

## Rowe Channel Upgrade Study

### Municipal Class Environmental Assessment Schedule 'B' Project File

August 2022



Prepared for:



## Executive Summary

The Town of Whitby, in partnership with Central Lake Ontario Conservation Authority, has retained Resilient Consulting and their subconsultants to complete a Schedule B Municipal Class Environmental Assessment for the upgrade of Rowe Channel, in accordance with the planning process outlined in the Municipal Engineers Association's Municipal Class Environmental Assessment document (October 2000, amended in 2007, 2011 and 2015).

Rowe Channel, located between Lake Ontario and the Whitby GO Station, conveys surface runoff to Lake Ontario from three (3) main areas: a residential area north of Highway 401, the Whitby GO Station, and nearby properties to the south of Victoria Street West. The total contributing drainage area to Rowe Channel is 83.4 hectares.

The geometry or shape of Rowe Channel consists of a rectangular open channel between Victoria Street West and Watson Street West, a trapezoidal channel between Watson Street West and Front Street West, and three (3) existing culvert crossings located at Victoria Street West, Watson Street West, and Front Street West. The existing open channels are lined with gabion baskets and mattresses that are in near failing condition and require remediation to address future erosion and stability issues anticipated along the channel.

The Problem/ Opportunity Statement for this Class Environmental Assessment study is as follows:

**Rowe Channel was constructed in 1989 as a part of the Port Whitby (Rowe) Development to convey drainage to Lake Ontario. The channel was lined with concrete and gabion baskets, which are now nearing the end of their design life and are beginning to fail. Failure of these gabion baskets may result in reduced conveyance capacity in the channel and flooding. Sediment (soil) and invasives vegetation has also accumulated within the channel reducing its ability to drain surface water to Lake Ontario. There is an opportunity to rehabilitate or replace the channel to mitigate risk, in addition to providing additional benefits such as reduction of invasive species, aesthetic improvement, reduced flooding risks and reduced maintenance requirements.**

The purpose of this Municipal Class Environmental Assessment is to select the preferred upgrade alternative based on comparative evaluation of several possible options, and ultimately to provide a conceptual design. The following seven (7) alternative solutions were identified and evaluated for upgrading Rowe Channel:

1. Do Nothing
2. Full Piped Channel Replacement
3. Partial Channel Replacement Excluding Victoria Street West
4. Partial Channel Replacement Excluding Front Street West
5. Open Channel Replacement with Armour Stone
6. Replacement with Combination of Piped and Overland Flow
7. Partial Diversion of Peak Flow Along Victoria Street West

Following the evaluation of each alternative against natural, social, economic, and technical criteria, **Alternative 5, Open Channel Replacement with Armour Stone, was identified as the preferred solution.** This preferred alternative will replace the existing channel, which

is in poor condition, with a long-lasting solution that will mitigate long term erosion concerns. In addition, this alternative will reduce flood risks, promote the removal of invasive species and improve fish habitat and passage through the channel.

Stakeholders including various Indigenous communities, the public, and regulatory review agencies were consulted throughout the preparation of this study, and their comments and concerns have been addressed where possible.

The Town of Whitby plans to implement the preferred alternative solution in stages, with the first stage of construction anticipated to commence in 2025. The anticipated cost to construct the preferred alternative is estimated to be \$4.75 million.

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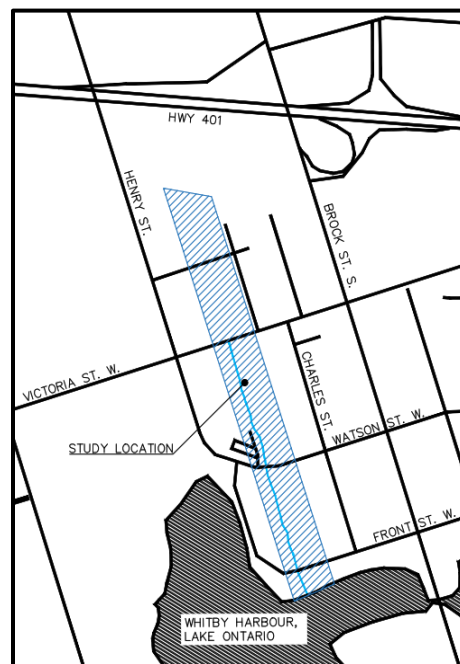
# 1 Introduction

The Town of Whitby (Town), in partnership with Central Lake Ontario Conservation Authority, has retained the services of Resilient Consulting and their subconsultants to prepare this Municipal Class Environmental Assessment (Class EA) study to assess possible improvement alternatives for upgrading Rowe Channel, located between the Whitby GO Station and the Front Street West culvert outfall into Lake Ontario. The Municipal Class Environmental Assessment identifies various design alternatives to address the near failing gabion baskets that currently line the channel, and ultimately recommends a preferred solution based on evaluation of all examined alternatives.

## 1.1 Study Area and Background

Rowe Channel, shown in **Figure 1**, is located south of the Whitby GO Station and approximately 290 metres west of Brock Street, in the Town of Whitby. The primary function of Rowe Channel is to convey drainage to Lake Ontario from the neighbouring residential and commercial areas, including runoff from the Whitby GO Station and a residential area located to the north of Highway 401. The channel was originally designed by G.M. Sernas and Associates and constructed in 1989 as part of the Port Whitby (Rowe) Development. Though not considered a part of the Pringle Creek watershed, Rowe Channel discharges into Whitby Harbour at the mouth of Pringle Creek.

The geometry or shape of Rowe Channel consists of a rectangular open channel between Victoria Street West and Watson Street West, a trapezoidal channel between Watson Street West and Front Street West, and three (3) existing culvert crossings located at Victoria Street West, Watson Street West, and Front Street West. The existing open channels are lined with gabion baskets and mattresses that are in near failing condition and require remediation to address future erosion and stability issues anticipated along the channel.



**Figure 1. Study Area.**



## 1.2 Purpose of the Project File

This Project File documents the preliminary design process and conclusions reached during the preparation of the Rowe Channel Upgrade Municipal Class Environmental Assessment study. Problems and opportunities associated with this study were first documented in accordance with the Municipal Class Environmental Assessment process. To address the identified problems, various alternative solutions were then developed and evaluated, resulting in the recommendation of a preliminary preferred solution. This information was then presented to stakeholders through an online (virtual) Community Open House, which was made available for public review and comment between November 18 and December 17, 2021. This Project File documents the full extent of this process and is structured for ease of public review.

## 2 Planning Context

The following section provides an overview of the planning context behind the proposed works, including why this study was required, the Municipal Class Environmental Assessment planning process, and the various legislative and policy considerations behind it.

### 2.1 Environmental Assessment Act

The Environmental Assessment Act was passed by the Ontario government in 1976 and first applied to municipalities in 1981. The Environmental Assessment Act requires proponents to study, document, and examine all potential environmental impacts that could result from major projects or activities prior to construction. The process is intended to result in the selection of a project alternative that has the fewest environmental impacts. In this context, the Environmental Assessment Act broadly defines the environment as:

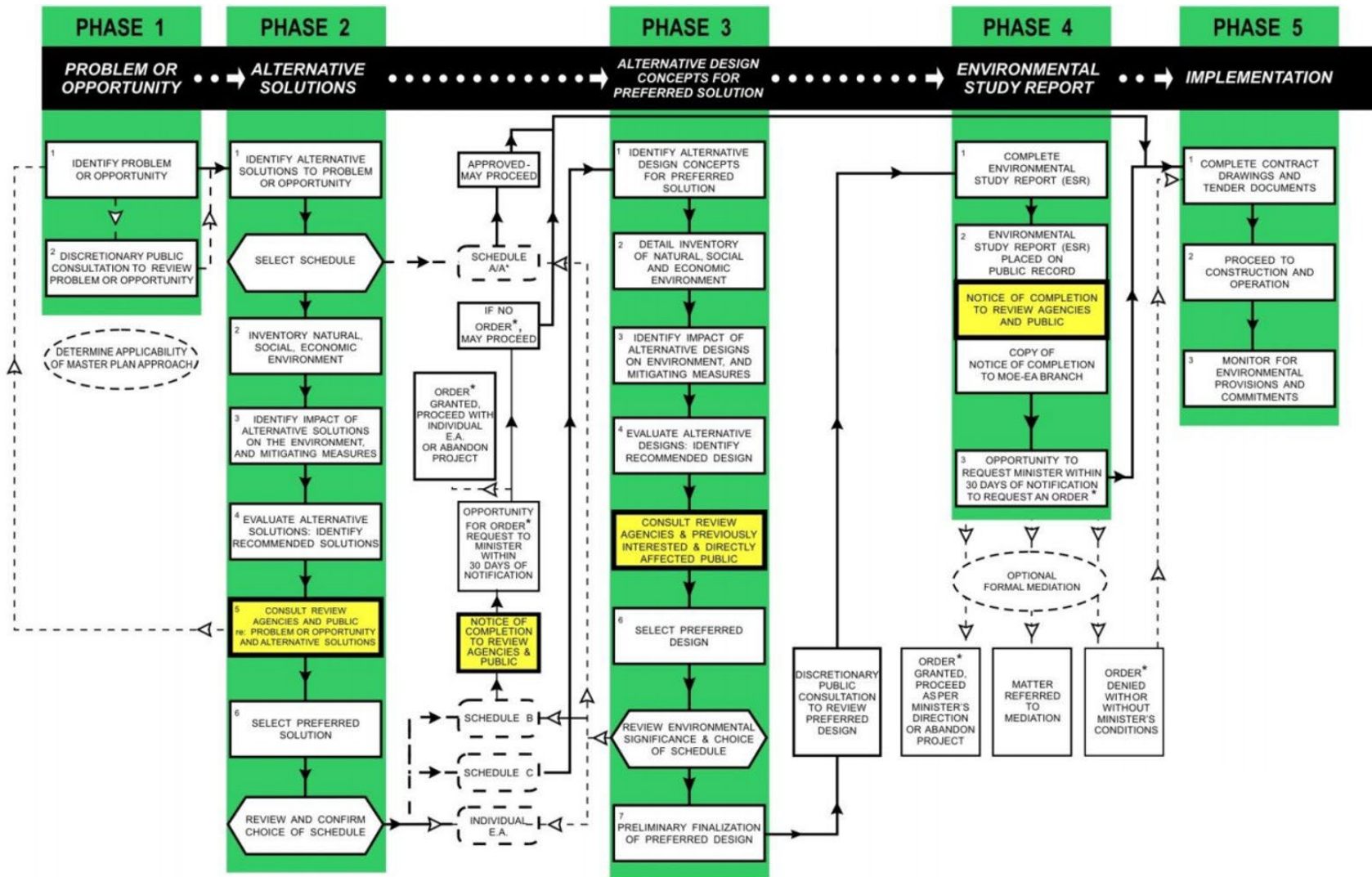
- Air, land or water;
- Plant and animal life, including human life;
- The social, economic and cultural conditions that influence the lives of humans or a community;
- Any building, structure, machine or other device or thing made by humans;
- Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or
- Any part or combination of the foregoing and the interrelationships between any two (2) or more of them.

The Environmental Assessment Act applies to major public sector projects and designated private sector projects that have the potential for significant environmental effects. All municipalities in Ontario, including the Town of Whitby, are subject to the provisions of the Environmental Assessment Act and its requirements to conduct an Environmental Assessment for applicable projects.

### 2.2 Municipal Class Environmental Assessment Planning Process

The Municipal Engineers Association “Municipal Class Environmental Assessment” document (October 2000, as amended in 2007, 2011, and 2015) outlines a planning process, approved under the Environmental Assessment Act, for municipal projects having a predictable range of environmental impacts and applicable mitigation measures. This study follows the planning and

design process outlined within this document as it allows the Town of Whitby to achieve the requirements of the Environmental Assessment Act for municipal infrastructure without having to either undertake an Individual Environmental Assessment or request a specific exemption for the project. Municipal projects included in the Class Environmental Assessment may be implemented without further approval under the Environmental Assessment Act, provided that the approved Class Environmental Assessment planning and design process is followed (refer to **Figure 2**).



**Figure 2. Municipal Class Environmental Assessment Planning Process**  
(Municipal Engineers Association, 2000, as amended in 2007, 2011 and 2015)

### 2.2.1 Municipal Class Environmental Assessment Project Schedule

Since projects undertaken by municipalities vary in their environmental effects, the Municipal Class Environmental Assessment document classifies these projects into four (4) schedules depending on the anticipated level of environmental impact:

- **Schedule 'A'** projects are limited in scale, have minimal adverse effects, and include the majority of municipal maintenance and operation activities. These projects are approved and may proceed directly to Phase 5 for implementation without following the other phases.
- **Schedule 'A+'** projects are limited in scale and have minimal adverse effects. These projects are approved and may proceed directly to Phase 5 for implementation without following the other phases. However, the public is to be advised prior to project implementation, though there is no ability for the public to request a Part II Order (see **Section 2.3** below for further explanation).
- **Schedule 'B'** projects have the potential for some adverse environmental effects. The municipality or proponent is required to undertake a screening process (Phases 1 and 2) involving mandatory contact with the directly affected public and relevant review agencies and Indigenous communities to ensure that they are aware of the project and that any concerns they may have are addressed, where possible. Schedule 'B' projects require that a Project File (Environmental Assessment Report) be prepared and made available for review by all interested parties. If the Class Environmental Assessment process is followed and there are no outstanding concerns, then the proponent may proceed to Phase 5 for implementation.
- **Schedule 'C'** projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Municipal Class Environmental Assessment document (Phases 1 to 4). Schedule 'C' projects require that an Environmental Study Report be prepared and made available for review by all interested parties. If the Class Environmental Assessment process is followed and there are no outstanding concerns, then the proponent may proceed to Phase 5 for implementation.

Due to the nature of this project, this study is being undertaken under the Municipal Class Environmental Assessment process for Schedule 'B' projects. As per Appendix 1 of the Municipal Class Environmental Assessment document, projects that are subject to the Schedule 'B' planning process include:

#### **17. Works undertaken in a watercourse for the purpose of flood control or erosion control, which may include:**

- **Bank or slope regrading**
- **Deepening the watercourse**
- **Relocation, realignment, or channelization of a watercourse**

As this project involves regrading of the banks of the existing channel, and other works within the watercourse for the purpose of erosion control, it has been classified as a Schedule 'B' project.

### 2.2.2 Climate Change Considerations

The Ministry of Environment, Conservation and Parks has prepared a guide entitled “Considering Climate Change in the Environmental Assessment Process” which sets out how climate change must now be considered in Class Environmental Assessment studies. Specifically, each study must consider: the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and the resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation). **Section 7.3** summarizes how the proposed Rowe Channel upgrades have addressed both climate change mitigation and adaptation.

### 2.3 Public Review of this Report and Next Steps

Following finalization of the Project File, this document will be placed on public record and made available for review and comment by any interested parties for a period of 30-calendar days. During this comment period, anyone has the right to raise comments or concerns, which can be addressed to the following: **rowechannel@resilientconsulting.ca**

Alternatively, concerned parties may contact one of the following Project Team representatives:

**Priyan Tharumaratinam**  
**Water Resources Technician**  
**Town of Whitby**  
3000 Garden Street, Unit 100B  
Whitby, ON L1R 2G6  
905.430.4943  
tharumaratinamp@whitby.ca

**Louie Jakupi, P. Eng.**  
**Senior Water Resources Engineer**  
**Central Lake Ontario Conservation Authority**  
100 Whiting Avenue  
Oshawa, ON L1H 3T3  
905.579.0411 x. 113  
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**Mark Bassingthwaite, P.Eng.**  
**Project Manager**  
**Resilient Consulting**  
PO Box 643  
Whitby, ON L1N 5V3  
289.943.4651  
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In the event that any concerns cannot be resolved, individuals can request that the Minister of the Environment, Conservation and Parks make an “order” under Section 16 of the Environmental Assessment Act that a higher level of study approvals be required, i.e., a comprehensive or Individual Environmental Assessment. Alternatively, they may request that conditions such as further study be imposed. However, recent amendments to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act, 2020, note that such a request (formerly referred to as a “Part II Order” request) will only be considered by the Minister if the project

impacts constitutionally protected Aboriginal or treaty rights. Requests on other grounds will not be considered.

Requests should specify what kind of order is being requested (i.e., a request for conditions or a request for an Individual Environmental Assessment), how an order may prevent, mitigate or remedy potential adverse impacts on Aboriginal or treaty rights, 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.

Written requests must be submitted by the end of the 30-calendar day review period, September 24, 2022, to both the following addresses:

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 copied to the Project Team members listed above. Further details on the process to request a Part II Order can be found on the Ontario government website: <https://www.ontario.ca/page/class-environmental-assessments-section-16-order#section-3>.

If the Minister agrees with the request, the project will be subject to Part II of the Environmental Assessment Act and the Town of Whitby shall begin with preparing a Term of Reference for an Individual Environmental Assessment. If the Part II Order is denied by the Minister, the project is considered to have met the requirements of the Class Environmental Assessment and the project may proceed to detailed design and construction as outlined in this document. Alternatively, the Minister may impose additional conditions which must be met before proceeding.

## **2.4 Legislative and Policy Considerations**

As with all municipalities in Ontario, the Town of Whitby must operate according to the planning frameworks established by senior levels of government. Among other administrative, legislative and financial frameworks, this includes policies and legislation established by the Federal Government, the Province of Ontario, and the Region of Durham. In addition, the Planning Act requires that lower tier municipalities such as the Town of Whitby prepare their own Official Plans to govern land use. The following sections discuss the applicable legislation and relevant planning policies considered as a part of this study.

### **2.4.1 Federal Legislation**

The following sub-sections provide further details regarding Federal legislation relevant to this study, including the Canadian Environmental Assessment Act, Fisheries Act, Migratory Birds Convention Act, and the Species at Risk Act.

#### **Canadian Environmental Assessment Act**

The Canadian Environmental Assessment Act (2012) sets out the responsibilities and procedures for carrying out an Environmental Assessment for projects which have the potential to cause environmental impacts in areas of federal jurisdiction. The Act only applies to those projects designated under the "Schedule for Physical Activities". Following review of the proposed project, there are no physical activities proposed that match any activities listed the Schedule. Therefore, meeting the requirements of the Canadian Environmental Assessment Act is not required.

#### **Fisheries Act**

The Federal Fisheries Act (1985, last amended 2018) regulates the harm and destruction of fish and fish habitat in Canadian waterways. Proponents are responsible for determining if the project is likely to cause impacts or harm to fish and fish habitat, and if these impacts can be avoided or mitigated. Modifications to Rowe Channel below the highwater mark may be regulated under the Fisheries Act and may require review and/or authorization by Fisheries and Oceans Canada.

#### **Migratory Birds Convention Act**

The purpose of the Migratory Birds Convention Act (1994) is to protect migratory birds, their eggs, and their nests from harm or destruction. Canada seasonally hosts approximately 450 species of native birds, with the majority protected under the Act. The timing for required tree/vegetation clearing during construction at Rowe Channel will be impacted by the Migratory Birds Convention Act.

#### **Species at Risk Act**

The purpose of the Species at Risk Act (2002) is to protect wildlife species that are extirpated, endangered, or threatened as a result of human activity, and to manage species of concern to prevent them from becoming endangered or threatened. The Act would apply to all aquatic Species at Risk located within Rowe Channel, however, following field investigations, no aquatic or terrestrial Species at Risk were identified within the study area.

### **2.4.2 Provincial Policies and Legislation**

The following sub-sections provide further details regarding Provincial policies and legislation relevant to this study, including the Provincial Policy Statement, Growth Plan for the Greater Golden Horseshoe, Clean Water Act, Endangered Species Act, Conservation Authorities Act, and the Ontario Heritage Act.

#### **Provincial Policy Statement**

Ontario's Provincial Policy Statement, 2020 under the Planning Act provides direction to municipalities on matters related to land use planning and development. The Provincial Policy Statement supports improved land use planning and management, while protecting natural resources of provincial interest, public health and safety, and the quality of the natural and built

environment. Sections 1.6 and 2.1 apply to the proposed channel upgrade works and were taken into consideration during the evaluation of the design alternatives.

Section 1.6 of the Provincial Policy Statement provides direction to municipalities regarding infrastructure and public service facilities, which includes stormwater services. Specifically, Section 1.6.6.7 states that planning for stormwater management shall:

- a) be integrated with planning for sewage and water services and ensure that systems are optimized, feasible and financially viable over the long term;
- b) minimize, or where possible, prevent increases in contaminant loads;
- c) minimize erosion and changes in water balance, and prepare for the impacts of a changing climate through the effective management of stormwater, including the use of green infrastructure;
- d) mitigate risks to human health, safety, property and the environment; and
- e) promote stormwater management best practices, including stormwater attenuation and re-use, water conservation and efficiency, and low impact development.

Section 2.1 of the Provincial Policy Statement promotes the protection of natural heritage features and functions, including the fish habitat (although limited) provided by Rowe Channel and the significant wildlife habitat provided by Whitby Harbour (see **Section 4.2** below). Section 2.1.5 prohibits development and site alteration in significant natural heritage features, including significant wildlife habitat, unless it has been demonstrated that there will be no negative impacts on those features and their ecological function. Section 2.1.6 prohibits development and site alteration in fish habitat, except in accordance with Provincial and Federal requirements.

Section 2.2 of the Provincial Policy Statement similarly promotes the protection, improvement, or restoration of water resources. Relevant to this study, Section 2.2.1 i) states that planning authorities must ensure that stormwater management practices minimize stormwater volumes and contaminant loads and maintain or increase the extent of vegetative and pervious surfaces.

### **Growth Plan for the Greater Golden Horseshoe**

Ontario's "A Place to Grow: Growth Plan for the Greater Golden Horseshoe" (2020) builds upon the Provincial Policy Statement by outlining a plan for growth and development that "supports economic prosperity, protects the environment, and helps communities achieve a high quality of life". Relevant excerpts for this project include Policy 4.2.10.1 d) regarding climate change which states that municipalities shall undertake stormwater management planning in a manner that assesses the impacts of extreme weather events and incorporates appropriate green infrastructure and low impact development.

### **Clean Water Act**

The Clean Water Act (2006) mandates source water protection, otherwise known as the protection of drinking water resources. In Ontario, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system located in a source protection area. These include:

- Wellhead Protection Areas;



- Surface water Intake Protection Zones;
- Highly Vulnerable Aquifers;
- Significant Groundwater Recharge Areas;
- Event-based modelling areas; and
- Issues Contributing Areas.

The study area falls within the plan jurisdiction of the Central Lake Ontario Source Protection Area and is located within an Intake Protection Zone-2 where water and pollutants can reach the drinking water intake within approximately two (2) hours. The study area is also located within a Highly Vulnerable Aquifer Area, where contaminants may be able to reach underlying aquifers due to permeable (sandy) soil characteristics or surface cracks. As such, applicable policies of the Central Lake Ontario Source Protection Plan apply.

The “Approved Source Protection Plan: Central Lake Ontario Source Protection Region” (2019) includes a number of policies pertaining to Intake Protection Zones and Highly Vulnerable Aquifers which are primarily related to the storage, handling and application of road salt and the handling and storage of potentially hazardous substances. As noted in **Section 8.3** below, a Spills Management Plan will be prepared during the design or tender phases of the project to ensure spills prevention and an appropriate response should a spill occur during construction. No other potential threats or risks to drinking water resources as a result of this project are anticipated.

### **Endangered Species Act**

The purpose of Ontario’s Endangered Species Act (2007) is to protect provincially listed Species at Risk and their habitats. These include those species and habitats classified as Endangered or Threatened under the Act. Species classified as Special Concern under the Endangered Species Act do not receive these protections, however their habitat is protected from development under the Provincial Policy Statement. **Section 4.2.4** below discusses the potential for Species at Risk within the study area.

### **Conservation Authorities Act**

The purpose of the Conservation Authorities Act (1990) is to give authority to the Central Lake Ontario Conservation Authority and other Conservation Authorities within Ontario to regulate development, interference with wetlands, and alterations to shorelines and watercourses. Under Ontario Regulation 42/06, Central Lake Ontario Conservation Authority regulates development located within the Central Lake Ontario watershed, including within and adjacent to creeks, valley lands, shorelines, and wetlands. Permission may be granted for development within these regulated areas if the control of flooding, erosion, dynamic beaches, pollution, or the conservation of land will not be affected by the development. As Rowe Channel is located within a regulated area, a permit to complete the proposed work will be required from Central Lake Ontario Conservation Authority.

In Central Lake Ontario Conservation Authority’s “Policy and Procedural Document for Regulation and Plan Review” (2014), key policies of Section 8.8 Infrastructure, apply to the proposed works as follows:

- Improvements to existing infrastructure...shall incorporate measures to eliminate any existing and/or future impediment to stream flow, fish movement or aquatic habitat;

- Where existing in stream barriers exist, the Municipality and Central Lake Ontario Conservation Authority will work together to determine the best method of removal or preservation;
- Green infrastructure that provides ecological and hydrological benefits is encouraged. Green infrastructure can include components such as stormwater management systems;
- When infrastructure cannot protect a natural feature, or part of a natural feature, (and the feature is not protected by any other applicable federal, provincial, or municipal requirement(s), compensation be provided in consultation with the municipality(ies).

### **Ontario Heritage Act**

The purpose of the Ontario Heritage Act (1990) is to identify and protect heritage properties and archaeological sites within Ontario. A Stage 1 Archaeological Assessment has been completed as a part of this study to determine the potential impacts the project may have on archaeological resources. Based on discussion with the Town of Whitby Policy and Heritage Planning Division, a Cultural Heritage Evaluation Report was not required for the site, as detailed in **Section 4.5** below.

#### **2.4.3 Municipal Policies**

The following sub-sections provide further details regarding municipal policies relevant to this study, including both the Town of Whitby and Region of Durham Official Plans.

##### **Town of Whitby**

Rowe Channel's floodplain has been identified as a natural hazard as per Schedule C of the Town of Whitby's Official Plan (2021). Therefore, the potential for development and site alterations within this area is limited. However, upgrades to the Rowe Channel are required for erosion and flood control, and therefore are permitted under exception 'A' of Policy 5.3.7.4 of the Official Plan.

As per the Port Whitby Secondary Plan, the majority of the study area is designated as residential land use, with the exception of the outlet into Whitby Harbour which has been designated as major open space.

##### **Regional Municipality of Durham**

Rowe Channel has been identified as a permanent watercourse as per the Natural Heritage Existing Conditions and Constraints Analysis Report (**Appendix A**). The Durham Regional Official Plan (2020) identifies permanent watercourses as a key hydrologic feature, thereby prohibiting development and site alteration within the channel and any associated vegetation protection zone. However, upgrades to Rowe Channel are expected to fall under exception 'b' under Policy 2.3.15. This policy states that conservation and flood or erosion control projects are permitted, provided they are demonstrated to be necessary in the public interest and after all alternatives have been considered.

## **3 Problem or Opportunity Statement**

Phase 1 of the Municipal Class Environmental Assessment planning process defines the starting point for any Class Environmental Assessment as the "Problem or Opportunity Statement." This

statement assists in defining the scope of the project and serves as its central theme and integrating element.

### **3.1 Problem**

Rowe Channel was constructed in 1989 as a part of the Port Whitby (Rowe) development. The channel functions to convey drainage to Lake Ontario from a residential area north of Highway 401, the Whitby GO station, and areas south of Victoria Street West. The channel consists of a rectangular shaped channel between Victoria Street West and Watson Street West, and a trapezoid channel between Watson Street West and Front Street West, both lined with concrete and gabion baskets. The gabion baskets are nearing the end of their design life and have begun to experience failure due to corrosion. If the gabion baskets are allowed to fail and fall into the channel, the capacity of the channel would be reduced and flooding may occur. Sediment and invasive vegetation (phragmites) have accumulated within the channel reducing available flow capacity.

### **3.2 Opportunity**

There is an opportunity to undertake rehabilitation/replacement of the channel to mitigate risk. Potential benefits of the project include:

- Reduction in invasive species;
- Improvements to the aesthetics of the channel;
- Improvements in hydraulic capacity resulting in reduced flood risk; and,
- Reduction in requirements for maintenance by the Town of Whitby.

The Town of Whitby initiated this Municipal Class Environmental Assessment to identify and evaluate alternative solutions to address these problems and opportunities.

## **4 Inventory of Existing Conditions**

Phase 2 of the Municipal Class Environmental Assessment planning process requires a general inventory of the natural, cultural and socio-economic environments to be considered. It also requires that significant features and potential impacts be identified early in the Class Environmental Assessment planning process where possible, so that significant features can be avoided, or efforts can be made to mitigate (reduce) adverse impacts. This chapter summarizes the environmental inventory completed.

To collect information on the existing conditions within the study area, field visits were undertaken by the Project Team, in combination with the completion of desktop reviews of available background information, where applicable. Supporting studies completed as part of this process are found in the Appendices as noted throughout this section.

### **4.1 Existing Channel Condition**

Rowe Channel was initially constructed in 1989 as part of the Port Whitby (Rowe) development to convey drainage to Lake Ontario from a residential area north of Highway 401, the Whitby GO Station and areas south of Victoria Street West. The existing channel is lined with concrete and gabion baskets/ mattresses, with geometry varying from a rectangular shaped channel between Victoria Street West and Watson Street West, to a trapezoidal channel between Watson Street

West and Front Street West. The original design of the channel did not include a low flow channel or considerations for sediment transport. The rectangular portion of the channel is approximately 4.0 metres wide and 2.0 metres deep, lined on either side with stacked 1.0 metre high gabion baskets (see images below). The bottom of the channel is lined with 150 millimetre concrete slab with wire mesh reinforcement. The trapezoidal channel, in comparison, has a base width of approximately 2.0 metres, height of 1.3 metres, and a bank slope of 2:1. Gabion mattresses line the banks of this portion of the channel, and a 150 millimetre concrete slab was also constructed along the channel bottom.

During a field survey completed by Resilient Consulting in November 2019, sediment accumulation above the concrete channel lining was noted throughout the full length of the open channel. The presence of this sediment has contributed to the decrease in channel depth, ultimately resulting in a reduction in conveyance capacity within the channel.

The channel includes three (3) culvert crossings, located at Victoria Street West, Watson Street West, and Front Street West. The Victoria Street West crossing consists of a 3.0 metre by 1.5 metre concrete box culvert, supported by gabion walls at both the upstream and downstream openings. The Watson Street West crossing consists of twin 1.8 metre by 1.2 metre concrete box culverts, approximately 24.4 metres long. The upstream inlet of the twin culverts is supported with a gabion wall, and the downstream ties into the channel via concrete wingwalls and armour stone. Additional pipe outfalls are connected through the concrete wing walls, discharging runoff from Watson Street West directly into the channel. A 72 metre long, 3.0 metre by 1.2 metre concrete box culvert, newly constructed in 2015, conveys flows under Front Street West and the Port Whitby Marina to the outlet into Lake Ontario. All three (3) culvert crossings appear to be good condition, however sediment accumulation has been identified within the Victoria Street West and Watson Street West culvert crossings.



