124; Wright, 1994, pp.26-28; Ellis, 2013, pp.41-46; Dawson, 1983, pp.8-14).
Middle	ca. 6000 to 2000 BC	
Late	ca. 2500 to 500 BC	
WOODLAND		
Early	ca. 800 BC to 0 AD	Evolved out of the Late Archaic Period; introduction of pottery (ceramic) where the earliest were coil-formed, under fired and likely utility usage; two primary cultural complexes: Meadowood (broad extent of occupation in southern Ontario) and Middlesex (restricted to Eastern Ontario); poorly understood settlement-subsistence patterns; artifacts include cache blades, and side-notched points that were often recycled into other tool forms; primarily Onondaga chert; commonly associated with Saugeen and Point Peninsula complexes; oral traditions of the present-day Michi Saagiig (Mississauga Anishinaabeg), an Algonquian-speaking First Nation group, state that they, “are the descendants of the ancient peoples who lived in Ontario during the Archaic and Paleo-Indian periods” (Migizi and Kapyrka, 2015, p.1) - Meadowood side-notched projectile points (Spence et al., 1990, pp.125-142; Wright, 1994, pp.29-30; Ferris and Spence, 1995, p.89-97; Williamson, 2013, pp.48-61; Dawson, 1983, pp.15-19).
Middle	ca. 200 BC to AD 700	Three primary cultural complexes: Point Peninsula (generally located throughout south-central and eastern Southern Ontario), Saugeen (generally located southwestern Southern Ontario), and Couture (generally located in southwestern-

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Periods	Date Range	Overview and Attributes
		most part of Ontario); introduction of large “house” structures and substantial middens; settlements have dense debris cover indicating increased degree of sedentism; incipient horticulture; burial mounds present; shared preference for stamped, scallop-edged or tooth-like decoration, but each cultural complex had distinct pottery forms; Laurel Culture (ca. 500 BC to AD 1000) established in boreal forests of Northern Ontario. - Saugeen Point projectile points (Saugeen) - Vanport Point projectile points (Couture) - Snyder Point projectile points - Laurel stemmed and corner-notched projectile points (Spence et al., 1990, pp.142-170; Wright, 1994, pp.28-33; Ferris and Spence, 1995, p.97-102; Wright, 1999, pp.629-649; Williamson, 2013, pp.48-61; Hessel, 1993, pp.8-9; Dawson, 1983, pp.15-19; Gagné, 2012).
Late (Transitional)	ca. AD 600 to 1000	The north shore of Lake Ontario in Southern Ontario was occupied throughout the entire Late Woodland Period by the Mississauga Anishinaabeg (Michi Saagiig); their territory extended north where they would hunt and trap during the winter months, followed by a return to Lake Ontario in the spring and summer; “the traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft and north of the Haliburton highlands” (Migizi and Kapyrka, 2015, p.1); the Mississauga were highly mobile and often traveled great distances to obtain resources; Mississauga oral traditions speak of people (the Iroquoian) coming into their territory between AD 500-1000 who wished to establish villages and grow corn; treaties were made and the Mississauga allowed the Iroquois to stay in their traditional territories. Earliest Iroquoian development in Southern Ontario is Princess Point which exhibits few continuities from earlier developments with no apparent predecessors; hypothesized to have migrated into Ontario; the settlement data is limited, but oval houses are present; artifacts include ‘Princess Point Ware’ vessels that are cord roughened, with horizontal lines and exterior punctation; smoking pipes and ground stone tools are rare; introduction of maize/corn horticulture; continuity of Princess Point and Late Woodland Iroquoian groups. - Triangular projectile points (Fox, 1990, pp.171-188; Ferris and Spence, 1995, pp.102-106; Migizi and Kapyrka, 2015, pp.1-3; MCFN, 2017a).
Early Late Woodland	ca. AD 900 to 1300	Two primary Iroquoian cultures in Southern Ontario: Glen Meyer (located primarily in southwestern Ontario from Long Point on Lake Erie to southwestern shore of Lake Huron) and Pickering (encompassed north of Lake Ontario to Georgian Bay and Lake Nipissing); well-made and thin-walled clay vessels with stamping, incising and punctation; multi-family longhouses and some small, semi-permanent palisade villages; adoption of greater variety of harvest products; increase in corn-yielding sites; crudely made smoking pipes, and worked bone/antler present; evolution of the ossuary burials. - Triangular-shaped, basally concave projectile points with downward projecting corners or spurs (Williamson, 1990, pp.291-320; Ferris and Spence, 1995, pp.106-109).

Periods	Date Range	Overview and Attributes
Middle Late Woodland	ca. AD 1300 to 1400	Two primary Iroquoian cultures in Southern Ontario: Uren and Middleport; decorated clay vessels decrease; well-developed clay pipe complex that includes effigy pipes; increase in village sizes (0.5 to 1.7 hectares) and campsites (0.1 to 0.6 hectares) appear with some palisades; classic longhouse takes form; increasing reliance on maize and other cultigens such as beans and squash; intensive exploitation of locally available land and water resources; from Middleport emerged the Huron-Wendat, Petun, Neutral Natives and the Erie. - Triangular and (side of corner or corner removed) notched projectile points - Middleport Triangular and Middleport Notched projectile points (Dodd et al., 1990, pp.321-360; Ferris and Spence, 1995, pp.109-115).
Late Late Woodland	ca. AD 1400 to 1600	The Mississauga Anishinaabeg “were the negotiators, the messengers, the diplomats, and they successfully mediated peace throughout this area of Ontario for countless generations” (Migizi and Kapyrka, 2015, p.1); the Mississauga Anishinaabeg, along with the Odawa Nation, continued to meet with the Huron-Wendat, Neutral Nation and Petun Nation to ensure their friendly political and economic relations remained strong while the Iroquois continued to establish villages in the Mississauga traditional territory. Two major Iroquoian groups: the Neutral Natives to the west, and the Huron-Wendat to the east; Neutral (called Attiewandaron by the Huron-Wendat) Natives distributed west of the Niagara Escarpment, around the western end of Lake Ontario and eastward across the Niagara Peninsula; sites also found west of the Niagara Escarpment as far as Milton; varying settlements include villages up to five acres in size to isolated fishing cabins; villages tend to be located along smaller creeks, headwaters and marshlands; diet dependent on hunting, gathering, fishing and farming; longhouses present; ossuaries; tribe/band formation; theorized that the Credit River may have functioned as a boundary marker between the ancestral Neutral Natives and ancestral Huron-Wendat peoples. - Neutral Native projectile points are typically small but long and narrow, frequently side-notched (Lennox and Fitzgerald, 1990, pp.405-456; Ramsden, 1990, pp.361-384; Ferris and Spence, 1995, pp.115-122; Warrick, 2000, p.446; Warrick, 2008, p.15; Migizi and Kapyrka, 2015, pp.1-3)

1.3.2 Contact Period

The Contact Period of Southern Ontario is defined by European arrival, interaction and influence with the established Aboriginal communities of Southern Ontario. **Table 2** includes an overview of some of the main developments that occurred during the Contact Period of Southern Ontario.

Table 2: Contact Period

Period	Date Range	Overview and Attributes
European Contact	ca. AD 1600s	The Mississauga Anishinaabeg focused on hunting/fishing/gathering with little emphasis on agriculture; highly mobile within their traditional territory; temporary and moveable houses (wigwam); inter-marriage between Algonquian-speaking groups (such as the Nipissing, Algonquin, Odawa, Mississauga and Ojibway) and Iroquois groups likely occurred; Algonquian-speaking groups often wintered with Iroquois neighbours, resulting in a complex archaeological record; oral traditions

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Period	Date Range	Overview and Attributes
		of the Mississauga Anishinaabeg state that at the time of European Contact, the Mississauga Anishinaabeg retreated to their winter grounds in the north, thus avoiding disease and warfare. Huron-Wendat villages north of Lake Simcoe; Neutral Native villages were clustered in the Niagara Peninsula but their territorial hunting grounds stretched from the “Niagara River on the east, Lake Erie on the south, Lake St. Clair on the west, and a hazy Huron-Wendat-Attiewandaron frontier on the north” (Hunt, 1940, p.50); Neutral Natives referred as <i>la Nation neutre</i> by Samuel de Champlain but limited European contact with Neutrals; French missionaries visited Neutral Native villages but no permanent missions were established; no direct commercial trade relationship was formed between the French and Neutral Natives; trade goods begin to replace traditional tools/items; epidemics (Jury, 1974, pp.3-4; White, 1978, pp.407-411; Lennox and Fitzgerald, 1990, pp.405-456; Trigger, 1994, pp.47-55; Warrick, 2008, pp.12, 245; Fox and Garrad, 2004, p.124; McMillian and Yellowhorn, 2004, pp.110-111).
Five Nations of Iroquois (Haudenosaunee) Arrival	ca. AD 1650s	The Five (later Six) Nations of Iroquois (or Haudenosaunee), originally located south of the Great Lakes, engaged in warfare with Huron-Wendat neighbours as their territory no longer yielded enough furs; the Five Nations, armed with Dutch firearms, attacked and destroyed numerous Huron-Wendat villages in 1649-50; the small groups that remained became widely dispersed throughout the Great Lakes region, ultimately resettling in Quebec, in southwestern Ontario and in America; to prevent the revival of Huron-Wendat settlements, the Five Nations of Iroquois attacked and destroyed the villages of the Huron-Wendat allies, the Petun Natives; the Five Nations of Iroquois attacked Neutrals ca.1650s and caused their dispersal; the Five Nations, particularly the Seneca, established settlements along the Lake Ontario shoreline at strategic locations along canoe-and-portage routes and used territory for extensive fur trade; settlement along the Niagara River; a fort and trading post, Fort Niagara, had been constructed along the eastern bank of the Niagara River; European fur trade and exploration continues (Smith, 1897, p.40; Robinson, 1965, pp.15-16; Abler and Tooker, 1978, p.506; Schmalz, 1991, pp.12-34; Trigger, 1994, p.53-59; Williamson, 2013, p.60; Migizi and Kapyrka, 2015, p.2).
Anishinaabe Return	ca. AD 1650s to 1700s	Algonquian-speaking groups within the Anishinaabeg (Ojibway, Chippewa, Odawa, Mississauga and others) returned from the north to their traditional territory of Southern Ontario; by 1690s, the Five Nations settlements were abandoned; battles fought throughout Southern Ontario; by 1701, the Five Nations were driven out by the returning Anishinaabeg; the Five Nations returned to their homelands south of the Great Lakes, and some remained in parts of Southern Ontario (Hathaway, 1930, p.433; Trigger, 1994, pp.57-59; Johnston, 2004, pp.9-10; Gibson, 2006, pp.35-41; Smith, 2013, pp.16-20; Williamson, 2013, p.60).
Trade, Peace and Conflict	ca. AD 1700 to 1770s	Great Peace negotiations of 1701 in Montreal established peace around the Great Lakes; collectively referred to Anishinaabe and Five Nations of Iroquois as the First Nations; European commerce and exploration resumed; the Anishinaabe continued to trade with both the English and the French; genesis of the Métis; France and Britain were the basis of the Seven Years’ War; French defeat transferred the territory of New France to Britain; Treaty of Paris (1763); Royal Proclamation of 1763 established the government administration of the North American territories ceded by France to Britain and established the framework for the negotiation of treaties with First Nation inhabitants; Pontiac’s War; fur trade

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Period	Date Range	Overview and Attributes
		continued until Euro-Canadian settlement (Schmalz, 1991, pp.35-62, 81; Surtees, 1994, pp.92-97; Johnston, 2004, pp.13-14; Jaenen, 2013; Hall, 2015).
Early British Administration and Euro-Canadian Settlement	ca. AD 1760s to 1790s	American Revolution (1775 to 1783) caused large numbers of United Empire Loyalists, military petitioners, immigrants from the British Isle/European locations, and groups who faced persecution in the United States to arrive in Upper Canada; Treaty of Paris (1783) and formally recognized the independence of the United States; Province of Quebec divided in 1791 into sparsely populated Upper Canada (now southern Ontario) and culturally French Lower Canada (now southern Quebec); Jay's Treaty of 1795 establishes American/Canadian border along the Great Lakes; large parts of Upper Canada opened to settlement after land cession treaties were secured with various First Nations groups by the British Crown (Department of Indian Affairs, 1891; Government of Ontario, 2014; Jaenen, 2014; Hall, 2019; Surtees, 1994, p.110; Sutherland, 2014).
British Land Treaties	1780-1790s	Haldimand Proclamation of 1784 granted a track of land along the Grand River from its headwaters to Lake Erie to the Six Nations of Iroquois (Haudenosaunee) as compensation for their alliance with the British during the American Revolution; that same year, the Mississauga at the western end of Lake Ontario ceded a large tract of land that "included the Niagara Peninsula, lands close to the head of Lake Ontario, and the north shore of Lake Erie as far west as Cat Fish Creek" (Surtees, 1994, p.103); the purchased became known as the Between the Lakes Purchase, or Treaty No. 3 (Surtees, 1994, p.103); a track of land nearly 12 miles (or 19 kilometres) wide on either side of the Grand River was awarded to the Six Nations of Iroquois; a document from 1792 confirmed this transaction (Treaty No.4); the tract was surveyed by Augustus Jones from 1788 to 1791, and a second survey, commissioned by the Six Nations of Iroquois, occurred in 1796 (Department of Indian Affairs, 1891, pp. lxii, lxiv; Bricker, 1935a, p.82; Bourgeois, 1986, p.11; Surtees, 1994, pp.103-104; Bloomfield, 1995, p.19; Government of Ontario, 2014; Government of Ontario, 2019; MCFN, 2017b)
British Land Treaties – Township of Waterloo	1790s	Joseph Brant, a Mohawk war chief, interpreter and Indian Department officer, managed the Grand River tract on behalf of the Six Nations; sold parcels along the Grand River to Euro-Canadians but by 1791, Lieutenant Governor John Graves Simcoe refused the Six Nations the right to sell land or lease any part of their reserve; in 1796, Joseph Brant obtained the Power of Attorney from the other chiefs of the Six Nations, allowing him the right to sell and lease Six Nations lands within the Grand River tract (Haldimand Proclamation); by 1798, Joseph Brant sold six large blocks, totaling 350,000 acres of land and the proceeds from the sale of those lands would be invested for the benefit of the Six Nations; Treaty No. 9 and Treaty No.10 (Bricker, 1935a, p.83; Bloomfield, 1995, p.20; Graymont, 2014; Johnston, 1964, pp.xlii-liv; Johnston, 1967, pp.12-14; Department of Indian Affairs, 1891, p.lxii).
British Land Treaties – Township of Wilmot	1825-1827	In 1825, a provisional surrender was made by the Chippewa Indians (Treaty No.27½), and in 1827 a confirmatory surrender (Treaty No.29) was issued where 2,200,000 areas were sold to the British Government; this land encompasses the Township of Wilmot (Department of Indian Affairs, 1891, pp.lxiv, 65-67, 71-75).

1.3.3 Euro-Canadian Settlement Period (1800s to present)

1.3.3.1 Township of Waterloo

The Township of Waterloo, originally named 'Block No.2,' consisted of 94,012 acres of land (Sutherland, 1864, p.27). Richard Beasley, James Wilson and John Baptiste Rosseau, owned the entire township after purchasing Block No. 2 from Joseph Brant for £9,497 in 1796 (Hayes, 1997, p.2; Sutherland, 1864, p.27). These men owned Waterloo Township until 1798 (Sutherland, 1864, p.27). In 1800, Richard Beasley became the sole owner of the Township of Waterloo, having obtained a quit claim deed from Joseph Brant (Bricker, 1935a, p.82). Provisions within the deed prevented Richard Beasley from selling parcels of land within the Block until the full payment for the block was received (Bloomfield, 1995, p.20). Survey of the township was conducted by Richard Cockrell, who divided it into three parts; Upper Block, Middle Block, and Lower Block (Bloomfield, 1995, p.20). The Lower Block, or James Wilson's Lower Block, was "subdivided into smaller blocks known as Beasley's Old Survey, Beasley's Broken Front, Beasley's Lower Block, Horning's Tract, Bean's Tract, Bechtel's Tract, and Heistand's Tract" (Bricker, 1935a, p.83). Despite not having ownership of Waterloo Township, Beasley had sold nearly 14,200 acres of land within Waterloo Township. However, since Beasley had only the mortgage rights to the land, those individuals who purchased land from Beasley did not own the title (Bloomfield, 1995, p.21).

Additionally, Beasley failed to make regular payments on the mortgage of the lands and completely ignored the trustees, the Six Nations. However, at the time the Six Nations allowed this as Beasley often made direct payments to the Mohawk chief (Johnston, 1964, p.lviii). The Executive Council of Upper Canada acknowledged the land title but were still reviewing and monitoring the purchase. That same year, German Mennonites Joseph Shorg and Samuel Betzner arrived in Waterloo Township, found the land desirable for their needs, and obtained land deeds from Beasley. Unfortunately, the deeds were considered worthless, as Beasley had not paid for a large portion of the mortgage (Johnston, 1964, p.lix). As a result, the Executive Council of Upper Canada forced Beasley to sell 60,000 acres to a group, consisting of Joseph Shorg, Samuel Betzner and 25 additional German Mennonites stockholders from Pennsylvania and became known as the German Company Tract (Johnston, 1964, p.lix). The money owing to Beasley, in excess of £10,000, was paid and title to German Company Tract was given to Daniel Erb and Jacob Erb, sole agents for the Company, in 1805 (Bricker, 1934, p.65).

In lieu of the initial pitfalls of Beasley's settlement scheme, settlement in the Waterloo Township increased slowly, with most settlers primarily from Pennsylvania who were principally of Mennonite religion and of Swiss extraction (Bricker, 1934, p.65). Traveling in their large conestogas, drawn by horses or oxen, the settlers arrived in Waterloo after four to eight weeks of travel from Pennsylvania (Bricker, 1935b, p.123). Only the War of 1812 slowed the arrival of Mennonites to Waterloo County and by 1818, 860 individuals resided within Waterloo Township (Leibbrandt, 1980, p.12). In 1820, Germans and other Europeans arrived in Waterloo Township; by 1825, the Townships of Waterloo and Wilmot were the most densely populated townships in Upper Canada, with the exception of York (Leibbrandt, 1980, pp.13, 26). Subsequently, Amish Mennonites, Roman Catholics and Lutherans arrived in Waterloo Township (Leibbrandt, 1980, p.27). The German Revolution of 1848, or the March Revolution, brought 15,000 individuals to

the counties of Waterloo, Perth, Bruce, and Grey, many of whom were poverty-stricken as a result of the famine and economic crisis overseas (Leibbrandt, 1980, p.29).

Upon their arrival, the German Mennonites were tasked to clear the land of timber resources. The trees were large in size and of the finest quality of timber and lumber (Snider, 1918, p.14). Once the land was cleared, houses were erected soon after, and surplus timber was in abundance. Dundas and Hamilton remained the closest markets for Waterloo Township until 1854, at which time, the Great Western Railway reached Galt and in 1856, the Grand Trunk Railway traversed the Township providing an outlet for surplus timber (Snider, 1918, p.16). The majority of the Township remained agriculturally focused as the soil was rich and fertile, where no other County in Canada was better improved, and none where agricultural classes were better off (Sutherland, 1864, p.2).

1.3.3.1 Township of Wilmot

The Township of Wilmot, surrounded by other townships in Waterloo County, Perth County and Oxford County, was described as having a favourable climate, fertile soil and numerous streams “rendering it one of the most advantageous locations for the husbandman [a farmer] to be found on the continent” (Parsell & Co., 1881, p.vii). The Township of Wilmot was “first settled in 1822 by Christian Naffziger [also spelled Nafziger], a German of the Menonist persuasion, who applied to the British Government for a free grant of fifty acres of land to each family who should emigrate with him from Germany to Canada” (Sutherland, 1864, p.51; Parsell & Co., 1881, p.vii). Christian Naffziger was part of a society of German Non-Conformists, or Amish, and was originally from Amsterdam (Eby, 1895, p.57). He successfully received the land grants and returned to Canada with a number of German settlers who each received a front quarter of each lot north and south of Erbs Road, Snyder’s Road and Bleams Road (Sutherland, 1864, p.51). Consequently, the survey of the Township of Wilmot divided the township into three horizontal blocks of lands: the German Blocks North and South of Erbs Road, Snyder’s Road and Bleams Road; and Block A and Block B, which were purchased by the Canada Company (Sutherland, 1864, p.51).

Soon after, “Roman Catholics and Lutherans from Alsace and Germany, Anglicans from the British Isles and others joined the initial settlers in clearing land and building roads, mills, shops, churches, schools and villages” (Heritage Wilmot, 2015a). In 1825, the township contained 720 individuals; by 1841, there were 2,220 individuals (who were primarily German, with few Canadians); by 1854, there were 4,863 individuals; and by 1861, there were 6,173 individuals living in the Township of Wilmot (Smith, 1846, p.220; Smith, 1851, p.122; Sutherland, 1864, p.51). By the 1850s, there were three grist mills, 14 saw mills and 15,310 acres were under cultivation of the 51,463 acres owned (Smith, 1846, p.220). As the township continued to develop, small villages began to form that serviced the surrounding rural community.

1.3.3.3 Waterloo

The City of Waterloo, located east of the study area, was first settled by Abraham Erb in 1806 when he purchased a tract of 900 acres from the German Company that included the entire site of the present town (Parsell & Co., 1881, p.6; Mika and Mika, 1983, p.604). Waterloo was named after a place in Belgium and the name served as a guide for other German immigrants (Mika and

Mika, 1983, p.604). Abraham Erb built the first grist mill in 1816 which attracted settlers; however, he refused to sell parts his large parcel for smaller lots. In 1829, Jacob C. Snider bought 240 acres of Erb's land which included the grist and saw mills, and added a distillery (Mika and Mika, 1983, p.604).

A small community developed around the milling complex, many of which were skilled German craftsmen and by 1850, the village was settled almost exclusively by Germans. Waterloo contained "a population of about 250; a post office, a grist mill, saw mill, brewery, distillery, and two churches" (Smith, 1851, p.118). During the 1860 and 1870s, Waterloo became known for the quantity of insurance companies located in the town. By 1876, Waterloo had a population of approximately 2,000 individuals and in 1877, the Grand Trunk Railway reached Waterloo (Mika and Mika, 1983, p.605). A street railway between Waterloo and Berlin (now Kitchener) was opened in 1880 and the communities of both towns continued to develop and grow throughout the remainder of the nineteenth century as more manufacturing companies and industries were set up within the town limits (Mika and Mika, 1983, p.606).

1.3.3.4 St. Agatha

The village of St. Agatha, located west of the study area at the intersection of Erbs Road and Notre Dame Drive, was established after the St. Agatha Roman Catholic Church in 1834. The area was originally settled by Amish Mennonites, and then Roman Catholics and Lutherans from Alsace-Lorraine (Heritage Wilmot, 2015b). The parish of St. Agatha was founded by Catholic settlers who arrived from Alsace-Lorraine and the church became known as the "womb of Catholicism in Waterloo County" (St. Agatha Church, 2020). By 1864, the hamlet was described as, "situated one mile north of the Petersburg station of the Grand Trunk Railway, and seven miles from Berlin the county town. The village contains a large Roman Catholic Church and school, one store, two hotels. Population about 150" (Sutherland, 1864, p.182).

1.3.4 Past Land Use

1.3.4.1 Pre-1900 Land Use

Several documents were reviewed to gain an understanding of the land use history and of the study area's potential for the recovery of historic pre-1900 remains, namely *G.R. & G.M. Tremaine's 1861 Map of the County of Waterloo – Townships of Waterloo and Wilmot* and H. Parsell & Co.'s *1881 Illustrated Historical Atlas of the County of Waterloo – Townships of Waterloo and Wilmot* (see **Maps 2-3; Table 3**). The study area primarily encompassed within farmland owned by several individuals.

Table 3: Summary of Structures and Property Owners/Occupants documented in the 1861 *Tremaine's Map* and the 1881 *Illustrated Historical Atlas* in the Study Area

Lot	Con.	Part	Owner/Occupant		Structure(s) in the Study Area	
			1861	1881	1861	1881
40	GCT*	S½ of N½	Fickert K[---]ing	Isaac B. Shantz	-	-
40	GCT	N¼ of N½	Theobald Knorr		-	
41	GCT	SW pt.	George Spekt	Unlisted	-	-
41	GCT	SW pt.	Michael Hergott		-	

Lot	Con.	Part	Owner/Occupant		Structure(s) in the Study Area	
			1861	1881	1861	1881
1	NER**	All	Jacob Schneider	Unlisted	-	-
1	SER***	E½	Jacob Dietrich	Henry Wahl	-	-

*GCT = Germany Company Tract

** NER = North Erb Road

***SER = South Erb Road

Additionally, two homesteads are depicted falling within 300 metres of the study area in the 1861 *Tremaine's Map*. By 1881, one homesteads were depicted within 300 metres of the study area.

Additionally, the study area is located along present-day Wilmot Line and Erbs Road/Erb Street West which was originally laid out during the survey of the Township of Waterloo and Wilmot. In Ontario, the 2011 S&G considers areas of early Euro-Canadian settlements (e.g., pioneer homesteads, isolated cabins, farmstead complexes, early wharf or dock complexes, pioneer churches, and early cemeteries), early historic transportation routes (e.g., trails, passes, roads, railways, portage routes), and properties that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations, as features or characteristics that indicate archaeological potential (per *Section 1.3.1* of the 2011 S&G). Therefore, based on the proximity of both early Euro-Canadian settlements and historic transportation routes, there is elevated potential for the location of Euro-Canadian archaeological resources (pre-1900) within the study area.

1.3.4.2 Post-1900 Land Use

To facilitate the further evaluation of the established archaeological potential along the study area, a detailed review of topographic maps from 1927 and 1938 (*see Map 4*), aerial imagery from 1954 (*see Map 5*), and satellite images from 2006, 2009 and 2019 was undertaken.

The 1927 *Topographic Map* depicted the majority of the study area in land that had been cleared of overgrown vegetation and was likely agricultural lands, as well as pockets of treed areas situated along periphery of Alternative Treatment Facility Location #6 and #7. Several houses are depicted within 300 metres of the study area, but no structures are located in the study area. Erbs Road/Erb Street is depicted as a 2nd class metalled roadway with a telegram/telephone line on both sides of the road. Wilmot Line was depicted as an unmetalled roadway that travels both north and south of Erbs Road/Erb Street. The study area remained unchanged to 1938.

By 1954, the study area still primarily consisted of open agricultural lands with treed areas situated along periphery of Alternative Treatment Facility Location #6 and #7. No houses are depicted in the study area, while several houses were also located within 300 metres the study area. Additionally, Wilmot Line appears to no longer extend south of Erbs Road/Erb Street.

A review of satellite imagery (Google Earth, 2020a-c) shows that the study area has seen the beginnings phases of several residential developments in recent years. Beginning in 2006, several large construction grading activities occurred in the vicinity of Alternative Treatment Facility Location #4 and #7, and two structures (outbuildings) had been constructed in Alternative

Treatment Facility Location #5 and #7. By 2009, additional construction grading had occurred throughout Alternative Treatment Facility Location #4, and partially within Alternative Treatment Facility Location #5 and #6. By 2019, the study area remained relatively unchanged except for additional construction grading occurring at Alternative Treatment Facility Location #6.

1.3.6 Present Land Use

The present land use of the study area is categorized as Employment, Open Space, Rural Areas and Prime Agricultural (Township of Wilmot, 2019a; City of Waterloo, 2019a).

1.4 Archaeological Context

To establish the archaeological context and further establish the archaeological potential of the study area, *Archeoworks Inc.* conducted a comprehensive review of designated and listed heritage properties, commemorative markers and pioneer churches and early cemeteries in relation to the study area. Furthermore, an examination of registered archaeological sites and previous AAs in proximity to the study area limits, and a review of the physiography of the study area were performed.

The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research.**

1.4.1 Designated and Listed Cultural Heritage Resources

Per *Section 1.3.1* of the *2011 S&G*, properties listed on a municipal register or designated under the *Ontario Heritage Act*, or that is a federal, provincial, or municipal historic landmark or site, are considered features or characteristics that indicate archaeological potential. The study area is not located in or within 300 metres of a designated or listed heritage resource (City of Waterloo, 2019b; Township of Wilmot, 2019b; Township of Wilmot, 2019c). Therefore, this feature does not contribute in establishing the archaeological potential of the study area.

1.4.2 Heritage Conservation Districts

Per *Section 1.3.1* of the *2011 S&G*, heritage resources listed on a municipal register or designated under the *Ontario Heritage Act* are considered features or characteristics that indicate archaeological potential. The study area is not located in or within 300 metres of a Heritage Conservation District (City of Waterloo, 2006; MHSTCI, 2020a). Therefore, this feature does not contribute in establishing the archaeological potential of the study area.

1.4.3 Commemorative Plaques or Monuments

Per *Section 1.3.1* of the *2011 S&G*, commemorative markers of Aboriginal and Euro-Canadian settlements and history which may include local, provincial, or federal monuments, cairns or plaques, or heritage parks are considered features or characteristics that indicate archaeological potential. The study area is not located in or within 300 metres of a commemorative plaque or monument (Ontario Historic Plaques, 2019; OHT, 2020). Therefore, this feature does not contribute in establishing the archaeological potential of the study area.

1.4.4 Pioneer/Historic Cemeteries

Per *Section 1.3.1* of the *2011 S&G*, pioneer churches and early cemeteries are considered features or characteristics that indicate archaeological potential. No pioneer churches or early cemeteries are located in or within 300 metres of the study area (Google Maps, 2020; Township of Wilmot, 2015). Therefore, this feature does not contribute in establishing the archaeological potential of the study area.

1.4.5 Registered Archaeological Sites

Per *Section 1.1, Standard 1* and *Section 7.5.8, Standard 1* of the *2011 S&G*, the *Ontario Archaeological Sites Database* (OASD) maintained by the *MHSTCI* was consulted in order to provide a summary of registered or known archaeological sites within a minimum one-kilometre distance of the study area limits.

According to the OASD there are eight archaeological sites within a one-kilometre radius of the study area (MHSTCI, 2020) (*see Table 4*). Of these, two are located in the study area (of Alternative Treatment Facility Location #1).

Table 4: Registered Archaeological Sites within One Kilometre of the Study Area

Borden #	Name	Cultural Affiliation	Type
Registered archaeological sites in the Study Area			
AiHd-175	Location 2	Early Woodland	Camp/campsite
AiHd-176	Location 5	Pre-Contact (Aboriginal)	Camp/campsite
Other Registered archaeological sites within one kilometre			
AiHd-174	Location 1	Post-Contact (Euro-Canadian)	Farmstead
AiHd-132	Greyerbiehl 1	Pre-Contact (Aboriginal)	-
AiHd-133	Greyerbiehl 2	Pre-Contact (Aboriginal)	-
AiHd-134	Greyerbiehl 3	Pre-Contact (Aboriginal)	-
AiHd-135	Greyerbiehl 4	Pre-Contact (Aboriginal)	-
AiHd-136	Greyerbiehl 5	Pre-Contact (Aboriginal)	-

Per *Section 1.3.1* of the *2011 S&G*, previously registered archaeological sites in close proximity are considered to be features or characteristics that indicate archaeological potential. Therefore, given the presence of two registered archaeological site located within a 300 metre-radius of the study area, this feature contributes in the establishing archaeological potential of the study area.

1.4.6 Previous Archaeological Assessments

Per *Section 1.1, Standard 1* and *Section 7.5.8, Standards 4-5* of the *2011 S&G*, to further establish the archaeological context of the study area, a review of previous AAs carried out within the limits of, or immediately adjacent (i.e., within 50 metres) to the study area — as documented by all available reports — was undertaken. Five reports were identified (*see Table 5*).