Sediment accumulation in channel between Victoria Street West and Watson Street West



Sediment accumulation with Victoria Street West culvert crossing

## 4.2 Natural Environment

A Natural Heritage Report (**Appendix A**) was prepared by North-South Environmental in October 2021. The report provides a detailed description of the existing natural heritage features and functions within the study area and summarizes potential natural heritage constraints which were taken into consideration during evaluation of the channel upgrade alternatives. North-South Environmental completed a thorough background review of information pertaining to natural heritage features, which included:

- Aquatic Species At Risk mapping from Fisheries and Oceans Canada;
- Hydrological and fisheries data from Central Lake Ontario Conservation Authority;
- Natural Heritage Information Centre Natural Heritage Areas mapping;
- Geospatial data from Land Information Ontario;
- eBird, iNaturalist, and other citizen science platforms;
- Aerial imagery; and,
- Publicly available natural heritage atlases.

In addition to a background review, field investigations were completed by North-South Environmental on four (4) occasions in 2021. A breakdown of the completed field work is summarized in **Table 1** below. Key findings are summarized in the sub-sections below.

**Table 1. Natural Heritage Field Investigations**

Date	Field Investigation
May 13, 2021	<ul style="list-style-type: none"> <li>• High level stream assessment (channel morphology and fish habitat feature examination)</li> <li>• Spring vegetation inventory</li> </ul>
June 9, 2021	<ul style="list-style-type: none"> <li>• Breeding bird survey No. 1 using Ontario Breeding Bird Atlas protocol</li> </ul>
June 28, 2021	<ul style="list-style-type: none"> <li>• Breeding bird survey No. 2 using Ontario Breeding Bird Atlas protocol</li> <li>• Summer vegetation inventory</li> <li>• Vegetation community assessment using Ecological Land Classification system</li> </ul>
September 14, 2021	<ul style="list-style-type: none"> <li>• Fall vegetation inventory</li> </ul>

### 4.2.1 Fish and Aquatic Habitat

Rowe Channel has been identified as a permanent watercourse, which may support a warmwater fish community. Fish habitat is noted to be minimal within the majority of the channel as a result of unvegetated banks, warm deoxygenated water, sediment accumulation and invasive plants which act as significant barriers to fish passage (see image below). The portion of the channel upstream of the Victoria Street West crossing is considered an exception, as it contains a greater diversity of stream morphology, substrates, and cover.



Rowe Channel upstream of Front Street West crossing

Although there are significant barriers to fish movement throughout the channel, some fish habitat is still provided. Consultation and approval by Fisheries and Oceans Canada under the Fisheries Act will be required for all work proposed within the channel.

#### **4.2.2 Vegetation**

The majority of vegetation within the study area has been identified as non-native plant species, which reflects the long history of human disturbance within the area. Field visits in the spring, summer and fall documented 101 plant species within the study area, with non-native species making up nearly half of the documented species. No rare or at risk plants were found within the study area. Documented Ecological Land Classification communities included Mineral Cultural Meadow, Mineral Cultural Woodland, and one (1) Open Aquatic community near the Whitby GO station. No rare or otherwise significant vegetation communities were found.

#### **4.2.3 Wildlife**

A total of 28 bird species were identified within the study area during field investigations completed in June 2021. Two (2) species were confirmed to be breeding in the study area, the American Robin and Black-capped Chickadee, and the remaining 25 species were determined to be possible/probable breeders within the study limit. Most of these bird species are common and widespread in Ontario, with the exception of the Red-necked Grebe (rare to uncommon) which was observed in Whitby Harbour. Other wildlife observed within the study area included common urban animals such as the Eastern Gray Squirrel and Striped Skunk.

Whitby Harbour, located downstream of the channel, has been known to regularly support various wildlife species. The harbour is identified as Significant Wildlife Habitat for its waterfowl stopover and staging area, as well as potential Significant Wildlife Habitat for turtle nesting and overwintering.

Habitat for the following Special Concern and provincially rare wildlife species were also identified within or adjacent to Rowe Channel or Whitby Harbour:

- Monarch
- Snapping Turtle
- Eastern Wood-pewee

- Golden-winged Warbler
- Red-headed Woodpecker
- Red-necked Grebe

As Whitby Harbour will not be impacted by upgrades to Rowe Channel, the proposed work is anticipated to have limited impact to Significant Wildlife Habitat within the harbour. There may also be opportunities to provide a net increase in suitable habitat within the channel given an open channel alternative is recommended as the preferred solution (see **Section 7** below).

#### **4.2.4 Species at Risk**

A list of Species at Risk and Species of Concern that occur or could occur within the study limit was compiled based on background review and field data collected during onsite investigations. Historic records indicate that 11 species listed as Endangered or Threatened under the Endangered Species Act were identified within the vicinity of the study area. The majority of these species were identified as birds which have been observed in the area during migration, but do not breed in the study area. The Species at Risk screening completed as part of North-South Environmental's Natural Heritage Report (**Appendix A**) determined that habitat for the following Species at Risk may be present in the study area:

- Barn Swallow
- Chimney Swift
- American Eel
- Eastern Pondmussel

However, there is currently no suitable nesting habitat for Barn Swallow or Chimney Swift along the channel itself, nor does Rowe Channel provide any direct habitat for any aquatic Species at Risk. Whitby Harbour may provide seasonal habitat for American Eel and Eastern Pondmussels, however upgrades to Rowe Channel will not impact Whitby Harbour.

### **4.3 Geotechnical Environment**

A desktop review of geotechnical background information was completed by the Project Team. Based on the review of available information, the subsurface condition within the study area is anticipated to consist mainly of sand with traces of silt and clay, over bedrock located at moderate depths. The bedrock is expected to be comprised mainly of Ordovician shale of the Whitby Formation, which extends from Lake Ontario in the vicinity of Whitby to Collingwood, on Nottawasaga Bay (Ontario Geological Survey, 1981).

Based on public well records available through the Ministry of Environment, Conservation and Parks, the surface of bedrock within the study area generally occurs at depths greater than 7 metres. The typical stratigraphy documented on these records include surface fill, sand, and silty sand with clay above bedrock.

### **4.4 Socio-Economic Environment**

Based on desktop review, the properties located in the study area are zoned mostly as High Density Residential Mixed Use and Community/Institutional as per the Port Whitby Community Secondary Plan (July 2018). This includes the existing condominiums backing onto the channel at 340 and 360 Watson Street West and 1600 Charles Street, and vacant lands, future

condominium developments, a commercial plaza, and a marine supply and yacht dealer located along Charles Street. The channel outlet into Lake Ontario, downstream of Front Street West, has been zoned as Major Open Space, where the Port Whitby Marina is located. The existing channel is located on land owned by the Town of Whitby.

As illustrated on **Figure 3**, various active transportation networks have been identified within the study area, including along Front Street West, Watson Street West, and potentially, along the channel corridor between Watson Street West and Victoria Street West. These active transportation routes are meant to encourage alternative transportation methods such as walking and cycling, while also providing easier access to public transportation systems including the Whitby GO Station located directly north of the study area.

## **4.5 Cultural Environment**

The cultural environment includes archaeological and cultural heritage resources. This information is summarized in the sub-sections below based on the Stage 1 Archaeological Assessment completed as part of this study and review of Heritage Registers and associated information.

### **4.5.1 Archaeological Conditions**

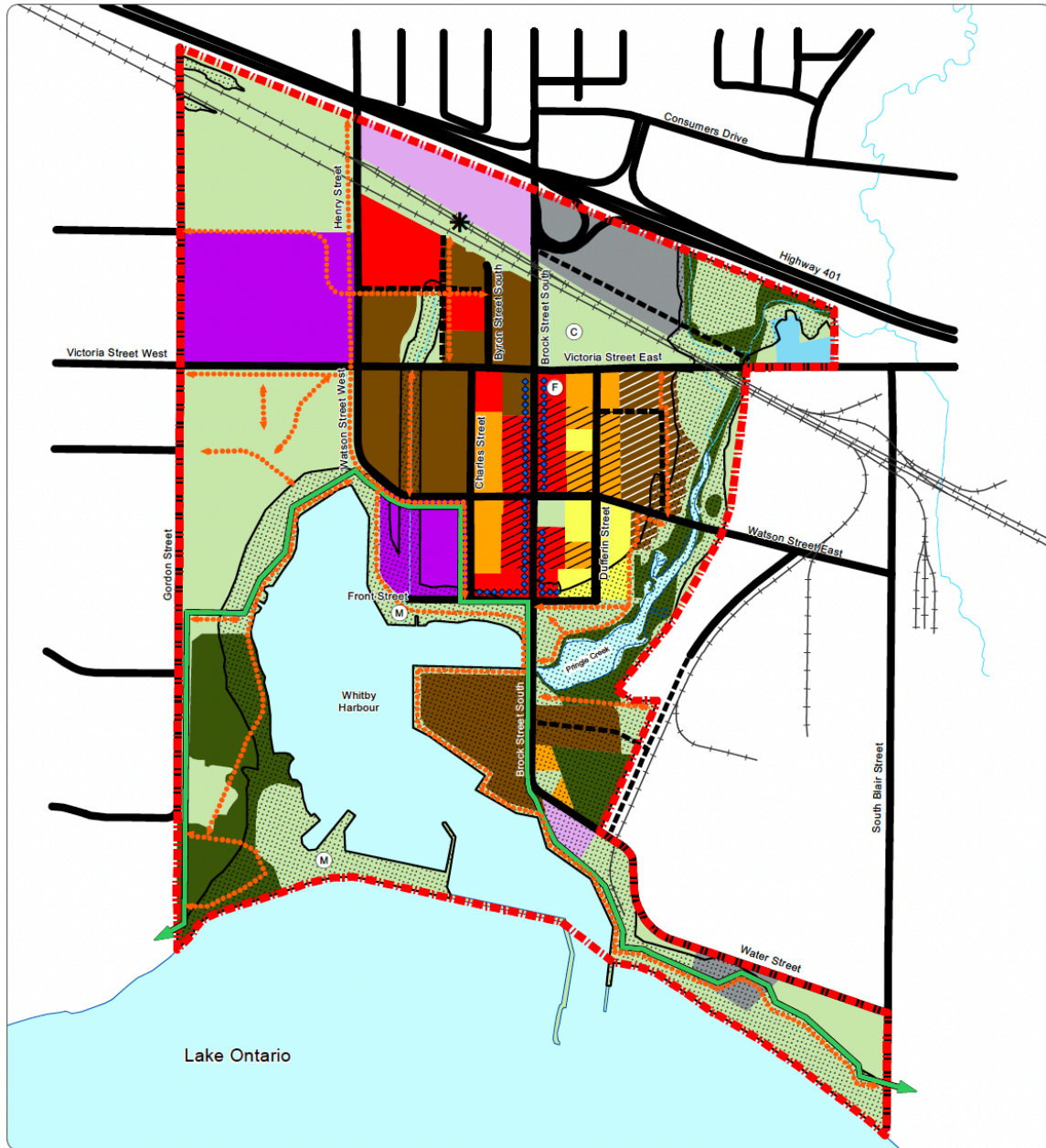
A Stage 1 Archaeological Assessment was completed for Rowe Channel by Archaeological Services Inc. (ASI) in August 2021. Results of the investigation concluded that the study area does not retain archaeological potential, and the area can be considered clear of further archaeological concerns. A copy of the Stage 1 Assessment can be found in **Appendix B**.

### **4.5.2 Cultural Heritage Resources**

The Ontario Ministry of Heritage, Sport, Tourism and Culture Industries mandates the conservation of Ontario's cultural heritage, which includes archaeological resources, cultural landscapes, and built heritage resources. Built heritage resources are typically individual buildings or structures associated with a variety of human activities such as historical settlement or patterns of architectural development. Generally, buildings or structures more than 40-years old may have heritage value. A cultural heritage landscape is a collection of individual built heritage resources and other related features that together form farm complexes, roadsides and settlements.

Based on review of federal registers and municipal and provincial heritage inventories, James Rowe House, a two-storey white clapboard building, is located adjacent to the study area at 299/301 Front Street West. This property is a Part IV designated heritage property located on the shoreline of Whitby Harbour and is considered a significant structure to the Town of Whitby. However, as no work is proposed in the immediate area of James Rowe House for any of the proposed alternatives, a Cultural Heritage Evaluation Report was not required as a part of this study.





**Legend:**

- Boundary of Port Whitby Community
- Low Density Residential
- Medium Density Residential One
- Medium Density Residential Two
- Mixed Use Residential One
- Mixed Use Residential Two
- High Density Residential Mixed Use
- High Density Residential
- Community / Institutional
- Commercial
- Utilities
- Prestige Industrial
- Major Open Space
- Natural Hazard Area
- Environmental Protection Area
- C Cemetery
- M Marina
- F Fire Station
- \* Major Transit Station
- Proposed Roads
- Existing Road Network
- Active Transportation Network / Connections
- Waterfront Trail (Improved)
- Ground Floor Animation

**PORT WHITBY COMMUNITY  
SECONDARY PLAN**

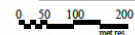


**Official Plan  
Town of Whitby**

**SCHEDULE**



**Consolidation Date:**  
July 2018



**Figure 3. Land Use Zoning (Port Whitby Community Secondary Plan, July 2018)**

## 4.6 Existing Utilities and Services

In addition to public notices (see **Section 9.1** below), requests were made to Ontario One Call for information regarding existing utilities located below Victoria Street West and Watson Street West within the study area. The utility report received from Enbridge indicates that no buried gas line is located within the work area.

As-builts of the existing services below Victoria Street West and Watson Street West have been provided to the Project Team by Durham Region. A 600 millimetre diameter storm sewer, 600 millimetre diameter sanitary sewer, and 300 millimetre diameter watermain and 300 millimetre diameter gas line are located within the study area on Victoria Street West. In addition, traffic conduits used to service the nearby traffic lights at the intersection of Watson Street West and Victoria Street West are noted to cross through the study area on Victoria Street West. An existing 600 millimetre sanitary sewer and 500 millimetre watermain cross the study area on Watson Street West. Further investigation into the existing utilities located within the study area is recommended during the detailed design stage of the project.

## 4.7 Rowe Channel Hydrology and Hydraulics

A hydrology and hydraulic assessment was completed for Rowe Channel to examine existing conditions, and determine hydraulic parameters which are to be considered during the development of the proposed alternatives.

### 4.7.1 Hydrologic Modelling

Hydrologic computer modelling of the Pringle Creek watershed using Visual Hymo Suite (2013) software, was completed by Candevcon Limited ('Candevcon') as a component of the Pringle Creek Master Drainage Plan Update in 2018. The model was based on the previous hydrologic assessment created in the 1999 Master Drainage Plan Update, which had subdivided the watershed into nineteen (19) drainage catchments with a total watershed area of 2854.9 hectares. The model updated by Candevcon included the delineation of ten (10) additional catchments within the watershed, in addition to the delineation of a new single catchment for Rowe Channel identified as Catchment RC-1 in the model. As per the Master Drainage Plan Update, the total contributing drainage area Rowe Channel used within the hydrologic model is 67.7 hectares. To the north of Highway 401, the northern catchment boundary is defined just south of Dundas Street, between Dunlop Street West and Colborne Street West. The western boundary is located along King Street, and the eastern boundary at Athol Street, east of Brock Street South. To the south of Highway 401, the catchment is defined by Henry Street to the west, Dufferin Street to the east, and Front Street West to the south. Iroquois Park Sports Centre is excluded from this drainage catchment.

Following further review and discussion with Central Lake Ontario Conservation Authority, it is noted that Catchment RC-1 of the Master Drainage Plan Update has an actual contributing drainage area of 114.72 hectares based on the delineated area shown on Drawing 3.1 of the Master Drainage Plan Update report. The catchment area of 67.7 hectares used in the Master Drainage Plan Update hydrology modelling only represents the contributing drainage area located to the north of Highway 401, and therefore results in an underestimation of the peak flows contributing to Rowe Channel in the Master Drainage Plan Update. A Technical Memorandum to

summarize the variations in contributing drainage areas was prepared in July 2021 and is included as **Appendix C**.

As a result of these inconsistencies, Resilient Consulting completed a field investigation to confirm the contributing drainage area to Rowe Channel. A field visit was completed in June 2021 to identify the northern boundary of the contributing drainage area located to the north of Highway 401. Global Positioning System survey equipment was used to collect survey points for verifying overland flow direction at the intersection of Burns Street and Centre Street South. Results of the verification survey indicated that runoff from Centre Street South, north of Burns Street, would be conveyed east along Burns Street. To the east of the Burns Street and Centre Street South intersection, runoff is conveyed towards Brock Street South and therefore excluded from the Rowe Channel drainage catchment. Runoff from south of Burns Street is conveyed south to a culvert under Highway 401, and ultimately discharged into Lake Ontario via Rowe Channel.

To confirm the contributing drainage area to the south of Highway 401, the following reports were reviewed:

- Whitby Station Temporary Parking Lot – Stormwater Management and Flood Analysis Report, IBI Group, October 2008;
- Iroquois Park Storm Sewer System Assessment, G.M. Sernas & Associates Ltd., April 1997; and,
- As Constructed Drawings, Victoria Street, Region of Durham, December 1999.

Runoff from the Whitby GO Station and Iroquois Park Sports Centre were confirmed to discharge into Rowe Channel via Victoria Street West. The resultant total contributing drainage area to Rowe Channel was identified by Resilient Consulting as 83.38 hectares. The contributing drainage area to Rowe Channel was then compared to contributing drainage areas delineated in previous reports, including:

- 1606-1614 Charles Street Rowe Channel Floodplain Analysis, May 2020 by GHD Limited; and,
- Highway 401- Brock Street Interchange SWM Report, January 2018 by Ontario Ministry of Transportation.

**Table 2** below summarizes the different contributing drainage areas that have been delineated to Rowe Channel.

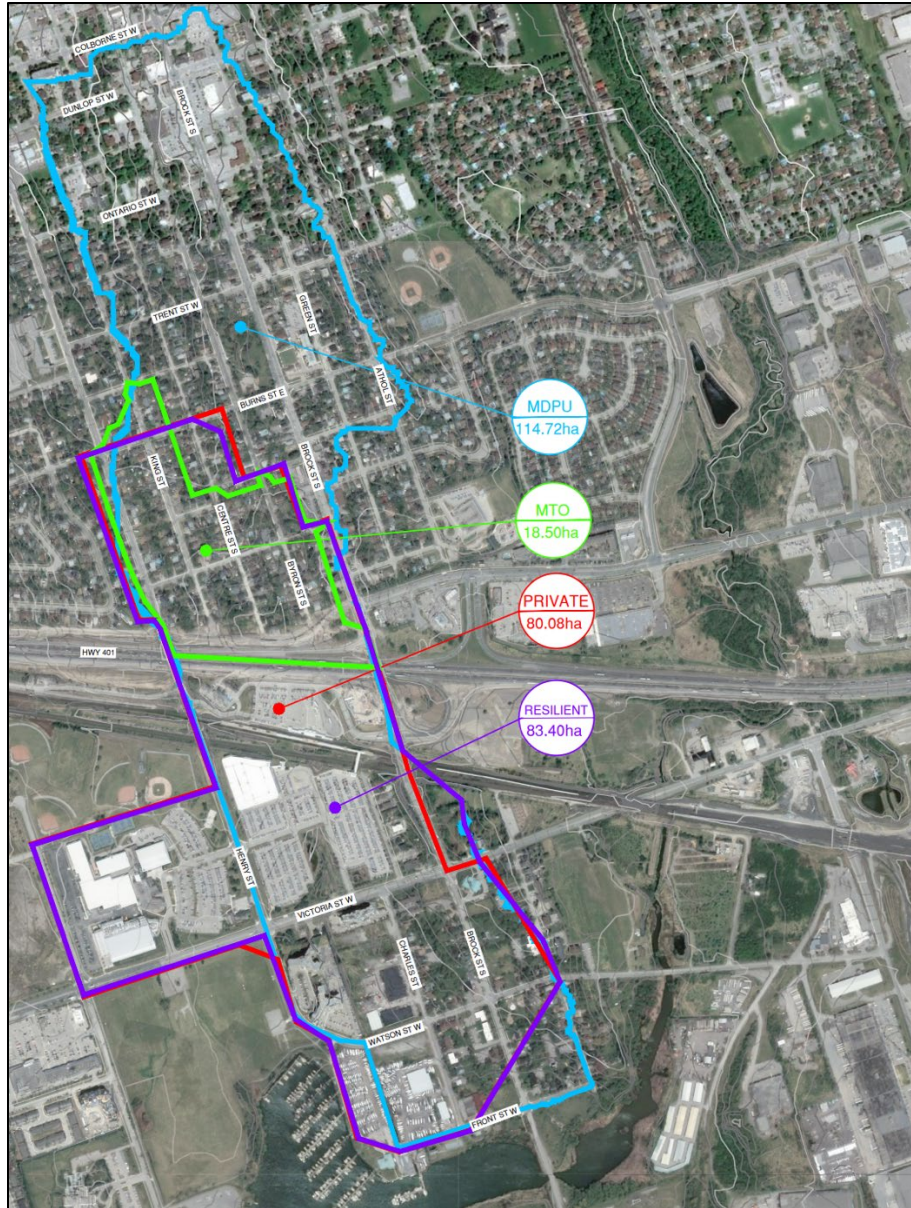
**Table 2. Comparison of Contributing Drainage Areas to Rowe Channel**

Source	Contributing Area North of Hwy 401 (hectares)	Contributing Area South of Hwy 401 (hectares)	Total Contributing Drainage Area (hectares)
Master Drainage Plan Update, Candevcon 2018*	67.70	47.02	114.72
606-1614 Charles Street Development, GHD 2020	19.10	60.90	80.08

<b>Source</b>	<b>Contributing Area North of Hwy 401 (hectares)</b>	<b>Contributing Area South of Hwy 401 (hectares)</b>	<b>Total Contributing Drainage Area (hectares)</b>
Highway 401 and Brock Street Interchange, MTO 2018	18.50	N/A	N/A
Ground-Truthed Delineation, Resilient Consulting 2021	18.68	64.72	83.38

\* Total drainage areas used in the Master Drainage Plan Update model was 67.70 hectares.

A visual comparison of the differences in contributing drainage areas is illustrated in **Figure 4** below.



**Figure 4. Comparison of Contributing Drainage Areas**

Using the contributing drainage area delineated by Resilient, a new hydrology model was prepared using Visual OTTHYMO software. The total contributing drainage area to Rowe Channel was subdivided into 14 catchments, as illustrated in the figure found in **Appendix C**. Detailed model input parameters for each catchment are provided in **Appendix C**.

Similar to the original Master Drainage Plan Update model, peak flows were calculated in the updated model using Toronto City Station Intensity-Duration-Frequency data and the 12-Hour Chicago distribution. Hurricane Hazel is identified as the regulatory storm event for all watersheds located within the Central Lake Ontario Conservation Authority jurisdiction, with the exception of the Pringle Creek watershed where the 100-year storm event is set as the regulatory standard. Therefore, the 100-year event was used as the largest event for completing the analysis for the

proposed Rowe Channel alternatives. Peak flow results from the hydrology model are summarized in **Table 3** below, with detailed outputs from the model provided in **Appendix C**.

**Table 3. Rowe Channel Peak Flows from Resilient Consulting Catchment Delineation**

Flow Change Location	Total Contributing Drainage Area (hectares)	Storm Event	Peak Flow (cubic metres per second)
Upstream of Victoria Street West Crossing (HEC-RAS ID 694.2)	58.13	2 Year	5.98
		5 Year	8.53
		10 Year	10.25
		25 Year	12.56
		50 Year	14.21
		100 Year	16.02
Upstream of Watson Street West Crossing (HEC-RAS ID 385.3)	73.79	2 Year	7.42
		5 Year	10.58
		10 Year	12.77
		25 Year	15.62
		50 Year	17.67
Upstream of Front Street West Crossing (HEC-RAS ID 144.2)	83.38	2 Year	8.12
		5 Year	11.59
		10 Year	13.95
		25 Year	17.16
		50 Year	19.41
		100 Year	21.90

A floodplain analysis of Rowe Channel was completed by GHD Limited in May 2020 to accompany a site plan application for a new condominium (1606-1614 Charles Street) proposed near Rowe Channel. The analysis was completed using PCSWMM modelling software, with flow node locations selected to match an existing HEC-RAS model previously approved by Central Lake Ontario Conservation Authority in 2018. The analysis was run using both the 12-hour Chicago and 6-hour Chicago rainfall distributions; however, the 6-hour distribution was determined to result in the worst-case scenario and was therefore used in establishing the existing floodplain elevations. A comparison of 100-year peak flow values from the Master Drainage Plan Update, Resilient's Visual OTTHYMP modelling, and the GHD Ltd. PCSWMM modelling are provided in **Table 4**.

**Table 4. 100 Year Peak Flow Comparison**

Flow Change Location	100 Year Peak Flows (m <sup>3</sup> /s)		
	Master Drainage Plan Update (Candevcon, 2018)	Visual OTTHYMO Model (Resilient, 2020)	PCSWMM (GHD, 2020)
Upstream of Victoria Street West Crossing (HEC-RAS ID 694.2)	19.42	16.02	9.90
Upstream of Watson Street West Crossing (HEC-RAS ID 385.3)	19.42	19.94	12.80
Upstream of Front Street West Crossing (HEC-RAS ID 144.2)	19.42	21.90	12.80

As demonstrated in **Table 4**, the PCSWMM model results in reduced peak flows along the channel compared to the results from the Master Drainage Plan Update and Resilient's Visual OTTHYMO modelling. This can be attributed to the PCSWMM model providing more time sensitive results, in addition to the accounting for dual drainage systems where minor flows are diverted into the storm sewer system rather than to Rowe Channel.

For the purpose of this study, peak flows determined using Visual OTTHYMO modelling prepared by Resilient Consulting were used in analyzing each alternative. This method provides a conservative peak flow value at each channel crossing location, allowing for the proposed infrastructure upgrades to be adequately sized for the anticipated flow.

#### 4.7.2 Hydraulic HEC-RAS Modelling

Hydraulic modelling and floodplain mapping of Pringle Creek watershed, including Rowe Channel, was developed by Candevcon as a component of the Master Drainage Plan Update in 2018. The model was created using HEC-RAS Version 4.1.0 modelling software and was based on an existing model of the watershed prepared by Central Lake Ontario Conservation Authority in 2007. Cross-section geometry of the channel was determined using 2014 LiDAR topographic data, with all cross-sections being cut from left to right, looking downstream. Existing culvert crossings were coded into the model using a combination of the new LiDAR data and the existing crossing information provided in the 2007 Central Lake Ontario Conservation Authority model.

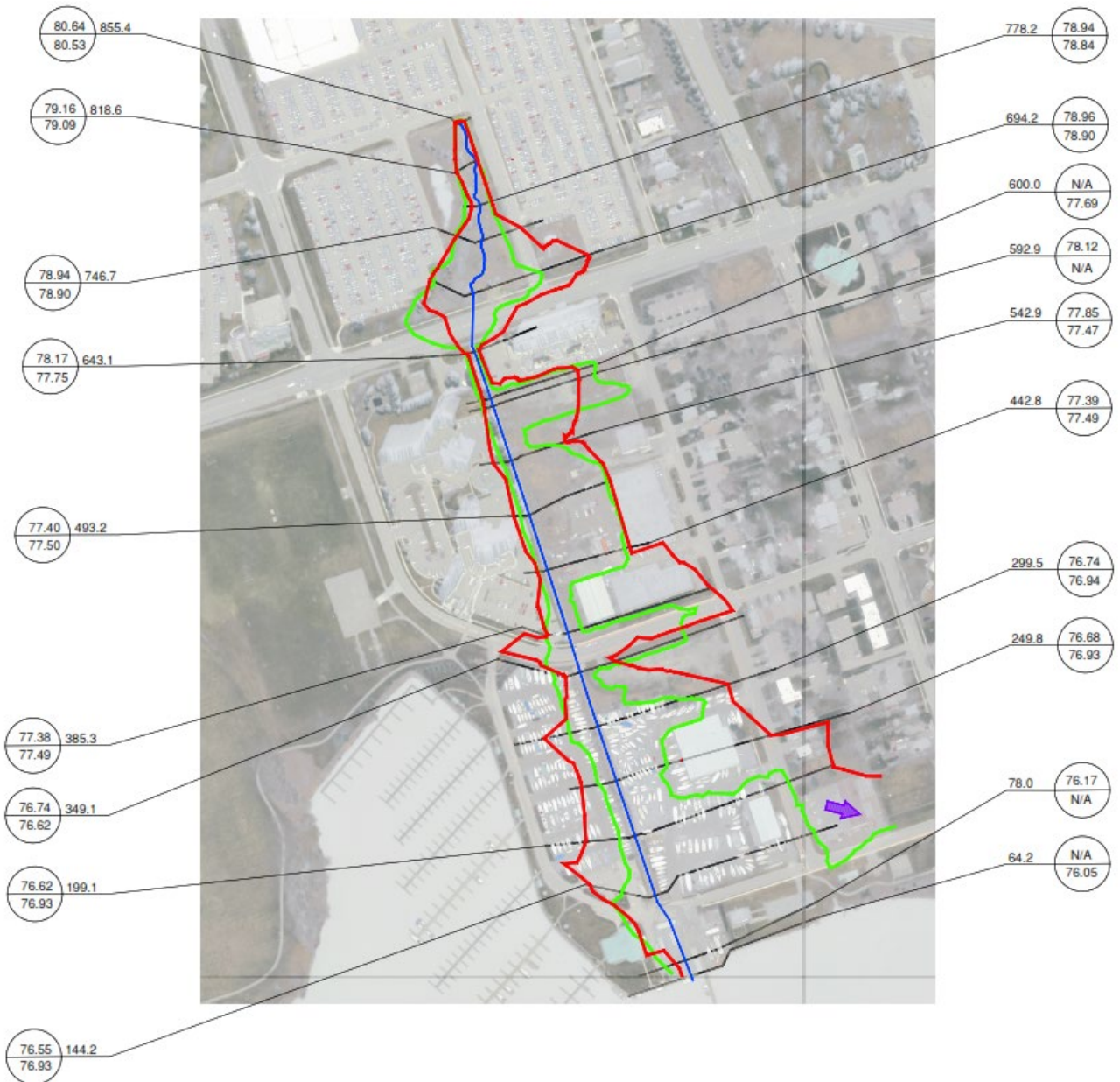
Floodplain mapping, prepared by Candevcon, was generated by inputting peak flows in the HEC-RAS model from the hydrology modelling prepared as a part of the Master Drainage Plan Update. The model downstream boundary condition for Rowe Channel was set at a known water level of 74.8 metres above sea level, based on the historical average water elevation between 1918 and 2016.

Resilient Consulting completed updates to the HEC-RAS model geometry for Rowe Channel in October 2020 as a part of the previously completed Rowe Channel Improvement Feasibility Study. Topographic survey data, collected by Resilient Consulting in November 2019, and Digital Elevation Model data provided by the Town of Whitby was used to update the cross-section geometry along the channel. Two (2) cross-sections from the 2018 HEC-RAS were removed and

replaced, with the new cross-sections determined to more accurately represent the existing channel geometry. The existing culvert crossings were also revised to correspond with survey results and as-built drawings obtained from the Town of Whitby. The flow file from the existing 2018 HEC-RAS model was updated based on the new peak flow values by Resilient Consulting that were determined using the updated contributing drainage area. As part of the previous study completed by Resilient, the downstream boundary condition was updated to 75.20 metres above sea level, based on the historic average high lake level between 1918 and 2018 in Lake Ontario.