**STAGE 1 AA FOR THE ERB STREET WATER SUPPLY MANGANESE UPGRADE
TOWNSHIP OF WILMOT & CITY OF WATERLOO, RM OF WATERLOO, ONTARIO**

Table 5: Previous Archaeological Assessments

Company, Year	Stage of Work	Relation to Current Study Area	Recommendation
<i>Previous Archaeological Assessments Tied to Other Development Projects:</i>			
AECOM, 2017	Stage 1	Encompassing part of the study area	Associated with the AA of the Paramedic Services Headquarters/North Fleet Centre Design Project in the Township of Wilmot. A property inspection was conducted. It was recommended that the entire study area has been subjected to deep and extensive disturbance and does not require further archaeological work. It should be cleared of further archaeological concerns.
ASI Archaeological and Cultural Heritage Services, 2015	Stage 1 AA	Encompassing part of the study area	Associated with the AA of Erb Street from Fischer-Hallman Road to Wilmot Line. A property inspection was conducted and determined much of the subject corridor deep and extensive disturbances associated with the typical disturbed ROW. Stage 2 AA required in undisturbed portions of the subject corridor.
Stantec Consulting Ltd. 2018a	Stage 1 AA	Encompassing part of the study area	Located in part of Lots 41 and 41, German Company Tract, measuring 49.5 hectares of land and associated with the West Side Employment Lands at the northeast corner of Erb Street West and Wilmot Line. Stage 2 AA recommended.
Stantec Consulting Ltd. 2018b	Stage 2 AA	Encompassing part of the study area	Located in part of Lots 41 and 41, German Company Tract, measuring 49.5 hectares of land and associated with the West Side Employment Lands at the northeast corner of Erb Street West and Wilmot Line. During the Stage 2, several sites were found: Location 1 (AiHd-174), a historic, Euro-Canadian site; Location 2 (AiHd-175), a lithic scatter of Onondaga chert; Location 3, a isolated Indigenous findspot; Location 4, an isolated Indigenous findspot; Location 5 (AiHd-176), a lithic scatter of Onondaga chert; Location 6, an isolated Indigenous findspot; and Location 7, an isolated Indigenous findspot. Further Stage 3 AA was recommended for Location 1 (AiHd-174), Location 2 (AiHd-175) and Location 5 (AiHd-176). Due to their isolated nature, no further AA was recommended for Locations 3, 4, 6 and 7.
Stantec Consulting Ltd., 2019	Stage 3 AA	Encompassing part of the study area	Associated with the AA of Location 2 (AiHd-175) and Location 5 (AiHd-176). A controlled surface pickup (CSP) was conducted at both sites after the site was relocated. 20 surface artifacts were found at Location 2 and 11 surface artifacts were found at Location 5. During the Stage 3 AA of Location 2 (AiHd-175), a total of 48 one-by-one metre test units were excavated yielding 34 artifacts. No subsurface features were found. During the Stage 3 AA of Location 5 (AiHd-176), a total of 48 one-by-one metre test units were

Company, Year	Stage of Work	Relation to Current Study Area	Recommendation
			excavated yielding 34 artifacts and no subsurface cultural features were observed. These sites represent ephemeral activities of people manufacturing and repairing tools while travelling through the area. Based on the above, Location 2 (AiHd-175) and Location 5 (AiHd-176) represent typical, briefly occupied, Aboriginal sites within the region. Due to the paucity of artifacts recovered, both Location 2 (AiHd-175) and Location 5 (AiHd-176) do not fulfill the criteria for Stage 4 mitigation of development. Therefore, it has been determined that the cultural heritage value or interest of Location 2 (AiHd-175) and Location 5 (AiHd-176) has been sufficiently documented and a Stage 4 mitigation of development impacts is not required.

1.4.7 Physical Features

1.4.7.1 Physiographic Region

The study area is within the Waterloo Hills physiographic region of Southern Ontario, which chiefly lies in the Regional Municipality of Waterloo. The surface is composed of sandy hills, some of them being ridges of sandy till while others are kames or kame moraines, with outwash sands occupying the intervening hollows. A peculiar characteristic is the preponderance of fine sand, particularly on the surface. Adjoining the hilly region is an extensive area of alluvial terraces of the Grand River spillway system which, although nearly horizontal, contains similar but more uniform sandy and gravelly materials. The Conestogo River and the till plain lying north of it separate the northern end from the main body of this area. In the main part of the region, a number of kettle lakes appear. Small swamps are even more numerous. The soils of the hilly areas are well drained and have developed as mature Grey Brown Luvisolic soils. For the most part they may be classified in four series: Guelph, Harriston, Dumfries, and Waterloo. The Guelph and Harriston soils are found on gentle slopes in the areas where loamy tills occur, while there are some nearly level areas which may have the imperfectly drained London and Listowel soils. Dumfries soils are found in rougher parts where the parent material is a loose gravelly till. Waterloo sandy loam is found on most of the rounded, sandy hills of the area but there are associated small areas of many other types (Chapman & Putnam, 1984, pp.136-137).

1.4.7.2 Soil Types and Topography

Several soil types are found within the study area including Brant-Waterloo and Huron-St. Clements. A description of their characteristics may be found in **Table 6** (Soil Research Institute, 1971).

Table 6: Study Area Soil Types

Soil Association	Description
Brant-Waterloo	Moderately coarse- and medium-textured soils formed on lacustrine deposits.
Huron-St. Clements	Fine-textured soils formed on till or lacustrine deposits.

The topography within the study area is rolling, measuring between 392 and 405 metres above sea level.

1.4.7.3 Hydrological Features

Hydrological features such as primary water sources (i.e. lakes, rivers, creeks, streams) and secondary water sources (i.e. intermittent streams and creeks, springs, marshes, swamps) would have helped supply plant and food resources to the surrounding area and are indicators of archaeological potential (per *Section 1.3.1* of the 2011 S&G). A tributary of Alder Creek is located within 300 metres of the study area. Therefore, this feature contributes in establishing the archaeological potential of the study area.

1.4.8 Current Land Conditions

The study area is situated mainly within a rural setting of the Township of Wilmot and City of Waterloo, on the municipal border of both municipalities. The study area encompasses two extant outbuildings, gravel and paved driveways and roadways, areas subjected to previous construction grading, areas of open agricultural fields and areas of overgrown vegetation.

1.4.9 Date of Review

A desktop review of field conditions using historic aerial photographs, and past and current satellite imagery reviewed through Google Earth application was undertaken on June 24th, 2020.

1.5 Confirmation of Archaeological Potential

Based on the information gathered from the background research documented in the preceding sections, elevated archaeological potential has been established within the study area limits. Features contributing to archaeological potential are summarized in **Appendix B**. However, it must be noted that post-1900 developments can negate the possibility of encountering intact archaeological deposits due to deep and extensive soil disturbance. Further assessment of conditions within the study area will be addressed in **Section 2.0** below.

2.0 ANALYSIS AND CONCLUSIONS

In combination with data gathered from the background research (*see Sections 1.3 and 1.4*) and an inspection of contour mapping, aerial photographs, recent satellite imagery, and additional historical maps and records, an evaluation of the established archaeological potential of the study area was performed. The results of this evaluation are presented in **Maps 6-7**. An inventory of the documented records can be found within **Appendix C**.

2.1 Previous Assessments and Registered Archaeological Sites

Background research has revealed that portions of the study area have been previously subjected to a Stage 1, and/or Stage 2 as reported by: AECOM (2017), ASI Archaeological and Cultural Heritage Services (2015), Stantec Consulting Ltd. (2018a) and Stantec Consulting Ltd. (2018b).

With previous AAs having fulfilled the Stage 1 and/or Stage 2 AA requirements (*see Section 1.4.6, Table 5*) within their respective portions of the current study area, it is therefore recommended that these areas (*see Map 6*) be exempt from further assessment within the scope of this project.

Two sites, Location 2 (AiHd-175) and Location 5 (AiHd-176) were located in the study area of Alternative Treatment Facility Location #1 (*see Section 1.4.6, Tables 4-5*). Both sites were subjected to Stage 3 AA (Stantec Consulting Ltd., 2019) and were determined to be Aboriginal lithic scatters that were ephemeral and likely created by people manufacturing and repairing tools while travelling through the area. Both sites were determined to no longer be of cultural heritage value or interest and have been cleared of archaeological concern.

2.2 Physiographic Features of No or Low Archaeological Potential

The study area was also evaluated for physical features of no or low archaeological potential. These include (but are not limited to): permanently wet areas, exposed bedrock, and steep slopes (greater than 20°) except in locations likely to contain pictographs or petroglyphs, as per *Section 2.1, Standard 2.a. of the 2011 S&G*.

Physiographic features of no or low archaeological potential encountered within the study area include steep slopes (*see Maps 6-7*). On-site confirmation and documentation of the actual condition and exact extent of areas of no or low archaeological potential will, however, be required during the Stage 2 AA.

2.3 Identified Deep and Extensive Disturbances

The study area was evaluated for extensive and deep land alterations which have severely impacted the integrity of archaeological resources, commonly referred to as 'disturbances,' that remove archaeological potential. Per *Section 1.3.2 of the 2011 S&G*, features indicating that

archaeological potential has been removed include (but are not limited to): quarrying, major landscaping involving grading below topsoil, building footprints, or sewage and infrastructure development.

Disturbances include, but are not limited to, extant structures (sheds, outbuildings), gravel driveways and lands previous subjected to construction grading (*see Maps 6-7*). The construction of these features would have resulted in severe damage to the integrity of any archaeological resources which may have been present within their footprints and, as such, are exempt from Stage 2 survey. On-site confirmation and documentation of the actual condition and exact extent of the disturbances will, however, be required during the Stage 2 AA.

2.4 Identified Areas of Archaeological Potential

Portions of the study area that exhibit neither extensively disturbed conditions nor contain physical features of no or low archaeological potential are considered to have archaeological potential. These areas include areas of overgrown vegetation and agricultural fields (*see Maps 6-7*).

Given the established potential to recover archaeological resources within these identified areas, a Stage 2 AA will be required. Actively or recently cultivated agricultural land must be subjected to pedestrian survey, in accordance with the standards outlined in *Section 2.1.1* of the *2011 S&G*. In areas where ploughing is not possible or viable due to the presence of overgrown vegetation or existing infrastructure and landscaping, a Stage 2 test pit survey at five metre intervals must be performed, in accordance with the standards outlined in *Section 2.1.2* of the *2011 S&G*.

3.0 RECOMMENDATIONS

Considering the findings detailed in preceding sections, the following recommendations are presented:

1. With previous assessments by *AECOM* (2017), *ASI Archaeological and Cultural Heritage Services* (2015), *Stantec Consulting Ltd.* (2018a, 2018b and 2019) having fulfilled the Stage 1 AA, Stage 2 AA and Stage 3 AA requirements within their respective portions of the current study area, it is recommended that these areas (**see Map 6**) be exempt from further assessment within the scope of this project.
2. Parts of the study area that were identified as having archaeological potential removed are exempt from requiring Stage 2 AA (**see Map 6**; extents of these areas to be confirmed during the Stage 2 AA).
3. Parts of the study area that were identified as having no or low archaeological potential are exempt from requiring Stage 2 AA (**see Map 6**; extents of these areas to be confirmed during the Stage 2 AA).
4. All areas identified as retaining archaeological potential must be subjected to a Stage 2 AA (**see Map 6**). These areas must be subjected to pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.
5. Should construction activities extend beyond the assessed limits of the study area, further archaeological investigation will be required to assess the archaeological potential of these lands.

No construction activities shall take place within the study area prior to the *MHSTCI* (Archaeology Program Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

4.0 ADVICE ON COMPLIANCE WITH LEGISLATION

1. This report is submitted to the *MHSTCI* as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the *MHSTCI*, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.
2. It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.
3. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.
4. The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the *Ministry of Consumer Services*.
5. Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

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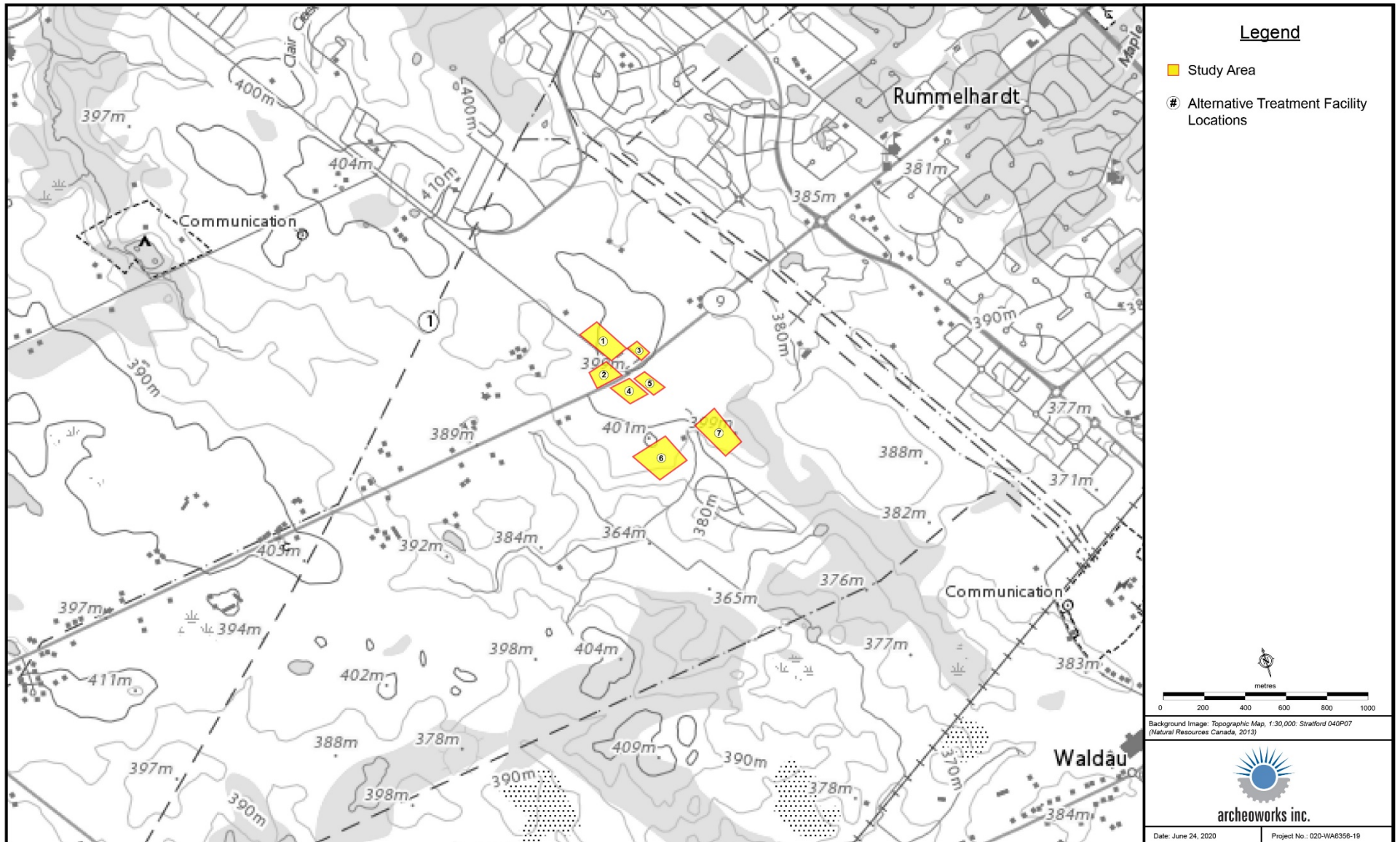
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APPENDICES

APPENDIX A: MAPS



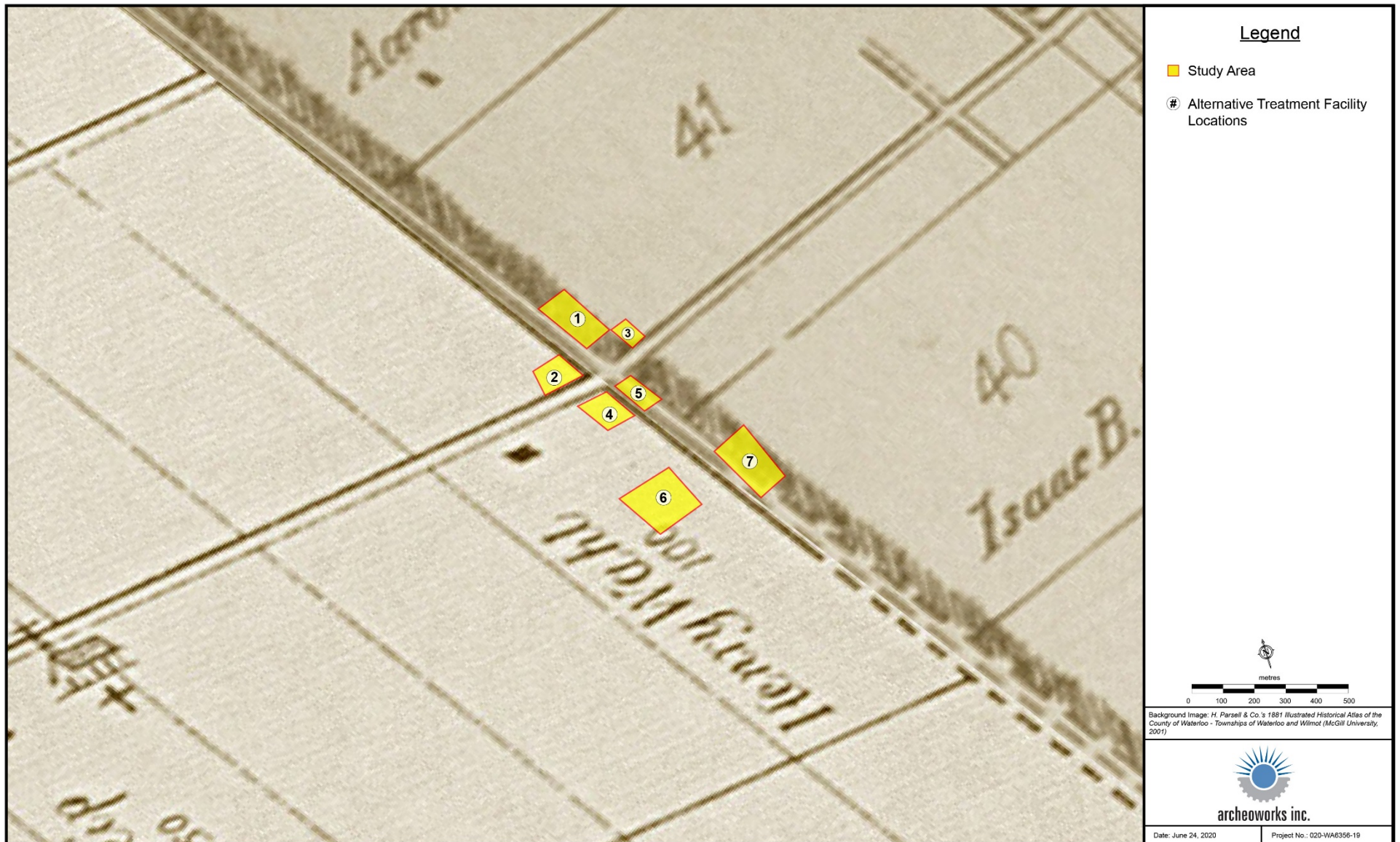
Map 1: Topographic Map, 1:30,000, Stratford 040P07 (Natural Resources Canada, 2013) identifying the Stage 1 AA study area.

STAGE 1 AA FOR THE ERB STREET WATER SUPPLY MANGANESE UPGRADE
TOWNSHIP OF WILMOT & CITY OF WATERLOO, RM OF WATERLOO, ONTARIO



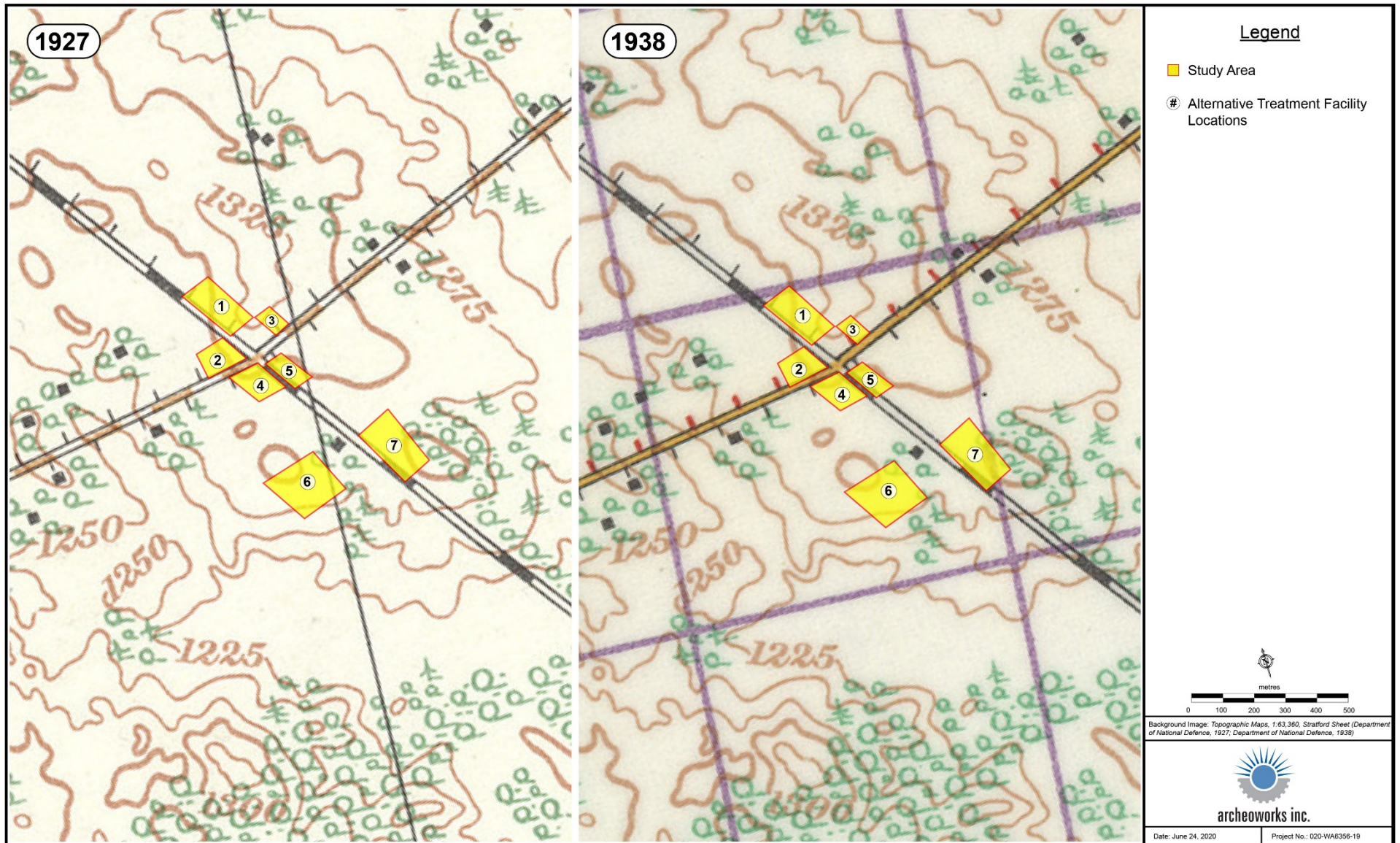
Map 2: Stage 1 AA study area within G.R. & G.M. Tremaine's 1861 Map of the County of the County of Waterloo – Townships of Waterloo and Wilmot (OHCMP, 2019).

STAGE 1 AA FOR THE ERB STREET WATER SUPPLY MANGANESE UPGRADE
TOWNSHIP OF WILMOT & CITY OF WATERLOO, RM OF WATERLOO, ONTARIO



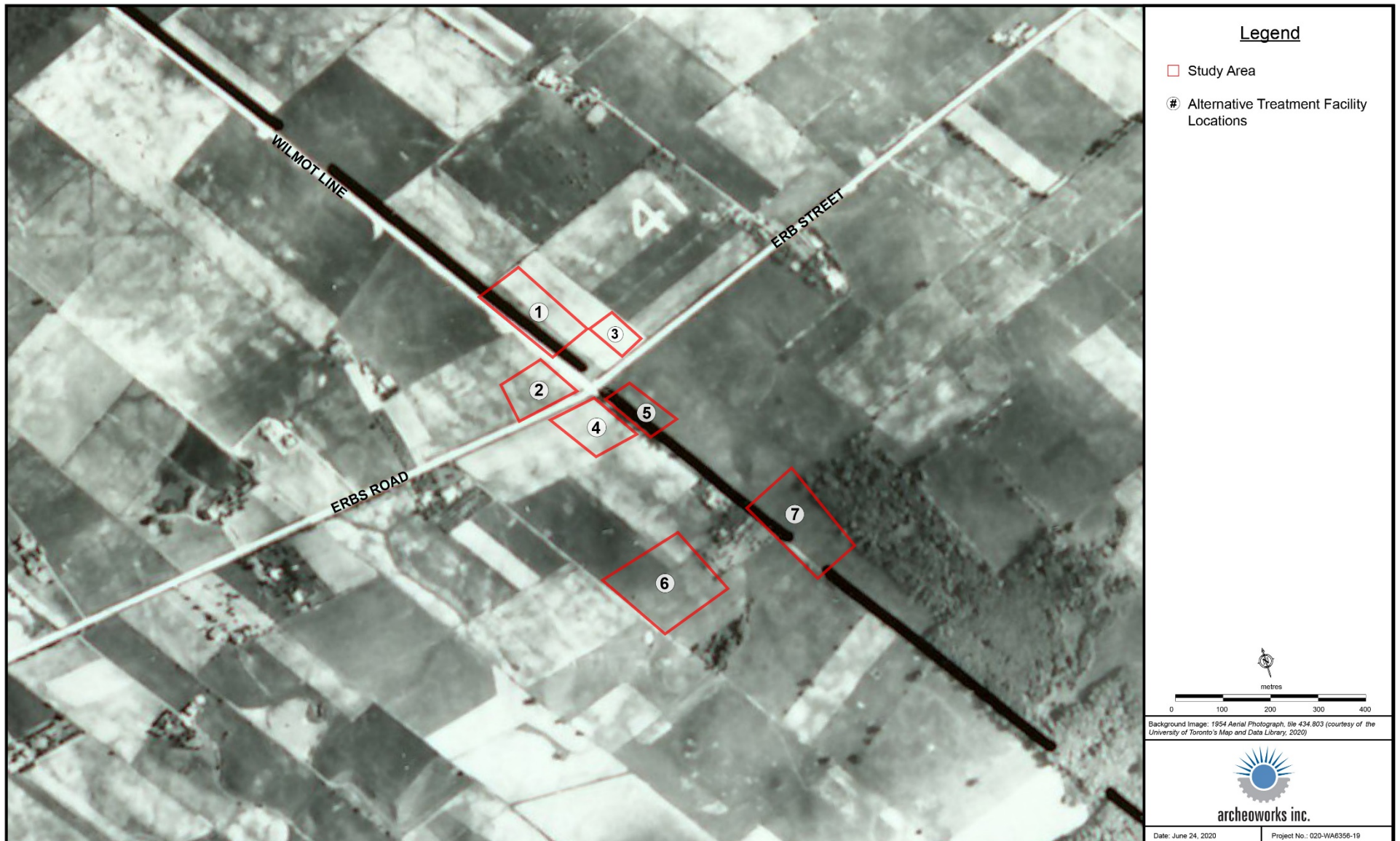
Map 3: Stage 1 AA study area within the H. Parsell & Co. 1881 Illustrated Historical Atlas of the County of Waterloo – Townships of Waterloo and Wilmot (McGill University, 2001).

STAGE 1 AA FOR THE ERB STREET WATER SUPPLY MANGANESE UPGRADE
TOWNSHIP OF WILMOT & CITY OF WATERLOO, RM OF WATERLOO, ONTARIO



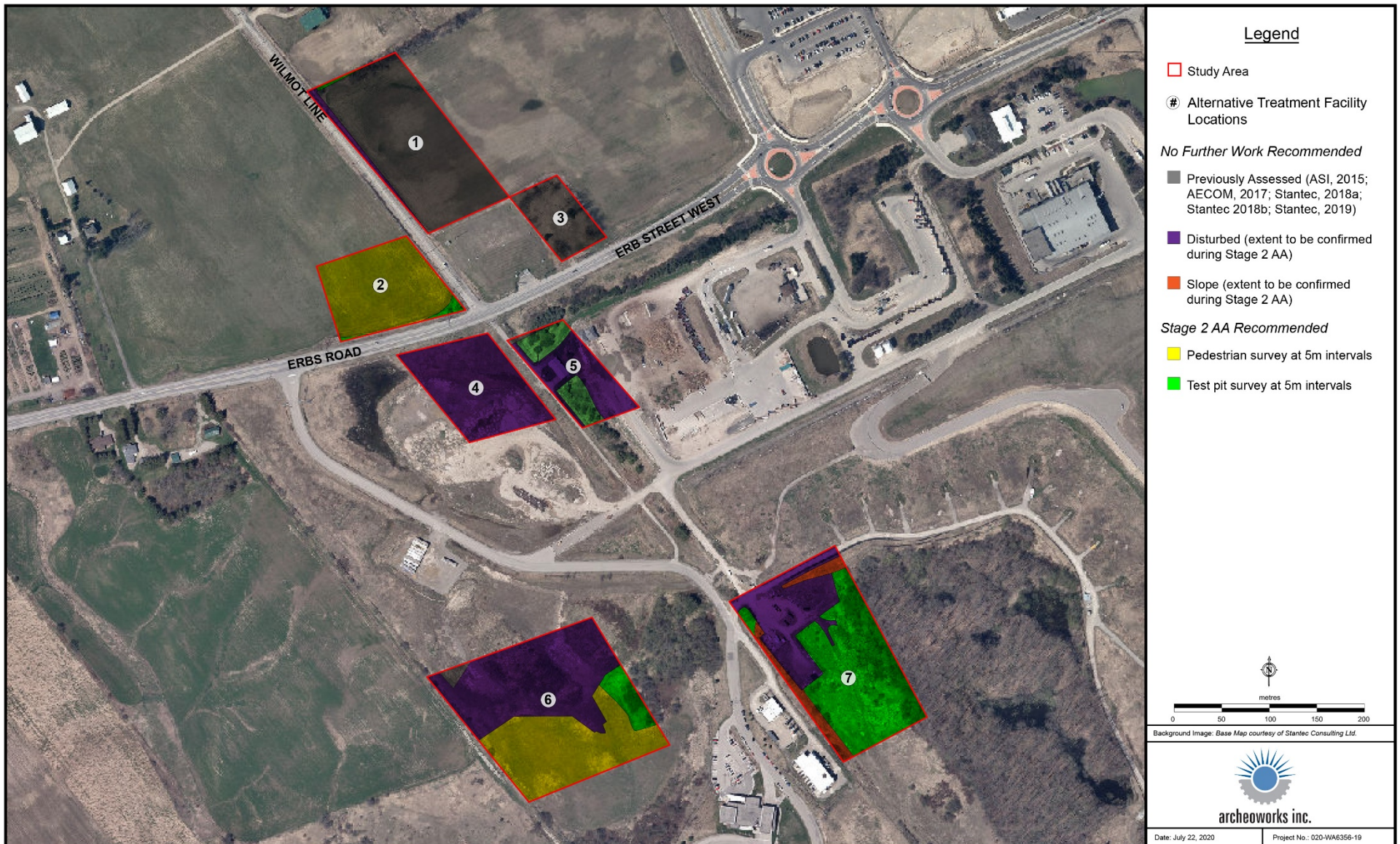
Map 4: Stage 1 AA study area within a 1927 and 1938 Topographic Maps (Department of National Defence; Department of National Defence).

STAGE 1 AA FOR THE ERB STREET WATER SUPPLY MANGANESE UPGRADE
TOWNSHIP OF WILMOT & CITY OF WATERLOO, RM OF WATERLOO, ONTARIO



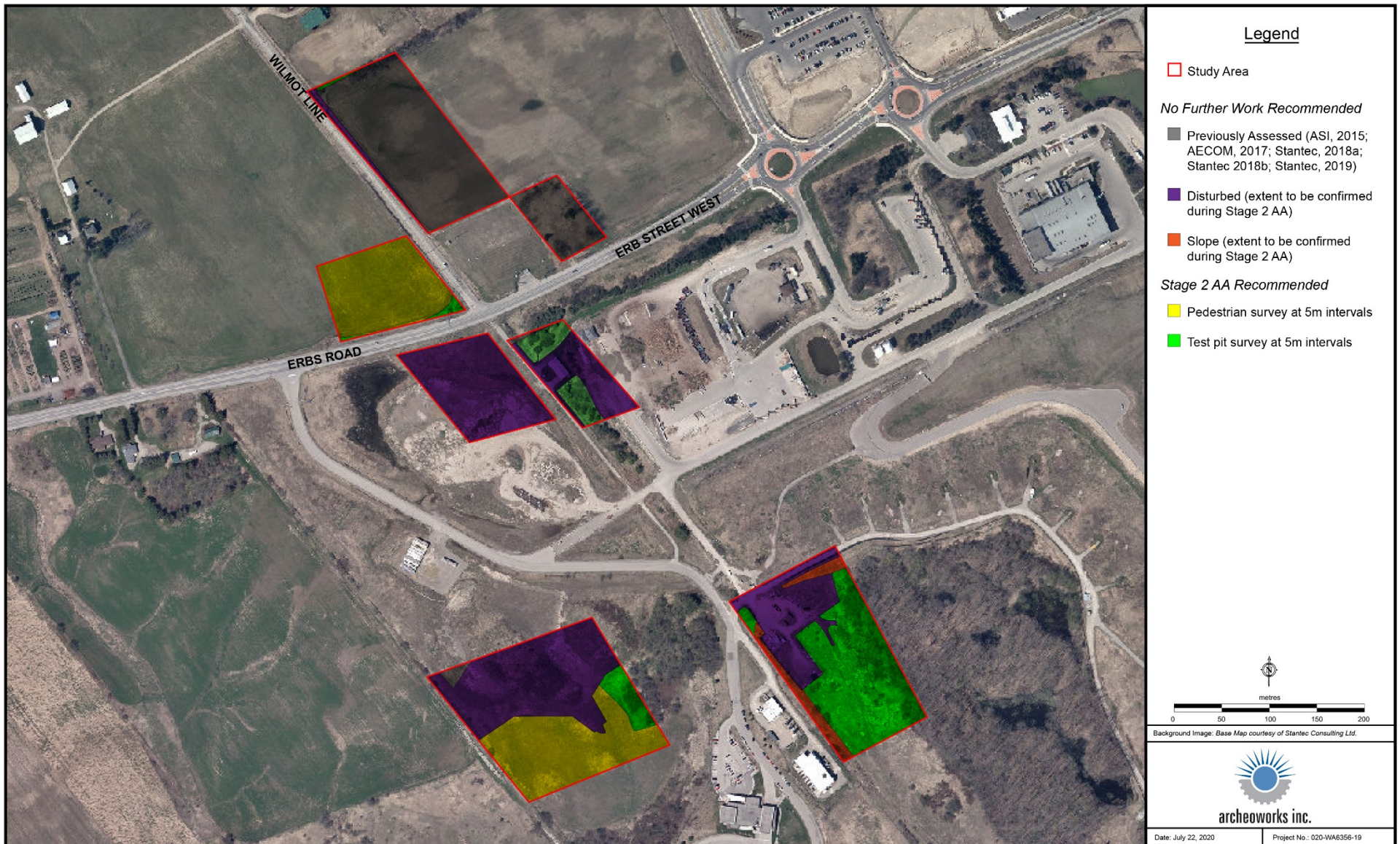
Map 5: Stage 1 AA study area within a 1954 aerial photograph (courtesy of University of Toronto's Map and Data Library, 2020).