The original Master Drainage Plan Update regulatory floodplain and the flood limit estimation generated by Resilient Consulting were plotted on **Drawing FP** as found in **Appendix C**, and are shown on **Figure 5** below. The updated HEC-RAS model and existing 2018 model were observed to result in similar regulatory flood limits in the upper portion of the channel, however the estimated flood limit delineated by Resilient Consulting was noted to be greater for the downstream portion of the study area. This increase is the result of the revised contributing peak flows to the channel, detailed in **Section 4.7.1** above. Further assessment of the existing floodplain of Rowe Channel and the preparation of updated floodplain mapping will not be undertaken as a part of this Municipal Class Environmental Assessment.





**Figure 5. Rowe Channel Floodplain Mapping**

## 5 Identification of Alternative Solutions

The Municipal Class Environmental Assessment process recognizes that there are different ways of solving a particular problem and requires that various alternative solutions be considered. To address the identified problem and opportunity defined in **Section 3**, a range of alternative solutions were developed for upgrading Rowe Channel. The seven (7) alternatives identified for evaluation included:

- Alternative 1- Do Nothing
- Alternative 2- Full Channel Replacement with Pipe
- Alternative 3- Partial Channel Replacement excluding the Victoria Street W Crossing
- Alternative 4- Partial Channel Replacement excluding the Front Street W Crossing
- Alternative 5- Open Channel with Armour Stone Protection
- Alternative 6- Combination of Piped Flow and Overland Flow
- Alternative 7- Partial Diversion of Peak Flow along Victoria Street W

The sub-sections below provide further details regarding each alternative. Conceptual drawings of each alternative are shown as part of the Community Open House materials provided in **Appendix E**.

### 5.1 Alternative 1 - 'Do Nothing'

As mandated in the Municipal Class Environmental Assessment, a 'Do Nothing' alternative was included in this study as a means of providing a benchmark for evaluating other alternative solutions. The 'Do Nothing' alternative would involve leaving Rowe Channel in its current condition. As a result, the existing gabion baskets/ mattresses that line the channel will be at risk of failing, and emergency repairs may be required to ensure that flow within the channel can be maintained. The channel and existing culvert crossing under Victoria Street West, Watson Street West, and Front Street West will continue to overtop during storms greater than the 5-year event.

### 5.2 Alternative 2 - Full Channel Replacement with Pipe

This alternative involves enclosing the existing channel reach within a network of concrete pipes, manholes and catch basins. Preliminary sizing of the proposed pipe network was completed for box pipe alternatives, with final selection of the optimal pipe geometry dependent on further investigations into costs, existing servicing crossings, and other factors that would be examined during detailed design.

The proposed box pipe network would consist of twin 3000 millimetre by 1500 millimetre (or 3 metre by 1.5 metre) concrete pipes, which would extend from the upstream end of Victoria Street West down to the final outlet into Lake Ontario. The existing culvert crossings at Victoria Street West, Watson Street West, and Front Street West, and existing gabion baskets/ mattresses lining the channel would be removed.

Runoff from adjacent properties originally conveyed to the channel via overland flow would be captured and conveyed to the new pipe network through a series of catch basins, and all existing minor outlet pipes would be connected into the proposed concrete pipe. The proposed pipe network would be sized to fully convey the 100-year peak flows detailed in **Section 4.7.1**. Sizing calculations for the proposed pipe network can be found in **Appendix D**.

### 5.3 Alternative 3 - Partial Channel Replacement excluding the Victoria Street West Crossing

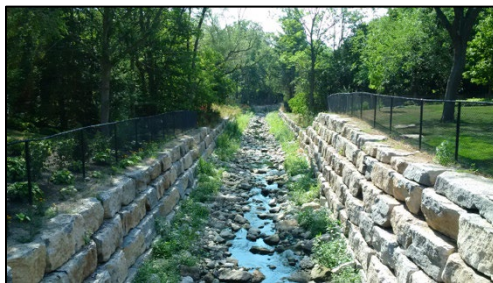
As a part of this alternative, the existing 3000 millimetre by 1500 millimetre (or 3 metre by 1.5 metre) concrete box culvert crossing below Victoria Street West would remain unchanged, with the remainder of the channel downstream of this culvert enclosed within new concrete box pipe. Twin 3000 millimetre by 1500 millimetre box pipes, approximately 583 metres long, would be proposed to connect from the existing Victoria Street West culvert crossing to the outlet into Lake Ontario. The existing culvert crossing on Watson Street West and Front Street West would be removed.

The unchanged Victoria Street West culvert would be anticipated to continue to surcharge and overtop during large storm events. Two (2) intake grates, each 1.5 metres long by 2.5 metres wide, would be proposed on the downstream side of Victoria Street West to capture and convey major peak flow overtopping Victoria Street West into the pipe network. The grates would be required to capture a minimum flow rate of 5.3 cubic metres per second, based on the existing conveyance capacity of the Victoria Street West culvert crossing. Sizing calculations for the proposed pipe network and preliminary intake grates can be found in **Appendix D**.

### 5.4 Alternative 4 - Partial Channel Replacement excluding the Front Street West Crossing

This alternative consists of enclosing Rowe Channel within a concrete pipe between Victoria Street West and Watson Street West, but maintaining an open channel between Watson Street West and Front Street West. Twin 3000 millimetre by 1500 millimetre (or 3 metre by 1.5 metres) concrete box pipes would be proposed upstream of Victoria Street West and extending to the downstream side of Watson Street West, thereby replacing the existing undersized culvert crossings at Victoria Street West and Watson Street West.

The existing open channel between Watson Street West and Front Street West would require reconstruction to remediate the failing gabion mattresses, in addition to increasing the depth and width of the channel to allow for peak flows to be fully contained within the channel banks. Armour stone (see image below), which is typically expected to last more than 100 years, would be proposed to line the banks of the new portion of open channel.



Example of Armour stone used to line the banks of a channel

Preliminary channel sizing, using Bentley FlowMaster modelling software, was completed to determine the minimum channel dimensions required to fully contain the 100-year peak flows. A rectangular channel with a minimum width of 7.0 metres and height of 1.73 metres would provide

adequate capacity to convey the required peak flows, while providing 10 centimetres of freeboard (or room above the high-water mark) to ensure the banks of the channel are not overtopped during large storm events. Sizing calculations for the proposed pipe network and modelling outputs for the open channel can be found in **Appendix D**.

The existing culvert crossing at Front Street West, that outlets into Lake Ontario, would remain unchanged. As a result, localized flooding at the Port Whitby Marina and surcharging of the Front Street West culvert crossing during large storm events would be anticipated to continue following completion the proposed work.

### **5.5 Alternative 5 - Open Channel with Armour Stone Protection**

This alternative involves removal of the existing gabion baskets and mattresses that line Rowe Channel, and replacement of the channel banks using armour stone retaining walls. The existing open portions of the channel, located between Victoria Street West and Watson Street West, and Watson Street West and Front Street West, would be reconstructed to remediate the failing gabion structures and remove sediment that has accumulated along the bed of the channel. A low flow channel could be added within the rectangular channel to facilitate more natural sediment transport and channel function.

A 5.5 metre wide by 1.6 metre high rectangular channel with vertical armour stone retaining walls would provide adequate capacity to convey the required 100-year peak flows within the banks of the channel between Victoria Street West and Watson Street West. Therefore, between Watson Street West and Front Street West, a 5.5 metre wide by 1.7 metre high rectangular channel with vertical armour stone retaining walls would be proposed. The height of the proposed armour stone lining the channel was selected to provide a minimum of 10 centimetre of freeboard (or room above the high-water mark) to ensure the banks are not overtopped during large storm events. Modelling results for the proposed open channel reconstruction are provided in **Appendix D**.

The existing crossings at Victoria Street West, Watson Street West, and Front Street West would each be replaced using twin 3000 millimetre by 1500 millimetre concrete box culverts in order to fully convey peak flows within the channel.

### **5.6 Alternative 6 - Combination of Piped Flow and Overland Flow**

This alternative consists of splitting the 100-year peak flow between an underground pipe network and overland spill route in the location of the existing channel. The proposed underground pipe network would be sized to convey peak flows from the 25-year storm event, with the remainder of the peak flow conveyed overland towards Lake Ontario through a grass lined spillway located above the pipe network. Twin 2400 millimetre by 1200 millimetre concrete box pipes would be proposed beginning upstream of Victoria Street West and extending to the downstream end of Watson Street West. Beginning at the downstream end of Watson Street West, twin 3000 millimetre by 1200 millimetre concrete box pipes would be proposed to convey the 25-year peak flows to Lake Ontario. All existing culvert crossings along Rowe Channel would be replaced.

An overland trapezoidal spillway (see image below) would be proposed above the pipe network between Victoria Street West and Watson Street West, and between Watson Street West and Front Street West. Beginning downstream of Victoria Street West, the spillway would be proposed

to have a bottom width of 8.0 metres, height of 0.4 metres, and side slope of 4:1. Beginning downstream of Watson Street West, the spillway would be proposed to have a bottom width of 8.5 metres, height of 0.45 metres, and side slope of 4:1. Results of the spillway modelling indicate the anticipated maximum flow depth within the channel would be 0.3 metres between Victoria Street West and Watson Street West, and 0.42 metres between Watson Street West and Front Street West; therefore, some freeboard (or room above the high-water mark) would be provided to ensure the spillway is not overtopped during major storm events. Sizing calculations for the proposed pipe network and modelling outputs for the spillway can be found in **Appendix D**.



Example of trapezoidal spillway

## 5.7 Alternative 7 - Partial Diversion of Peak Flow Along Victoria Street West

This alternative includes diverting a portion of the flow originally conveyed within Rowe Channel to a new outlet location into Whitby Harbour. Runoff from the contributing drainage area upstream of Victoria Street West (58.13 hectares) would be captured and conveyed west within a 2400 millimetre diameter concrete pipe under Victoria Street West. The pipe network would be directed under the existing Victoria Field facility and released into Whitby Harbour via a new secondary outfall structure. This diversion pipe would have sufficient capacity to fully convey the 100-year peak flows, and would be independent of the other storm servicing along Victoria Street West. Two (2) large intake gates, approximately 3.0 metre by 3.0 metres, would be required to capture the 100-year peak flows from the contributing drainage area upstream of Victoria Street West. Due to the naturalized state of the channel to the north of Victoria Street West, a 50 percent blockage of the gates was considered when completing the preliminary sizing of the intakes to account for a potential build-up of natural debris.

A secondary pipe network, consisting of a 2400 millimetre by 1200 millimetre concrete box pipe, would be required along the length of the existing channel reach to capture and convey all contributing runoff from properties that border the channel. Adequate intake structures, capable of fully capturing the 100-year storm event, would have to be provided along the channel corridor to capture all overland flow directed towards the channel. Sizing calculations for the proposed pipe networks can be found in **Appendix D**.

This alternative would include the removal of the existing culvert crossing under Victoria Street West, and the replacement of the Watson Street West and Front Street West culvert crossings, therefore reducing the risk of overtopping of the existing roadways.

## 6 Evaluation of Alternatives

Taking the previously described existing environment into consideration, the seven (7) alternatives described above were comparatively evaluated to consider the suitability of each potential solution. The sub-sections below provide further details regarding the evaluation methodology, the comparative evaluation itself, and how the preliminary recommended solution was confirmed as the preferred solution.

### 6.1 Evaluation Methodology

The evaluation used a descriptive or qualitative assessment based on evaluation criteria that were developed specific to this project and take into consideration the definition of the “environment” as defined under the Environmental Assessment Act (see **Section 2.1** above). Evaluation criteria were divided into the following categories, as listed in **Table 5** below.

**Table 5. Evaluation Criteria**

<b>Evaluation Category</b>	<b>Evaluation Criteria</b>
Functional (or Technical) Environment	Hydraulic Performance (Ability to convey water)
	Flood Mitigation
	Erosion Mitigation
	Constructability
	Site Access
Natural Environment	Aquatic Habitat Impact/ Opportunities
	Terrestrial Habitat Impact/ Opportunities
	Sensitive Species Impact/ Opportunities
	Water Quality
Social/Cultural Environment	Safety Impacts/Opportunities
	Recreational Amenity Impact/ Opportunities
	Archaeological and Cultural Heritage Resources Impact/Opportunities
	Adjacent Property Impact/ Opportunities
	Indigenous Community Impact
	Noise, Traffic, Dust Impacts During Construction
Economic Environment	Capital Costs
	Operation and Maintenance Costs

The evaluation criteria reflect all components of the functional (technical), natural, social, and cultural environment, as well as the estimated costs, as required by the Environmental Assessment Act. Each element of the evaluation assessed the impacts in terms of the potential changes from existing conditions, in addition to opportunities for improvement.

To evaluate each alternative, each of the evaluation criteria presented above was assessed in a descriptive manner. A numerical or weighted ranking system was not used. Instead, the evaluation focused on the strengths and weaknesses of each alternative to identify the best possible solution. While set weightings for each criterion were not specifically assigned, all

evaluation criteria are not necessarily equal, and professional judgement and knowledge of the area and issues were used to determine preferences.

Using this assessment, each alternative was ranked as 'more preferred' (green '+'), 'somewhat preferred' (yellow triangle), or 'less preferred' (red 'x'), as depicted by the colours illustrated in **Table 6** below. Upon completion of the evaluation, the alternative with the most criteria identified as 'more preferred' was selected as the preliminary preferred solution, depending on the relative advantages and disadvantages of each environmental effect and whether or not they could be mitigated.

## **6.2 Comparative Evaluation**

The comparative evaluation of alternative solutions is provided in **Table 6** below.





























**Table 6. Comparative Evaluation of Alternative Solutions**















Evaluation Criteria	Alternative Solutions						
	Alternative 1 'Do Nothing'	Alternative 2 Full Channel Replacement with Pipe	Alternative 3 Partial Channel Replacement excluding the Victoria Street West Crossing	Alternative 4 Partial Channel Replacement excluding the Front Street West Crossing	Alternative 5 Open Channel with Armour Stone Protection	Alternative 6 Combination of Piped Flow and Overland Flow	Alternative 7 Partial Diversion of Peak Flow along Victoria Street West
<b>Functional (Technical)</b>							
Hydraulic Performance (Ability to convey water)	Hydraulic performance anticipated to decline due to failure of gabion baskets and mattresses and increase in sediment within channel.	Increase in hydraulic performance. Pipe network has been sized adequately to fully convey runoff.	Increase in hydraulic performance downstream of Victoria Street West crossing. Victoria Street West crossing continues to be undersized and not have adequate capacity to fully contain runoff.	Increase in hydraulic performance except for Front Street West culvert to Lake Ontario. Pipe and open channel have been sized adequately to fully convey runoff. Front Street West culvert continues to be undersized and not have adequate capacity to fully contain runoff.	Increase in hydraulic performance. Open channel replacement has been sized adequately to fully convey runoff. Proposed culvert crossings are also adequately sized to fully convey runoff.	Increase in hydraulic performance during minor storm events only. Pipe network has been sized to fully convey minor storm events. Major flow is contained within the proposed spillway between roadways; however, spills over Victoria Street West, Watson Street West and Front Street West.	Increase in hydraulic performance. Pipe network has been sized adequately to fully convey runoff.
Flood Mitigation	Flooding to continue as per existing conditions during major storm events.	No flooding anticipated. Flows up to 100-year event to be contained within pipe.	Flooding during major storm events at Victoria Street West crossing location.	Flooding during major storm events at Front Street West crossing location.	No flooding anticipated. Flows up to 100-year event to be contained within channel or less than existing conditions.	Flooding anticipated during major storm events at Victoria Street West, Watson Street West and Front Street West.	No flooding anticipated. Flows up to 100-year event to be contained within pipe.
Erosion Mitigation	Existing gabion baskets within the channel continue to deteriorate, resulting in erosion of channel banks.	Removal of erosion risks.	Removal of most erosion risks. Potential for erosion near intake structure downstream of Victoria Street West during major storm events.	Removal of most erosion risks. Potential for erosion during spill of major flow over Front Street West.	Reduction in erosion risks due to armour stone replacement of gabion baskets and mattresses.	Potential for erosion within overland spillway.	Removal of erosion risks.
Constructability	No construction required.	Temporary construction disturbances on Victoria Street West will result in difficult traffic management as it is an arterial road providing access to the Whitby GO	Minor temporary construction disturbance on Watson Street West and Front Street West.	Temporary construction disturbances on Victoria Street West will result in difficult traffic management as it is an arterial road providing access to the Whitby GO	Temporary construction disturbances on Victoria Street West will result in difficult traffic management as it is an arterial road providing access to the Whitby GO	Temporary construction disturbances on Victoria Street West will result in difficult traffic management as it is an arterial road providing access to the Whitby GO	Most complex and intrusive construction process. Requires extensive work along Victoria Street West which contains numerous utilities and services. Victoria



Evaluation Criteria	Alternative Solutions						
	Alternative 1 'Do Nothing'	Alternative 2 Full Channel Replacement with Pipe	Alternative 3 Partial Channel Replacement excluding the Victoria Street West Crossing	Alternative 4 Partial Channel Replacement excluding the Front Street West Crossing	Alternative 5 Open Channel with Armour Stone Protection	Alternative 6 Combination of Piped Flow and Overland Flow	Alternative 7 Partial Diversion of Peak Flow along Victoria Street West
		Station. Minor temporary construction disturbance on Watson Street West and Front Street West.		Station. Placement of armour stone downstream of Watson Street West will be difficult due to limited workspace around channel. Minor temporary construction disturbance on Watson Street West.	Station. Placement of armour stone will be difficult due to limited workspace around channel. Minor temporary construction disturbance on Watson Street West and Front Street West.	Station. Minor temporary construction disturbance on Watson Street West and Front Street West.	Street West is also a main arterial roadway providing access to Whitby GO Station. Minor temporary construction disturbance on Watson Street West and Front Street West.
Site Access	+	▲ Site access from Victoria Street West, Watson Street West and Front Street West. Access may be required from private properties located along study limit.	▲ Site access from Victoria Street West, Watson Street West and Front Street West. Access may be required from private properties located along study limit.	▲ Site access from Victoria Street West, Watson Street West and Front Street West. Access may be required from private properties located along study limit.	▲ Site access from Victoria Street West, Watson Street West and Front Street West. Access may be required from private properties located along study limit.	▲ Site access from Victoria Street West, Watson Street West and Front Street West. Access may be required from private properties located along study limit.	✗ Site access from Victoria Street West, Watson Street West and Front Street West. Access may be required from private properties located along study limit. Access to Victoria Field also required.
<b>Natural Environment</b>							
Aquatic Habitat Impact/ Opportunities	▲ No disturbance to existing habitat. No opportunity to enhance existing habitat. Invasive species will remain.	✗ Removal of invasive aquatic plant species. Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement.	✗ Removal of invasive aquatic plant species. Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement.	▲ Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement. Opportunity for minor improvements to channel form through substrates and minor opportunities for riparian cover between Watson Street West and Front Street West.	+	✗ Removal of invasive aquatic plant species. Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement.	✗ Removal of invasive aquatic plant species. Replacement of degraded existing condition of highly channelized, concrete line channel. Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement.
Terrestrial Habitat Impact/ Opportunities	✗ No disturbance to existing habitat. No opportunity to enhance existing habitat. Invasive species will remain.	▲ Minimal disturbance to existing habitat, can be mitigated. Minor disturbance at outlet into Lake Ontario, considered nominal and unlikely to	▲ Minimal disturbance to existing habitat, can be mitigated. Minor disturbance at outlet into Lake Ontario, considered nominal and unlikely to	▲ Minimal disturbance to existing habitat, can be mitigated. Opportunity to incorporate turtle nesting mounds into open channel design between	+	▲ Minimal disturbance to existing habitat, can be mitigated. Minor disturbance at outlet into Lake Ontario, considered nominal and unlikely to	▲ Minimal disturbance to existing habitat. Minor disturbance at outlet into Lake Ontario, considered nominal and unlikely to impact waterfowl stopover

Evaluation Criteria	Alternative Solutions						
	Alternative 1 'Do Nothing'	Alternative 2 Full Channel Replacement with Pipe	Alternative 3 Partial Channel Replacement excluding the Victoria Street West Crossing	Alternative 4 Partial Channel Replacement excluding the Front Street West Crossing	Alternative 5 Open Channel with Armour Stone Protection	Alternative 6 Combination of Piped Flow and Overland Flow	Alternative 7 Partial Diversion of Peak Flow along Victoria Street West
		impact waterfowl stopover and staging areas, and breeding habitat for Red-necked Grebe. Opportunity to remove existing invasive plant species.	impact waterfowl stopover and staging areas, and breeding habitat for Red-necked Grebe. Opportunity to remove existing invasive plant species.	Watson Street West and Front Street West to provide net increase in suitable habitat. Opportunity to remove existing invasive plant species.	full reach to provide net increase in suitable habitat. Opportunity to remove existing invasive plant species.	impact waterfowl stopover and staging areas, and breeding habitat for Red-necked Grebe. Opportunity to remove existing invasive plant species.	and staging areas, and breeding habitat for Red-necked Grebe. Opportunity to remove existing invasive plant species.
Sensitive Species Impact/ Opportunities	No impact to identified Species at Risk and their associated habitat.	No impact to identified Species at Risk and their associated habitat.	No impact to identified Species at Risk and their associated habitat.	No impact to identified Species at Risk and their associated habitat.	No impact to identified Species at Risk and their associated habitat.	No impact to identified Species at Risk and their associated habitat.	No impact to identified Species at Risk and their associated habitat.
Water Quality	No impact to water quality or opportunity to better existing water quality.	Potential reduction in water quality during excavation of existing channel due to disturbance of sediments. Reduction in water quality within Whitby Harbour due to increased sediment transport through pipe network and increased dredging needs.	Potential reduction in water quality during excavation of existing channel due to disturbance of sediments. Reduction in water quality within Whitby Harbour due to increased sediment transport through pipe network and increased dredging needs.	Potential reduction in water quality during excavation of existing channel due to disturbance of sediments. Between Watson Street West and Front Street West some opportunity to increase water quality through bank stabilization and creation of riparian buffers for filtering sediment and pollutants.	Potential reduction in water quality during excavation of existing channel due to disturbance of sediments. Opportunity to increase water quality through bank stabilization and creation of riparian buffers for filtering sediment and pollutants.	Potential reduction in water quality during excavation of existing channel due to disturbance of sediments. Reduction in water quality within Whitby Harbour due to increased sediment transport through pipe network and increased dredging needs.	Potential reduction in water quality during excavation of existing channel due to disturbance of sediments. Reduction in water quality within Whitby Harbour due to increased sediment transport through pipe network and increased dredging needs.
<b>Social/Cultural Environment</b>							
Safety Impacts/ Opportunities	Instability of existing channel banks and potential for failure a risk to public safety. Open water also potential safety concern.	Public safety improved due to removal of open water and no flooding or spilling of runoff over roadway.	Public safety improved due to removal of open water. Risk to public safety at spill location over Victoria Street West.	Public safety improved due to removal of open water. Risk to public safety at spill location over Front Street West.	Open water remains safety concern. Fencing along channel may be required to protect public.	Public safety concern during major storm events when normally dry spillway conveys a large amount of flow.	Public safety improved due to removal of open water and no flooding or spilling of runoff over roadway.
Recreational Amenity Impact/ Opportunities	No impact to recreational amenities, but no	Opportunity to increase public recreation space	Opportunity to increase public recreation space	Opportunity to increase public recreation space	No impact to recreational amenities, but no	No impact to recreational amenities, but no	Opportunity to increase public recreation space

Evaluation Criteria	Alternative Solutions						
	Alternative 1 'Do Nothing'	Alternative 2 Full Channel Replacement with Pipe	Alternative 3 Partial Channel Replacement excluding the Victoria Street West Crossing	Alternative 4 Partial Channel Replacement excluding the Front Street West Crossing	Alternative 5 Open Channel with Armour Stone Protection	Alternative 6 Combination of Piped Flow and Overland Flow	Alternative 7 Partial Diversion of Peak Flow along Victoria Street West
	opportunity for enhancements.	through trail development.	through trail development.	through trail development along landscaped corridor from Victoria Street West to Watson Street West.	opportunity for enhancements. Potential loss of public access along channel due to required channel width.	opportunity for enhancements.	through trail development. Temporary closure of Victoria Field during construction of secondary pipe outlet into Whitby Harbour.
Archaeological and Cultural Heritage Resources Impact/Opportunities	 No potential impact to archaeological and cultural heritage resources, including James Rowe House.	 Low potential impact to archaeological and cultural heritage resources, including James Rowe House. All potential impacts can be mitigated.	 Low potential impact to archaeological and cultural heritage resources, including James Rowe House. All potential impacts can be mitigated.	 Low potential impact to archaeological and cultural heritage resources, including James Rowe House. All potential impacts can be mitigated.	 Low potential impact to archaeological and cultural heritage resources, including James Rowe House. All potential impacts can be mitigated.	 Low potential impact to archaeological and cultural heritage resources, including James Rowe House. All potential impacts can be mitigated.	 Low potential impact to archaeological and cultural heritage resources, including James Rowe House. All potential impacts can be mitigated.
Adjacent Property Impact/ Opportunities	 No impact to adjacent properties.	 Easement on neighbouring properties may be required to tie in grading above pipe network into existing ground surface.	 Easement on neighbouring properties may be required to tie in grading above pipe network into existing ground surface.	 Easement on neighbouring properties may be required to tie in grading above pipe network, and top of armour stone, into existing ground surface.	 Easement on neighbouring properties may be required to tie in grading above pipe network into existing ground surface.	 Easement on neighbouring properties may be required to tie in emergency spillway grading into existing ground surface.	 Significant impact. Easement will need to be granted to install secondary storm sewer pipe through Victoria Field.
Indigenous Community Impact	 No potential impacts to Indigenous communities, rights, and interests.	 Low potential for impacts to Indigenous communities, rights, and interests.	 Low potential for impacts to Indigenous communities, rights, and interests.	 Low potential for impacts to Indigenous communities, rights, and interests.	 Low potential for impacts to Indigenous communities, rights, and interests.	 Low potential for impacts to Indigenous communities, rights, and interests.	 Low potential for impacts to Indigenous communities, rights, and interests.
Noise, Traffic, Dust Impacts During Construction	 No impact on noise, traffic, and dust.	 Multiple sources of noise and dust due to construction. Some traffic disturbance on Victoria Street West as it is an arterial road providing access to the Whitby GO Station. Minor traffic impact to Watson Street	 Multiple sources of noise and dust due to construction. Minor traffic impact to Watson Street West.	 Multiple sources of noise and dust due to construction. Some traffic disturbance on Victoria Street West as it is an arterial road providing access to the Whitby GO Station. Minor traffic impact to Watson Street West.	 Multiple sources of noise and dust due to construction. Some traffic disturbance on Victoria Street West as it is an arterial road providing access to the Whitby GO Station. Minor traffic impact to Watson Street	 Multiple sources of noise and dust due to construction. Some traffic disturbance on Victoria Street West as it is an arterial road providing access to the Whitby GO Station. Minor traffic impact to Watson Street	 Multiple sources of noise and dust due to construction. Significant traffic disturbance on Victoria Street West as it is an arterial road providing access to the Whitby GO Station. Minor traffic impact to Watson

Evaluation Criteria	Alternative Solutions						
	Alternative 1 'Do Nothing'	Alternative 2 Full Channel Replacement with Pipe	Alternative 3 Partial Channel Replacement excluding the Victoria Street West Crossing	Alternative 4 Partial Channel Replacement excluding the Front Street West Crossing	Alternative 5 Open Channel with Armour Stone Protection	Alternative 6 Combination of Piped Flow and Overland Flow	Alternative 7 Partial Diversion of Peak Flow along Victoria Street West
		West and Front Street West.			West and Front Street West.	West and Front Street West.	Street West and Front Street West.
<b>Economic</b>							
Capital Costs	 No capital costs.	 High capital costs. Earthwork is significant as it will extend full length of existing channel. High material supply cost for concrete box culverts.  Approximately \$ 8.7 Million	 Moderate capital costs. Earthwork and material supply of concrete box culverts have a high cost; however, removal of work on Victoria Street West significantly decreases overall costs compared to other alternatives.  Approximately \$ 7.9 Million	 Moderate capital costs. Earthwork and material supply of concrete box culverts have a high cost; however, removal of work on Front Street West will decrease overall costs compared to other alternatives.  Approximately \$ 5.9 Million	 Low capital costs. Earthworks significant to widen channel for installation of armour stone. High material supply cost for concrete box culverts under roadway and armour stone.  Approximately \$ 4.7 Million	 Moderate capital costs. High cost for earthworks, including grading of spillway. Reduced material supply cost for pipe network due to smaller pipe size.  Approximately \$ 7.1 Million	 High capital costs. Largest material supply cost and earthworks costs. Additional costs associated with major roadway restoration on Victoria Street West.  Approximately \$ 8.4 Million
Operation and Maintenance Costs	 High costs for continued annual maintenance and repair of failing gabion baskets and removal of sediment accumulation in the channel.	 Moderate costs for the maintenance anticipated. Maintenance would include enclosed space inspections of infrastructure every 2 to 4 years, flushing of pipe network to remove sediment accumulation, and minor repairs to pipe where required.	 Moderate costs for the maintenance anticipated. Maintenance would include enclosed space inspections of infrastructure every 2 to 4 years, flushing of pipe network to remove sediment accumulation, and minor repairs to pipe where required.	 Moderate costs for the long-term maintenance of the open channel portion to remove debris buildup. Flushing of pipe network to remove sediment accumulation may also be required.	 Moderate costs for the long-term maintenance of the open channel portion to remove debris buildup.	 Moderate costs for the minor annual maintenance anticipated. Overland spillway to be maintained (removal of debris, landscape maintenance) to ensure spillway maintains design conveyance capacity. Flushing of pipe network to remove sediment accumulation may also be required.	 Moderate costs for the maintenance anticipated. Maintenance would include enclosed space inspections of infrastructure every 2 to 4 years, flushing of pipe network to remove sediment accumulation, and minor repairs to pipe where required.

### 6.3 Identification of Recommended Solution

Based on the comparative evaluation, the most preferred alternative is Alternative 5 – Open Channel with Armour Stone Protection. In addition to an anticipated design life of more than 100 years, resulting in improved erosion risk mitigation, this alternative provides reduced risk of flooding. The selected alternative was also identified as superior to the other alternatives in relation to potential natural environmental impacts and opportunities. Specifically, the open channel alternative will provide for fish passage and habitat within the channel, in addition to providing opportunities to incorporate new terrestrial habitat, such as turtle nesting mounds. Using a low flow channel, more natural sediment transport and watercourse functions can be promoted. Although there may be some temporary potential reduction in water quality in the channel during excavation due to the disturbance of sediments, this recommended alternative also provides the opportunity to improve water quality through bank stabilization and creation of riparian buffers for filtering sediment and pollutants. In addition, with the exception of the 'Do Nothing' alternative which does not address any of the previously described problems or opportunities, the estimated capital costs to construct the new open channel was the lowest. Further, operation and maintenance costs avoid the need for confined space inspections of the piping infrastructure every two to four (2 to 4) years.

Disadvantages of Alternative 5, which can be mitigated, include the incomplete removal of erosion risks, temporary (nuisance) construction disturbances, site access/easement requirements on adjacent private properties, and potential safety concerns regarding standing water in the channel. In addition, rehabilitation of the existing open channel does not provide the opportunity to increase public recreation space through trail development as shown in the Port Whitby Secondary Plan, as there is not sufficient property available for a trail in addition to the channel.