STAGE 1 AA FOR THE ERB STREET WATER SUPPLY MANGANESE UPGRADE
TOWNSHIP OF WILMOT & CITY OF WATERLOO, RM OF WATERLOO, ONTARIO



Map 6: Stage 1 AA results.

STAGE 1 AA FOR THE ERB STREET WATER SUPPLY MANGANESE UPGRADE
TOWNSHIP OF WILMOT & CITY OF WATERLOO, RM OF WATERLOO, ONTARIO



Map 7: Stage 1 AA results without Alternative Treatment Facility Location Numbers.

APPENDIX B: SUMMARY OF BACKGROUND RESEARCH

Feature of Archaeological Potential		Yes	No	Unknown	Comment
1	Known archaeological sites within 300 m?	X			If Yes, potential confirmed
Physical Features		Yes	No	Unknown	Comment
2	Is there water on or adjacent to the property?	X			If Yes, potential confirmed
2a	Presence of primary water source within 300 metres of the study area (lakes, rivers, streams, creeks)		X		If Yes, potential confirmed
2b	Presence of secondary water source within 300 metres of the study area (intermittent creeks and streams, springs, marshes, swamps)	X			If Yes, potential confirmed
2c	Features indicating past presence of water source within 300 metres (former shorelines, relic water channels, beach ridges)		X		If Yes, potential confirmed
2d	Accessible or inaccessible shoreline (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh)		X		If Yes, potential confirmed
3	Elevated topography (knolls, drumlins, eskers, plateaus, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
4	Pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
5	Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
Cultural Features		Yes	No	Unknown	Comment
6	Is there a known burial site or cemetery that is registered with the Cemeteries Regulation Unit on or directly adjacent to the property?		X		If Yes, potential confirmed
7	Associated with food or scarce resource harvest areas (traditional fishing locations, food extraction areas, raw material outcrops, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
8	Indications of early Euro-Canadian settlement (monuments, cemeteries, structures, etc.) within 300 metres	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
9	Associated with historic transportation route (historic road, trail, portage, rail corridor, etc.) within 100 metres of the property	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
Property-specific Information		Yes	No	Unknown	Comment
10	Contains property designated under the Ontario Heritage Act		X		If Yes, potential confirmed
11	Local knowledge (aboriginal communities, heritage organizations, municipal heritage committees, etc.)		X		If Yes, potential confirmed
12	Recent ground disturbance, not including agricultural cultivation (post-1960, extensive and deep land alterations)	X – in some parts			If Yes, low archaeological potential is determined

APPENDIX C: INVENTORY OF DOCUMENTARY AND MATERIAL RECORD

Project Information:				
Project Number:		020-WA6356-19		
Licensee:		Kassandra Aldridge (P439)		
MHSTCI PIF:		P439-0087-2020		
Document/ Material			Location	Comments
1	Research/ Analysis/ Reporting Material	Digital files stored in: /2019/020-WA6356-19 - Erb Street Water Supply Manganese Upgrades - Waterloo/Stage 1	Archeoworks Inc., 16715-12 Yonge St., Suite 1029, Newmarket, ON, Canada L3X 1X4	Stored on Archeoworks network servers

Under the Section 14 of the Terms and Conditions for Archaeological Licences issued under the *Ontario Heritage Act*, "the licensee shall hold in safekeeping all artifacts and records of archaeological fieldwork carried out under this licence, except where those artifacts and records are transferred by the licensee to Her Majesty the Queen in right of Ontario or the licensee is directed to deposit them in a public institution in accordance with subsection 66(1) of the Act." The collections are being stored at Archeoworks Inc. on the licensee's behalf.

Appendix E: Project Notices and Correspondence



**Notice of Study Commencement
Erb Street Water Supply Iron and Manganese Upgrades
Schedule C Municipal Class Environmental Assessment**



The Region of Waterloo (Region) has initiated a Municipal Class Environmental Assessment (EA) Study to assess the need for upgrades to elements of the Region's water supply, which are located in the Township of Wilmot (please refer to Study Area map). These include an existing reservoir, located at 990 Erb Street West, and the existing well sites, located at 1226 B Erbs Road and 1211 Erbs Road. The Study will review existing conditions and provide recommendations related to iron and manganese treatment upgrades based on current industry standards and new technologies, which may include a new location for potential treatment upgrades.

How is this Study being undertaken?

This Study is being undertaken in accordance with the planning and design process for Schedule C projects, as outlined in the Municipal Class Environmental Assessment document (October 2000, as amended in 2007, 2011 and 2015), which is an approved process under the Ontario Environmental Assessment Act.

How can I participate in this Study?

The Region encourages the public to participate in the Study planning process and learn more about the Study by:

- Signing up to the email contact list to receive project notices
- Attending the Public Consultation Centres (PCCs) during the Study to review information and provide feedback to the project team on the problems and opportunities, potential options, the decision-making process, recommended solutions, and next steps.

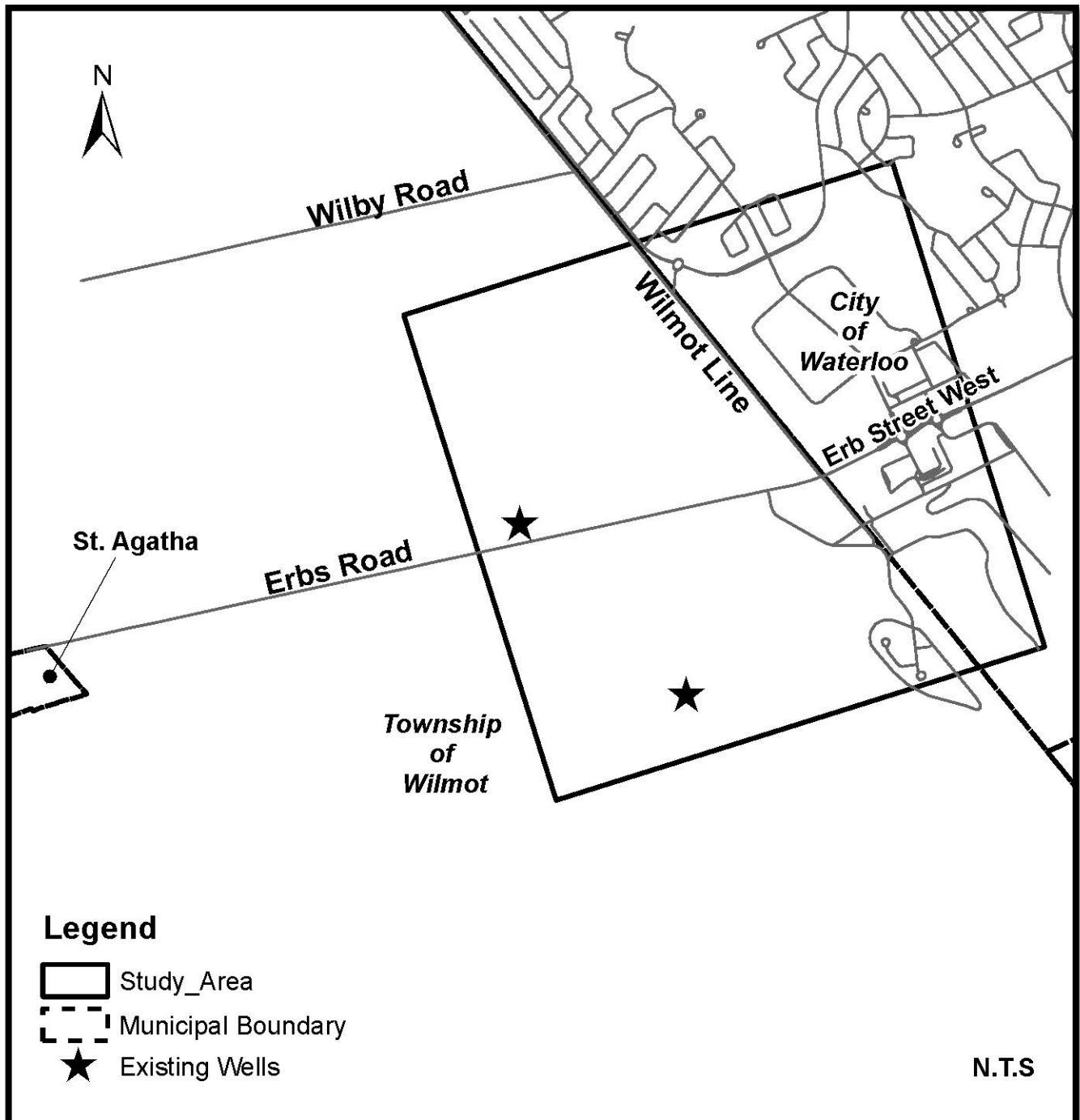
If you would like more information on the Study, or would like to sign up for the Study contact list, please contact:

Pam Law, P.Eng
Senior Project Engineer
Region of Waterloo, Water Services
Phone: 519-575-4095
Email: PLaw@regionofwaterloo.ca

Stephanie Bergman, MA, ENV SP
Planner
Stantec Consulting Ltd.
Phone: 519-675-6614
Email: Stephanie.Bergman@stantec.com

All comments and information received from individuals, stakeholder groups and agencies regarding this project are being collected under the authority of the "Municipal Act" to assist the Region of Waterloo in making a decision. Under the "Municipal Act", personal information such as name, address, telephone number, and property location that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be directed to Pam Law at the Region of Waterloo.

This Notice was first issued on October 16, 2019.





**Notice of Online Public Consultation Centre #1
Erb Street Water Supply Iron and Manganese Upgrades
Schedule C Municipal Class Environmental Assessment**



The Region of Waterloo (Region) is undertaking a Municipal Class Environmental Assessment (EA) Study to assess the need for upgrades to elements of the Region's water supply, located in the Township of Wilmot (see Study Area map). This includes an existing reservoir, located at 960 Erb Street West, and the existing well sites, located at 1226 B Erbs Road and 1211 Erbs Road. The Study will review existing conditions and provide recommendations related to iron and manganese treatment upgrades based on current industry standards and new technologies, which may include a new location for potential treatment upgrades.

This Study is being undertaken in accordance with the planning and design process for Schedule C projects, as outlined in the Municipal Class Environmental Assessment document (2000 as amended), which is an approved process under the Ontario Environmental Assessment Act.

How can I participate in this Study?

A Public Consultation Centre (PCC) is being held online through the Region's YouTube channel to enable you to review the background information on the study, alternative drinking water treatment technologies, and alternative treatment facility locations. More detailed project information is also available at the links below. We encourage all those who are interested to review the information and contact a member of the project team if you have any questions, comments, or would like to provide input on the study. The PCC materials will be available on the Region's YouTube channel and the Region's website starting Wednesday, July 1, 2020.

Where: <https://www.youtube.com/regionofwaterloo>
<https://www.regionofwaterloo.ca/CurrentWaterProjects/>

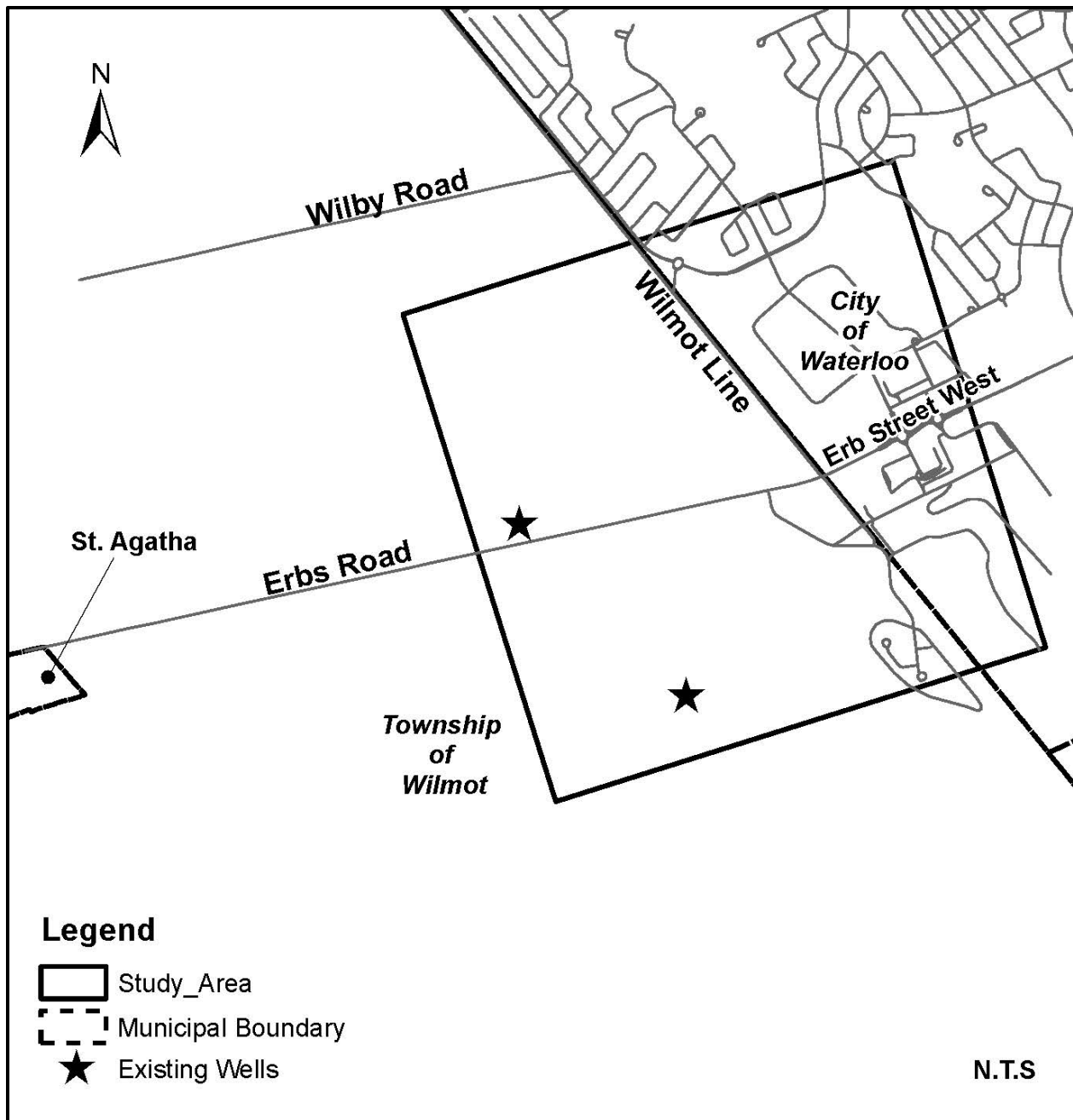
Please contact one of the following team members if you have any questions or comments or would like to be added to the project mailing list. You can also fill out the comment sheet on the Region's website and provide that to one of the following team members.

Please provide comments to a member of the project team by Friday, July 17, 2020.

Kevin Dolishny P.Eng.
Senior Project Engineer
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: 519-575-4757 x. 3862
Email: kdolishny@regionofwaterloo.ca

Neil Harvey, P.Eng., PMP
Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Telephone: 905-381-3234
Fax: 519-579-6733
Email: neil.harvey@stantec.com

This Notice was first issued on June 17, 2020.





**Notice of Virtual Public Consultation Centre #2
Erb Street Water Supply Iron and Manganese Upgrades
Schedule C Municipal Class Environmental Assessment**



The Region of Waterloo (Region) is undertaking a Municipal Class Environmental Assessment (EA) Study to assess the need for upgrades to elements of the Region's water supply, located in the Township of Wilmot. This includes an existing reservoir, located at 960 Erb Street West, and the existing well sites, located at 1226 B Erbs Road and 1211 Erbs Road. The Study has reviewed existing conditions, evaluated alternative solutions and options, and has identified preliminary recommendations for a new water treatment facility located on Erb Street, adjacent to the existing reservoir at 960 Erb Street West. Preliminary recommendations are being presented at Public Consultation Centre (PCC) #2 for stakeholder review and comment.

This Study is being undertaken in accordance with the planning and design process for Schedule C projects, as outlined in the Municipal Class Environmental Assessment document (2000 as amended), which is an approved process under the Ontario Environmental Assessment Act.

How can I participate in this Study?

A second Public Consultation Centre (PCC) is being held online through the Region's YouTube channel to present the preliminary recommendations, including the proposed location for the new water treatment facility. Additional information and background on the study can be found within the PCC #1 presentation available on the Region's website. We encourage all those who are interested to review the information and provide their feedback to the project team.

The PCC material will be available on the Region's YouTube channel and the Region's Website starting Friday December 11, 2020:

Where: <https://www.youtube.com/regionofwaterloo>
<https://www.regionofwaterloo.ca/CurrentWaterProjects/>

Please contact one of the following team members if you have any questions or comments or would like to be added to the project mailing list. You can also fill out the comment sheet on the Region's website and provide that to one of the following team members.

Please provide comments to a member of the project team by January 15, 2021.

Kevin Dolishny P.Eng.
Senior Engineer
Region of Waterloo
150 Frederick Street, 7th Floor
Kitchener, ON N2G 4J3
Telephone: 519-575-4757 x. 3862
Email: kdolishny@regionofwaterloo.ca

Neil Harvey, P.Eng., PMP
Senior Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Telephone: 905-381-3234
Email: neil.harvey@stantec.com

All comments and information received from individuals, stakeholder groups and agencies regarding this project are being collected under the authority of the "Municipal Act" to assist the Region of Waterloo in making a decision. Under the "Municipal Act", personal information such as name, address, telephone number, and property location that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be directed to Kevin Dolishny at the Region of Waterloo.

Erb Street Water Supply Iron and Manganese Upgrades

Municipal Class Environmental Assessment

Agency/Utility Comment TRACER

Contact Information	Comment	Response/Commitment to Carry Forward
Trevor Heywood Resource Planner Grand River Conservation Authority 400 Clyde Road, PO Box 729, Cambridge ON, N1R 5W6 519-621-2763 x2292 theywood@grandriver.ca	Received Notice of Commencement. Response Letter October 21, 2019 indicating that GRCA wishes to stay involved as the EA process moved forward – no further concerns.	GRCA to be kept updated with EA project process.
Barbara Slattery EA/Planning Coordinator Ministry of Environment 119 King Street West, 12 th Floor Hamilton ON, L8P 4Y7 (905) 521-7864 Barbara.slattery@ontario.ca	Received Notice of Commencement - Notes other wells in area (any potential impacts?) - Provided info on ESA/Species at Risk including government contacts - Delegation of procedural aspects of FN consultation	Updated FN TRACER with provided FN contacts MOE to be kept updated with EA project process.
Karla Barboza MCIP, RPP, CAHP (A) Team Lead, Heritage Ministry of Heritage, Sport, Tourism and Culture Industries Heritage, Tourism and Culture Division Programs and Services Branch Heritage Planning Unit T. 416.314.7120 Email: karla.barboza@ontario.ca	Remove Neil MacKay from contact list Include the following MHSTCI contacts for this file: - Katherine Kirzati, Heritage Planner Heritage Planning Unit (Heritage, Sport, Tourism and Culture Industries) 416-314-7643 katherine.kirzati@ontario.ca - Karla Barboza, (A) Team Lead - Heritage Heritage Planning Unit (Heritage, Sport, Tourism and Culture Industries) 416-314-7120 karla.barboza@ontario.ca	Removed and added contacts to the project stakeholder contact list, as requested.

Erb Street Water Supply Manganese Upgrades Municipal Class Environmental Assessment

Contact Information	Comment	Response/Commitment to Carry Forward
Hydro One Networks Inc <i>Secondary Land Use</i> <i>Asset Optimization</i> <i>Strategy & Integrated Planning</i> 483 Bay St Toronto, ON	In our preliminary assessment, we have confirmed that Hydro One has existing high voltage Transmission facilities within your study area. In addition to the existing infrastructure mentioned above, the affected transmission corridor may have provisions for future lines or already contain secondary land uses (i.e. pipelines, watermains, parking, etc). Please take this into consideration in your planning. Also, we would like to bring to your attention that should (Erb Street Water Supply Iron and Manganese Upgrades) result in a Hydro One station expansion or transmission line replacement and/or relocation, an environmental assessment (EA) will be required as described under the Class Environmental Assessment for Minor Transmission Facilities (Hydro One, 2016). This EA process would require a minimum of 6 months to be completed and associated costs will be allocated and recovered in accordance with the Transmission System Code. Furthermore, to complete an EA it can take from 6 months (to complete a Class EA Screening Process) to 18 months (to complete a Full Class EA Process) based on the level of assessment required for the EA. In order to achieve speedy completion of the EA, Hydro One will need to rely on studies and/or reports completed as part of the EA for your project. Please allow the appropriate lead-time in your project schedule in the event that your proposed development impacts Hydro One infrastructure to the extent that it would require modifications to our infrastructure.	secondarylanduse@hydroone.com added to contact list. Hydro-one to continue to be consulted during all stages of the Erb Street EA

Erb Street Water Supply Manganese Upgrades Municipal Class Environmental Assessment

Contact Information	Comment	Response/Commitment to Carry Forward
	In planning, please note that developments should not reduce line clearances or limit access to our facilities at any time in the study area of your Proposal. Any construction activities must maintain the electrical clearance from the transmission line conductors as specified in the Ontario Health and Safety Act for the respective line voltage. Please note that the proponent will be held responsible for all costs associated with modification or relocation of Hydro One facilities, as well as any added costs that may be incurred due to increase efforts to maintain our facilities. We reiterate that this message does not constitute any form of approval for your project. Hydro One must be consulted during all stages of your project. Please ensure that all future communications about your project are sent to us electronically to secondarylanduse@hydroone.com.	
Lisa Myslicki Environmental Specialist Infrastructure Ontario Lisa.Myslicki@infrastructureontario.ca	While our initial scan indicates that several properties owned by the Minister of Government and Consumer Services (identifiable as Hydro one corridor/ Bill 58 Lands) are within your study area, it is the proponent's responsibility to verify if provincial government property is within the study area. If provincial government property in the study area is not required for the project, please continue to consult us as a directly affected stakeholder. However, if government property is required for the project, the proponent should contact us so that we can advise about requirements for obtaining government property. <i>Please include our environmental specialist, Lisa Myslicki (Lisa.Myslicki@infrastructureontario.ca) when</i>	Lisa Myslicki added to contact list. IO to continue to be consulted as a directly affected stakeholder for the EA.

Erb Street Water Supply Manganese Upgrades Municipal Class Environmental Assessment

Contact Information	Comment	Response/Commitment to Carry Forward
	<i>responding to this email.</i>	
Neil MacKay Heritage Planner Culture Division – Heritage Planning Unit Ministry of Heritage, Sport, Tourism, and Culture Industries 401 Bay Street, 17th Floor Toronto, ON M7A 0A7 (416) 314-7182 neil.mackay@ontario.ca	Under the EA process, the proponent is required to determine a project's potential impact on cultural heritage resources. The recommendations below are for a Schedule C Municipal Class EA project, as described in the notice of study commencement. If any municipal bridges may be impacted by this project, we can provide additional screening documentation as formulated by the Municipal Engineers Association in consultation with MHSTCI. While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Indigenous communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Municipal Heritage Committees, historical societies and other local heritage organizations may also have knowledge that contributes to the identification of cultural heritage resources. Please note that the Standards and Guidelines for Conservation of Provincial Heritage Properties (S&G), prepared pursuant to Section 25.2 of the <i>Ontario Heritage Act</i> (OHA), came into effect on July 1, 2010. All Ontario government ministries and public bodies that are prescribed under Ontario Regulation 157/10 must	Cultural Heritage resources will be identified through a CHER as well as through consultation with local indigenous communities. MHSTCI Criteria for evaluating potential for built heritage recourse and cultural heritage landscapes will be completed as part of this project, Further, the potential for the EA to impact archaeological resources will be screened using the MHSTCI Criteria for Evaluating Archaeological Potential. An archaeological assessment will be prepared by an archaeologist licensed under the OHA should the EA project area exhibit archaeological potential. MHSTCI will continue to be consulted throughout the EA process.

Erb Street Water Supply Manganese Upgrades Municipal Class Environmental Assessment

Contact Information	Comment	Response/Commitment to Carry Forward
	comply with the S&Gs. They apply to property that is owned or controlled by the Crown in right of Ontario or by a prescribed public body. This EA project may impact archaeological resources and should be screened using the MHSTCI Criteria for Evaluating Archaeological Potential to determine if an archaeological assessment is needed. The MHSTCI Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes should be completed to help determine whether this EA project may impact cultural heritage resources. A Cultural Heritage Evaluation Report (CHER) is used to determine the cultural heritage value or interest of a potential Provincial Heritage Property. If potential or known heritage resources exist, MHSTCI recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, should be completed to assess potential project impacts.	
Ken Cornelisse Partnership Specialist Ministry of Natural Resources and Forestry - Guelph District 1 Stone Road West Guelph, ON N1G 4Y2 office phone: (519) 826-6849 fax: (519) 826-4929 Email: ken.cornelisse@ontario.ca	Received Notice of Commencement Request to be added to project distribution list.	Added to project contact list for future project distributions.

Erb Street Water Supply Iron and Manganese Upgrades Municipal Class Environmental Assessment Public Comment TRACER

Contact Information	Comment	Response/Commitment to Carry Forward
	I have been involved in discussions relative to the Sanico Landfill, the leachate testing of 1,4 Dioxane in the area, the lack of response from the MECP and the Cdn Gov't on standards, as well as testing to determine the source of this chemical. The Erb St well field, wells 6A/B and 7/8, seems to have the Sanico Landfill upgradient of their water flow. Will your assessment be looking into anything other than iron and manganese and if not I ask why not? The Region was tasked with this question in 2015 and to date there does not appear to be much interest. International interest in setting standards for 1,4 Dioxane range from 3 ug/l to 50ug/l and I've seen reports in the area as high as 153. This rings a bell for me and I'd appreciate your feedback.	Added to Project Mailing List. Response as follows: Thanks for your interest and for taking the time to respond to the Erb St Water Treatment Upgrades EA. The Region of Waterloo continues to protect drinking water quality at the Erb Street wellfield and the drinking water from the Erb Street wells is safe and meets all Ontario drinking water standards for health. Groundwater protection activities include ongoing assessment and monitoring of groundwater near the closed Sanico Landfill. The closed Sanico Landfill is located north of the Erb Street wellfield, approximately 1 km from the closest municipal wells. The Sanico landfill was a privately run landfill located on private property; it operated between 1964 and 1969. The Region of Waterloo (Water Services division) is monitoring the Erb Street wells, to make sure there continues to be no unacceptable impact to the drinking water from this closed landfill. This includes testing the groundwater for 1,4-dioxane, which is a chemical of concern at the former Sanico landfill. The drinking water at the Erb Street wells is safe and meets all Ontario drinking water standards for health. Of the three Erb Street supply wells, one of the wells has groundwater containing trace levels of 1,4-dioxane (approximately 1 part per billion). The other two supply wells have non-detectable results for 1,4-dioxane. The trace levels detected in the one supply well are far below the proposed Health Canada 1,4-dioxane drinking water guideline of 50 part per billion. For long-term protection of the wellfield, Region staff are working with the Ontario Ministry of the Environment, Conservation and Parks, to ensure that the responsible parties continue with their studies of

Clarke Road Municipal Class Environmental Assessment

Contact Information	Comment	Response/Commitment to Carry Forward
		the Sanico landfill and, if needed, that they put in place measures to protect local groundwater.
	Request to be included on distribution list for future studies to do with water in Waterloo Region.	Added to project contact list and directed to Current Project Page on Region's website.

Erb Street Water Supply Iron and Manganese Upgrades
Municipal Class Environmental Assessment

Contact Information	Date/Method of Communication	Comment/Concern	Response/Commitment to Carry Forward
Six Nations of the Grand River Territory Director, Lonny Bomberry (Six Nations of the Grand River Territory Six Nations Wildlife Management Office) 2498 Chiefswood Road, PO Box 5000 Ohsweken, ON, N0A 1M0 Chief Mark Hill #: 519-732-2905 markhill@sixnations.ca Arlen M. arleenma@sixnations.ca Lonny Bomberry Lands and Resources Director lbomberry@sixnations.ca	Notice of Commencement was sent via Canada Post on October 15 th , 2019	n/a	n/a
	Notice of PCC#1 was sent via email on June 17, 2020.	n/a	n/a
	Notice of PCC #2 was sent via email on March 8, 2021.	n/a	n/a
	Notice of Completion – 2 phone calls, left voicemail indicating they will receive the notice in coming weeks. Phone call attempts/voicemail May 10, 2021.		
Six Nations Haudenosaunee Confederacy Chiefs Council 2634 6th Line Road, R.R. #2 905-765-1749 Ohsweken, ON N0A 1M0 Secretary, Hohahes Leroy Hill jocko@sixnations.ca Old address: 16 Sunrise Court, P.O. Box 714, Suite 600 Ohsweken, ON, N0A1M0	Notice of Commencement was sent via Canada Post on October 15 th , 2019	n/a	n/a
	Notice of PCC#1 was sent via email on June 17, 2020.	n/a	n/a
	Notice of PCC #2 was sent via email on March 8, 2021.	n/a	n/a
	Notice of Completion – 2 phone calls, voicemail inbox full and could not leave a message. May 10, 2021.		
Mississaugas of the Credit First Nation 2789 Mississauga Road, RR # 6 Hagersville, ON, N0A 1H0 905-768-4260 Chief R. Stacey LaForme Stacey.Laforme@newcreditfirstnation.com Department of Consultation and Accommodation Fawn Sault, Consultation Manager Fawn.Sault@newcreditfirstnation.com	Notice of Commencement was sent via Canada Post on October 15 th , 2019	n/a	n/a
	Notice of PCC#1 was sent via email on June 17, 2020.	n/a	n/a
	Notice of PCC #2 was sent via email on March 8, 2021.	n/a	n/a
	Notice of Completion – 2 phone calls, left voicemail indicating they will receive the notice in		

Erb Street Water Supply Iron and Manganese Upgrades
Municipal Class Environmental Assessment

Contact Information	Date/Method of Communication	Comment/Concern	Response/Commitment to Carry Forward
	coming weeks. Phone call attempts/voicemail May 10, 2021.		

From: Pam Law
To: ["Cornelisse, Ken \(MNRF\)"](#)
Cc: [Bergman, Stephanie](#); [Harvey, Neil](#)
Subject: RE: Notice of Study Commencement - Erb St Water Supply Iron and Mg Upgrades EA
Date: Thursday, October 17, 2019 11:32:19 AM

Hi Ken,

Thanks for the email, we will make sure you are removed from any future mailings.

Pam

From: Cornelisse, Ken (MNRF) <ken.cornelisse@ontario.ca>
Sent: October 17, 2019 10:46 AM
To: Pam Law <PLaw@regionofwaterloo.ca>
Subject: Notice of Study Commencement - Erb St Water Supply Iron and Mg Upgrades EA

Hello Pam,

Could you please remove my name from the distribution list for the Notice of Study Commencement - Erb St Water Supply Iron and Mg Upgrades EA Sched. C?

Thank you.

Ken

Ken Cornelisse
Partnership Specialist
Ministry of Natural Resources and Forestry - Guelph District
1 Stone Road West
Guelph, ON
N1G 4Y2
office phone: (519) 826-6849
fax: (519) 826-4929
Email: ken.cornelisse@ontario.ca



BY EMAIL ONLY

October 21, 2019

Pam Law
Senior Project Engineer, Water Services
Region of Waterloo
150 Frederick Street
Kitchener ON N2G 4J3
plaw@regionofwaterloo.ca

Dear Ms. Law,

The Grand River Conservation Authority (GRCA) has received the Notice of Commencement for the Erb Street Water Supply Treatment Upgrades Class Environmental Assessment (Class EA).

The study area contains Alder Creek and its tributaries and floodplains, as well as wetlands associated with Alder, Clair and Monastery Creeks. As the Class EA may propose measures that have the potential to impact these regulated features, the GRCA wishes to stay involved as the EA process moves forward.

Please include the GRCA on the project mailing list. If you have any further questions, please contact Trevor Heywood directly at 519-621-2763 extension 2292 or at theywood@grandriver.ca.

Sincerely,

A handwritten signature in black ink, appearing to read "John Brum", is written over a horizontal line.

John Brum
Resource Planner
Grand River Conservation Authority
*JB\th

c.c. Stephanie Bergman, Planner, Stantec

From: [Pam Law](#)
To: [Bergman, Stephanie](#)
Cc: [Romano, Jess](#); [Harvey, Neil](#)
Subject: FW: Erb Street Wells EA
Date: Friday, November 1, 2019 10:30:42 AM
Attachments: 

Hi Stephanie,

Please see attached response from the MECP. Please review and ensure that we are meeting all of the consultation requirements outlined.