Alternative 5 – Open Channel with Armour Stone Protection was brought forward as the recommended solution for stakeholder review and comment as part of the online Community Open House. As a result, a preference was expressed for both Alternative 5 and by some neighbouring residents and members of the Whitby Yacht Club, for Alternative 2 – Full Channel Replacement with Pipe. Ultimately, Alternative 5 was confirmed as the preferred solution. Further details regarding the Project Team's discussion with the neighbouring residents are provided in **Section 9** below.

## 7 Preferred Solution

As detailed above and shown in **Figure 6, Alternative 5 - Open Channel with Armour Stone Protection** was identified as the preferred solution for upgrading Rowe Channel. The following sections describe the proposed works and considerations recommended to implement the preferred solution.



**Figure 6. Preferred Alternative 5 – Open Channel with Armour Stone Protection**

## **7.1 Temporary Easement Requirements**

The existing Rowe Channel is situated on an approximately 12 metre wide easement that is owned by the Town of Whitby. The existing channel is proposed to be widened to ensure major storm events can be fully conveyed within the channel, thereby reducing the amount of space available to work on Town-owned land. Private property borders the channel between Victoria Street West and Watson Street West, and property owned by the Town of Whitby (Port Whitby Marina) borders the channel between Watson Street West and the outlet into Lake Ontario.

Based on the conceptual design, the proposed upgraded channel width will be contained within the existing easement and additional permanent land acquisition will not be required. However, temporary easements on private property adjacent to the channel will be required to access the full extent of the channel during construction. Agreements with neighbouring property owners will be implemented prior to commencing work to ensure sufficient workspace is available. Restoration of any disturbance on private property will also be completed as part of the proposed work.

## **7.2 Conceptual Design Considerations**

### **7.2.1 Site Preparation and Existing Channel Removal**

Prior to commencing removal of the existing gabion baskets and mattresses, a comprehensive Erosion and Sediment Control Plan to be developed during detailed design must be implemented on site. It is anticipated the Plan will focus on isolation of the work area from the incoming channel flow and will prohibit sediment runoff downstream. Flow bypass around the work area, consisting of a dam and pump type system, should be implemented to ensure the proposed work can be completed in dry conditions. The requirement for a Permit to Take Water from the Ministry of Environment, Conservation and Parks for water takings greater than 50,000 litres per day is not anticipated, nor are any impacts to groundwater. Permits to Take Water are not required for passive and/or active in-stream diversions for construction purposes.

The removal of the existing gabion baskets and mattresses can be done primarily with a small excavator. Where possible, gabion units should be removed fully intact. All wire cages and stone used to fill these cages are to be removed and disposed of offsite. However, the Whitby Yacht Club may be interested in this material for shoreline protection. Further discussion regarding the disposal of gabion materials should take place during detailed design.

Excess fill generated from the excavation of the existing channel banks will be managed in accordance with Ontario Regulation 406/19, which applies to the movement, temporary storage and final disposal of excess soils generated during construction projects. Under the regulation, a Qualified Person must be retained to oversee the management of all excess soil generated on site. Documentation, including a soil characterization report, sampling analysis, and reporting on the proposed soil destination, must be prepared by, or under the supervision, of the Qualified Person. This documentation will ultimately be reported to the online Excess Soil Registry.

### **7.2.2 Bank Restoration with Armour Stone**

Once the existing gabion baskets and mattresses have been removed, excavation to revise the geometry of the existing channel can commence. The proposed preliminary channel design

consists of a 5.5 metre wide by 1.6 metre high rectangular channel between Victoria Street West and Watson Street West, and a 5.5 metre wide by 1.7 metre high rectangular channel between Watson Street West and Front Street West. Excess fill material generated from excavation of the channel is to be removed and disposed of offsite at an appropriate disposal location.

Prior to placement of the armour stone, a filter layer, consisting of bedding stone or geotextile, should be installed against the existing backfill material. This filter layer will ensure fine material located under or behind the armour stone is not washed out through the large voids between the stones. Armour stone is to be stacked along the banks to achieve the required design height. All vertical joints should be tight fitted to minimize gaps. As the wall is currently proposed to be greater than 1 metre high, the design of the wall is to be sealed by a Structural Engineer.

### **7.2.3 Low Flow Channel**

A low flow channel is to be integrated into the design of the project. The low flow channel will assist in maintaining a more natural sediment transport regime, which should reduce the accumulation of sediment within the Rowe Channel. It is noted that during periods of high Lake Ontario water levels, such as in 2017 and 2019, tailwater will be present through the channel, potentially approaching Victoria Street West. During this condition, there is limited potential to reduce sedimentation and maintenance may be required.

### **7.2.4 Riparian Buffers and Fencing**

The opportunity to create riparian buffers along the channel for filtering sediment and pollutants should also be considered as part of the Restoration Plan.

The need for fencing along the channel for public safety purposes will be determined by the Town of Whitby.

### **7.2.5 Culvert Replacement**

The existing culvert crossings at Victoria Street West, Watson Street West, and Front Street West are to be replaced using twin 3000 millimetre by 1500 millimetre (or 3 metre by 1.5 metre) concrete box culverts in order to fully convey peak flows within the channel. Removal of the existing culverts and replacement works must be completed in such a way as to minimize disturbance to local traffic. The roadway, curbs and sidewalks must be restored following culvert installation to match existing conditions.

## **7.3 Climate Change Considerations**

Climate change resiliency and adaptation is now considered an integral part of the design and upgrade of municipal infrastructure. Changing rainfall patterns and more extreme storm events have increased the risk of flooding and damage to both public and private properties. The proposed upgrades to Rowe Channel provide an opportunity to improve the existing hydraulic capacity of the channel, therefore resulting in a reduction of flood risks to the properties that neighbour the channel. The proposed upgrade alternatives have been sized to fully convey the 100-year storm event (i.e., a storm that has a 1 percent chance of occurring during any given year), in addition to providing some additional capacity for more extreme events that can be attributed to climate change.



With the exception of temporary greenhouse gas emissions from construction equipment, the project will not increase greenhouse gases. Rather, the naturalized channel will serve as a small carbon sink. The design of the channel will be confirmed during detailed design.

#### 7.4 Construction Nuisances

In addition to separate, temporary lane closures at Victoria Street West, Watson Street West, and Front Street West during culvert crossing replacements, temporary construction nuisance effects may include dust, noise and vibrations. The severity of impact will depend on various factors such as time of operation, size of equipment, and soil conditions. Although these details will not be determined until detailed design, recommended mitigation measures to minimize the annoyance potential are provided in **Section 8** below.

#### 7.5 Construction Schedule and Timing

Subject to Environmental Assessment clearance and budget approval, detailed design is tentatively planned for 2023, with construction planned to start in 2025. The project may be completed in stages according to available budget and maximizing the life of existing infrastructure. The following potential phasing plan is anticipated:

- Stage 1: Removal of existing gabion baskets and installation of armour stone lined channel between Victoria Street West and Watson Street West – recommended for implementation in the next few years.
- Stage 2: Removal of existing gabion mattresses and installation of armour stone lined channel between Watson Street West and Front Street West – recommended for implementation in the next few years.
- Stage 3: Replacement of the existing 3000 millimetre by 1500 millimetre concrete box culvert under Victoria Street West with proposed twin 3000 millimetre by 1500 millimetre concrete box culverts – can be delayed until culvert crossing nears end of service life.
- Stage 4: Replacement of the existing twin 1900 millimetre by 1200 millimetre concrete box culverts under Watson Street West with proposed twin 3000 millimetre by 1500 millimetre concrete box culverts – can be delayed until culvert crossing nears end of service life.
- Stage 5: Replacement of the existing 3000 millimetre by 1200 millimetre concrete box culvert under Front Street West with proposed twin 3000 millimetre by 1500 millimetre concrete box culverts – can be delayed until culvert crossing nears end of service life.

Assuming there are no outstanding Part II Order requests at the end of the 30-calendar day comment period, construction of the proposed works is tentatively scheduled as follows:

- |                                      |                      |
|--------------------------------------|----------------------|
| • End of 30-day comment period:      | Month 0              |
| • Detailed Design and Tender period: | Month 0 to Month 8   |
| • Stage 1 of Construction:           | Month 8 to Month 11  |
| • Stage 2 of Construction:           | Month 11 to Month 14 |
| • Post Construction Monitoring:      | Month 14 to Month 28 |

Therefore, it is anticipated that the channel upgrades will take approximately six (6) to eight (8) months to complete, depending on a number of construction variables such as ground conditions

and the contractor. Fish timing windows may also restrict the time during which the proposed work can occur.

As noted in **Section 10.2** below, replacement of the undersized culverts at Victoria Street West, Watson Street West, and Front Street West (Stages 3 to 5) can be delayed until the existing culvert crossings reach the end of their service life. As such, Stages 3 through 5 have not been included in the construction schedule recommended above. However, it is recommended that the construction works at Watson Street West and Front Street West occur in the summer (when boats are in the water) to increase available staging areas and minimize impacts at the Port Whitby Marina.

## **7.6 Estimated Costs and Funding**

The cost breakdown has been split into five (5) stages corresponding the recommended sequencing identified in **Section 10.2**. Excavation and earthworks include work associated with removal of the existing gabion baskets and mattresses, concrete liner, culverts, and fill material required to widen the channel, in addition to final backfilling and grading work required to tie in the new armour stone and culverts.

Due to the continuous conveyance of runoff within the channel, dewatering and bypassing of the existing flow will be required during construction. Outfall connection and catch basin installation include works associated with reconnecting existing drainage pipes into the open channel, and the installation of catch basins along the top of the channel to capture surface drainage and convey it into the channel. The cost estimate does not include disposal costs, utility supports, erosion and sediment controls, etc. associated with construction works.

The Town of Whitby will be responsible for all construction and operations/maintenance costs of the Rowe Channel, with the exception of the Victoria Street West culvert, which is a Durham Region asset. Construction has been identified in the Town of Whitby's ten (10) year capital budget and there will be no increase in taxes as a result of this project. To assist in funding construction of the Rowe Channel upgrade, it is recommended that the Town of Whitby apply for provincial and federal funding grants such as the Government of Canada Disaster Mitigation and Adaptation Fund, to reduce the financial contribution requirements of the Town of Whitby.

**Table 7. Alternative 5 Cost Estimate**

Stage	Description	Units	Unit Price	Quantity	Total
Stage 1 – Channel between Victoria Street West and Watson Street West	Traffic Control	Lump Sum	\$ 25,000	100%	\$ 25,000
	Dewatering and Flow Bypass	Lump Sum	\$ 45,000	100%	\$ 45,000
	Excavation and Earthworks	Cubic metre	\$ 50	5,000	\$ 250,500
	Armour Stone Supply and installation	Tonne	\$400	2,750	\$ 1,100,000
	Outfall connections and catch basin installation	Each	\$ 5,000	4	\$ 20,000
<b>Stage 1 Total</b>					<b>\$ 1,440,500</b>
Stage 2 – Channel between Watson Street West and Front Street West	Traffic Control	Lump Sum	\$ 25,000	100%	\$ 25,000
	Dewatering and Flow Bypass	Lump Sum	\$ 45,000	100%	\$ 45,000
	Excavation and Earthworks	Cubic metre	\$ 50	3,500	\$ 175,000
	Armour Stone Supply and installation	Tonne	\$400	2,200	\$ 880,000
	Outfall connections and catch basin installation	Each	\$ 5,000	4	\$ 20,000
<b>Stage 2 Total</b>					<b>\$ 1,145,000</b>
Stage 3 – Victoria Street West Culvert	Traffic Control	Lump Sum	\$ 150,000	100%	\$ 150,000
	Dewatering and Flow Bypass	Lump Sum	\$ 20,000	100%	\$ 20,000
	Excavation and Earthworks	Cubic metre	\$ 50	1,000	\$ 50,000
	3.0 metre x 1.5 metre Concrete Box Pipe	Metre	\$ 5,790	84	\$ 486,255
	Roadway Reconstruction	Square metre	\$150	350	\$ 52,500
<b>Stage 3 Total</b>					<b>\$ 758,755</b>
Stage 4 – Watson Street West Culvert	Traffic Control	Lump Sum	\$ 75,000	100%	\$ 75,000
	Dewatering and Flow Bypass	Lump Sum	\$ 20,000	100%	\$ 20,000
	Excavation and Earthworks	Cubic metre	\$ 50	750	\$ 37,500
	3.0 metre x 1.5 metre Concrete Box Pipe	Metre	\$ 5,790	48	\$ 277,860
	Roadway Reconstruction	Square metre	\$150	250	\$ 37,500
<b>Stage 4 Total</b>					<b>\$ 447,860</b>
Stage 5 – Front Street West Culvert	Traffic Control	Lump Sum	\$ 75,000	100%	\$ 25,000
	Dewatering and Flow Bypass	Lump Sum	\$ 20,000	100%	\$ 20,000

Stage	Description	Units	Unit Price	Quantity	Total
	Excavation and Earthworks	Cubic metre	\$ 50	750	\$ 37,500
	3.0 metre x 1.5 metre Concrete Box Pipe	Metre	\$ 5,790	144	\$ 833,580
	Roadway Reconstruction	Square metre	\$150	250	\$ 37,500
<b>Stage 5 Total</b>					<b>\$ 953,580</b>
<b>Project Total</b>					<b>\$4,745,695</b>

## 8 Mitigation Measures

Construction of the proposed upgrades to Rowe Channel is likely to result in some potential negative impacts. In most cases however, potential impacts will be limited to the period of construction and are considered manageable with the appropriate mitigation techniques. Mitigation involves the application of appropriate measures to eliminate or reduce the negative impacts to ensure that any disturbances are managed by best available methods. For example, the restoration of areas disturbed during construction is considered mitigation. Mitigation measures are discussed in the sub-sections below.

### 8.1 Utilities Avoidance

As noted in **Section 4.6**, requests were made to Ontario One Call to complete preliminary utility locates within the study area at Victoria Street West and Watson Street West. All correspondence and locate information made available has been provided in **Appendix E**. With the exception of the culvert replacement under Victoria Street West and Watson Street West, the proposed channel works are not anticipated to be impacted by the existing utilities. Traffic conduits that service the traffic lights at the Watson Street West and Victoria Street West intersection were identified to cross at the proposed culvert replacement location on Victoria Street West. In addition, as-built drawings of Victoria Street West indicate existing services, including a storm and sanitary sewer, currently cross the existing Victoria Street West culvert crossing. An existing sanitary sewer and watermain were identified to cross the existing culvert on Watson Street West.

Special consideration for these services will be required during the detailed design and construction of the channel upgrade. The detailed design of the proposed channel upgrade must ensure the minimum separation requirements between the existing servicing and the proposed culvert replacements at Victoria Street West and Watson Street West are achieved. Temporary support structures must be implemented during construction to prevent damage or displacement of the existing services. These measures are to be designed by a Professional Engineer who specializes in this type of work.

### 8.2 Erosion and Sediment Control

There is a risk of erosion and sediment transport downstream into Whitby Harbour during the proposed construction works within Rowe Channel. An increase in sediment transport downstream would result in increased dredging needs within the harbour, and ultimately degrade the overall water quality within the channel. Implementation of a comprehensive Erosion and Sediment Control Plan will be required to prevent migration of sediment downstream of the

construction area into Whitby Harbour. This Plan should be completed in accordance with the "Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Control Guideline for Urban Construction" (2006) and include, at minimum:

- Isolation of in-stream work areas with coffer dams and pumps, required to ensure all work is completed in dry conditions;
- Installation of silt fence around the perimeter of the work area, including any construction staging areas. This fencing is to be inspected regularly and is to remain in place until all surfaces contributing to the watercourse are fully stabilized;
- Newly constructed surfaces are to be stabilized and re-vegetated as quickly as possible following completion of the work;
- Installation of mud mats at entrances to the work and staging areas to minimize transport of mud and sediment onto public roads; and,
- Development of a contingency Erosion and Sediment Control Plan in the event that silt is released downstream.

The Erosion and Sediment Control Plan should illustrate the location and details of all erosion and sediment control measures proposed. A maintenance and inspection schedule should also be included in the Erosion and Sediment Control Plan which considers Central Lake Ontario Conservation Authority's Erosion and Sediment Control Inspection Guide (TRCA, 2008). The Erosion and Sediment Control Plan will be developed during the detailed design phase of the project prior to implementation.

### **8.3 Spills Prevention**

The Contractor will be required to prepare a Spills Management Plan and always make it available for implementation in the event of a spill (e.g., diesel). The Plan should include a list of materials, instructions regarding their use and emergency contact numbers, and should indicate that the Ministry of Environment, Conservation and Parks Spills Action Centre must be contacted in the event of a spill. Contract personnel should be educated regarding the Spills Management Plan. In the event that a spill occurs, a spill kit containing commercially suitable absorbent material should be maintained on-site and kept in an accessible area.

### **8.4 Fish and Fish Habitat Restoration**

Rowe Channel has been identified as a permanent watercourse which may support a warmwater fish community. During construction of the channel upgrade, any existing fish habitat may be altered and water quality may be impacted as a result of site erosion and the release of sediment from the proposed works. The suspension of sediment within the channel can cause respiratory stress, reduced feeding, and altered growth for resident fish species. In addition, the accumulation of sediments can bury instream vegetation that are a food source to local fish populations.

To mitigate these potential impacts, construction within the channel should be completed in dry conditions achieved through isolating the work area using coffer dams and a pump dewatering system. This process will reduce sediment transport, therefore reducing potential adverse effects to water quality within the channel. In addition, all in-water works within Rowe Channel must be

conducted within applicable construction timing windows. As the watercourse has been identified as warmwater fish habitat, all in-water construction must be completed between July 15 and March 15 of any given year.

The new channel design will provide opportunities to improve existing fish habitat within the channel. As previously noted, fish habitat within the existing channel is minimal due to the existing unvegetated banks, warm deoxygenated water, sediment accumulation, and invasive plants which act as significant barriers to fish passage. The detailed design should incorporate a mixture of riffles and pool habitat, and must include the removal of invasive vegetation. A low flow channel is to be integrated into the design of the project which will assist in maintaining a more natural sediment transport regime and watercourse function. The design of all proposed fish habitat will be incorporated into the hydraulic analysis during detailed design to ensure the proposed features do not impact the hydraulic function of the proposed channel.

### **8.5 Wildlife, Wildlife Habitat, and Vegetation Restoration**

Whitby Harbour, located downstream of the channel, has been known to regularly support various wildlife species. The harbour is identified as Significant Wildlife Habitat for a waterfowl stopover and staging area, as well as potential habitat for turtle nesting and overwintering. Waterfowl stopover and habitat for other wildlife species within the channel boundaries was noted to be limited. As Whitby Harbour will not be impacted by upgrades to Rowe Channel, the proposed work is anticipated to have limited impact to wildlife habitat within the harbour.

Removal of vegetation along the perimeter of the channel may impact terrestrial ecology during construction, as the vegetation helps maintain the ecological integrity of the channel. To reduce these effects, construction access routes should be identified and maintained through the construction process to minimize disturbance. Tree protection measures should be implemented, which includes the installation of tree protection fencing where required. Restoration plantings should be completed following construction, comprised of native species.

Should wildlife be encountered within or adjacent to the work area during construction, the Contractor shall stop work that could harm or harass the species and report the encounter to the onsite inspector. If the species encountered is determined to be threatened or endangered, the Town of Whitby is to be contacted to determine the next course of action. The Contractor on site is to familiarize themselves with the Species at Risk identified in **Section 4.2.4** of this report.

### **8.6 Invasive Species Management**

As identified in the Natural Heritage Report (**Appendix A**), approximately 49 species of non-native vegetation have been identified within the study area. Excavation of the existing channel will result in the removal of a portion of these invasive species; however, all non-native species located within the work area should be removed prior to the planting of native vegetation post construction. Restoration plans should include invasive species control measures, which may include the application of herbicides. Best Management Practices documents developed by the Ontario Invasive Plan Council should be followed during application of all herbicides used for invasive species management.

## 8.7 Noise, Odour and Dust Control

As noted in **Section 4.4** above, properties adjacent to Rowe Channel consist mostly of high density residential and institution land uses. During construction, nuisance effects such as noise, odour and dust are anticipated to impact these neighbouring properties. A Noise, Odour and Dust Management Plan must be prepared during detailed design to mitigate against these potential effects. The mitigation measures included in the Management Plan must be monitored by an onsite inspector, and revisions to the Plan should be made as needed to minimize the effects on adjacent properties as much as possible. Mitigation measures to be included in the Plan may include:

- Minimize idling of construction equipment and keep equipment in good working order;
- Adhere to noise by-laws which restrict any sounds made by construction activities to set hours;
- Use of effective dust suppression techniques and/or best management practices such as on-site watering of stockpiles and unpaved areas using non-chloride dust suppressants;
- Reduce speed limits on unpaved areas on site;
- Use functional and effective emission control devices on equipment and preferably new or well-maintained heavy equipment and machinery, preferably fitted with muffler/exhaust system baffles and engine covers; and
- Optimize material transfer operations, including reducing distance for material transfers and drop heights, where possible.

## 8.8 Construction Access

As noted in **Section 0**, Rowe Channel is situated on an approximately 12 metre wide easement that is owned by the Town of Whitby. The existing channel is proposed to be widened, thereby reducing the amount of space available to work on Town-owned land. As such, temporary easements on private property adjacent to the channel will be required to access the full extent of the channel during construction. Agreements with neighbouring property owners must be implemented prior to commencing work to ensure sufficient workspace is available. The construction access and work areas must be clearly defined using protective fencing or barriers to minimize disturbance on adjacent properties. Restoration of any disturbance on private property must also be completed as part of the proposed work.

## 8.9 Excess Materials Management

Removal of sediment, existing gabion baskets and mattresses, and concrete from the existing channel will be required during construction of the upgraded channel. These items will need to be characterized and re-used/disposed of in accordance with Ontario's new On-Site and Excess Soil Management Regulation (Ontario Regulation 406/19).

Any temporary stockpiled material must be properly contained in accordance with Ontario Provincial Standard Specification 180. All construction materials, excess materials, and debris must be removed and appropriately disposed of following construction. Where possible, alternatives to recycle or reuse materials will be investigated to reduce the amount of material

directed into landfill facilities. For example, the Whitby Yacht Club may be interested in using the materials for shoreline protection.

A geotechnical investigation will be required during detailed design to confirm the soil makeup of material in and around the channel. If hazardous contaminants are found in the sediment at elevated levels, the removed fill will require special handling as well as disposal at an approved facility.

### **8.10 Archaeological Resources**

The Stage 1 Archaeological Assessment (**Appendix B**) concluded that the study area does not retain archaeological potential, and the area can be considered clear of further archaeological concerns. However, if something of archaeological significance is uncovered during construction, the following directions apply in accordance with Ontario Provincial Standard Specification 100 General Conditions of Contract G3.07.05:

- If previously unknown or unassessed deeply buried archaeological resources are uncovered during construction, the Contractor shall immediately cease work and notify the Town of Whitby's Inspector. Work shall remain suspended within the subject area until otherwise directed by the Town of Whitby in writing, according to subsection GC 7.11, Suspension of Work. The Town of Whitby will contact the Ministry of Heritage, Sport, Tourism and Culture Industries who will confirm the need to engage a licensed consultant archaeologist to carry out any archaeological fieldwork, in compliance with Section 48 (1) of the Ontario Heritage Act.
- If human remains are encountered during construction, the Contractor shall immediately cease all work and notify the Town of Whitby's Inspector. The Inspector must notify the police or coroner and the Town of Whitby. The Town of Whitby will notify the Regional Archaeologist, Registrar of Cemeteries at the Ministry of Government and Consumer Services, and the Ministry of Heritage, Sport, Tourism and Culture Industries. Work shall remain suspended within the subject area until otherwise directed by the Town of Whitby in writing, according to subsection GC 7.11, Suspension of Work.

### **8.11 Advanced Notification**

Public notification should occur in advance of construction to ensure that area residents are informed. Nearby residents and businesses should be notified directly of impending works.

### **8.12 Proposed Monitoring and Maintenance**

As a part of implementing this project, monitoring must be conducted during construction to ensure that:

- Individual mitigation measures are providing the expected control and protection through the construction process;
- The mitigation measures are adequate to minimize or eliminate adverse effects; and,
- Additional mitigation measures are provided, if required, to address any unanticipated adverse environmental effects that arise during construction.



Subsequent recommendations should be made after construction to determine any required operation and maintenance activities required for the channel. These recommendations should include inspection frequency and clean out requirements for the replacement culverts and open channel. During periods of high water levels in Lake Ontario, such as in 2017 and 2019, there is increased potential for sediment accumulation in the channel, and additional monitoring should be completed, with sediment removal activities undertaken as required.

## 9 Communication and Consultation

Communication and consultation are an integral part of the Class Environmental Assessment process. The purpose is to advise all potentially affected stakeholders of the proposed project and to ensure that any comments or concerns are identified as early as possible, documented, and considered. To meet the Municipal Class Environmental Assessment consultation requirements for this Schedule B study, nearby property owners and members of the public, regulatory review agencies, Indigenous communities, and other potentially relevant stakeholders were contacted using a variety of communication tools including e-mail, phone, individual meetings, and an online Community Open House. Other activities included posting of information on the [project website](#) via Connect Whitby, Councillor communications, and an online presentation to members of the Whitby Yacht Club. The following sections document these activities and the feedback received, where applicable.

### 9.1 Public Communications and Consultation Activities

Public communication and consultation activities included newspaper publication and distribution of all three (3) project notices to those on the project mailing list, hosting of the Online Community Open House, and correspondence and meetings with Town Council, interested property owners and community groups. The sub-sections below provide further details regarding these activities. **Table 9** below summarizes the issues that were raised and how they have been addressed. For further reference, a copy of all communication materials and correspondence is included in **Appendix E**.

#### 9.1.1 Project Mailing List

A project mailing list was compiled at the project start and updated throughout the study as required. In addition to the review agencies and Indigenous communities discussed in **Sections 9.2 and 9.3** below, the mailing list included local property owners, utilities, service providers, elected officials, and Town of Whitby and Region of Durham staff. The mailing list was developed based on past projects and the requirements of the Municipal Class Environmental Assessment document. Members of the public and other interested stakeholders were then added to the list when their correspondence was received. A copy of the final project mailing list (with personal information obscured) is provided in **Appendix E**.

#### 9.1.2 Notice of Study Commencement

The proposed project was first introduced to the public via the Notice of Study Commencement. The notice included a brief description of the study purpose and process, a study area map, and study team member contact information. The notice was e-mailed to all those on the project mailing list on March 25, 2021, and mailed to property owners along Rowe Channel the week of

March 22, 2021. All project e-mail correspondence was sent via the project e-mail address: [rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca).

The notice was also published in two (2) editions of the local newspaper, Whitby This Week, on March 25 and April 1, 2021, and made available on the [project website](#).

Other than requests to be added to the project mailing list, no comments were received from local property owners or members of the public as a result of publication of the Notice of Study Commencement.

### **9.1.3 Notice of Online Community Open House**

Due to the ongoing COVID-19 pandemic and concerns over public health and safety, the Community "Open House" was held via an online format, with project informational materials posted on the project website on November 18, 2021 and completion of an online survey or e-mail submission of comments requested by December 17, 2021.

The Notice of Online Community Open House again included a brief description of the study purpose and process, a study area map, and study team member contact information. In addition, it also included notification that the preliminary preferred solution was replacement of the existing channel with an open channel lined with armour stone, and provided an invitation to review the project materials and provide feedback.

The notice was e-mailed to all those on the updated project mailing list on November 18, 2021, and mailed to property owners along Rowe Channel that same week. Town of Whitby staff also directly notified the Mayor and Regional and Town Councillors. The notice was also published in two (2) editions of the local newspaper, Whitby This Week, on November 18 and 25, 2021, and made available on the [project website](#).

### **9.1.4 Online Community Open House**

As advertised in the notice, the Online Community Open House was formally held from November 18 to December 17, 2021, although comments were accepted throughout the duration of the study. An online survey was made available to the public during the Community Open House, which asked general questions but was designed to get respondents thinking about various aspects of the project, including the information presented on existing conditions within the study area, the preliminary preferred solution, and the Schedule B Municipal Class Environmental Assessment process. The online survey questions are included in **Appendix E**.

In addition to online survey responses, a total of eleven (11) comments were received directly from the public via e-mail, online comment boxes, and verbally. Comments received from local property owners or members of the public included requests to be added to the project mailing list, general support for the project, and preferred alternative selection. **Table 9** at the end of this section summarizes the issues that were raised and how they have been addressed.

### **9.1.5 Online Meeting with Whitby Yacht Club**

At the request of the Town of Whitby's Centre Ward 3 Councillor, an online presentation was made to the Whitby Yacht Club during a Board of Directors meeting held December 9, 2021 at 7pm. Project Team members provided an overview of the study area, problem statement, and

Class Environmental Assessment process, and then presented a scaled-down version of the Community Open House slides. Questions were asked regarding the project objectives and whether the materials removed from the channel could be reused for shoreline protection at the Club. See **Table 9** below for further details regarding this exchange and follow-up correspondence.

A copy of the presentation and follow-up correspondence is provided in **Appendix E**. Attendees were directed to Connect Whitby for a full version of the Open House materials.

### **9.1.6 Council Meetings**

A Town of Whitby Staff Report summarizing this study was brought to the Town's Committee of the Whole on June 13, 2022. The Staff Report recommended that the Draft Project File be received as information, that the finalized report be made available for agency and stakeholder review in accordance with the Municipal Class Environmental Assessment process, that Council be advised if any significant comments or concerns are received during the public comment period, and that based on the study recommendations, staff continue to develop the implementation plan for the recommended channel upgrade works, including the update of asset management plans and capital budgets. A copy of the Draft Project File was also made available with the Staff Report. The Staff Report was moved and carried forward by the Committee to Regular Council on June 20, 2022, where its recommendations were approved. A copy of the Staff Report is provided in **Appendix E**. Meeting minutes are available on the Town's [website](#).

### **9.1.7 Notice of Study Completion**

The Notice of Study Completion explained that this Schedule B Municipal Class Environmental Assessment report has been filed for public review and comment for a period of 30-calendar days. The notice formally requested written comments within the 30-day comment period, starting on August 26 and ending on September 24, 2022. As per the Municipal Class Environmental Assessment requirements, the notice also provided further details regarding the process for submitting written objections to the Minister of Environment, Conservation and Parks within the 30-day comment period.

The notice was e-mailed to all those on the updated project mailing list on August 26, 2022, and mailed to property owners along Rowe Channel that same week. The notice was also published in two (2) editions of the local newspaper, Whitby This Week, and made available on the project website.

If no written objections are received by September 24, 2022, the Town of Whitby intends to proceed with detailed design and construction as outlined in this report.

## **9.2 Review Agency Communication and Consultation Activities**

In addition to the public communication and consultation activities described above, relevant regulatory review agencies and service providers (utilities) as listed in the project mailing list (**Appendix E**) were also provided with a copy of the Notice of Study Commencement, Notice of Online Community Open House, and Notice of Study Completion. Additional correspondence was exchanged with the agencies noted in the sub-sections below.

### 9.2.1 Central Lake Ontario Conservation Authority

As a co-proponent (partner) in this proposed project, the Town of Whitby closely coordinated with Central Lake Ontario Conservation Authority staff regarding most aspects of the study. A project kick-off meeting was held March 4, 2021 with staff from the Town of Whitby, Central Lake Ontario Conservation Authority, Region of Durham, and Resilient Consulting. Key discussion points included project background information, the Problem/Opportunity Statement, the Draft Communications and Consultation Plan, and the proposed project schedule.