Thanks

Pam

From: Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>
Sent: October 24, 2019 8:10 AM
To: PLaw@regionofwaterloo.ca
Subject: Erb Street Wells EA

With best regards,

Barb Slattery, EA/Planning Coordinator
Ministry of the Environment, Conservation and Parks
West Central Region
(905) 521-7864

Ministry of the Environment,
Conservation and Parks
Drinking Water and Environmental
Compliance Division
West Central Region

119 King Street West, 12th Floor
Hamilton, Ontario L8P 4Y7
Tel.: 905 521-7640
Fax: 905 521-7820

Ministère de l'Environnement de la
Protection de la nature et des Parcs
Division de la conformité en matière
d'eau potable et d'environnement
Direction régionale du Centre-Ouest

119 rue King Ouest, 12^e étage
Hamilton (Ontario) L8P 4Y7
Tél.: 905 521-7640
Télééc.: 905 521-7820



October 23, 2019

Ms. Pam Law
Region of Waterloo

Ms. Stephanie Bergman
Stantec Consulting Ltd.

**Re: Response to Notice of Study Commencement
Erb Street Water Supply Iron and Manganese Upgrades
Region of Waterloo**

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Region of Waterloo has indicated that it has commenced a Schedule "C" study in accordance with the MEA Class EA to assess the needs for upgrades for the water supply facilities at Erb Street, in Wilmot Township. Existing conditions will be reviewed to provide recommendations to address iron and manganese treatment upgrades.

A map has been prepared and attached to these comments to show the complexity of the study area. In addition to the well sites, a number of other wells are within the area. It is expected that the assessment of all alternatives will address these wells and how actions taken by the Region might affect them.

With respect to Species at Risk, MECP has responsibility for the administration of the Ontario Endangered Species Act (ESA). If you believe that you may need an ESA permit or authorization in order for the implementation for this project, please visit <https://www.ontario.ca/page/species-risk> to learn more about protecting and recovering species at risk, then navigate to the Resources and Permits section, including Register or Get a Permit for more information about permits and authorizations under the ESA. You only need an authorization under the ESA (e.g. a permit or other type of authorization if your work is going to contravene the ESA (e.g. if the activity you are proposing is going to kill, harm or harass a species at risk or damage or destroy their habitat. If you are able to undertake your work in a manner that does not contravene the ESA, this is known as "avoidance" of impacts and it is the ideal scenario and will not require undertaking the process of obtaining an authorization.

We have developed a guide to help clients work through the preliminary screening process including providing advice to clients on how they can gather information from publicly available sources. If you are seeking information regarding species at risk likely to occur at, or near your area of study for this EA, please send an email to sarontario@ontario.ca and include "Request for preliminary screening guide" in the email subject line. To provide the most efficient service,

it is recommended clients read this guide and explore application information sources prior to contacting the ministry to begin discussions with the Permissions and Compliance team.

If during the course of your site visit(s) you encounter any known species at risk, please visit <https://www.ontario.ca/page/report-rare-species-animals-and-plants> for information on how to report a species at risk sighting.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal Peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

Your proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to your proposed project, **the MECP is delegating the procedural aspects of rights-based consultation to you through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information you have provided to date and the Crown's preliminary assessment you are required to consult with the following communities who have been identified as potentially affected by your proposed project:

COMMUNITY	CONTACT
Six Nations of the Grand River Territory 1695 Chiefswood Road P.O. Box 5000 Ohsweken, ON N0A 1M0	Chief Ava Hill Tel: (519)445-2201 or avahill@sixnations.ca Email: arleenma@sixnations.ca and Lonny Bomberry, Lands and Resources Director at lonnybomberry@sixnations.ca
Haudenosaunee Confederacy Chiefs Council 2634 6 th Line Road R.R. #2 Ohsweken, ON N0A 1M0	Hohahes Leroy Hill, Secretary jocko@sixnations.ca
Mississaugas of the Credit First Nation 2789 Mississauga Road RR #6 Hagersville, ON N0A 1H0	Fawn Sault Consultation Manager Email: Fawn.Sault@newcreditfirstnation.com

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process" which can be found at the following link:

<https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process>

Additional information related to Ontario's Environmental Assessment Act is available online at:
www.ontario.ca/environmentalassessments

You must contact the Director of Environmental Assessment and Permissions Branch under the following circumstances subsequent to initial discussions with the communities identified by MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right
- Consultation has reached an impasse
- A Part II Order request or elevation request is expected

The Director of the Environmental Assessment and Permissions Branch can be notified either by email with the subject line "Potential Duty to Consult" by mail, email or fax at the addresses provided below:

Email:	enviropemissions@ontario.ca Subject: Potential Duty to Consult
Fax:	416-314-8452
Address:	Environmental Approvals and Permissions Branch 135 St. Clair Avenue West, 1 st Floor Toronto, ON, M4V 1P5

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play in them.

As of July 1st 2018, a standardized form is to be used by anyone who believes that the environmental assessment process was incomplete, incorrect in that it failed to follow the required process. The required form can be found on the Forms Repository website (<http://www.forms.ssb.gov.on.ca/>) by searching "Part II Order" or "012-2206E (the form ID number). Once completed, the form is then to be sent to both the Minister and Director of the Environmental Assessment and Permissions Branch. Their addresses are:

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

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

As of May 1, 2018, proponents are requested to send all Notices of Commencement and Completion and completed project information form to the region where the project is located. If your project is located in more than one ministry region, you need to submit your notices to all

appropriate regions. This is in addition to the existing notification requirements in each class environmental assessments and streamlined environmental assessment process.

To submit your Notice you need to:

1. download and complete the [project information form](#)
2. the subject line of your email must include the project location, type of streamlined environmental assessment and project name
3. attach a copy of your project notice in PDF format and your completed project information form in Excel format to the email
4. send your email to the appropriate ministry regional office:
 - o Central Region – eanotification.cregion@ontario.ca
 - o Eastern Region – eanotification.eregion@ontario.ca
 - o Northern Region – eanotification.nregion@ontario.ca
 - o South West Region – eanotification.swregion@ontario.ca
 - o West Central Region – eanotification.wcregion@ontario.ca

It is now ministry procedure to review all Schedule C Environmental Study Reports (ESR). Accordingly, please send a draft copy of the ESR to me allowing for a minimum of 30 days for our technical review. Please provide a copy of the final ESR (hard copy preferred, but e-copy is also acceptable) and should you have any questions or require clarification, please contact me either at (905) 521-7864 or at Barbara.slattery@ontario.ca

With best regards,

A handwritten signature in cursive script that reads "Barbara Slattery". The signature is written in dark ink on a light-colored background.

EA/Planning Coordinator

Encl.

From: [Mackay, Neil \(MHSTCI\)](#)
To: [Bergman, Stephanie](#)
Cc: PLaw@regionofwaterloo.ca
Subject: MHSTCI File #0011617 - Erb Street Water Supply Iron and Manganese Upgrades
Date: Friday, December 13, 2019 4:24:22 PM
Attachments: [0011617_ErbStreetWaterSupplyUpgrades.pdf](#)

Hi Stephanie,

Please find the attached MHSTCI acknowledgement letter for the above-noted project.

Thanks,

Neil MacKay | Heritage Planner
Culture Division – Heritage Planning Unit

Ministry of Heritage, Sport, Tourism, and Culture Industries
401 Bay Street, 17th Floor
Toronto, ON M7A 0A7
(416) 314-7182
neil.mackay@ontario.ca

13 December 2019

EMAIL ONLY

Stephanie Bergman
Planner
Stantec Consulting Ltd.
300 Hagey Boulevard, Suite 100
Waterloo, ON N2L 0A4
Stephanie.Bergman@stantec.com

MHSTCI File : 0011617
Proponent : The Region of Waterloo
Subject : Notice of Study Commencement
Project : Erb Street Water Supply Iron and Manganese Upgrades
Location : 990 Erb Street West, 1226 B Erbs Road and 1211 Erbs Road, Township of Wilmot, Region of Waterloo.

Dear Stephanie Bergman:

Thank you for providing the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) with the Notice of Study Commencement for the above-referenced project. MHSTCI's interest in this Environmental Assessment (EA) project relates to its mandate of conserving Ontario's cultural heritage, which includes:

- Archaeological resources, including land and marine;
- Built heritage resources, including bridges and monuments; and,
- Cultural heritage landscapes.

Under the EA process, the proponent is required to determine a project's potential impact on cultural heritage resources. The recommendations below are for a Schedule C Municipal Class EA project, as described in the notice of study commencement. If any municipal bridges may be impacted by this project, we can provide additional screening documentation as formulated by the Municipal Engineers Association in consultation with MHSTCI.

Project Summary

The Region of Waterloo (Region) has initiated a Municipal Class EA Study to assess the need for upgrades to elements of the Region's water supply in the Township of Wilmot. The study will review existing conditions of an existing reservoir site and two existing well sites and provide recommendations related to iron and manganese treatment upgrades based on current industry standards and new technologies, which may include a new location for potential treatment upgrades.

Identifying Cultural Heritage Resources

While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Indigenous communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Municipal Heritage Committees, historical societies and other local heritage organizations may also have knowledge that contributes to the identification of cultural heritage resources.

Please note that the [Standards and Guidelines for Conservation of Provincial Heritage Properties](#) (S&G), prepared pursuant to Section 25.2 of the *Ontario Heritage Act* (OHA), came into effect on July 1, 2010. All Ontario government ministries and public bodies that are prescribed under Ontario Regulation 157/10 must comply with the S&Gs. They apply to property that is owned or controlled by the Crown in right of Ontario or by a prescribed public body.

Archaeological Resources

This EA project may impact archaeological resources and should be screened using the MHSTCI [Criteria for Evaluating Archaeological Potential](#) to determine if an archaeological assessment is needed. MHSTCI archaeological sites data are available at archaeology@ontario.ca. If the EA project area exhibits archaeological potential, then an archaeological assessment (AA) should be undertaken by an archaeologist licenced under the *OHA*, who is responsible for submitting the report directly to MHSTCI for review.

Built Heritage and Cultural Heritage Landscapes

The MHSTCI [Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes](#) should be completed to help determine whether this EA project may impact cultural heritage resources. The Clerk for the Region can provide information on property registered or designated under the *Ontario Heritage Act*. Municipal Heritage Planners can also provide information that will assist in completing the checklist.

A Cultural Heritage Evaluation Report (CHER) is used to determine the cultural heritage value or interest of a potential Provincial Heritage Property. If potential or known heritage resources exist, MHSTCI recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, should be completed to assess potential project impacts. Our Ministry's [Info Sheet #5: Heritage Impact Assessments and Conservation Plans](#) outlines the scope of HIAs. Please send the HIA to MHSTCI and the local municipality for review and make it available to local organizations or individuals who have expressed interest in review.

Environmental Assessment Reporting

All technical cultural heritage studies and their recommendations are to be addressed and incorporated into EA projects. Please advise MHSTCI whether any technical cultural heritage studies will be completed for this EA project, and provide them to MHSTCI before issuing a Notice of Completion or commencing any work on the site. If screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file.

Thank you for consulting MHSTCI on this project and please continue to do so throughout the EA process. If you have any questions or require clarification, do not hesitate to contact me.

Sincerely,

Neil MacKay
Heritage Planner
Heritage Planning Unit
neil.mackay@ontario.ca

Copied to: Pam Law, Water Services, Region of Waterloo

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. MHSTCI makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MHSTCI be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Please notify MHSTCI if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the *Standards and Guidelines for Consultant Archaeologists*.

If human remains are encountered, all activities must cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services (416-326-8800) must be contacted. In situations where human remains are associated with archaeological resources, MHSTCI should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

From: [Jordan, Abraham \(IO\)](#)
To: Plaw@regionofwaterloo.ca; [Bergman, Stephanie](#)
Subject: IO EA Notice response: Erb Street Water Supply Iron and Manganese Upgrades
Date: Friday, December 20, 2019 2:40:31 PM

Good afternoon,

Thank you for sending us the Notice of Commencement for the Erb Street Water Supply Iron and Manganese Upgrades in the Township of Wilmot.

While our initial scan indicates that several properties owned by the Minister of Government and Consumer Services (identifiable as Hydro one corridor/ Bill 58 Lands) are within your study area, it is the proponent's responsibility to verify if provincial government property is within the study area. Title documents may identify owners of provincial government property as any of the following:

- His Majesty the King
- Her Majesty the Queen
- Hydro One
- Hydro One Networks Inc.
- Management Board Secretariat (MBS)
- Minister of Economic Development, Employment and Infrastructure (MEDEI)
- Minister of Energy and Infrastructure (MEI)
- Minister of Government and Consumer Services (MGCS)
- Minister of Infrastructure (MOI)
- Minister of Natural Resources and Forestry (MNR)
- Minister of Public Infrastructure Renewal (PIR)
- Minister of Public Works
- Minister of Transportation (MTO)
- Ontario Lands Corporation (OLC)
- Ontario Realty Corporation (ORC)

If provincial government property in the study area is not required for the project, please continue to consult us as a directly affected stakeholder. However, if government property is required for the project, the proponent should contact us so that we can advise about requirements for obtaining government property.

Please include our environmental specialist, Lisa Myslicki (Lisa.Myslicki@infrastructureontario.ca) when responding to this email.

Yours sincerely,

Abraham Jordan
Environmental Management Co-op
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON M5G 2L5
E-mail: Abraham.Jordan@infrastructureontario.ca
Skype: 647-264-4786

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recipient(s) named above. If you are not the intended recipient of the email, you are hereby notified that any dissemination or copying of this email and/or any attachment files is strictly prohibited. If you have received this e-mail in error, please immediately notify the sender and arrange for the return of any and all copies and the permanent deletion of this message including any attachments, without reading it or making a copy. Thank you.



Hydro One Networks Inc
483 Bay St
Toronto, ON

January 02, 2020

Re: Erb Street Water Supply Iron and Manganese Upgrades

Attention:
Stephanie Bergman, MA, ENV SP
Planner
Stantec Consulting Ltd.

In our preliminary assessment, we have confirmed that Hydro One has existing high voltage Transmission facilities within your study area. At this point in time we do not have enough information about your project to provide you with meaningful input with respect to the impacts that your project may have on our infrastructure. As such, this response does not constitute any sort of approval for your plans and is being sent to you as a courtesy to inform you that we must be consulted on your project.

In addition to the existing infrastructure mentioned above, the affected transmission corridor may have provisions for future lines or already contain secondary land uses (i.e. pipelines, watermains, parking, etc). Please take this into consideration in your planning.

Also, we would like to bring to your attention that should (Erb Street Water Supply Iron and Manganese Upgrades) result in a Hydro One station expansion or transmission line replacement and/or relocation, an environmental assessment (EA) will be required as described under the Class Environmental Assessment for Minor Transmission Facilities (Hydro One, 2016). This EA process would require a minimum of 6 months to be completed and associated costs will be allocated and recovered in accordance with the Transmission System Code. Furthermore, to complete an EA it can take from 6 months (to complete a Class EA Screening Process) to 18 months (to complete a Full Class EA Process) based on the level of assessment required for the EA. In order to achieve speedy completion of the EA, Hydro One will need to rely on studies and/or reports completed as part of the EA for your project.

Please allow the appropriate lead-time in your project schedule in the event that your proposed development impacts Hydro One infrastructure to the extent that it would require modifications to our infrastructure.

In planning, please note that developments should not reduce line clearances or limit access to our facilities at any time in the study area of your Proposal. Any construction activities must maintain the electrical clearance from the transmission line conductors as specified in the Ontario Health and Safety Act for the respective line voltage.

Please note that the proponent will be held responsible for all costs associated with modification or relocation of Hydro One facilities, as well as any added costs that may be incurred due to increase efforts to maintain our facilities.

We reiterate that this message does not constitute any form of approval for your project. Hydro One must be consulted during all stages of your project. Please ensure that all future communications about your project are sent to us electronically to secondarylanduse@hydroone.com.

Sent on behalf of,

***Secondary Land Use
Asset Optimization
Strategy & Integrated Planning
Hydro One Networks Inc.***

From: [Barboza, Karla \(MHSTCI\)](#)
To: [Bergman, Stephanie](#)
Cc: [Kevin Dolishny](#); [Harvey, Neil](#); [Romano, Jess](#); [Kirzati, Katherine \(MHSTCI\)](#)
Subject: FW: Region of Waterloo Erb Street Wells Iron and Manganese Upgrades Municipal Class EA - Notice of Virtual PCC
Date: Monday, June 22, 2020 4:12:48 PM
Attachments: [REDACTED]

Hi Stephanie,

Thanks for sending the Notice of Virtual Public Consultation Centre for the above project to the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI). I attached our preliminary comments on this file for your information.

There has been some changes in our ministry. Could you please remove Neil MacKay and include the following MHSTCI contacts for this file:

- Katherine Kirzati, Heritage Planner | Heritage Planning Unit (Heritage, Sport, Tourism and Culture Industries) | 416-314-7643 | katherine.kirzati@ontario.ca
- Karla Barboza, (A) Team Lead - Heritage | Heritage Planning Unit (Heritage, Sport, Tourism and Culture Industries) | 416-314-7120 | karla.barboza@ontario.ca

Please do not hesitate to contact us, should you have any questions.