A second meeting was held October 28, 2021 to discuss the draft Online Community Open House materials, including the evaluation of alternatives and preliminary preferred solution. Following the meeting, the draft open house materials were circulated to Central Lake Ontario Conservation Authority for review and comments were received November 3, 2021. Central Lake Ontario Conservation Authority's comments and the study team's responses are included in **Appendix E**. Meeting minutes are available upon request.

A copy of the Draft Project File (Environmental Assessment Report) was issued to Central Lake Ontario Conservation Authority for review on January 27, 2022. Comments were received on February 17, 2022, which were addressed and incorporated into the Project File. A letter responding to Central Lake Ontario Conservation Authority's comments on the Project File has been included in **Appendix E**.

The updated Draft Project File was submitted to Central Lake Ontario Conservation Authority for a secondary review on April 11, 2022, with comments received on April 28, 2022. A comment response letter was prepared to detail how the comments were addressed and incorporated into the Project File, with a copy of the letter found in **Appendix E**.

### 9.2.2 Fisheries and Oceans Canada

Fisheries and Oceans Canada does not typically respond to Class Environmental Assessment notifications or requests for comment, nor did they for this project. However, preliminary discussions regarding this project were held during other Whitby Harbour discussions with Fisheries and Oceans Canada and marina staff.

Fisheries and Oceans Canada reviews project proposals for impacts to Species at Risk, as well as activities or works being conducted in or near waterbodies that support fish. As such, a Request for Review Form should be submitted to Fisheries and Oceans Canada as part of detailed design, to definitively determine if a Fisheries Act Authorization will be required prior to construction.

### 9.2.3 Transport Canada

Transport Canada responded to the Notice of Study Commencement on April 7, 2021. They requested that the study team self-assess whether the proposed project will interact with a federal property and/or waterway and require approval and/or authorization under any of the Acts administered by Transport Canada. If not, Transport Canada requested to be removed from the mailing list.

Although Whitby Harbour is considered federal property, the Navigable Waters Act does not apply because the outfall located at Lake Ontario does not allow for boat passage or any other "navigation" of Rowe Channel. Likewise, no other approvals or authorizations are required from

Transport Canada. Therefore, Transport Canada was removed from the mailing list and no further correspondence is required.

#### **9.2.4 Crown-Indigenous Relations and Northern Affairs Canada**

Crown-Indigenous Relations and Northern Affairs Canada responded to the Notice of Online Community Open House on November 22 2021. Crown-Indigenous Relations and Northern Affairs Canada comments provided information about the online Aboriginal and Treaty Rights Information System which can be used to identify the location of Indigenous groups and provide users with information pertaining to each group's established or asserted rights. The requirement for further correspondence with Crown-Indigenous Relations and Northern Affairs Canada is not anticipated.

#### **9.2.5 Ministry of Environment, Conservation and Parks**

The Ministry of Environment, Conservation and Parks initially responded to the Notice of Study Commencement on March 25, 2021 by providing information on Ministry of Environment, Conservation and Parks Class Environmental Assessment notification procedures. As a result, the notice was resent that same day to the Ministry of Environment, Conservation and Parks Central Region office, along with the requested Project Information Form. A response was received May 26, 2021, along with Ministry of Environment, Conservation and Parks "Areas of Interest" document (February 2021) which provides guidance regarding MECP's interests with respect to the Municipal Class Environmental Assessment process. This checklist has been filled out and included in **Appendix E**.

Also included was "A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities" and a listing of communities who Ministry of Environment, Conservation and Parks identified as potentially affected by the proposed project. Follow-up correspondence between the consultant team and Ministry of Environment, Conservation and Parks regarding the potential need for an Air Quality Impact Assessment was exchanged on June 1 and 3, 2021. It was confirmed that a quantitative Air Quality Impact Assessment was not required, but rather, dust mitigation measures and/or best management dust practices be considered to minimize off-site impacts at nearby sensitive receptors.

As per Ministry of Environment, Conservation and Parks request, a draft copy of this Project File (Environmental Assessment Report) was issued for review on April 8, 2022. Comments were received from the Ministry of Environment, Conservation and Parks on May 11, 2022, and have been addressed within this Project File report. A copy of the comments received have been included in **Appendix E**.

#### **9.2.6 Ministry of Transportation**

Following up on the Notice of Study Commencement, the Ministry of Transportation was contacted on May 3, 2021 to request a copy of the existing drainage and hydrology report for the Highway 401 widening project through the Whitby area. The report was received on May 13, 2021 and was used to confirm the portion of Highway 401 draining to Rowe Channel and the size of the existing culvert crossing under Highway 401. Further correspondence with Ministry of Transportation is not anticipated.

### 9.2.7 Ministry of Heritage, Sport, Tourism and Culture Industries

The Notice of Study Commencement was issued to the Ministry of Heritage, Sport, Tourism and Culture Industries on April 1, 2021, along with a request for confirmation that a Cultural Heritage Evaluation Report would not be required. Through coordination with Town of Whitby Policy and Heritage Planning staff, it was confirmed that a Cultural Heritage Evaluation Report was not required as part of this Municipal Class Environmental Assessment, provided there is no work being done in the immediate area of the James Rowe House.

An additional comment was received on November 22, 2021 identifying the need for a Heritage Permit to complete the work due to the channel's close proximity to the James Rowe House historical building. The completion of the permit application will be prepared during the detailed design phase of the project.

A copy of the finalized Stage 1 Archaeological Assessment was provided by Archaeological Services Inc. to the Ministry of Heritage, Sport, Tourism and Culture Industries for review and clearance on February 23, 2022.

### 9.2.8 Region of Durham

Region of Durham staff participated in the project kick-off meeting held March 4, 2021 and the progress meeting held October 28, 2021 (meeting minutes are available upon request). A draft copy of the Project File was submitted to the Region on March 18, 2022 for final comment.

### 9.2.9 Utilities

In addition to the Ontario One Call request described in **Section 4.6**, the following utilities or service providers were provided with the public notices:

- Bell Canada
- Enbridge Gas
- Hydro One Networks
- Rogers Communications
- TELUS
- TransCanada Pipelines
- Trans-Northern Pipelines
- Veridian Connections
- Whitby Hydro

Hydro One Networks advised on November 19, 2021 that they do not have any existing Hydro One Transmission assets within the study area. On November 22, 2021, TELUS responded that they do not have any infrastructure within the Rowe Channel study area, but they will need to be notified if the scope of work extends to the nearby railway right-of-way. No other comments have been received to date.

It is expected that during detailed design, plan and profile drawings of the proposed works will be circulated to all relevant utilities and any conflicts will be addressed at that time.

### 9.3 Indigenous Communities Communication and Consultation

Various Indigenous communities were identified as potentially having interests in the general area using the online Aboriginal and Treaty Rights Information System and based on the Ministry of Environment, Conservation and Parks correspondence dated May 26, 2021. In addition to Ministry of Environment, Conservation and Parks list, two (2) other groups were initially identified using the Aboriginal and Treaty Rights Information System (denoted with an asterisk\*). All notices were sent to the identified groups advising them of the project and providing invitation for involvement and/or input. The potentially interested groups identified included:

- Alderville First Nation
- Beausoleil First Nation
- Chippewas of Georgina Island
- Chippewas of Rama First Nation (Chippewas of Mnjikaning)
- Curve Lake First Nation
- Hiawatha First Nation
- Huron-Wendat Nation
- Kawartha Nishnawbe First Nation
- Metis Nation of Ontario\*
- Mississaugas of Scugog Island First Nation
- Six Nations of the Grand River\*

With the exception of those communities in the sub-sections below, no further correspondence has been received to date. A final request for comments was made with distribution of the Notice of Study Completion.

#### 9.3.1 Curve Lake First Nation

Correspondence received from Curve Lake First Nation on March 30, 2021 provided updated contact information and follow-up correspondence dated April 20, 2021 requested a File Fee and further information, as well as provided a link to "Curve Lake First Nation's Consultation and Accommodation Standards". The document was reviewed and a response to Curve Lake First Nation's request was issued May 3, 2021, and again on June 20, 2021 and August 17, 2021. As requested, the response summarized how the project would address the following areas of concern to Curve Lake First Nation within their Traditional and Treaty Territory: possible environmental impact to drinking water; endangerment to fish and wild game; impact on Aboriginal heritage and cultural values; and to endangered species, lands, savannas, etc. Payment of the requested File Fee was sent via mail June 20, 2021, and a copy of the Draft Stage 1 Archaeological Assessment was sent for review and comment, as requested, on August 12, 2021. Curve Lake First Nation subsequently confirmed their agreement with the Stage 1 findings, and requested that their Oral History be included in the report. A revised copy of the Stage 1 Archaeological Assessment was then issued on February 22, 2022 and confirmed acceptable by Curve Lake First Nation on the same day. No further comments from Curve Lake First Nation are anticipated.

### **9.3.2 Huron-Wendat Nation**

A response was received from Huron-Wendat Nation on March 28, 2021, acknowledging receipt of the Notice of Study Commencement, requesting to be kept informed, and providing additional contact information. Results of the Stage 1 Archaeological Assessment were issued along with the Notice of Online Community Open House on November 18, 2021. No further correspondence has been received to date.

### **9.3.3 Metis Nation of Ontario**

A response was received from the Metis Nation of Ontario on November 22, 2021, providing updated contact information, and noting that if there is any concern, further correspondence would be issued within approximately 15 business days. However, the e-mail also noted that from an initial assessment, it would be unlikely that the Metis Nation of Ontario would have concerns, and that the recommended open channel design makes sense. Results of the Stage 1 Archaeological Assessment were issued along with the Notice of Online Community Open House on November 18, 2021. No further correspondence has been received to date.



**Table 8. Comments and Response Summary**

No.	Received from/Type/Date	Comment or Comment Summary	Response
<b>Project Overview</b>			
1	Verbal comment received from member of Whitby Yacht Club, December 7, 2021	Is the objective of the project strictly rehabilitation of the existing channel or is the objective to reduce flooding, or is there some other reason for the project?	The focus of the project is on addressing the pending problem of failing gabions, which would result in erosion and flooding. However, capacity improvements will likely result as the intent is to safely convey the flow during the 100-year rainfall event.
<b>Alternatives and Preliminary Preferred Solution</b>			
2	Online comment received from member of the public, November 18, 2021	I do not see a separator structure to assure contaminants do not enter Lake Ontario. Existing vegetation acts like a filter capturing garbage etc., it also is a habitat for birds, amphibians and Coyote, Fox and Raccoon trails. Lack of maintenance and control of Phragm has led to the overgrowth of this invasive species but does act like a filter. Complete box culvert covered with pedestrian walkway and landscaping with a separation system prior to outfall to the bay/lake.	The Rowe Channel is considered as a receiver of stormwater and not a treatment system. Stormwater is typically managed prior to discharge to a watercourse through treatments such as the stormwater management pond at the Whitby GO station. As per natural environment investigations, the Rowe Channel connects fish habitat north of Victoria with Lake Ontario. Fish passage through the Rowe Channel is therefore encouraged according to numerous policies. In addition to being expensive, installation of an oil/grit separator would impact fish/wildlife passage. To enclose the Rowe Channel, environmental approvals from Department of Fisheries and Oceans and Central Lake Ontario Conservation Authority would be required and may not be possible.
3	Online comment received from member of the public, November 18, 2021	My preference is the open channel with armour stone. This supports both the directing of run off and the environmental advantages of the open channel for native reeds and grasses to sink carbon and provide habitat for the birds and fish species that inhabit the current channel. A cost effective and sustainable key to climate change mitigation is	Acknowledged, thank you.

No.	Received from/Type/Date	Comment or Comment Summary	Response
		preservation and protection of natural habitat to sink carbon and promote ecological diversity using natural infrastructure.	
4	E-mail received from member of the public, December 3, 2021 (and restated in second e-mail received December 7, 2021)	A number of residents in the three condo buildings located just south of Victoria Street West and close to the open channel believe the best solution would be to replace at least the portion of the channel south of Victoria and north of Watson with pipes, completely closing off that part of the channel. As stated in your Public Notice this solution would reduce flooding risk and most importantly reduce the presence of invasive species that are attracted to the area due to the swamp like conditions.	The preferred alternative is to replace the existing gabion lined watercourse with a new armour stone open watercourse. As per natural environment investigations, the Rowe Channel connects fish habitat north of Victoria with Lake Ontario. Fish passage through the Rowe Channel is therefore encouraged according to numerous policies. To enclose the Rowe Channel, environmental approvals from Department of Fisheries and Oceans and Central Lake Ontario Conservation Authority would be required and may not be possible.
5	E-mail received from member of the public, December 7, 2021	<p>The following are names of the residents in the 3 condo buildings that have been approached and support the solution to enclose the portion of the channel between Victoria and Watson. More than 90% of the residents that have been approached support the enclosure solution and no doubt at least a 75% support level would be maintained if all residents were approached.</p> <p>Other problems resulting from the open channel are: 1) a large spider infestation is damaging the paint of cars parked both on level 1 and level 2 and our superintendent spends time cleaning it up; and 2) the tall vegetation in the channel obstructs drivers view when exiting the garage onto Watson.</p>	<p>Acknowledged, thank you.</p> <p>As correctly noted by your neighbour (see comments in 6 below), all alternatives other than the “do nothing” option will address the vegetation issue. An issue related to spiders in the parking garage is beyond the scope of this project.</p>
6	E-mail received from member of the public, December 9, 2021	I support the preferred option (5) as the most effective way to address possible future flooding events, at the least cost.	Acknowledged, thank you.

No.	Received from/Type/Date	Comment or Comment Summary	Response
		<p>The letter you have received speculates about the level of support from condominium residents for a piped option. This is just speculation.</p> <p>The letter also mentions a 'spider infestation' problem. I am active on our Board and am unaware of such a problem. I would point out that, even if such a problem exists, there is no evidence that it is caused by the Rowe channel.</p> <p>The letter further says that the tall vegetation obstructs driver's views. While I personally disagree that this is the case, I'd note that all options, other than "do nothing", will address the vegetation issue.</p>	
<b>Operational and Construction-Related Impacts</b>			
7	Verbal comment received from member of Whitby Yacht Club, December 7, 2021	Will the material removed from the channel be available as the Whitby Yacht club may be looking at re-using material for shore protection?	Re-use of material locally is preferred over hauling it off-site. It may also be possible to stockpile materials at the Yacht Club and this is to be discussed further during detailed design.
<b>General and Miscellaneous Comments</b>			
8	E-mail received from local resident, April 13, 2021	As the Town of Whitby allowed the truck depot to be built on Victoria Street west of us, we are forced to listen to the big trucks race by us in both directions, starting about 4am as they exit at Brock Street to/from the 401. When trucks are proceeding west from Brock exit, I am forced to listen to a big "boom" sound which rattles my windows. This sounds like a sonic boom when inside our homes. I have watched for years, and it happens as they pass over the Rowe channel as they travel Victoria Street. It is not a desirable noise to have to put up with numerous times a day.	<p>Thank you for your e-mail. We will consider your request if the study determines that the preferred solution requires construction works on Victoria Street. In the meantime, we have forwarded your e-mail to the Region of Durham because Victoria Street is the Region's responsibility because it's a regional road.</p> <p>We've also added your e-mail address to our project mailing list. A Community Open House is tentatively planned for Fall 2021 to provide further project details and obtain</p>

No.	Received from/Type/Date	Comment or Comment Summary	Response
		Could you please consider fixing the dip in the road at the same time that the channel project is being done? It would be very much appreciated.	feedback. You will receive e-mail notification of the Open House at that time.
9	E-mail received from member of the public, December 9, 2021	The Board of Directors of the Sailwinds has chosen not to make a corporate submission, on behalf of its condominium owners, in this consultation. Please do not interpret this as an indication that the letter represents the views of the Board of Directors.	Acknowledged, thank you.
10	Verbal comment received via phone from nearby land developer, December 15, 2021	We are in the middle of securing building permits for a five-building project. When you are free can you please call me to discuss your project, and can I please be added to the project emailing list?	Please refer to the Rowe Channel Upgrade Study Online Community Open House materials found on the Town’s website. This is also where you can find resources for providing your comments/feedback for this study.  We’ve added you to the project mailing list.
11	E-mail received from nearby property representative, January 14, 2022	Through correspondence with Central Lake Ontario Conservation Authority, we understand the regulatory floodplain elevation is 77.39 metres. According to the Pringle Creek Master Drainage Study, the flood standard used within the Pringle Creek watershed should be from the 100-year storm event. Having said that, was this elevation or a different elevation used as a factor when conducting your analysis/modelling for the alternatives? Did you also take into account any regional storm events?	The notice of completion is scheduled to be filed in the next month or two, and the Project File will be made available for review by the public at that time. The Project File contains more detail than what was provided through the online Community Open House material.  Hydrologic modelling was completed and is summarized in the Project File. Our understanding is that the 100-year storm is the regulatory event for the Rowe Channel. Our analysis is looking at return period (2 to 100 year) flows only, and we did not analyze the Hurricane Hazel event.
		With each option, particularly the favoured Alternative 5, if they are implemented, what would the new floodplain elevation be and would it be contained within the upgraded channel?	Basic hydraulic and floodplain analysis of existing conditions was completed but is not intended for analysis of development limits.

No.	Received from/Type/Date	Comment or Comment Summary	Response
			<p>It should be noted that the recommended alternative will be implemented in phases to maximize the lifespan of existing infrastructure, specifically existing culverts. Therefore, the culvert at Watson may not be replaced for some time.</p>
		<p>Was there any modelling done in association with this study? Is there any modelling done for alternative 5 specifically? Would you be able to provide us with this?</p>	<p>Any additional questions related to model requests, development potential or development applications should be directed to the Town and Central Lake Ontario Conservation Authority (reviewer for development limits related to flooding).</p>

## 10 Project Implementation

The following sections discuss the permit and approval requirements anticipated during detailed design and the recommended construction staging to be confirmed as part of the later phases of the project.

### 10.1 Permits and Approvals

As the proposed channel upgrade is located within a regulated area and will require in-water works, review and approval by a variety of review agencies will be required. Refer to **Table 9** below that summarizes the approval requirements for the project.

**Table 9. Summary of Permits and Approvals**

Agency	Required Permit/ Approval	Justification
Central Lake Ontario Conservation Authority	Permit Under Ontario Regulation 42/06	Rowe Channel is located in an area regulated by Central Lake Ontario Conservation Authority. Consultation with Central Lake Ontario Conservation Authority has been undertaken throughout the Municipal Class Environmental Assessment process. Permit application to be submitted during detailed design.
Fisheries and Oceans Canada	Authorization under the Fisheries Act	Fisheries and Oceans Canada review will be required for this project based on the new fish and fish habitat protection provisions that came into effect in 2019. Correspondence with Fisheries and Oceans Canada shall be undertaken during the detailed design phase.
Region of Durham	Authorization and Road Occupancy Permit	The proposed works will require construction under and adjacent to Victoria Street West, which is a regional roadway. Consultation with the Region has been undertaken throughout the Municipal Class Environmental Assessment process. Authorization will be required before proceeding, and a permit must be received prior to construction.
Ministry of Heritage, Sport, Tourism and Culture Industries	Archaeological Clearance	The finalized Stage 1 Archaeological Assessment has been submitted to Ministry of Heritage, Sport, Tourism and Culture Industries for review and clearance.
Town of Whitby	Heritage Permit	A Heritage Permit to undertake work in close proximity to the James Rowe House historical building will be required from Policy and Heritage

Agency	Required Permit/ Approval	Justification
		Planning. Completion of the permit application will be prepared during the detailed design phase.
Resources Productivity and Recovery Authority	Excess Soil Registry	Projects that generate 2000 cubic metres or more of excess soil are to be registered on the Excess Soil Registry, in accordance with Ontario Regulation 406/19. All excess fill material generated during the construction of the Rowe Channel upgrade, and the final disposal site of this material will be documented in support of the filing of the Registry by a "Qualified Person".

Should additional permitting requirements be identified, they should also be sought during the detailed design phase.

## 10.2 Construction Staging

The proposed works consist of removal of the existing near-failing gabion baskets and mattresses that line the existing channel and replacement of the channel banks using armour stone retaining walls. The existing crossings at Victoria Street West, Watson Street West, and Front Street West are also to be replaced using twin 3000 millimetre by 1500 millimetre (or 3 metre by 1.5 metre) concrete box culverts in order to fully convey peak flows within the channel. These proposed channel and culvert upgrades can be completed independently, thereby lessening the upfront financial commitment required to complete the work.

It is recommended that the proposed project be subdivided into five (5) stages:

- Channel upgrades between Victoria Street West and Watson Street West;
- Channel upgrades between Watson Street West and Front Street West;
- Culvert replacement at Watson Street West;
- Culvert replacement at Front Street West; and,
- Culvert replacement at Victoria Street West (Regional project with timing to be determined by the Region).

As replacement of the gabion baskets and mattresses is a top priority, open channel upgrade works are recommended to be completed first, within the next few years as capital budget is available. The existing culvert crossings at Victoria Street West, Watson Street West, and Front Street West are expected to overtop during major storm event runoff; however, they are in acceptable working condition and do not require immediate replacement. Replacement of these culvert crossings can be completed at the end of their service life, or when deemed necessary by the Town of Whitby's Public Works Department. It is noted that Victoria Street West is controlled by Durham Region. While recommended by this study for hydraulic reasons, replacement of this crossing would be considered a Regional project to be implemented at the Region's discretion.

The proposed construction staging and work plan will be further defined at the detailed design stage. During detailed design, hydraulic analysis of each stage should be completed to ensure that flood limits are reduced in comparison to existing conditions.

## 11 Next Steps and Future Commitments

Upon completion of the 30-day public comment period and Municipal Class Environmental Assessment clearance, it is recommended that the preferred solution proceed to detailed design, approvals and construction as outlined in this report.

The following list provides a preliminary set of commitments that must be completed prior to implementation of the proposed Rowe Channel upgrade and/or post construction:

- Confirm mitigation measures outlined in **Section 8**, including further refinement to be completed during the detailed design stage;
- Develop detailed design drawings, including Removal, Erosion and Sediment Control, Grading, Spill Management, Noise, Odour and Dust Management, and Restoration Plans;
- Undertake a geotechnical assessment to confirm soil quality for offsite disposal and groundwater elevations;
- Refine hydraulic assessment based on detail design channel geometry. Hydraulic modelling and floodplain mapping will be required at each stage of implementation of detail design, which will demonstrate the containment of the 100-year flood within the channel and easement;
- Continue to consult with review agencies (Central Lake Ontario Conservation Authority, Fisheries and Oceans Canada, Ministry of Heritage, Sport, Tourism and Culture Industries, Region of Durham, etc.), utilities, Indigenous communities, and other relevant stakeholders, as applicable;
- Continue correspondence with the Whitby Yacht Club regarding the possibility of using disposed gabion materials for shoreline protection. The placement of materials for shoreline protection within the Whitby Harbour will require coordination and permitting through Ontario Regulation 42/06 of the Conservation Authorities Act;
- Initiate discussions with adjacent property owners to obtain temporary easement agreements, as required;
- Obtain permits and approvals identified in **Table 9**.
- Implement the works through a staged implementation plan as described in **Section 10.2**. Stages 1 and 2 should be implemented in the next few years, with stages 3 to 5 implemented as each existing crossing nears the end of its service life.
- Following construction, all disturbed areas will be restored to their existing condition or better.

If additional measures are noted during the detailed design phase, these will be captured as part of the construction tender documents.



# APPENDIX A

## Natural Heritage Existing Conditions and Constraints Analysis Report

October 8, 2021

# Rowe Channel Upgrade Study

DRAFT Natural Heritage Existing  
Conditions and Constraints Analysis

Prepared for

The Town of Whitby



north-south  
ENVIRONMENTAL

## **Project Study Team**

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# Rowe Channel Upgrade Study – Natural Heritage Existing Conditions and Constraints Analysis Report

## 1. Introduction

The Town of Whitby has retained a consulting team led by Resilient Consulting to undertake a study of rehabilitation options for the Rowe Channel from Victoria Road West to the channel outlet at Whitby Harbour. Improvements and/or rehabilitation of this reach of the Rowe Channel are required in order to address structural issues (e.g., deteriorating gabion baskets and bank erosion) and increase flow capacity to accommodate future intensification in the area. There are also opportunities for ecological restoration and enhancements to the channel.

The upgrade study is being led by Resilient Consulting and involves an ongoing Municipal Class Environmental Assessment (EA), which includes public consultation and an evaluation of alternative options for improvements/ rehabilitation. North-South Environmental Inc. (NSE) was retained in order to provide natural heritage expertise and support for the project, culminating in this Natural Heritage Report, which provides a detailed description of the existing natural heritage features and functions in the study area and a summary of natural heritage constraints. This report is not intended to fulfill the requirements of an Environmental Impact Study (EIS), which may be required as part of a future detailed design and/or construction tender.

### 1.1. Study Area and Site Context

The study area for this project included a 600 m reach of the Rowe Channel from immediately downstream (south) of Victoria Street West to the channel outlet at Whitby Harbour in addition to terrestrial and aquatic features within 120 m of this reach (see **Map 1** in **Appendix 1**). This reach of the Rowe Channel is situated in a heavily urbanized area with minimal adjacent natural habitats. Land cover in the study area is primarily urban with a large proportion of impervious surfaces. Much of the catchment area is occupied by large parking lots surrounding the Whitby GO Station.

## 2. Policy Review

A brief overview of the federal, provincial and municipal policies which apply to natural heritage features in the study area is provided below.

### 2.1. Federal Policies

#### 2.1.1. Fisheries Act (1985)

The federal *Fisheries Act* regulates the harm and destruction of fish and fish habitat in Canadian

waterways. Modifications to the Rowe Channel below the high water mark are regulated under the *Fisheries Act* and will require review and/or authorization by Fisheries and Oceans Canada (DFO).

### **2.1.2. Migratory Birds Convention Act (1994)**

The federal *Migratory Birds Convention Act* (MBCA) regulates the harm or destruction of most birds and their nests in Canada. Active nests of most bird species are protected under MBCA, which will affect the timing of vegetation clearing if and when construction is undertaken.

### **2.1.3. Species at Risk Act (2002)**

The federal *Species at Risk Act* (SARA) regulates the destruction, harm and/or collection of Species at Risk (SAR) and their habitat in Canada. The SARA applies to federally-owned lands and all Canadian waterways but does not apply to species in terrestrial ecosystems.<sup>1</sup> SARA would apply to aquatic SAR (e.g., fish, freshwater mussels, etc.) which occur in the Rowe Channel or other waterways in the study area. However, no aquatic SAR were identified in the study area.

## **2.2. Provincial Policies**

### **2.2.1. Provincial Policy Statement (2020) under the Planning Act (1990)**

Ontario's Provincial Policy Statement (PPS) under the *Planning Act* is the primary policy document guiding land use in Ontario's municipalities. The current PPS was released in 2020 and replaces previous PPSs released in 2014, 2005 and 1997. Section 2.1 of the PPS applies to natural heritage features and functions, most importantly:

- Policy 2.1.4 prohibits development and site alteration in Provincially Significant Wetlands
- Policy 2.1.5 prohibits development and site alterations in other *significant* natural heritage features except where it can be demonstrated that there will be *no negative impacts* on those features or their ecological function.

One of the primary purposes of this Natural Heritage Report is to identify *significant* natural heritage features which are protected under the policies of the PPS and therefore represent constraints to development.

### **2.2.2. Conservation Authorities Act (1990)**

Ontario Regulation (O.Reg.) 42/06 under the *Conservation Authorities Act* gives authority to the Central Lake Ontario Conservation Authority (CLOCA) to regulate development, interference with wetlands and alterations to shorelines and watercourses in the Central Lake Ontario watershed, which

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<sup>1</sup> SARA does not apply to most terrestrial SAR, with the exception of bird SAR if they are also listed under MBCA.

includes the Rowe Channel. It is anticipated that a permit from CLOCA will be required in order to undertake construction of any channel improvements recommended by this study.

### **2.2.1. Endangered Species Act (2007)**

The provincial *Endangered Species Act* regulates the destruction or harm of provincially-listed SAR and their habitats. Regulatory protection applies to species and habitats of species listed as Endangered or Threatened under the Act. Note that species listed as Special Concern under the *Endangered Species Act* do not receive regulatory protection under the Act, but their habitats are protected from development and site alteration under Policy 2.1.5 of the PPS (see above).

## **2.3. Municipal Policies**

### **2.3.1. Regional Municipality of Durham**

The Rowe Channel is a permanent watercourse and is therefore designated as a *key hydrologic feature* in Durham Region's Official Plan. The general policies of the Official Plan prohibit development and site alteration in key hydrologic features, but improvements to the channel are expected to fall under exception "A" under Policy 2.3.15 of the Official Plan (i.e., "conservation and flood or erosion control projects demonstrated to be necessary in the public interest and after all alternatives have been considered").

### **2.3.2. Town of Whitby**

The study area is located entirely within the Port Whitby Secondary Plan area and the majority of the study area is designated for residential land use as illustrated on Schedule A of the Town's Official plan. However, the southern end of the study area where the Rowe Channel enters Whitby Harbour is designated "major open space". The Rowe Channel's floodplain is designated as natural hazard lands as illustrated on Schedule C of the Official Plan. Development and site alteration are generally prohibited in major open space and natural hazard lands, but improvements to the channel are expected to fall under exception "A" of Policy 5.3.7.4 of the Official Plan because they are required for erosion and flood control. Improvement/rehabilitation of the Rowe Channel may provide opportunities to connect active transportation and major open space areas and provide a "strong pedestrian linkage" between the Whitby GO Station and the waterfront, as described in Policies 11.1.4.3 and 11.1.4.4 of the Official Plan.

## **3. Methodology**

### **3.1. Background Review**

NSE reviewed background information pertaining to natural heritage features and functions in the EA study area. Background review examined:



- Fisheries and aquatic habitat in Rowe Channel and other watercourses in the study area
- Stormwater management studies
- Terrestrial features
- Other features or issues which may influence the selection of a preferred alternative.

The following background materials were reviewed:

- Aquatic SAR mapping from DFO (2021)
- Hydrological and fisheries data from CLOCA
- The Natural Heritage Information Centre (NHIC) Natural Heritage Areas mapping application
- Geospatial data from Land Information Ontario (LIO)
- Publicly available natural heritage atlases such as the Atlas of the Breeding Birds of Ontario, Second Edition (Cadman et al., 2009), the Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019), etc.
- Citizen science platforms such as eBird and iNaturalist
- Aerial imagery of the study area

### 3.2. Field Investigations

NSE’s ecologists visited the study area on four occasions in 2021 to complete field work (see **Table 1**).

Field work tasks included:

- High level stream assessment to document channel morphology and fish habitat features
- Breeding bird surveys using the Ontario Breeding Bird Atlas protocol
- Three-season vegetation inventory (spring, summer and fall)
- Vegetation community assessment using the Ecological Land Classification (ELC) system for southern Ontario (Lee et al., 1998).

**Table 1. Dates of field investigations and tasks completed**

Date	Staff	Task(s)
May 13, 2021	William Van Hemessen	Stream assessment Spring vegetation inventory
June 9, 2021	Grace Pitman	Breeding bird survey #1
June 28, 2021	Grace Pitman	Breeding bird survey #2 Summer vegetation inventory ELC
September 14, 2021	Grace Pitman	Fall vegetation inventory

### 3.3. Species at Risk and Species of Conservation Concern Screening

A list of SAR and species of conservation concern which occur or could potentially occur in the study area was developed based on field data and using the resources listed in **Section 2.1** SAR are species

which are listed as Endangered or Threatened under the provincial Endangered Species Act (2007) or the federal Species at Risk Act (SARA) (2002). Species of conservation concern include species listed as Special Concern under the Endangered Species Act or SARA.

Habitat requirements for SAR and species of conservation concern were determined from authoritative sources such as federal and provincial recovery strategies for each species and Appendix G of the Significant Wildlife Habitat Technical Guide. The probability that each species may occur in the study area was then assessed based on the habitat present in the study area. The SAR and species of conservation concern screening table can be found in **Appendix 2**.

### 3.4. Significant Wildlife Habitat Screening

Significant Wildlife Habitat (SWH) in the study area was assessed using the SWH Criteria Schedules for Ecoregion 6E (MNR 2015) in addition to the SWH Technical Guide (MNR 2000) and the Natural Heritage Reference Manual (NHRM), 2<sup>nd</sup> Edition (MNR 2010). Indicator species, ecosites and other characteristics of candidate SWH were reviewed. Where candidate SWH was identified, the criteria to confirm SWH were applied based on the features observed in the study area. The SWH screening table can be found in **Appendix 3**.

## 4. Existing Conditions

### 4.1. Physiography and Soils

The study area is located near the Lake Ontario shoreline within the Iroquois Plain physiographic region (Chapman & Putman, 1984). More specifically, the study area is located on a lacustrine plain (i.e., former lakebed) where Lynde and Pringle Creeks have formed the flat, marshy alluvial plain currently occupied by Whitby Harbour (Chapman & Putnam, 1984). The surrounding area is highly urbanized with extensive asphalt parking lots, high-density residential buildings and some light industrial land uses. As a result, the soil profile within and adjacent to Rowe Channel is heavily modified with imported fill, rocks and waste materials and does not exhibit a natural soil profile.

### 4.2. Surface Water and Groundwater

#### 4.2.1. Rowe Channel

Rowe Channel is a constructed drain which originates from a storm sewer outfall in the Whitby GO Station parking lot and flows in a southward direction to its outlet at Whitby Harbour approximately 0.75 km to the south. Within the study area, Rowe Channel can be divided into three distinct reaches:

- **Reach 1:** from the Whitby GO storm sewer outfall south to Victoria Street West
- **Reach 2:** from Victoria Street West south to Watson Street West
- **Reach 3:** from Watson Street West to Front Street West

- **Reach 4:** from Front Street West to the outlet at Whitby Harbour

### **Reach 1**

Reach 1 measures approximately 180 m in length and is the only reach of Rowe Channel which exhibits a relatively natural vertical and horizontal profile. This reach consists of a meandering channel within a relatively wide floodplain bounded to the west, north and east by the Whitby GO parking lot and to the south by Victoria Street West. The upper portions of this reach, immediately below the storm sewer outfall, have cut deeply into the substrate forming steep earth banks. Two stormwater management ponds outlet to the channel within this reach.

### **Reach 2**

Reach 2 measures approximately 300 m in length including the 35 m long concrete box culvert which conveys Rowe Channel underneath Victoria Street West. Downstream of this culvert, Rowe Channel is a heavily modified watercourse with a perfectly straight horizontal profile and a nearly flat vertical profile. The channel's banks are hardened with gabion baskets for the entire length of this reach and there is a substantial amount of sediment accumulation which may cut off the connection with Whitby Harbour during periods of low flow.

### **Reach 3**

Rowe Channel is conveyed beneath Watson Street West via a concrete box culvert. Including the culvert under Watson Street West, Reach 3 measures approximately 240 m in length and exhibits the same straightened and flattened profiles as Reach 2. However, Reach 3 is characterized by having earth banks rather in addition to hardened banks and by having less instream sediment accumulation. The majority of this reach flows through the gated Port Whitby Marina.

### **Reach 4**

Reach 4 represents the farthest downstream reach of Rowe Channel and measures approximately 75 m in length including the concrete box culvert which conveys the channel underneath Front Street West. This reach is similar to Reaches 2 and 3 in having straight and flat horizontal and vertical profiles. Like Reach 2, the banks are hardened and contain no natural vegetation. Rowe Channel outlets to Whitby Harbour, more specifically into the mouth of Pringle Creek.

#### **4.2.2. Pringle Creek**

Pringle Creek flows in a roughly north-to-south direction to the east of the study area and barely enters the southern end of the study area where it outlets to Whitby Harbour. The mouth of Pringle Creek is wide and shallow with muck and silt dominating the substrate.

### 4.2.3. Whitby Harbour

Whitby Harbour is an inlet of Lake Ontario. It is relatively shallow and is periodically dredged to maintain navigability for small watercraft. Because it is a relatively large inlet of Lake Ontario, Whitby Harbour may provide spawning, foraging or other habitat for a diversity of fish species, including SAR (see **Section 4.3.3**). It may also provide overwintering and foraging habitat for turtles and likely supports nesting waterfowl.

### 4.2.4. Other Surface Water Features

Two stormwater management ponds within the Whitby GO parking lot outlet to Rowe Channel. The first is a 0.08 ha pond located west of the channel and the second is a 0.02 ha pond located to the east of the channel on the other side of a private access road.

### 4.2.5. Groundwater

The entire study area is located on a Highly Vulnerable Aquifer (HVA) but there are no wellhead protection areas or other vulnerable areas in the study area. There are no seeps, springs or other areas of groundwater discharge in the study area.

## 4.3. Fish and Aquatic Habitat

### 4.3.1. Rowe Channel

Rowe Channel is a permanent watercourse which supports a warmwater fish community. However, it should be noted that substantial sediment accumulation and invasive plant species in the channel mean that it is only periodically connected to downstream waterbodies (e.g., Pringle Creek, Whitby Harbour and Lake Ontario). The best quality fish habitat in Rowe Channel is in Reach 1, since this reach contains a greater diversity of stream morphology (riffles, runs, pools, etc.), substrates (sand, gravel, muck) and cover (instream and riparian). Lower reaches of Rowe Channel (e.g., Reaches 2, 3 and 40) provide minimal habitat for fish due to a combination of unvegetated banks, warm, deoxygenated water and significant barriers to fish passage.

### 4.3.2. Other Waterbodies

Pringle Creek supports a coolwater fish community and is considered a migratory corridor for Pacific Salmon during the fall and Rainbow Trout during the spring. Rainbow Trout and Chinook salmon are observed annually within Pringle Creek during the spring and fall spawning run (CLOCA 2016). Fish sampling completed by CLOCA in Whitby Harbour documented 35 fish species, at least some of which spawn in Whitby Harbour or Pringle Creek (CLOCA 2016).

### 4.3.3. Aquatic Species at Risk

Rowe Channel does not provide direct habitat for any aquatic SAR. Whitby Harbour might provide

seasonal habitat for American Eel (*Anguilla rostrata*) and might contain Eastern Pondmussel (*Ligumia nasuta*), which is known from the mouth of nearby Lynde Creek. Upgrades to Rowe Channel are expected to improve water quality and will be of net benefit to downstream species and habitats, including SAR. Any modifications to the shoreline of Whitby Harbour will need to consider potential impacts to aquatic SAR.

#### 4.4. Wetlands

There are no wetlands within or adjacent to the study area. The Whitby Harbour Wetland Complex, a Provincially Significant Wetland, is located to the east and south but does not extend into the study area.

#### 4.5. Natural Hazards

The regulatory floodplain of the Rowe Channel is subject to flooding hazards and as such is designated as natural hazard lands in the Regional and local Official Plans. The regulatory floodplain throughout the study area extends approximately 30 m from the channel. South of Victoria Street West, the floodplain is generally flat in cross-section, with little to no elevation change from the channel banks to the outer edge of the floodplain. Within this area, flooding and erosion hazards are managed using gabion baskets to stabilize the banks of the channel. However, the current channel morphology and presence of obstructions (e.g., invasive aquatic plants) is likely insufficient for handling predicted future flood events. North of Victoria Street West, the floodplain exhibits a more natural cross section with tablelands sloping down to bottomlands closer to the channel.

#### 4.6. Vegetation

##### 4.6.1. Vegetation Communities

The study area is located in Ontario's Mixedwood Plains Ecozone and more specifically in Ecoregion 6E. This area of Ontario is characterized by a more temperate climate than most of the province and forest dominated by broad-leaved trees. Within the study area, however, the majority of vegetation communities are dominated by non-native plant species and reflect a long history of human disturbance.

**Table 2. Vegetation communities assessed in the Rowe Channel Upgrade Study Area**

Vegetation Community	Area (ha)	Description
Mineral Cultural Meadow (CUM1)	1.34	There are four cultural meadow communities within the Study Area.  Cultural Meadow communities (3) south of Victoria St. W., typically consist of scattered Manitoba Maple ( <i>Acer</i>

Vegetation Community	Area (ha)	Description
		<p><i>negundo</i>) and Black Walnut (<i>Juglans nigra</i>) in the canopy layer, with &lt;25% cover. There is no sub-canopy layer. The understory layer (&lt;25%) species includes Staghorn Sumac (<i>Rhus typhina</i>) and European Buckthorn (<i>Rhamnus cathartica</i>). The dense ground layer (&gt;60% cover) is dominated by Tansy (<i>Tanacetum vulgare</i>), Canada Goldenrod (<i>Solidago canadensis</i>), and European Reed (<i>Phragmites australis</i> subsp. <i>australis</i>).</p> <p>The Cultural Meadow community (1) north of Victoria St. W. consists of scattered European Buckthorn, American Elm (<i>Ulmus americana</i>), and Black Walnut in the canopy, with &lt;25% cover. The sparse sub-canopy layer (&lt;25%) consists of scattered Russian Olive (<i>Elaeagnus angustifolia</i>). The understory layer (&lt;25%) is dominated by European Buckthorn, Cottony Willow (<i>Salix eriocephala</i>), and Red-osier Dogwood (<i>Cornus sericea</i>). The ground layer is dominated by European reed, European Swallowwort (<i>Vincetoxicum rossicum</i>), and goldenrods (<i>Solidago</i> sp.) (&gt;60% cover). It appears there was native species plantings/seed mix surrounding the open aquatic pond community including Butterfly Milkweed (<i>Asclepias syriaca</i>), Wild Bergamot (<i>Monarda fistulosa</i>), Virginia Mountain-mint (<i>Pycnanthemum virginianum</i>), and Gray-headed Prairie Coneflower (<i>Ratibida pinnata</i>).</p>
Mineral Cultural Woodland (CUW1)	0.73	<p>There are two cultural woodland communities within the Study Area.</p> <p>The canopy layer (&gt;35%) typically consists of Black Walnut, Manitoba Maple, and White Willow (<i>Salix alba</i>). The subcanopy (&gt;25%) is dominated by European Buckthorn, European Ash (<i>Fraxinus excelsior</i>), and White Willow. The dense understory layer (&gt;60%) is dominated by European Reed, Narrow-leaved Cattail (<i>Typha angustifolia</i>) and Broad-leaved Cattail (<i>Typha latifolia</i>). The dense ground layer (&gt;60%) Goldenrods, Asters (<i>Symphyotrichum</i> sp.) and Common Milkweed.</p>

Vegetation Community	Area (ha)	Description
Open Aquatic	0.1	Open aquatic community located near the Whitby GO Station, north of Victoria St W. Open water surrounded by Narrow-leaved Cattail and European Reed.

### 4.6.2. Vegetation Inventory

Field visits in May, July and September of 2021 documented 101 plant species in the study area. Non-native species consist of nearly half of the documented species (49 species or 48% of all species), which is typical of disturbed environments. No rare or at risk plant species were found in the study area. For a full list of plant species identified in the study area, see **Appendix 4**.

## 4.7. Wildlife

For a full list of wildlife species identified in the study area, see **Appendix 4**.

### 4.7.1. Birds

A total of 28 bird species were identified in the study area during breeding bird surveys in 2021. Two species were confirmed to be breeding in the study area – American Robin (*Turdus migratorius*) and Black-capped Chickadee (*Poecile atricapillus*) – and 25 were determined to be “possible” or “probable” breeders. Most of the bird species seen in the study area are common and widespread in Ontario with conservation statuses of either “Secure” (S5) or “Apparently Secure” (S4). The exception is Red-necked Grebe (*Podiceps grisegana*), which has a provincial conservation status of S3 and was observed in Whitby Harbour. Data from eBird indicates that other rare birds have been observed in Whitby Harbour, such as Ross’s Goose and Tundra Swan, but these species only stop over during migration and do not breed in the study area.

### 4.7.2. Other Wildlife

The only other wildlife observed in the study area are common urban animals such as Eastern Gray Squirrel (*Sciurus carolinensis*) and Striped Skunk (*Mephitis mephitis*).

### 4.7.3. Significant Wildlife Habitat

#### 4.7.3.1. Seasonal Concentration Areas of Animals

#### Waterfowl Stopover and Staging Area (Aquatic)

Data from eBird indicates that Whitby Harbour regularly supports aggregations of over 100 individuals of indicator waterfowl for this habitat type. The harbour itself and all natural features within 100 m of the harbour are therefore SWH.

### **Turtle Wintering Area (candidate)**

Whitby Harbour is deep enough that it could provide overwintering habitat for turtles (e.g., Snapping Turtle, Midland Painted Turtle), but studies of turtles overwintering in the harbour have not been conducted.

#### *4.7.3.2. Specialized Habitat for Wildlife*

### **Turtle Nesting Areas (candidate)**

Turtles (e.g., Snapping Turtle, Midland Painted Turtle) occur in Whitby Harbour and could potentially use any exposed sandy or gravelly material in the area as nesting sites. No specific nesting sites were identified during field investigations, but any suitable features should be treated as candidate SWH.

#### *4.7.3.3. Habitat for Species of Conservation Concern*

### **Habitat for Rare Wildlife Species**

Habitat for the following Special Concern and provincially rare wildlife species occurs in the study area:

- **Monarch (*Danaus plexippus*):** Monarch butterflies were observed in the study area as well as milkweed plants (*Asclepias* spp.), their primary food plants. All vegetation communities which contain milkweed are therefore SWH.
- **Snapping Turtle (*Chelydra serpentina*):** Snapping Turtles are known to occur in the vicinity of Whitby Harbour.
- **Eastern Wood-pewee (*Contopus virens*):** Cultural woodland communities are breeding habitat for this species and are therefore SWH.
- **Golden-winged Warbler (*Vermivora chrysoptera*):** Woodland and thicket communities in the study area are potential nesting habitat for Golden-winged Warbler.
- **Red-headed Woodpecker (*Melanerpes erythrocephalus*):** Woodland habitats and even city parks in the study area are potential nesting habitat for Red-headed Woodpecker.
- **Red-necked Grebe (*Podiceps grisegana*):** Whitby Harbour may provide breeding habitat for Red-necked Grebe, which was observed in the harbour during field investigations.

## **4.8. Species at Risk**

Through background review, NSE identified historical records of 11 species listed as Endangered or Threatened under the provincial *Endangered Species Act* from the vicinity of the study area. The majority of these are bird SAR which have been observed in the area during migration but do not breed in the study area. The SAR screening (see **Appendix 2**) determined that habitat for the following Endangered and Threatened species may be present in the study area.



- **Barn Swallow (*Hirundo rustica*):** There may be open storage buildings in the Port Whitby Marina where Barn Swallows could nest. Other structures in and around the study area, such as parking garages, could be suitable nesting habitat. Culverts along the Rowe Channel were inspected for Barn Swallow nests in 2021 but none were found.
- **Chimney Swift (*Chaetura pelagica*):** Chimney Swifts forage over the study area and there may be suitable chimneys in and around the study area where Chimney Swifts could nest. However, there is no suitable nesting habitat along the Rowe Channel itself.
- **American Eel (*Anguilla rostrata*):** American Eels may seasonally occur in Whitby Harbour.
- **Eastern Pondmussel (*Ligumia nasuta*):** Eastern Pondmussel occurs in nearby Lynde Creek and could potentially occur in Whitby Harbour.

## 5. Constraints Analysis

The following natural heritage constraints occur in the study area and may affect the preferred alternative for upgrades to the Rowe Channel. Channel upgrade works will need to ensure conformity with the policies which apply to the constraints listed below.

### Surface Water

As a permanent watercourse, Rowe Channel is a key hydrologic feature which is subject to policies in the Regional and local Official Plans. Official Plan policies only permit alterations to key hydrologic features for improvements and restoration works which address erosion and flood control deficiencies. The proposed upgrades to the Rowe Channel are expected to satisfy this exception. Alterations to the shoreline of Whitby Harbour, if proposed (e.g., at the channel outlet), are also expected to fall under this exception.

### Fish Habitat

Although there are significant barriers to fish movement throughout the Rowe Channel, it still provides habitat for some fish. All upgrade works which require alterations to the channel (or to Whitby Harbour at the channel outlet) will require review by DFO and may require authorization under the *Fisheries Act*. It is important that the preferred alternative for channel upgrades provide net benefit to fish and fish habitat. This could include removing barriers to fish movement (e.g., instream structures, refuse, invasive plants), restoring natural channel geometry and/or providing riparian vegetation to attenuate pollutants.

### Natural Hazards

The regulatory floodplain along the Rowe Channel is designated as hazard lands in the Regional and local Official Plans. Channel upgrade works which result in improved channel stability and net benefit

to aquatic and terrestrial ecosystems are expected to conform with the applicable Official Plan policies.

### **Conservation Authority Regulated Areas**

The entire Rowe Channel falls within CLOCA's regulated area and the majority of channel upgrade works are therefore expected to require a site alteration permit under O.Reg. 42/06. CLOCA may have restoration targets for terrestrial and aquatic ecosystems which will need to be addressed during detail design (e.g., restoration of terrestrial vegetation using native species).

### **Significant Wildlife Habitat**

Whitby Harbour is a significant waterfowl stopover and staging area and may also be a significant turtle wintering area and provide breeding habitat for Red-necked Grebe. Exposed sandy/gravelly slopes in the study area should be assumed to be potential turtle nesting areas. Channel upgrade works are not expected to affect the habitat functions of Whitby Harbour (e.g., for waterfowl stopover and staging, waterbird breeding, turtle wintering) because alterations to the harbour would be nominal and limited to the shoreline around the creek outlet. Turtle nesting mounds could potentially be incorporated into the channel upgrades to provide a net increase in suitable habitat.

## **6. References**

- Atlas of the Breeding Birds of Ontario. 2021. Accessed Online: <https://www.birdsontario.org/atlas/>
- Cadman, M.D. et al. (eds.). 2007. *Atlas of the Breeding Birds of Ontario, 2001-2005*. Bird Studies Canada, Port Rowan. 706 pp.
- Chapman, L.J. and D.F. Putnam. 1984. *The Physiography of Southern Ontario, Third Edition*. Ontario Ministry of Natural Resources, Toronto. 270 pp.
- [CLOCA] Central Lake Ontario Conservation Authority. 2016. Memo from Natural Heritage: Aquatic Resources, subject: Front Street Culvert Replacement - Rowe Channel (Whitby Harbour).
- [CLOCA] Central Lake Ontario Conservation Authority. 2021. Accessed Online: <https://open-data.cloca.com/datasets/ecologically-significant-groundwater-recharge-areas/data?geometry=-78.987%2C43.850%2C-78.907%2C43.872>
- eBird Canada. 2021. Accessed Online: <https://ebird.org/home>
- Fisheries and Oceans Canada (DFO). 2019. Aquatic species at risk map. Accessed Online: <https://www.dfo-mpo.gc.ca/species-especies/sara-lep/map-carte/index-eng.html>
- iNaturalist. 2021. Accessed Online: <https://www.inaturalist.org>

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and Its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide.

McLean, W.A. 1959. *A Geographical Study of the Township of Whitby and the Town of Whitby*. The Faculty of the Department of Geography, McMaster University. 1-111 pp.

Ministry of Natural Resources (MNR). 2000. Significant Wildlife Habitat Technical Guide.

Ministry of Natural Resources (MNR). 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. 245 pp.

Ministry of Natural Resources and Forestry (MNRF). 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E. 38 pp.

Ministry of Natural Resources and Forestry (MNRF). 2021. Natural Heritage Information Center (NHIC). Accessed Online: <https://www.ontario.ca/page/make-natural-heritage-area-map>.

Ministry of the Environment, Conservation and Parks (MECP). 2021. Ontario Source Protection Information Atlas. Accessed Online: <https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?site=SourceWaterProtection&viewer=SWPViewer&locale=en-US>

Ontario Nature. 2019. Ontario Reptile and Amphibian Atlas. Accessed Online: <https://www.ontarioinsects.org/herp/index.html>

Regional Municipality of Durham. 1993. Durham Regional Official Plan. May 2020 Consolidation. 226 pp.

Toronto Entomologists' Association. 2019. Ontario Butterfly Atlas. 2019. Accessed Online: [http://www.ontarioinsects.org/atlas\\_online.html](http://www.ontarioinsects.org/atlas_online.html)

Town of Whitby. 1994. Town of Whitby Official Plan. August 2021 Consolidation. 395 pp.

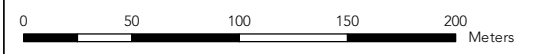
## APPENDIX 1 | Maps

Appendix page



# Map 1 | Rowe Channel Study Area

- Legend
- Study Area
  - Watercourse






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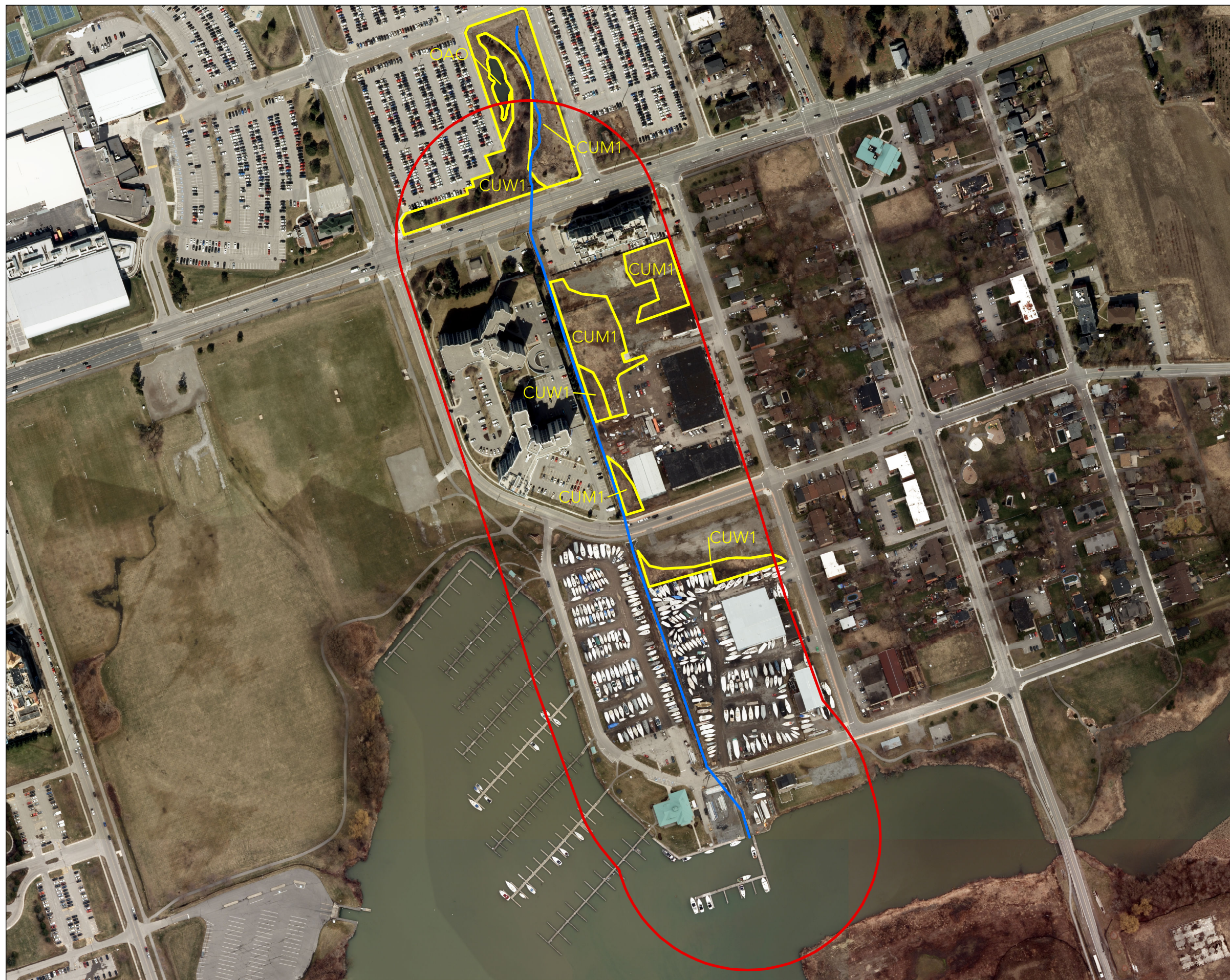
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# Map 2 | Rowe Channel Vegetation Communities

## Legend

-  Study Area
  -  Watercourse
  -  Ecological Land Classification (ELC)
- CUM1 - Mineral Cultural Meadow Ecosite  
CUW1 - Mineral Cultural Woodland Ecosite  
OAO - Open Aquatic



0 50 100 150 200 Meters

Project Number  
21 - 1188

Date:  
2021-10-08



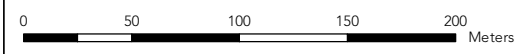
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**north-south**  
ENVIRONMENTAL

# Map 3 | Rowe Channel Preliminary Constraints Analysis

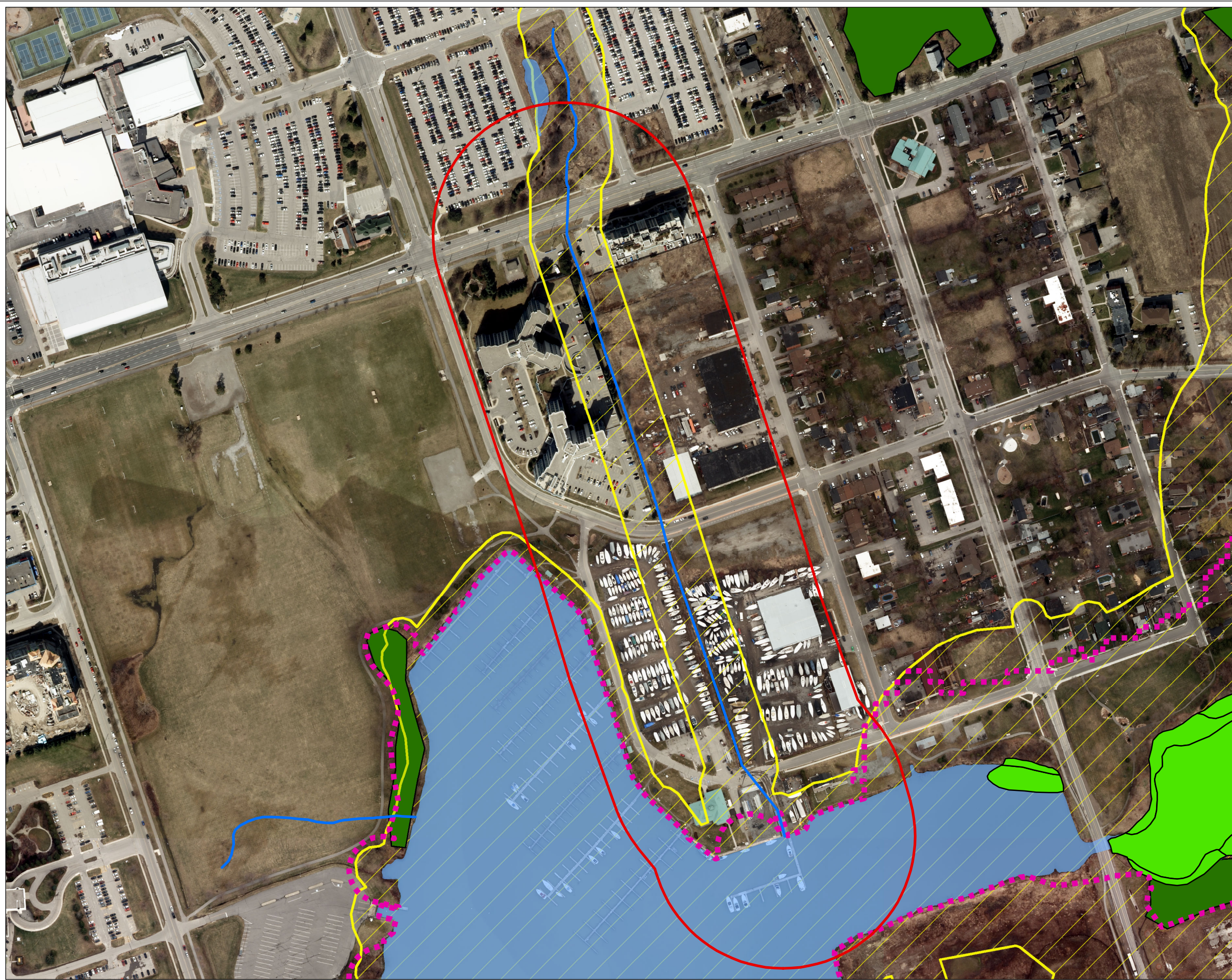
## Legend

-  Study Area
-  CLOCA Natural Heritage System
-  CLOCA Regulated Areas
-  Provincially Significant Wetland (PSW)
-  Waterbody
-  Watercourse
-  Wooded Area



Project Number 21 - 1188	Date: 2021-10-08	N ▲
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## **APPENDIX 2 |** Species at Risk Screening

Appendix page

**A2. Species at Risk and Species of Conservation Concern Screening**

Species	Source <sup>1</sup>	Status <sup>2</sup>	Habitat Description	Presence of Habitat in Study Area
<b>BIRDS</b>				
Bank Swallow <i>Riparia riparia</i>	OBBA eBird	SARA - Threatened ESA - Threatened NHIC - S4B	Sand, clay or gravel riverbanks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, roadcuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence (MNR, 2000).	ABSENT - Bank Swallows forage over Whitby Harbour but there are no suitable banks, cliffs or exposed slopes in the study area that could support nesting.
Barn Swallow <i>Hirundo rustica</i>	OBBA eBird	SARA - Threatened ESA - Threatened NHIC - S4B	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other manmade structures for nesting; open country near body of water (MNR, 2000).	CANDIDATE - There may be open storage buildings in the Port Whitby Marina where Barn Swallows could nest. Other structures in and around the study area, such as parking garages, could be suitable nesting habitat. Culverts along the Rowe Channel were inspected for Barn Swallow nests in 2021 but none were found.
Black Tern <i>Chlidonias niger</i>	NHIC	SARA - Not at Risk ESA - Special Concern NHIC - S3B, S4M	Wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to same area to nest each year in loose colonies; must have shallow (0.5 to 1 m deep) water and areas of open water near nests; requires marshes >20 ha in size; feeds over adjacent grasslands for insects; also feeds on fish, crayfish and frogs (MNR, 2000).	ABSENT - Black Terns forage over Whitby Harbour but there are no suitable cattail marshes in the study area that could support nesting Black Terns.
Bobolink <i>Dolichonyx oryzivorus</i>	NHIC OBBA eBird	SARA - Threatened ESA - Threatened NHIC - S4B	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha (MNR, 2000).	ABSENT - Bobolinks occur in the study area only as occasional stop overs during migration. There are no extensive open country habitats where Bobolinks could nest.
Canada Warbler <i>Cardellina canadensis</i>	OBBA eBird	SARA - Threatened ESA - Special Concern NHIC - S5B	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat; usually requires at least 30 ha (OMNR 2000).	ABSENT - This species stops over during migration but there are no forests in the study area where this species could nest.
Chimney Swift <i>Chaetura pelagica</i>	OBBA eBird	SARA - Threatened ESA - Threatened NHIC - S3B	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water (MNR, 2000).	CANDIDATE - Chimney Swifts forage over the study area and there may be suitable chimneys in and around the study area where Chimney Swifts could nest. However, there is no suitable nesting habitat along the Rowe Channel itself.
Common Nighthawk <i>Chordeiles minor</i>	OBBA eBird	SARA - Threatened ESA - Special Concern NHIC - S4B	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs (MNR, 2000).	CANDIDATE - Common Nighthawks forage over the study area and could nest on gravel rooftops and other open gravelly areas.
Eastern Meadowlark <i>Sturnella magna</i>	NHIC	SARA - Threatened ESA - Threatened NHIC - S4B, S3N	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size (MNR, 2000).	ABSENT - Eastern Meadowlarks stop over in the study area during migration but there are no extensive open country habitats where this species could nest.
Eastern Wood-pewee <i>Contopus virens</i>	OBBA eBird	SARA - Special Concern ESA - Special Concern NHIC - S4B	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks (MNR, 2000).	CANDIDATE - Woodlands in the study area are potential nesting habitat for Eastern Wood-pewee.