Thanks in advance,
Karla

Karla Barboza MCIP, RPP, CAHP | (A) Team Lead, Heritage
Ministry of Heritage, Sport, Tourism and Culture Industries
Heritage, Tourism and Culture Division | Programs and Services Branch | Heritage Planning Unit
T. 416.314.7120 | Email: karla.barboza@ontario.ca

From: Bergman, Stephanie <Stephanie.Bergman@stantec.com>
Sent: Friday, June 19, 2020 12:05 PM
To: Kevin Dolishny <KDolishny@regionofwaterloo.ca>; Harvey, Neil <Neil.Harvey@stantec.com>
Cc: Romano, Jess <Jess.Romano@stantec.com>
Subject: Region of Waterloo Erb Street Wells Iron and Manganese Upgrades Municipal Class EA - Notice of Virtual PCC

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi there,

Please find attached the Notice of Virtual Public Consultation Centre (PCC) for the Erb Street Wells Iron and Manganese Treatment Upgrades Municipal Class EA being undertaken by the Region of Waterloo.

The Virtual PCC information will be available on the [Region's YouTube Channel](#) starting July 1st. Additional information is also available on the Region's website: <https://www.regionofwaterloo.ca/CurrentWaterProjects/>.

Please feel free to contact us if you have any questions,

Stephanie L. Bergman MA
Planner, Community Development

Direct: 519-675-6614

Mobile: 519-852-8945

stephanie.bergman@stantec.com

Stantec

600-171 Queens Avenue

London ON N6A 5J7



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Better Together, Even If We're Apart. [Read more](#) about Stantec's COVID-19 response, including remote working and business continuity measures.

From: [REDACTED]
To: [REDACTED]
Cc: [Bergman, Stephanie](#); [Harvey, Neil](#); [Romano, Jess](#)
Subject: RE: Erb St Environ Assment
Date: Tuesday, July 21, 2020 6:29:29 PM

Good Day [REDACTED],

Thanks for your interest and for taking the time to respond to the Erb St Water Treatment Upgrades EA.

The Region of Waterloo continues to protect drinking water quality at the Erb Street wellfield and the drinking water from the Erb Street wells is safe and meets all Ontario drinking water standards for health. Groundwater protection activities include ongoing assessment and monitoring of groundwater near the closed Sanico Landfill.

The closed Sanico Landfill is located north of the Erb Street wellfield, approximately 1 km from the closest municipal wells.

The Sanico landfill was a privately run landfill located on private property; it operated between 1964 and 1969.

The Region of Waterloo (Water Services division) is monitoring the Erb Street wells, to make sure there continues to be no unacceptable impact to the drinking water from this closed landfill. This includes testing the groundwater for 1,4-dioxane, which is a chemical of concern at the former Sanico landfill. The drinking water at the Erb Street wells is safe and meets all Ontario drinking water standards for health. Of the three Erb Street supply wells, one of the wells has groundwater containing trace levels of 1,4-dioxane (approximately 1 part per billion). The other two supply wells have non-detectable results for 1,4-dioxane. The trace levels detected in the one supply well are far below the proposed Health Canada 1,4-dioxane drinking water guideline of 50 part per billion.

For long-term protection of the wellfield, Region staff are working with the Ontario Ministry of the Environment, Conservation and Parks, to ensure that the responsible parties continue with their studies of the Sanico landfill and, if needed, that they put in place measures to protect local groundwater.

We will add you to the project mailing list and will include your email in the project file.

Kevin Dolishny, P. Eng. | Senior Engineer
Water Services | Region of Waterloo
o.519.575.4757x3862 | c.226.751.4551
kdolishny@regionofwaterloo.ca

From: [REDACTED]
Sent: July-01-20 1:00 PM
To: Kevin Dolishny <KDolishny@regionofwaterloo.ca>
Subject: Erb St Environ Assment

Kevin, I have been involved in discussions relative to the Sanico Landfill, the leachate testing of 1,4 Dioxane in the area, the lack of response from the MECP and the Cdn Gov't on standards, as well as testing to determine the source of this chemical.

The Erb St well field, wells 6A/B and 7/8, seems to have the Sanico Landfill upgradient of their water flow.

Will your assessment be looking into anything other than iron and manganese and if not I ask why not?

The Region was tasked with this question in 2015 and to date there does not appear to be much interest.

International interest in setting standards for 1,4 Dioxane range from 3 ug/l to 50ug/l and I've seen reports in the area as high as 153.

This rings a bell for me and I'd appreciate your feedback.

Please add me to the project mailing list as well.

Thanks!

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

From: Pam Law <PLaw@regionofwaterloo.ca>

Sent: Friday, October 18, 2019 4:12:01 PM

To: [REDACTED]

Cc: Bergman, Stephanie <Stephanie.Bergman@stantec.com>; Harvey, Neil
<Neil.Harvey@stantec.com>

Subject: RE: Study contact list

Hi [REDACTED]

I will add you the mailing list for the project that I am managing for the Region, which is the Erb Street Water Supply Iron and Manganese Upgrades.

If you are interested in learning more about water projects at the Region, all currently active water and wastewater projects are listed on our website:

<https://www.regionofwaterloo.ca/en/living-here/current-projects.aspx#water>

Regards

Pam Law, P. Eng.

Senior Project Engineer

Region of Waterloo

Water Services

PLaw@regionofwaterloo.ca

519-575-4095



From: [REDACTED]

Sent: October 16, 2019 10:24 PM

To: Pam Law <PLaw@regionofwaterloo.ca>

Subject: Study contact list

Please included me on your list for studies to do with water in the Waterloo region. Thank you

[REDACTED]

Appendix F: Project Contact List

Erb Street Water Supply Iron and Manganese Upgrades Schedule C Municipal Class Environmental Assessment

Interest	Agency	Title	First Name	Last Name	Department	Title	Address	City	Pr	Postal	Phone	Email
Federal Department Contacts												
Federal	Department of Fisheries and Oceans Canada		Cynthia	Milton-Wilkie		Senior Biologist, Ontario - Great Lakes Area	867 Lakeshore Road	Burlington	ON	L7R 4A6		cynthia.milton-wilkie@dfo-mpo.gc.ca
Provincial	Ministry of the Environment Conservation and Parks		Barbara	Slattery	West Central Region	EA/Planning Coordinator	119 King Street West, 12th floor	Hamilton	ON	L8P 4Y7	905-521-7864	barbara.slattery@ontario.ca
Provincial	Ministry of the Environment Conservation and Parks		Amy	Shaw	Guelph District Office	District Manager	1 Stone Road West, 4th floor	Guelph	ON	N1G 4Y2	519-826-4258	amy.shaw@ontario.ca
Provincial	Ministry of the Environment Conservation and Parks		Michael	Spencer	West Central Region	Surface Water Group Leader	119 King Street West, 12th floor	Hamilton	ON	L8P 4Y7	905-521-7864	michael.spencer@ontario.ca
Provincial	Ministry of the Environment Conservation and Parks											eanotification.wcregion@ontario.ca
Provincial	Ministry of Agriculture, Food and Rural Affairs		Carol	Neumann	Rural Planner	Rural Planner	6484 Wellington Road 7, Elora Resource Centre, Unit 10	Elora	ON	N0B 1S0	519-846-3393	carol.neumann@ontario.ca
Provincial	Ministry of Municipal Affairs & Housing		Erick	Boyd	Municipal Services Office - Western Region, Community Planning and Development	Manager	659 Exeter Road, 2nd floor	London	ON	N6E 1L3	519-873-4025	erick.boyd@ontario.ca
Provincial	Ministry of Natural Resources and Forestry		David	Marriot	Guelph District Office	District Planner	1 Stone Road West	Guelph	ON	N1G 4Y2	519-826-4926	david.marriott@ontario.ca
Provincial	Ministry of Natural Resources and Forestry		Ken	Cornelisse		Partnership Specialist	1 Stone Road West	Guelph	ON	N4G 4Y2	519-826-4926	ken.cornelisse@ontario.ca
Provincial	Ministry of Natural Resources and Forestry		Karina	Cerniavskaja			1 Stone Road West	Guelph	ON	N1G 4Y2		Karina.Cerniavskaja@ontario.ca
Provincial	Ministry of Heritage, Sport, Tourism, and Culture Industries		Katherine	Kirzati	Heritage Planning Unit	Heritage Planner						katherine.kirzati@ontario.ca
Provincial	Ministry of Heritage, Sport, Tourism, and Culture Industries		Karla	Barboza	Heritage Planning Unit	Team Lead						karla.barboza@ontario.ca
Provincial	Infrastructure Ontario		Alan	Sawyer	Realty Portfolio Planning	Manager Environmental Projects	1 Dundas St. W, Suite 2000	Toronto	ON	M5G 1Z3		alan.sawyer@infrastructureontario.ca
Provincial	Infrastructure Ontario		Tate	Kelly	Planning Coordinaor	Planning Coordinaor	1 Dundas St. W, Suite 2000	Toronto	ON	M5G 1Z3		tate.kelly@infrastructureontario.ca
Provincial	Infrastructure Ontario		Fid	Leonard	Asset Management South Region	Director	1 Dundas St. W, Suite 2000	Toronto	ON	M5G 1Z3	519-837-6372	fid.leonard@infrastructureontario.ca
Provincial	Infrastructure Ontario		Lisa	Myslicki	Environmental Specialist		1 Dundas St. W, Suite 2000	Toronto	ON	M5G 1Z3		Lisa.Myslicki@infrastructureontario.ca
Provincial	Ministry of Health and Long-Term Care		Tony	Amalfa	Environmental Health Policy & Programs Unit	Manager	393 University Avenue, Suite 2100	Toronto	ON	M7A 2S1	416-327-7624	tony.amalfa@ontario.ca
Provincial	Grand River Conservation Authority		Trevor	Heywood	Waterloo, Wilmot, Woolwich Planner	Conservation Planner	400 Clyde Road, PO Box 729	Cambridge	ON	N1R 5W6	T. 519-621-2763 ext. 2292	thaywood@grandriver.ca
Regional Departments												
Regional	Region of Waterloo		John	Cicuttin	Transit Development	Manager	250 Strasburg Road	Kitchener	ON	N2E 3M6	519-575-4023	cjohn@region.waterloo.on.ca
Regional	Region of Waterloo		Mike	Henderson	Transportation Program Development	Manager	150 Frederick St., 7th Floor	Kitchener	ON	N2G 4J3		MHenderson@regionofwaterloo.ca
Municipal Departments												
Municipal	City of Kitchener		Denise	McGoldrick	Infrastructure Services	General Manager	200 King St. W	Kitchener	ON	N2G 4G7		denise.mcgoldrick@kitchener.ca
Municipal	City of Waterloo		Cameron	Rapp	Integrated Planning & Public Works	Commissioner	100 Regina Street South	Waterloo	ON	N2J 4A8		
Municipal	Township of Wilmot		Jeff	Molenhuis	Public Works	Director	60 Snyder's Road West	Baden	ON	N3A 1A1	519-634-8444	jeff.molenhuis@wilmot.ca
Municipal	Township of Wilmot		Dawn	Mittelholtz		Clerk	60 Snyder's Road West	Baden	ON	N3A 1A1		
Municipal	City of Waterloo		Olga	Smith		Clerk	100 Regina Street South	Waterloo	ON	N2J 4A8		
Special Interest Groups												
	Region of Waterloo		Kate	Hagerman	Region of Waterloo Ecological and Environmental Advisory Committee		150 Frederick Street, 8th Floor	Kitchener	ON	N2G 4J3	519-575-4501	KHagerman@regionofwaterloo.ca
	Region of Waterloo		Bridget	Coady	Region of Waterloo Heritage Planning Advisory Committee		150 Frederick Street, 8th Floor	Kitchener	ON	N2G 4J3	(519) 575-4500 ext. 3112	bcoady@regionofwaterloo.ca
	City of Waterloo		Chloe	Richer	Municipal Heritage Committee		100 Regina Street South, P.O. Box 337	Waterloo	ON	N2J 4A8	519-747-6068	Chloe.Richer@waterloo.ca
	Township of Wilmot		Tracy	Loch	Heritage Wilmot		60 Snyder's Road West	Baden	ON	N3A 1A1	519-634-8444	tracy.loch@wilmot.ca
	Waterloo Region		Kevin	Fergin	Waterloo Region Home Builders Association	President	625 King Street East, Suite 1C	Kitchener	ON	N2G 4V4		marie-schroeder@wrhba.com - executive officer
First Nations	Six Nations of the Grand River Territory	Chief	Mark	Hill		Chief	1695 Chiefswood Road, PO Box 5000	Ohswéken	ON	N0A 1M0	Cell: 519-732-2905	markhill@sixnations.ca
Local	Six Nations of the Grand River Territory		Lonny	Bomberry	Land and Resource Department	Director	2498 Chiefswood Road, PO Box 5000	Ohswéken	ON	N0A 1M0		lbomberry@sixnations.ca
Local	Six Nations of the Grand River Territory		Paul	General	Six Nations Wildlife Management Office	Wildlife Manager	1721 Iroquois Village Plaza, P.O. Box 5000, Unit 109	Ohswéken	ON	N0A 1M0		pgeneral@sixnations.ca
Local	Six Nations Haudenosaunee Confederacy Council		Leroy	Hill		Secretary	16 Sunrise Court, P.O. Box 714, Suite 600	Ohswéken	ON	N0A1M0		1749resource@gmail.com
Local	Mississaugas of the Credit First Nation	Chief	R. Stacey	LaForme		Chief	2789 Mississauga Road, RR # 6	Hagersville	ON	N0A 1H0	905-768-1133	Stacey.Laforme@newcreditfirstnation.com
Local	Mississaugas of the Credit First Nation		Fawn D	Sault	Department of Consultation and Accomodation	Consultation Manager	4065 Hwy 6	Hagersville	ON	N0A 1H0	905-768-4260	Fawn.Sault@newcreditfirstnation.com
Private Sector												
	Allstream		David	Pitchforth	OSP Network Implementation	Project Supervisor	50 Worcester Road	Etobicoke	ON	M9W 5X2	416-649-7539	david.pitchforth@allstream.com
	Atria Networks Inc.		John	Stephens	Waterloo, Wellington and Hamilton Area	Manager of Field Operations	301 Victoria Street South, P.O. Box 64	Kitchener	ON	N2G 3W9	1-888-623-0623 #4516	jstephens@atrianetworks.com
	Bell Canada		Daniel	Steffler	Kitchener/Waterloo	Access Network Provisioning	575 Riverbend Drive, 1st Floor	Kitchener	ON	N2K 3S3	519-744-0569	daniel.steffler@bell.ca
	Enbridge Gas Distribution Inc.		Russell	McLean			P.O. Box 650	Scarborough,	ON	M1K 5E3	416-447-4911	russ.mclean@enbridge.com
	Hydro One Network		Rosella	Fazio	Transmission Lines Sustainment/Investment Pla	Manager	483 Bay Street, 15th Floor	Toronto	ON	M5G 2P5	416-345-6411	rossella.fazio@HydroOne.com
	Hydro One Networks Inc				Secondary Land Use	Asset Optomization, Strategy & Integrated Planning	483 Bay Street, 15th Floor	Toronto	ON	M5G 2P5		secondarylanduse@hydroone.com
	Kitchener-Wilmot Hydro Inc.		Sandy	Ferneyhough		Distribution Design Supervisor	301 Victoria Street South, P.O. Box 9010	Kitchener	ON	N2G 4L2	519-745-4771 #209	sferneyhough@kwhydro.ca
	Kitchener-Wilmot Hydro Inc.		Bruce	McKague		Engineering Manager	302 Victoria Street South, P.O. Box 9010	Kitchener	ON	N2G 4L2	519-745-4771 #209	bmckague@kwhydro.ca
	Rogers Cablesystems Inc.		Richard	Bolliger		Outside Plant Engineering	85 Grand Crest Place, P.O. Box 488	Kitchener	ON	N2G 4A8	519-894-8188 #8142	richard.bollinger@rci.rogers.com
	Telus		Robert	Quick			82 Locust Street	Kitchener	ON	N2H 1W9		Bob.quick@telus.com
	Union Gas Ltd.		Kevin	Schimus		Distribution System Development	603 Kumpf Drive, P.O. Box 340	Waterloo	ON	N2J 1K3	519-885-7513	kschimus@uniongas.com
	Union Gas Ltd.		Rick	Bigelow		Utilities Service Manager	603 Kumpf Drive, P.O. Box 340	Waterloo	ON	N2V 1K3	519-885-7405	rbigelow@uniongas.com
	Waterloo-North Hydro Inc.		Rocket	Wei		Engineering Supervisor	526 Country Squire Rd.	Waterloo	ON	N2J 4G8	519-888-5572	
	Kitchener Utilities						131 Goodrich Drive	Kitchener	ON	N2C 2E8	519-741-2529	RWei@wnhydro.com
Public												