Species	Source <sup>1</sup>	Status <sup>2</sup>	Habitat Description	Presence of Habitat in Study Area
Golden-winged Warbler <i>Vermivora chrysoptera</i>	OBBA eBird	SARA - Threatened ESA - Special Concern NHIC - S3B	Early successional habitat; shrubby, grassy abandoned fields with small deciduous trees bordered by low woodland and wooded swamps; alder bogs; deciduous, damp woods; shrubbery clearings in deciduous woods with saplings and grasses; brier-woodland edges; requires >10 ha of habitat (MNR, 2000).	CANDIDATE - Woodland and thicket communities in the study area are potential nesting habitat for Golden-winged Warbler.
Least Bittern <i>Ixobrychus exilis</i>	OBBA eBird	SARA - Threatened ESA - Threatened NHIC - S4B	Deep marshes, swamps, bogs; marshy borders of lakes, ponds, streams, ditches; dense emergent vegetation of cattail, bulrush, sedge; nests in cattails; intolerant of loss of habitat and human disturbance (MNR, 2000).	ABSENT - Least Bittern may occasionally forage or stop over in the study area but there are no extensive cattail marshes where this species could nest.
Loggerhead Shrike <i>Lanius ludovicianus</i>	NHIC eBird	SARA - Endangered ESA - Endangered NHIC - S1B	Grazed pasture, marginal farmland with scattered hawthorn shrubs, hedgerows; fence posts, wires and associated low-lying wetland; located on core areas of limestone plain adjacent to Canadian Shield; greatest threat is fragmentation of suitable habitat due to natural succession; probably needs at least 25 ha of suitable habitat (MNR, 2000).	ABSENT - Loggerhead Shrikes have rarely stopped over in the study area during migration but there are no extensive open country habitats in the study area which could support nesting.
Northern Bobwhite <i>Colinus virginianus</i>	NHIC	SARA - Endangered ESA - Endangered NHIC - S1?B	Grassland, prairie or hay fields with woody cover in form of thickets, tangles of vines, shrubs; fence rows or woodland edges; cropland growing corn, soybeans or small grains and clover or grass; well-drained sandy or loamy soil; pond edges (MNR, 2000).	ABSENT - Northern Bobwhite historically occurred in the area around Whitby Harbour but is now extirpated.
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	NHIC OBBA eBird	SARA - Endangered ESA - Special Concern NHIC - S3	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40 cm DBH; require about 4 ha for a territory (MNR, 2000).	CANDIDATE - Woodland habitats and even city parks in the study area are potential nesting habitat for Red-headed Woodpecker.
Red-necked Grebe <i>Podiceps grisegena</i>	NSE	SARA - n/a ESA - Not at Risk NHIC - S3	Permanent freshwater lakes with a fringe of aquatic emergent vegetation; marshes, impoundments or sewage lagoons with >4 ha of open water; protected marshy areas or bays in larger lakes; nest greatly affected by wave action of boats and other human disturbances (MNR, 2000).	CANDIDATE - Shorelines of Whitby Harbour are potential nesting habitat for Red-necked Grebe.
Wood Thrush <i>Hylocichla mustelina</i>	OBBA eBird	SARA - Threatened ESA - Special Concern NHIC - S4B	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m (MNR, 2000).	ABSENT - Wood Thrush regularly stops over in the study area during migration but there are no forest communities that would be suitable nesting habitat for this species.
<b>REPTILES AND AMPHIBIANS</b>				
Snapping Turtle <i>Chelydra serpentina</i>	NHIC	SARA - Special Concern ESA - Special Concern COSEWIC - Special Concern NHIC - S4	Permanent, semi-permanent freshwater; marshes, swamps or bogs; rivers and streams with soft, muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha (MNR, 2000).	CANDIDATE - Whitby Harbour probably provides foraging and wintering habitat for Snapping Turtles and there may be suitable nesting sites in the area.
Spiny Softshell <i>Apalone spinifera</i>	NHIC	SARA - Threatened ESA - Endangered NHIC - S2	Intolerant of pollution; large river systems, shallow lakes and ponds with muddy bottoms and aquatic vegetation; basks on sandbars, mud flats, grassy beaches, logs or rocks; eggs are laid near water on sandy beaches or gravel banks in areas with sun; requires acceptable feeding, nesting, habitat and natural, undisturbed corridors between these critical habitats (MNR, 2000).	ABSENT - Spiny Softshell has not been seen in Whitby for a significant period of time and may be extirpated from the area.
<b>INSECTS</b>				

Species	Source <sup>1</sup>	Status <sup>2</sup>	Habitat Description	Presence of Habitat in Study Area
Monarch <i>Danaus plexippus</i>	NSE	SARA - Special Concern ESA - Special Concern NHIC - S2N, S5B	Breeding habitat is confined to where milkweed grows (the sole food of the caterpillars). This includes meadows, roadsides, ditches, open wetlands, dry sandy areas, grasslands, riverbanks, arid valleys and south-facing hillsides. Adult butterflies nectar on a wide variety of flowers including goldenrods, asters and milkweeds (Environment Canada, 2014).	CANDIDATE - Several vegetation communities in the study area contain milkweed, including cultural meadows, thickets and marshes.
<b>FISH</b>				
American Eel <i>Anguilla rostrata</i>	NHIC DFO	SARA - n/a ESA - Endangered NHIC - S1S2	Spawns in the Sargasso Sea and migrates to the North Atlantic Ocean. In Ontario, it is found in a variety of freshwater habitats from Niagara Falls to the St. Lawrence River (DFO-MPO 2016).	CANDIDATE - American Eels may seasonally occur in Whitby Harbour.
<b>FRESHWATER MUSSELS</b>				
Eastern Pondmussel <i>Ligumia nasuta</i>	NHIC	SARA - Special Concern ESA - Endangered NHIC - S1	Sheltered areas of lakes, in slack-water areas of rivers and in canals; prefers substrates of fine sand and mud at depths ranging from 0.3 to 4.5 m (COSEWIC, 2018).	CANDIDATE - Eastern Pondmussel occurs in nearby Lynde Creek and could potentially occur in Whitby Harbour.

<sup>1</sup>Source of species report: NHIC = Natural Heritage Information Centre data; NSE field work = identified in the study area by NSE

<sup>2</sup>Conservation Status: SARA = Status under federal Species at Risk Act; ESA = Status under provincial Endangered Species Act; COSEWIC = The Committee on the Status of Endangered Wildlife in Canada; NHIC = Provincial conservation status (SX = Extirpated, SH = Historical, S1 = Critically Imperiled, S2 = Imperiled, S3 = Vulnerable).

<sup>3</sup>Probability that the species presently occurs in the study area based on available habitat.

## **APPENDIX 3** | Significant Wildlife Habitat Screening

Appendix page

**A3. Significant Wildlife Habitat Screening Table.**

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Waterfowl Stopover and Staging Areas (Terrestrial)</b></p> <p><b>Rationale:</b> Habitat important to migrating waterfowl.</p>	<p>American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall</p>	<p>CUM1 CUT1 -Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.</p>	<p>Fields with sheet water during Spring (mid-March to May).</p> <ul style="list-style-type: none"> <li>•Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl.</li> <li>•Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available <sup>cxlviii</sup>.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence.</li> <li>•Reports and other information available from Conservation Authorities</li> <li>•Sites documented through water fowl planning processes (e.g., EHJV implementation plan)</li> <li>•Field Naturalist Clubs</li> <li>•Ducks Unlimited Canada</li> <li>•Natural Heritage Information Centre (NHIC)</li> </ul> <p>Waterfowl Concentration Area</p>	<p>Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</p> <ul style="list-style-type: none"> <li>•Any mixed species aggregations of 100 or more individuals required.</li> <li>•The flooded field ecosite habitat plus a 100-300m radius area, dependent on local site conditions and adjacent land use is the significant wildlife habitat.</li> <li>•Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates).</li> <li>•SWH MiST Index #7 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - There are no open fields or other flooded areas which could provide terrestrial stopover habitat during spring migration.</p>



Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Waterfowl Stopover and Staging Areas (Aquatic)</b></p> <p><b>Rationale:</b> Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.</p>	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long -tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	<ul style="list-style-type: none"> <li>•Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify.</li> <li>•These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water)</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Environment Canada.</li> <li>•Naturalist clubs often are aware of staging/stopover areas.</li> <li>•OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging.</li> <li>•Sites documented through waterfowl planning processes (e.g., EHJV implementation plan)</li> <li>•Ducks Unlimited projects</li> <li>•Element occurrence specification by Nature Serve: <a href="http://www.natureserve.org">http://www.natureserve.org</a></li> <li>•Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area</li> </ul>	Studies carried out and verified presence of: <ul style="list-style-type: none"> <li>•Aggregations of 100 or more of listed species for 7 days, results in &gt; 700 waterfowl use days.</li> <li>•Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH</li> <li>•The combined area of the ELC ecosites and a 100m radius area is the SWH</li> <li>•Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat.</li> <li>•Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded).</li> <li>•SWH MiST Index #7 provides development effects and mitigation measures.</li> </ul>	CONFIRMED - Data from eBird indicates that Whitby Harbour supports over 700 waterfowl use days of the listed species. The harbour and all natural features within 100 m of the harbour are SWH.

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Shorebird Migratory Stopover Area</b></p> <p><b>Rationale:</b> High quality shorebird stopover habitat is extremely rare and typically has a long history of use.</p>	<p>Greater Yellowlegs                      Lesser Yellowlegs                      Marbled Godwit                      Hudsonian Godwit                      Black-bellied Plover                      American Golden-Plover                      Semipalmated Plover                      Solitary Sandpiper                      Spotted Sandpiper                      Semipalmated Sandpiper                      Pectoral Sandpiper                      White-rumped Sandpiper                      Baird's Sandpiper                      Least Sandpiper                      Purple Sandpiper                      Stilt Sandpiper                      Short-billed Dowitcher                      Red-necked Phalarope                      Whimbrel                      Ruddy Turnstone                      Sanderling                      Dunlin</p>	<p>BBO1                      BBO2                      BBS1                      BBS2                      BBT1                      BBT2                      SDO1                      SDS2                      SDT1                      MAM1                      MAM2                      MAM3                      MAM4                      MAM5</p>	<p>•Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and unvegetated shoreline habitats.                      •Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October.                      •Sewage treatment ponds and storm water ponds do not qualify as a SWH.</p> <p><u>Information Sources</u>                      •Western hemisphere shorebird reserve network.                      •Canadian Wildlife Service (CWS) Ontario Shorebird Survey.                      •Bird Studies Canada                      •Ontario Nature                      •Local birders and naturalist clubs                      •Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area</p>	<p>Studies confirming:                      •Presence of 3 or more of listed species and &gt;1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period)                      •Whimbrel stop briefly (&lt;24hrs) during spring migration, any site with &gt;100 Whimbrel used for 3 years or more is significant.                      •The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area i                      •Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"                      •SWH MiST Index #8 provides development effects and mitigation measures.</p>	<p>ABSENT - Data from eBird indicates that some of the indicator species have been regularly recorded at Whitby Harbour during spring and fall migration, but the number of individuals stopping over is too small to result in the requisite number of shorebird use days to confirm this habitat type.</p>

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Raptor Wintering Area</b></p> <p><b>Rationale:</b> Sites used by multiple species, a high number of individuals and used annually are most significant</p>	<p>Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl</p> <p><b>Special Concern:</b> Short-eared Owl Bald Eagle</p>	<p><u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW.</p> <p><u>Bald Eagle:</u> Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).</p>	<ul style="list-style-type: none"> <li>•The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.</li> <li>•Raptor wintering sites (hawk/owl) need to be &gt;20 ha with a combination of forest and upland.</li> <li>•Least disturbed sites, idle/fallow or lightly grazed field/meadow (&gt;15 ha) with adjacent woodlands</li> <li>•Field area of the habitat is to be wind swept with limited snow depth or accumulation.</li> <li>•Eagle sites have open water, large trees and snags available for roosting <sup>cxlix</sup></li> </ul> <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> <li>•OMNRF Ecologist or Biologist</li> <li>•Field Naturalist Clubs</li> <li>•Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area</li> <li>•Data from Bird Studies Canada</li> <li>•Results of Christmas Bird Counts</li> <li>•Reports and other information available from Conservation Authorities.</li> </ul>	<p>Studies confirm the use of these habitats by:</p> <ul style="list-style-type: none"> <li>•One or more Short-eared Owls or; one or more Bald Eagles or; at least 10 individuals and two of the listed hawk/owl species.</li> <li>•To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds.</li> <li>•The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area</li> <li>•Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•SWH MiST Index #10 and #11 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - The study area does not contain the requisite combination of woodland and open country habitats.</p>
<p><b>Bat Hibernacula</b></p> <p><b>Rationale:</b> Bat hibernacula are rare habitats in all Ontario landscapes.</p>	<p>Big Brown Bat Tricoloured Bat</p>	<p>Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)</p>	<ul style="list-style-type: none"> <li>•Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.</li> <li>•Active mine sites should not be considered as SWH</li> <li>•The locations of bat hibernacula are relatively poorly known.</li> </ul> <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> <li>•OMNRF for possible locations and contact for local experts</li> <li>•Natural Heritage Information Center (NHIC) Bat Hibernaculum</li> <li>•Ministry of Northern Development and Mines for location of mine shafts.</li> <li>•Clubs that explore caves (e.g., Sierra Club)</li> <li>•University Biology Departments with bat experts.</li> </ul>	<ul style="list-style-type: none"> <li>•All sites with confirmed hibernating bats are SWH.</li> <li>•The habitat area includes a 200 m radius around the entrance of the hibernaculum for most development types and 1,000 m for wind farms.</li> <li>•Studies are to be conducted during the peak swarming period (August - September). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects".</li> <li>•SWH MiST Index #1 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - There are no caves, mine shafts or other features in the study area that could function as bat hibernacula.</p>

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Bat Maternity Colonies</b></p> <p><b>Rationale:</b> Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.</p>	<p>Big Brown Bat Silver-haired Bat</p>	<p>Maternity colonies considered SWH are found in forested Ecosites.</p> <p>All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM</p>	<p>•Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH).</p> <p>•Maternity roosts are not found in caves and mines in Ontario.</p> <p>•Maternity colonies located in Mature deciduous or mixed forest stands with &gt;10/ha large diameter (&gt;25 cm DBH) wildlife trees</p> <p>•Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2.</p> <p>•Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred</p> <p><u>Information Sources</u></p> <p>•OMNRF for possible locations and contact for local experts</p> <p>•University Biology Departments with bat experts.</p>	<p>Maternity Colonies with confirmed use by;</p> <ul style="list-style-type: none"> <li>•&gt;10 Big Brown Bats</li> <li>•&gt;5 Adult Female Silver-haired Bats</li> </ul> <p>•The area of the habitat includes the entire woodland, or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies.</p> <p>•Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects".</p> <p>•SWH MiST Index #12 provides development effects and mitigation measures.</p>	<p>ABSENT - There are no large snag trees in the study area and no woodland communities which could function as candidate maternity colonies.</p>
<p><b>Turtle Wintering Areas</b></p> <p><b>Rationale:</b> Generally, sites are the only known sites in the area. Sites with the highest number of individuals are most significant</p>	<p>Midland Painted Turtle</p> <p><b>Special Concern:</b> Northern Map Turtle Snapping Turtle</p>	<p>Snapping and Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO</p> <p>Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as overwintering habitat.</p>	<p>•For most turtles, wintering areas are in the same general area as their core habitat. Water must be deep enough not to freeze and have soft mud substrates.</p> <p>•Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen</p> <p>•Manmade ponds such as sewage lagoons or storm water ponds should not be considered SWH.</p> <p><u>Information Sources</u></p> <p>•EIS studies carried out by Conservation Authorities.</p> <p>•Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites.</p> <p>•OMNRF Ecologist or Biologist</p> <p>•Field Naturalist clubs</p> <p>•Natural Heritage Information Center (NHIC)</p>	<ul style="list-style-type: none"> <li>•Presence of 5 overwintering Midland Painted Turtles is significant.</li> <li>•One or more Northern Map Turtle or Snapping Turtle overwintering within a wetland is significant.</li> <li>•The mapped ELC ecosite area with the overwintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are overwintering is the SWH.</li> <li>•Overwintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (September - October) or spring (March - May).</li> <li>•Congregation of turtles is more common where wintering areas are limited and therefore significant.</li> <li>•SWH MiST Index #28 provides development effects and mitigation measures for turtle wintering habitat.</li> </ul>	<p>CANDIDATE - Whitby Harbour is deep enough to provide wintering habitat for turtles.</p>

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Reptile Hibernaculum</b></p> <p><b>Rationale:</b> Generally, sites are the only known sites in the area. Sites with the highest number of individuals are</p>	<p><u>Snakes:</u> Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake</p> <p><b>Special Concern:</b> Milksnake Eastern Ribbonsnake</p> <p><u>Lizard:</u> <b>Special Concern (Southern Shield population):</b> Five-lined Skink</p>	<p>For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.</p> <p>For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1, FOC3</p>	<p>•For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line, such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH.</p> <p>•Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line.</p> <p>•Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover.</p> <p>•Five-lined Skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures.</p> <p><u>Information Sources</u></p> <p>•In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g., old dug wells).</p> <p>•Reports and other information available from Conservation Authorities.</p> <p>•Field Naturalists clubs</p> <p>•University herpetologists</p> <p>•Natural Heritage Information Center (NHIC)</p> <p>•OMNRF ecologist or biologist may be aware of locations of wintering skinks</p>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>•Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp.</li> <li>•Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g., foundation or rocky slope) on sunny warm days in Spring (April/May) and Fall (September/October)</li> <li>•Note: If there are Special Concern Species present, then site is SWH</li> <li>•Note: Sites for hibernation possess specific habitat parameters (e.g., temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e., strong hibernation site fidelity). Other critical life processes (e.g., mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH</li> <li>•SWH MiST Index #13 provides development effects and mitigation measures for snake hibernacula.</li> <li>•Presence of any active hibernaculum for skink is significant.</li> <li>•SWH MiST Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.</li> </ul>	<p>ABSENT - There are no underground features extending below the frost line in the study area and no snakes or congregations of snakes were observed during field investigations.</p>

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Colonially -Nesting Bird Breeding Habitat (Bank and Cliff)</b></p> <p><b>Rationale:</b> Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.</p>	<p>Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)</p>	<p>Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles. Cliff faces, bridge abutments, silos, barns.</p> <p>Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1</p>	<ul style="list-style-type: none"> <li>•Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area.</li> <li>•Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles.</li> <li>•Does not include a licensed/permitted Mineral Aggregate Operation.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Reports and other information available from Conservation Authorities.</li> <li>•Ontario Breeding Bird Atlas</li> <li>•Bird Studies Canada; NatureCounts: <a href="http://www.birdscanada.org/birdmon/">http://www.birdscanada.org/birdmon/</a></li> <li>•Field Naturalist Clubs.</li> </ul>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>•Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season.</li> <li>•A colony identified as SWH will include a 50 m radius habitat area from the peripheral nests</li> <li>•Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•SWH MiST Index #4 provides development effects and mitigation measures</li> </ul>	<p>ABSENT - There are no suitable banks or cliffs in the study area.</p>
<p><b>Colonially -Nesting Bird Breeding Habitat (Tree/Shrubs)</b></p> <p><b>Rationale:</b> Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron</p>	<p>SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1</p>	<ul style="list-style-type: none"> <li>•Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.</li> <li>•Most nests in trees are 11 to 15 m from ground, near the top of the tree.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Ontario Breeding Bird Atlas colonial nest records.</li> <li>•Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF).</li> <li>•Natural Heritage Information Center (NHIC) Mixed Wader Nesting Colony</li> <li>•Aerial photographs can help identify large heronries.</li> <li>•Reports and other information available from CAs.</li> <li>•MNRF District Offices.</li> <li>•Local naturalist clubs</li> </ul>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>•Presence of 5 or more active nests of Great Blue Heron or other listed species.</li> <li>•The habitat extends from the edge of the colony and a minimum 300 m radius or extent of the Forest Ecosite containing the colony or any island &lt;15 ha with a colony is the SWH</li> <li>•Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells</li> <li>•SWH MiST Index #5 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - No heron nests have been observed in the study area and there are no swamp or forest communities which could support a heronry.</p>

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Colonially -Nesting Bird Breeding Habitat (Ground)</b></p> <p><b>Rationale:</b> Colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird</p>	<p>Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map).</p> <p>Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird)</p> <p>MAM1 - 6 MAS1 - 3 CUM CUT CUS</p>	<p>•Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas.</p> <p>•Brewers Blackbird colonies are found loosely on the ground in low bushes in close proximity to streams and irrigation ditches within farmlands.</p> <p><u>Information Sources</u></p> <p>•Ontario Breeding Bird Atlas, rare/colonial species records.</p> <p>•Canadian Wildlife Service</p> <p>•Reports and other information available from CAs.</p> <p>•Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area</p> <p>•MNRF District Offices.</p> <p>•Field Naturalist clubs.</p>	<p>Studies confirming:</p> <ul style="list-style-type: none"> <li>•Presence of &gt;25 active nests for Herring Gulls or Ring-billed Gulls, &gt;5 active nests for Common Tern or &gt;2 active nests for Caspian Tern.</li> <li>•Presence of 5 or more pairs for Brewer's Blackbird.</li> <li>•Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant.</li> <li>•The edge of the colony and a minimum 150 m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island &lt;3 ha with a colony is the SWH</li> <li>•Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•SWH MiST Index #6 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - There are no suitable islands or peninsulas in the study area which support large numbers of breeding gulls. Brewer's Blackbirds do not occur in this region of Ontario.</p>

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Migratory Butterfly Stopover Areas</b></p> <p><b>Rationale:</b> Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.</p>	<p>Painted Lady Red Admiral</p> <p><b>Special Concern:</b> Monarch</p>	<p>Combination of ELC Community Series; need to have present one Community Series from each land class: <u>Field:</u> CUM CUT CUS <u>Forest:</u> FOC FOD FOM CUP</p> <p>Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.</p>	<p>A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present and will be located within 5 km of Lake Ontario.</p> <ul style="list-style-type: none"> <li>•The habitat is typically a combination of field and forest and provides the butterflies with a location to rest prior to their long migration south.</li> <li>•The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat.</li> <li>•Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•OMNRF (NHIC)</li> <li>•Agriculture Canada in Ottawa may have list of butterfly experts.</li> <li>•Field Naturalist Clubs</li> <li>•Toronto Entomologists Association</li> <li>•Conservation Authorities</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>•The presence of Monarch Use Days (MUD) during fall migration (August/October). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur.</li> <li>•Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD.</li> <li>•MUD of &gt;5,000 or &gt;3,000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.</li> <li>•SWH MiST Index #16 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - Although the study area is within 5 km of Lake Ontario, there are no natural features larger than 10 ha in size which could support large numbers of migrating butterflies.</p>
<p><b>Landbird Migratory Stopover Areas</b></p> <p><b>Rationale:</b> Sites with a high diversity of species as well as high numbers are most significant.</p>	<p>All migratory songbirds.</p> <p>Canadian Wildlife Service Ontario website: <a href="http://www.ec.gc.ca/nature/default.asp?lang=En&amp;n=421B7A9D-1">http://www.ec.gc.ca/nature/default.asp?lang=En&amp;n=421B7A9D-1</a></p> <p>All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)</p>	<p>All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD</p>	<p>Woodlots need to be &gt;10 ha in size and within 5 km of Lake Ontario.</p> <ul style="list-style-type: none"> <li>•If multiple woodlands are located along the shoreline those Woodlands &lt;2 km from Lake Ontario are more significant</li> <li>•Sites have a variety of habitats, forest, grassland and wetland complexes.</li> <li>•The largest sites are more significant</li> <li>•Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and within 5 km of Lake Ontario are Candidate SWH.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Bird Studies Canada</li> <li>•Ontario Nature</li> <li>•Local birders and naturalist club</li> <li>•Ontario Important Bird Areas (IBA) Program</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>•Use of the habitat by &gt;200 birds/day and with &gt;35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant.</li> <li>•Studies should be completed during spring (April/May) and fall (August/October) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•SWH MiST Index #9 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - Although the study area is within 5 km of Lake Ontario, there are no natural features larger than 10 ha in size which could support large numbers of migrating birds.</p>



Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Deer Yarding Areas</b></p> <p><b>Rationale:</b> Winter habitat for deer is considered to be the main limiting factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.</p>	White-tailed Deer	<p>Note: OMNRF to determine this habitat.</p> <p>ELC Community Series providing a thermal cover component for a deer yard would include: FOM FOC SWM SWC</p> <p>Or these ELC Ecosites; CUP2 CUP3 FOD3 CUT</p>	<ul style="list-style-type: none"> <li>•Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter.</li> <li>•The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%.</li> <li>•OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual"</li> <li>•Woodlots with high densities of deer due to artificial feeding are not significant.</li> </ul>	<p>No Studies Required:</p> <ul style="list-style-type: none"> <li>•Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths &gt;40 cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH.</li> <li>•Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO).</li> <li>•Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations.</li> <li>•If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area, then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.</li> <li>•SWH MiST Index #2 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - MNRF does not map any deer yards in the study area.</p>

Seasonal Concentration Areas of Animals					
Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<b>Deer Winter Congregation Areas</b>  <b>Rationale:</b> Deer movement during winter in the southern areas of Eco region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions.	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD  Conifer plantations much smaller than 50 ha may also be used.	<ul style="list-style-type: none"> <li>•Woodlots will typically be &gt;100 ha in size. Woodlots &lt;100 ha may be considered as significant based on MNRF studies or assessment.</li> <li>•Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands.</li> <li>•If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule.</li> <li>•Large woodlots &gt;100 ha and up to 1,500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha.</li> <li>•Woodlots with high densities of deer due to artificial feeding are not significant. Information Sources</li> <li>•MNRF District Offices.</li> <li>•LIO/NRVIS</li> </ul>	Studies confirm: <ul style="list-style-type: none"> <li>•Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF.</li> <li>•Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF</li> <li>•Studies should be completed during winter (January/February) when &gt;20 cm of snow is on the ground using aerial survey techniques, ground or road surveys or a pellet count deer density survey.</li> <li>•If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area, then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.</li> <li>•SWH MiST Index #2 provides development effects and mitigation measures.</li> </ul>	ABSENT - MNRF does not map any deer winter congregation areas in the study area.

Rare Vegetation Communities					
Rare Vegetation Community	ELC Ecosite Codes	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		Habitat Description	Detailed Information and Sources	Defining Criteria	
<b>Cliffs and Talus Slopes</b>  <b>Rationale:</b> Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO TAS TAT CLO CLS CLT	A Cliff is vertical to near vertical bedrock >3m in height.  A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris	Most cliff and talus slopes occur along the Niagara Escarpment.  <u>Information Sources</u> <ul style="list-style-type: none"> <li>•The Niagara Escarpment Commission has detailed information on location of these habitats.</li> <li>•OMNRF District</li> <li>•Natural Heritage Information Center (NHIC) has location information available on their website</li> <li>•Field Naturalist clubs</li> <li>•Conservation Authorities</li> </ul>	<ul style="list-style-type: none"> <li>•Confirm any ELC Vegetation Type for Cliffs or Talus Slopes</li> <li>•SWH MiST Index #21 provides development effects and mitigation measures.</li> </ul>	ABSENT - The listed ecosites do not occur in the study area.

Rare Vegetation Communities					
Rare Vegetation Community	ELC Ecosite Codes	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		Habitat Description	Detailed Information and Sources	Defining Criteria	
<p><b>Sand Barren</b></p> <p><b>Rationale:</b> Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry</p>	<p>ELC Ecosites: SBO1 SBS1 SBT1</p> <p>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always &lt;60%.</p>	<p>Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.</p>	<p>A sand barren area &gt;0.5 ha in size.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•OMNRF Districts.</li> <li>•Natural Heritage Information Center (NHIC) has location information available on their website.</li> <li>•Field Naturalist clubs</li> <li>•Conservation Authorities</li> </ul>	<ul style="list-style-type: none"> <li>•Confirm any ELC Vegetation Type for Sand Barrens</li> <li>•Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotic spp.).</li> <li>•SWH MiST Index #20 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - The listed ecosites do not occur in the study area.</p>
<p><b>Alvar</b></p> <p><b>Rationale:</b> Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Eco regions 6E and 7E. Alvars in 6E are small and highly localized just north of the Paleozoic-Precambrian contact.</p>	<p>ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2</p> <p>Five Alvar Indicator Species: 1) <i>Carex crawei</i> 2) <i>Panicum philadelphicum</i> 3) <i>Eleocharis compressa</i> 4) <i>Scutellaria parvula</i> 5) <i>Trichostema brachiatum</i></p> <p>These indicator species are very specific to Alvars within Ecoregion 6E.</p>	<p>An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.</p>	<p>An Alvar site &gt;0.5 ha in size.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Alvars of Ontario (2000), Federation of Ontario Naturalists.</li> <li>•Ontario Nature - Conserving Great Lakes Alvars.</li> <li>•Natural Heritage Information Center (NHIC) has location information available on their website</li> <li>•OMNRF Districts</li> <li>•Field Naturalist clubs.</li> <li>•Conservation Authorities.</li> </ul>	<ul style="list-style-type: none"> <li>•Field studies that identify four of the five Alvar Indicator Species at a Candidate Alvar site is Significant.</li> <li>•Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotic spp.).</li> <li>•The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses</li> <li>•SWH MiST Index #17 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - The listed ecosites do not occur in the study area.</p>

Rare Vegetation Communities					
Rare Vegetation Community	ELC Ecosite Codes	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		Habitat Description	Detailed Information and Sources	Defining Criteria	
<p><b>Old Growth Forest</b></p> <p><b>Rationale:</b> Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.</p>	<p>Forest Community Series: FOD FOC FOM SWD SWC SWM</p>	<p>Old Growth forests are characterized by heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multilayered canopy and an abundance of snags and downed woody debris.</p>	<p>Woodland areas 30 ha or greater in size or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest.</p> <p>Information Sources</p> <ul style="list-style-type: none"> <li>•OMNRF Forest Resource Inventory mapping</li> <li>•OMNRF Districts.</li> <li>•Field Naturalist clubs</li> <li>•Conservation Authorities</li> <li>•Sustainable Forestry License (SFL) companies will possibly know locations through field operations.</li> <li>•Municipal forestry departments</li> </ul>	<p>Field Studies will determine:</p> <ul style="list-style-type: none"> <li>•If dominant trees species of the are &gt;140 years old, then the area containing these trees is Significant Wildlife Habitat</li> <li>•The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present)</li> <li>•The area of forest ecosites combined or an eco-element within an ecosite that contains the old growth characteristics is the SWH.</li> <li>•Determine ELC vegetation types for the forest area containing the old growth characteristics.</li> <li>•SWH MiST Index #23 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - There are no forest communities in the study area.</p>
<p><b>Savannah</b></p> <p><b>Rationale:</b> Savannahs are extremely rare habitats in Ontario.</p>	<p>TPS1 TPS2 TPW1 TPW2 CUS2</p>	<p>A Savannah is a tallgrass prairie habitat that has tree cover between 25-60%.</p>	<p>No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Natural Heritage Information Center (NHIC) has location information available on their website</li> <li>•OMNRF Districts</li> <li>•Feld Naturalist clubs.</li> <li>•Conservation Authorities.</li> </ul>	<p>Field studies confirm one or more of the Savannah indicator species listed in Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used.</p> <ul style="list-style-type: none"> <li>•Area of the ELC Ecosite is the SWH.</li> <li>•Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotic spp.).</li> <li>•SWH MiST Index #18 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - The listed ecosites do not occur in the study area.</p>

Rare Vegetation Communities					
Rare Vegetation Community	ELC Ecosite Codes	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		Habitat Description	Detailed Information and Sources	Defining Criteria	
<p><b>Tallgrass Prairie</b></p> <p><b>Rationale:</b> Tallgrass Prairies are extremely rare habitats in Ontario.</p>	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has <25% tree cover.	<p>No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Natural Heritage Information Center (NHIC) has location information available on their website</li> <li>•OMNRF Districts</li> <li>•Feld Naturalist clubs.</li> <li>•Conservation Authorities.</li> </ul>	<p>Field studies confirm one or more of the Prairie indicator species listed in Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used</p> <ul style="list-style-type: none"> <li>•Area of the ELC Ecosite is the SWH.</li> <li>•Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover are exotic spp.).</li> <li>•SWH MiST Index #19 provides development effects and mitigation measures.</li> </ul>	ABSENT - The listed ecosites do not occur in the study area.
<p><b>Other Rare Vegetation Communities</b></p> <p><b>Rationale:</b> Plant communities that often contain rare species which depend on the habitat for survival.</p>	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWH Technical Guide. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	<p>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M</p> <p>The OMNRF/NHIC will have up to date listing for rare vegetation communities.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Natural Heritage Information Center (NHIC) has location information available on their website</li> <li>•OMNRF Districts</li> <li>•Feld Naturalist clubs.</li> <li>•Conservation Authorities</li> </ul>	<p>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG.</p> <ul style="list-style-type: none"> <li>•Area of the ELC Vegetation Type polygon is the SWH.</li> <li>•SWH MiST Index #37 provides development effects and mitigation measures.</li> </ul>	ABSENT - None of the vegetation communities assessed in the study area are provincially rare.

Specialized Habitat for Wildlife					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Waterfowl Nesting Area</b></p> <p><b>Rationale:</b> Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.</p>	<p>American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard</p>	<p>All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4</p> <p><b>Note: includes adjacency to Provincially Significant Wetlands</b></p>	<p>A waterfowl nesting area extends 120 m from a wetland (&gt;0.5 ha) or a wetland (&gt;0.5 ha) and any small wetlands (0.5 ha) within 120 m or a cluster of 3 or more small (&lt;0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur.</p> <ul style="list-style-type: none"> <li>•Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests.</li> <li>•Wood Ducks and Hooded Mergansers utilize large diameter trees (&gt;40 cm DBH) in woodlands for cavity nest sites.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Ducks Unlimited staff may know the locations of particularly productive nesting sites.</li> <li>•OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat.</li> <li>•Reports and other information available from Conservation Authorities.</li> </ul>	<p>Studies confirmed:</p> <ul style="list-style-type: none"> <li>•Presence of 3 or more nesting pairs for listed species excluding Mallards, or;</li> <li>•Presence of 10 or more nesting pairs for listed species including Mallards.</li> <li>•Any active nesting site of an American Black Duck is considered significant.</li> <li>•Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest.</li> <li>•SWH MiST Index #25 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - Although common waterfowl, such as Mallards and American Black Ducks, could occasionally nest along the shoreline of Whitby Harbour, they do not nest in sufficient numbers to qualify as a significant waterfowl nesting area.</p>

Specialized Habitat for Wildlife					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Bald Eagle and Osprey Nesting, Foraging and Perching Habitat</b></p> <p><b>Rationale:</b> Nest sites are fairly uncommon in Ecoregion 6E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.</p>	<p>Osprey</p> <p><b>Special Concern:</b> Bald Eagle</p>	<p>ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM, and SWC directly adjacent to riparian areas - rivers, lakes, ponds and wetlands</p>	<p>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</p> <ul style="list-style-type: none"> <li>•Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy.</li> <li>•Nests located on man-made objects are not to be included as SWH (e.g., telephone poles and constructed nesting platforms).</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario.</li> <li>•MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat.</li> <li>•Nature Counts, Ontario Nest Records Scheme data.</li> <li>•OMNRF Districts.</li> <li>•Check the Ontario Breeding Bird Atlas ccv or Rare Breeding Birds in Ontario for species documented</li> <li>•Reports and other information available from Conservation Authorities.</li> <li>•Field Naturalists clubs</li> </ul>	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none"> <li>•One or more active Osprey or Bald Eagle nests in an area.</li> <li>•Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH.</li> <li>•For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important.</li> <li>•For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on sight lines from the nest to the development and inclusion of perching and foraging habitat</li> <li>•To be significant a site must be used annually. When found inactive, the site must be known to be inactive for &gt;3 years or suspected of not being used for &gt;5 years before being considered not significant.</li> <li>•Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid-March to mid-August.</li> <li>•Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”</li> <li>•SWH MiST Index #26 provides development effects and mitigation measure</li> </ul>	<p>ABSENT - No Bald Eagle or Osprey nests occur within 300 m of the study area.</p>

Specialized Habitat for Wildlife					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Woodland Raptor Nesting Habitat</b></p> <p><b>Rationale:</b> Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.</p>	<p>Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red -shouldered Hawk Barred Owl Broad-winged Hawk</p>	<p>May be found in all forested ELC Ecosites.</p> <p>May also be found in SWC, SWM, SWD and CUP3</p>	<p>All natural or conifer plantation woodland/forest stands &gt;30 ha with &gt;10 ha of interior habitat. Interior habitat determined with a 200 m buffer.</p> <ul style="list-style-type: none"> <li>•Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small offshore islands.</li> <li>•In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.</li> </ul> <p>Information Sources</p> <ul style="list-style-type: none"> <li>•OMNRF Districts.</li> <li>•Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented.</li> <li>•Check data from Bird Studies Canada.</li> <li>•Reports and other information available from Conservation Authorities.</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>•Presence of 1 or more active nests from species list is considered significant.</li> <li>•Red-shouldered Hawk and Northern Goshawk: A 400 m radius around the nest or 28 ha area of habitat is the SWH (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest)</li> <li>•Barred Owl: A 200 m radius around the nest is the SWH.</li> <li>•Broad-winged Hawk and Coopers Hawk: A 100 m radius around the nest is the SWH.</li> <li>•Sharp-Shinned Hawk: A 50 m radius around the nest is the SWH.</li> <li>•Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/ nesting) raptors and facilitate the discovery of nests by narrowing down the search area.</li> <li>•SWH MiST Index #27 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - There are no forest communities in the study area that could support raptor nests.</p>



Specialized Habitat for Wildlife					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Turtle Nesting Areas</b></p> <p><b>Rationale:</b> These habitats are rare and when identified will often be the only breeding site for local populations of turtles</p>	<p>Midland Painted Turtle</p> <p><b>Special Concern:</b> Northern Map Turtle Snapping Turtle</p>	<p>Exposed mineral soil (sand or gravel) areas adjacent (&lt;100 m) or within the following ELC Ecosites:</p> <p>MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1</p>	<p>Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals.</p> <ul style="list-style-type: none"> <li>•For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH.</li> <li>•Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels).</li> <li>•Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them.</li> <li>•Natural Heritage Information Center (NHIC)</li> <li>•Field Naturalist clubs</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>•Presence of 5 or more nesting Midland Painted Turtles</li> <li>•One or more Northern Map Turtle or Snapping Turtle nesting is a SWH.</li> <li>•The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100 m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH.</li> <li>•Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100 m area of habitat.</li> <li>•Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method.</li> <li>•SWH MiST Index #28 provides development effects and mitigation measures for turtle nesting habitat</li> </ul>	<p>CANDIDATE - Turtles occur in Whitby Harbour and can be assumed to use suitable sand and gravel features as nesting sites.</p>
<p><b>Seeps and Springs</b></p> <p><b>Rationale:</b> Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.</p>	<p>Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.</p>	<p>Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.</p>	<p>Any forested area (with &lt;25% meadow/field/pasture) within the headwaters of a stream or river system.</p> <ul style="list-style-type: none"> <li>•Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Topographical Map.</li> <li>•Thermography.</li> <li>•Hydrological surveys conducted by Conservation Authorities and MOE.</li> <li>•Field Naturalists clubs and landowners.</li> <li>•Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.</li> </ul>	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> <li>•Presence of a site with 2 or more seeps/springs should be considered SWH.</li> <li>•The area of a ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat.</li> <li>•SWH MiST Index #30 provides development effect and mitigation measures</li> </ul>	<p>ABSENT - There are no seeps or springs in the study area.</p>

Specialized Habitat for Wildlife					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Amphibian Breeding Habitat (Woodland).</b></p> <p><b>Rationale:</b> These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations</p>	<p>Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog</p>	<p>All Ecosites associated with these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD.</p> <p>Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibian</p>	<ul style="list-style-type: none"> <li>• Presence of a wetland, pond or woodland pool (including vernal pools) &gt;500 m<sup>2</sup> (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians.</li> <li>• Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records</li> <li>• Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property.</li> <li>• OMNRF District.</li> <li>• OMNRF wetland evaluations</li> <li>• Field Naturalist clubs</li> <li>• Canadian Wildlife Service Amphibian Road Call Survey</li> <li>• Ontario Vernal Pool Association: <a href="http://www.ontariovernalpools.org">http://www.ontariovernalpools.org</a></li> </ul>	<p>Studies confirm;</p> <ul style="list-style-type: none"> <li>• Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with Call Level Codes of 3.</li> <li>• A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands.</li> <li>• The habitat is the wetland area plus a 230 m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat.</li> <li>• SWH MiST Index #14 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - There are no woodland communities within 230 m of suitable amphibian breeding habitat in the study area.</p>
<p><b>Amphibian Breeding Habitat (Wetlands)</b></p> <p><b>Rationale:</b> Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.</p>	<p>Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog</p>	<p>ELC Community Classes SW, MA, FE, BO, OA and SA. Typically, these wetland ecosites will be isolated (&gt;120 m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g., Bullfrog) may be adjacent to woodlands.</p>	<ul style="list-style-type: none"> <li>• Wetlands &gt;500 m<sup>2</sup> (about 25 m diameter) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats.</li> <li>• Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators.</li> <li>• Bullfrogs require permanent water bodies with abundant emergent vegetation.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>• Ontario Herpetofaunal Summary Atlas (or other similar atlases)</li> <li>• Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count.</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>• Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3 or; Wetland with confirmed breeding Bullfrogs are significant.</li> <li>• The ELC ecosite wetland area and the shoreline are the SWH.</li> <li>• A combination of observational study and call count surveys ii will be required during the spring (March-June) when amphibians are</li> </ul>	<p>ABSENT - The only features in the study area which could provide amphibian breeding habitat are two stormwater management facilities on GO Transit property. No evidence of amphibian breeding was observed in these features during field work.</p>

Specialized Habitat for Wildlife					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
			<ul style="list-style-type: none"> <li>•OMNRF Districts and wetland evaluations</li> <li>•Reports and other information available from Conservation Authorities.</li> </ul>	concentrated around suitable breeding habitat within or near the wetlands. <ul style="list-style-type: none"> <li>•If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.</li> <li>•SWH MiST Index #15 provides development effects and mitigation measures.</li> </ul>	
<b>Woodland Area - Sensitive Bird Breeding Habitat</b>  <b>Rationale:</b> Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest songbirds.	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren  <b>Special Concern:</b> Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	<ul style="list-style-type: none"> <li>•Habitats where interior forest breeding birds are breeding, typically large mature (&gt;60 years old) forest stands or woodlots &gt;30 ha.</li> <li>•Interior forest habitat is at least 200 m from forest edge habitat.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Local bird clubs.</li> <li>•Canadian Wildlife Service (CWS) for the location of forest bird monitoring.</li> <li>•Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species</li> <li>•Reports and other information available from Conservation Authorities.</li> </ul>	Studies confirm: <ul style="list-style-type: none"> <li>•Presence of nesting or breeding pairs of 3 or more of the listed wildlife species.</li> <li>•Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.</li> <li>•Conduct field investigations in spring and early summer when birds are singing and defending their territories.</li> <li>•Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•SWH MiST Index #34 provides development effects and mitigation measures.</li> </ul>	ABSENT - There is no interior forest habitat in the study area.

Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species)					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Marsh Breeding Bird Habitat</b></p> <p><b>Rationale:</b> Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.</p>	<p>American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan</p> <p><b>Special Concern:</b> Black Tern Yellow Rail</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1</p> <p>For Green Heron: All SW, MA and CUM1 sites.</p>	<p>Nesting occurs in wetlands.</p> <ul style="list-style-type: none"> <li>•All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present.</li> <li>•For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•OMNRF District and wetland evaluations.</li> <li>•Field Naturalist clubs</li> <li>•Natural Heritage Information Center (NHIC) Records.</li> <li>•Reports and other information available from Conservation Authorities.</li> <li>•Ontario Breeding Bird Atlas.</li> </ul>	<p>Studies confirm:</p> <ul style="list-style-type: none"> <li>•Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species.</li> <li>•Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH.</li> <li>•Area of the ELC ecosite is the SWH.</li> <li>•Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats.</li> <li>•Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•SWH MiST Index #35 provides development effects and mitigation measures</li> </ul>	<p>ABSENT - None of the indicator species were observed in the study area.</p>
<p><b>Open Country Bird Breeding Habitat</b></p> <p><b>Rationale;</b> This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.</p>	<p>Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow</p> <p><b>Special Concern:</b> Short-eared Owl</p>	<p>CUM1 CUM2</p>	<ul style="list-style-type: none"> <li>•Large grassland areas (includes natural and cultural fields and meadows) &gt;30 ha</li> <li>•Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e., no row cropping or intensive hay or livestock pasturing in the last 5 years).</li> <li>•Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older.</li> <li>•The indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Agricultural land classification maps, Ministry of Agriculture.</li> <li>•Local bird clubs.</li> <li>•Ontario Breeding Bird Atlas</li> <li>•Reports and other information available from Conservation Authorities.</li> </ul>	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> <li>•Presence of nesting or breeding of 2 or more of the listed species.</li> <li>•A field with 1 or more breeding Short-eared Owls is to be considered SWH.</li> <li>•The area of SWH is the contiguous ELC ecosite field areas.</li> <li>•Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories.</li> <li>•Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•SWH MiST Index #32 provides development effects and mitigation measures</li> </ul>	<p>ABSENT - None of the indicator species were observed in the study area.</p>

Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species)					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p><b>Shrub/Early Successional Bird Breeding Habitat</b></p> <p><b>Rationale;</b> This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.</p>	<p>Indicator Species: Brown Thrasher Clay-coloured Sparrow</p> <p>Common Species: Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher</p> <p><b>Special Concern:</b> Yellow-breasted Chat Golden-winged Warbler</p>	<p>CUT1 CUT2 CUS1 CUS2 CUW1 CUW2</p> <p>Patches of shrub ecosites can be complexed into a larger habitat for some bird species</p>	<p>Large field areas succeeding to shrub and thicket habitats &gt;10 ha size.</p> <ul style="list-style-type: none"> <li>•Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e., no row-cropping, haying or livestock pasturing in the last 5 years).</li> <li>•Shrub thicket habitats (&gt;10 ha) are most likely to support and sustain a diversity of these species.</li> <li>•Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Agricultural land classification maps, Ministry of Agriculture.</li> <li>•Local bird clubs.</li> <li>•Ontario Breeding Bird Atlas</li> <li>•Reports and other information available from Conservation Authorities.</li> </ul>	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> <li>•Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species.</li> <li>•A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as SWH.</li> <li>•The area of the SWH is the contiguous ELC ecosite field/thicket area.</li> <li>•Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories</li> <li>•Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>•SWH MiST Index #33 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - One of the common indicator species was determined to be a probable breeder in the study area, but no other indicator species were observed.</p>
<p><b>Terrestrial Crayfish</b></p> <p><b>Rationale:</b> Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.</p>	<p>Chimney or Digger Crayfish (<i>Fallicambarus fodiens</i>)</p> <p>Devil Crayfish or Meadow Crayfish (<i>Cambarus Diogenes</i>)</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.</p>	<p>Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish.</p> <ul style="list-style-type: none"> <li>•Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water.</li> <li>•Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually, the soil is not too moist so that the tunnel is well formed.</li> </ul> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> <li>•Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998</li> </ul>	<p>Studies Confirm:</p> <ul style="list-style-type: none"> <li>•Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites</li> <li>•Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH.</li> <li>•Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult</li> <li>•SWH MiST Index #36 provides development effects and mitigation measures.</li> </ul>	<p>ABSENT - No evidence of terrestrial crayfish was observed in the study area.</p>

Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species)					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<b>Special Concern and Rare Wildlife Species</b>  <b>Rationale:</b> These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.	All plant and animal element occurrences (EOs) within a 1 or 10 km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites  <u>Information Sources</u> •Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. •NHIC Website "Get Information" : <a href="http://nhic.mnr.gov.on.ca">http://nhic.mnr.gov.on.ca</a> •Ontario Breeding Bird Atlas •Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: •Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. •The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species (e.g., specific nesting habitat or foraging habitat). •SWH MiST Index #37 provides development effects and mitigation measures.	CANDIDATE - Whitby Harbour is habitat for rare waterbirds such as Red-necked Grebe.

Animal Movement Corridors					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<b>Amphibian Movement Corridors</b>  <b>Rationale;</b> Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue -spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water.  Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1	Movement corridors between breeding habitat and summer habitat. Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat - Wetland) of this Schedule.  <u>Information Sources</u> •MNRF District Office. •Natural Heritage Information Center (NHIC). •Reports and other information available from Conservation Authorities. •Field Naturalist Clubs.	•Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. •Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant •Corridors should have at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps <20 m. •Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding	ABSENT - The only features in the study area which could provide amphibian breeding habitat are two stormwater management facilities on GO Transit property, but no evidence of amphibian breeding was observed in these features and there are no potential movement corridors for amphibians between these features and other suitable habitats.

Animal Movement Corridors					
Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment of Habitat in EIA Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
				habitat. •SWH MiST Index #40 provides development effects and mitigation measures	
<b>Deer Movement Corridors</b>  <b>Rationale:</b> Corridors important for all species to be able to access seasonally important lifecycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.	White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridor	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule. •A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion. •Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines or ridges).  <u>Information Sources</u> •MNRF District Office. •Natural Heritage Information Center (NHIC). •Reports and other information available from Conservation Authorities. •Field Naturalist Clubs.	Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. •Corridors that lead to a deer wintering habitat should be unbroken by roads and residential areas. •Corridors should be at least 200 m wide with gaps <20 m and if following riparian area with at least 15 m of vegetation on both sides of waterway. Shorter corridors are more significant than longer corridors. •SWH MiST Index #39 provides development effects and mitigation measures	ABSENT - No evidence of deer movement was observed in the study area and no deer were observed.

## APPENDIX 4 | Species List



Appendix page

**A4-1. Plant species list.**

Phylo Order	Family Scientific	Scientific Name	Common Name	Introduced	G Rank	S Rank	COSEWIC	SARO	SARA	CUM	CUW	TRCA (2018)
407	Pinaceae	<i>Picea glauca</i>	White Spruce		G5	S5					x	L3
411	Cupressaceae	<i>Juniperus virginiana var. virginiana</i>	Eastern Red Cedar		G5T5	S5				x		L5
411	Cupressaceae	<i>Thuja occidentalis</i>	Eastern White Cedar		G5	S5					x	L4
590	Typhaceae	<i>Typha angustifolia</i>	Narrow-leaved Cattail	TRUE	G5	SNA				x	x	L+
590	Typhaceae	<i>Typha latifolia</i>	Broad-leaved Cattail		G5	S5					x	L4
598	Cyperaceae	<i>Schoenoplectus tabernaemontani</i>	Soft-stemmed Bulrush		G5	S5				x		L4
603	Poaceae	<i>Anthoxanthum odoratum</i>	Sweet Vernalgrass	TRUE	GNR	SNA					x	L+
603	Poaceae	<i>Bromus inermis</i>	Smooth Brome	TRUE	G5	SNA					x	L+
603	Poaceae	<i>Dactylis glomerata</i>	Orchard Grass	TRUE	GNR	SNA					x	L+
603	Poaceae	<i>Elymus repens</i>	Quackgrass	TRUE	GNR	SNA				x		L+
603	Poaceae	<i>Hordeum jubatum</i>	Foxtail Barley		G5	S5?				x		
603	Poaceae	<i>Lolium perenne</i>	Perennial Ryegrass	TRUE	GNR	SNA				x		L+
603	Poaceae	<i>Phalaris arundinacea</i>	Reed Canarygrass		G5	S5				x		L+?
603	Poaceae	<i>Phalaris arundinacea var. arundinacea</i>	Reed Canarygrass		G5TNR	S5				x		
603	Poaceae	<i>Phleum pratense subsp. pratense</i>	Common Timothy	TRUE	GNRTNR	SE5				x		L+
603	Poaceae	<i>Phragmites australis subsp. australis</i>	European Reed	TRUE	G5T5	SE5				x	x	L+
603	Poaceae	<i>Poa pratensis</i>	Kentucky Bluegrass		G5	S5				x		
611	Ranunculaceae	<i>Anemonastrum canadense</i>	Canada Anemone		G5	S5					x	
636	Vitaceae	<i>Parthenocissus quinquefolia</i>	Virginia Creeper		G5	S4?				x	x	L5
636	Vitaceae	<i>Vitis riparia</i>	Riverbank Grape		G5	S5				x	x	L5
640	Fabaceae	<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil	TRUE	GNR	SNA				x	x	L+
640	Fabaceae	<i>Melilotus albus</i>	White Sweet-clover	TRUE	G5	SNA				x	x	L+
640	Fabaceae	<i>Trifolium repens</i>	White Clover	TRUE	GNR	SNA					x	L+
640	Fabaceae	<i>Vicia cracca</i>	Tufted Vetch	TRUE	GNR	SNA				x	x	L+
643	Rosaceae	<i>Potentilla anserina</i>	Silverweed		G5	S5				x	x	
643	Rosaceae	<i>Potentilla norvegica</i>	Rough Cinquefoil		G5	S5				x	x	L+?
643	Rosaceae	<i>Rosa multiflora</i>	Multiflora Rose	TRUE	GNR	SNA					x	L+
646	Elaeagnaceae	<i>Elaeagnus angustifolia</i>	Russian Olive	TRUE	GNR	SNA				x	x	L+
646	Elaeagnaceae	<i>Elaeagnus umbellata</i>	Autumn Olive	TRUE	GNR	SNA					x	L+
647	Rhamnaceae	<i>Rhamnus cathartica</i>	European Buckthorn	TRUE	GNR	SNA				x	x	L+
648	Ulmaceae	<i>Ulmus americana</i>	White Elm		G4	S5				x		L5

Phylo Order	Family Scientific	Scientific Name	Common Name	Introduced	G Rank	S Rank	COSEWIC	SARO	SARA	CUM	CUW	TRCA (2018)
648	Ulmaceae	<i>Ulmus pumila</i>	Siberian Elm	TRUE	GNR	SNA				x		L+
655	Juglandaceae	<i>Juglans nigra</i>	Black Walnut		G5	S4?				x	x	L5
686	Hypericeae	<i>Hypericum perforatum subsp. perforatum</i>	Common St. John's-wort	TRUE	GNR	SE5				x	x	L+
704	Salicaceae	<i>Populus deltoides</i>	Eastern Cottonwood		G5	S5					x	L5
704	Salicaceae	<i>Salix alba</i>	White Willow	TRUE	G5	SNA					x	L+
704	Salicaceae	<i>Salix eriocephala</i>	Cottony Willow		G5	S5				x		L5
704	Salicaceae	<i>Salix interior</i>	Sandbar Willow		G5	S5					x	L5
704	Salicaceae	<i>Salix sp.</i>	Willow		GNR	S?					x	
704	Salicaceae	<i>Salix x fragilis</i>	Hybrid White Willow	TRUE	GNA	SNA					x	L+
715	Lythraceae	<i>Lythrum salicaria</i>	Purple Loosestrife	TRUE	G5	SNA					x	L+
716	Onagraceae	<i>Circaea canadensis subsp. canadensis</i>	Canada Enchanter's Nightshade		G5TNR	S5					x	L5
716	Onagraceae	<i>Epilobium hirsutum</i>	Hairy Willowherb	TRUE	GNR	SNA					x	L+
716	Onagraceae	<i>Oenothera biennis</i>	Common Evening Primrose		G5	S5				x	x	L5
739	Anacardiaceae	<i>Rhus typhina</i>	Staghorn Sumac		G5	S5				x	x	L5
740	Sapindaceae	<i>Acer negundo</i>	Manitoba Maple		G5	S5				x	x	L+?
740	Sapindaceae	<i>Acer platanoides</i>	Norway Maple	TRUE	GNR	SNA				x	x	L+
740	Sapindaceae	<i>Acer saccharinum</i>	Silver Maple		G5	S5					x	L5
740	Sapindaceae	<i>Acer x freemanii</i>	Freeman's Maple		GNA	SNA					x	L4
770	Brassicaceae	<i>Alliaria petiolata</i>	Garlic Mustard	TRUE	GNR	SE5				x	x	L+
770	Brassicaceae	<i>Hesperis matronalis</i>	Dame's Rocket	TRUE	G4G5	SNA				x	x	L+
783	Polygonaceae	<i>Persicaria pensylvanica</i>	Pennsylvania Smartweed		G5	S5					x	L4
783	Polygonaceae	<i>Rumex crispus</i>	Curled Dock	TRUE	GNR	SNA				x	x	L+
797	Amaranthaceae	<i>Chenopodium album</i>	Common Lamb's-quarters	TRUE	G5	SNA				x		L+
824	Cornaceae	<i>Cornus sericea</i>	Red-osier Dogwood		G5	S5				x	x	
825	Balsaminaceae	<i>Impatiens capensis</i>	Spotted Jewelweed		G5	S5					x	L5
852	Rubiaceae	<i>Galium aparine</i>	Common Bedstraw		G5	S5				x		L5
852	Rubiaceae	<i>Galium mollugo</i>	Smooth Bedstraw	TRUE	GNR	SNA				x	x	L+
856	Apocynaceae	<i>Asclepias syriaca</i>	Common Milkweed		G5	S5				x	x	L5
856	Apocynaceae	<i>Asclepias tuberosa var. interior</i>	Butterfly Milkweed		G5T5?	S4				x		
856	Apocynaceae	<i>Vincetoxicum rossicum</i>	European Swallowwort	TRUE	GNR	SNA				x	x	
857	Boraginaceae	<i>Echium vulgare</i>	Common Viper's Bugloss	TRUE	GNR	SNA				x		L+
857	Boraginaceae	<i>Lithospermum officinale</i>	European Gromwell	TRUE	GNR	SNA					x	L+
859	Convolvulaceae	<i>Calystegia sepium</i>	Hedge False Bindweed		G5	S5					x	L5

Phylo Order	Family Scientific	Scientific Name	Common Name	Introduced	G Rank	S Rank	COSEWIC	SARO	SARA	CUM	CUW	TRCA (2018)
859	Convolvulaceae	<i>Convolvulus arvensis</i>	Field Bindweed	TRUE	GNR	SNA				x	x	L+
860	Solanaceae	<i>Solanum dulcamara</i>	Bittersweet Nightshade	TRUE	GNR	SNA				x	x	L+
866	Oleaceae	<i>Fraxinus excelsior</i>	European Ash	TRUE	GNR	SNA					x	L+
866	Oleaceae	<i>Fraxinus pennsylvanica</i>	Red Ash		G5	S4					x	L5
870	Plantaginaceae	<i>Linaria vulgaris</i>	Butter-and-eggs	TRUE	GNR	SNA				x	x	L+
883	Lamiaceae	<i>Lycopus americanus</i>	American Water-horehound		G5	S5					x	L4
883	Lamiaceae	<i>Lycopus europaeus</i>	European Water-horehound	TRUE	GNR	SNA					x	L+
883	Lamiaceae	<i>Monarda fistulosa</i>	Wild Bergamot		G5	S5				x	x	L5
883	Lamiaceae	<i>Pycnanthemum virginianum</i>	Virginia Mountain-mint		G5	S4				x		L3
883	Lamiaceae	<i>Stachys palustris</i>	Marsh Hedge-nettle	TRUE	G5	SNA					x	L+
904	Asteraceae	<i>Achillea millefolium</i>	Common Yarrow	TRUE	G5	SNA					x	L+
904	Asteraceae	<i>Ambrosia artemisiifolia</i>	Common Ragweed		G5	S5				x	x	L5
904	Asteraceae	<i>Arctium minus</i>	Common Burdock	TRUE	GNR	SNA				x		L+
904	Asteraceae	<i>Bidens cernua</i>	Nodding Beggarticks		G5	S5					x	L5
904	Asteraceae	<i>Bidens frondosa</i>	Devil's Beggarticks		G5	S5					x	L5
904	Asteraceae	<i>Cichorium intybus</i>	Wild Chicory	TRUE	GNR	SNA				x		L+
904	Asteraceae	<i>Cirsium arvense</i>	Canada Thistle	TRUE	G5	SNA				x	x	L+
904	Asteraceae	<i>Cirsium vulgare</i>	Bull Thistle	TRUE	GNR	SNA				x	x	L+
904	Asteraceae	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod		G5	S5				x	x	L5
904	Asteraceae	<i>Leucanthemum vulgare</i>	Oxeye Daisy	TRUE	GNR	SNA				x	x	L+
904	Asteraceae	<i>Ratibida pinnata</i>	Gray-headed Prairie Coneflower		G5	S3				x		L+
904	Asteraceae	<i>Solidago altissima</i>	Tall Goldenrod		G5	S5				x	x	L5
904	Asteraceae	<i>Solidago canadensis</i>	Canada Goldenrod		G5	S5				x	x	
904	Asteraceae	<i>Solidago gigantea</i>	Giant Goldenrod		G5	S5					x	L5
904	Asteraceae	<i>Solidago sp.</i>	Goldenrod		GNR	S?					x	
904	Asteraceae	<i>Sonchus arvensis</i>	Field Sow-thistle	TRUE	GNR	SNA				x	x	
904	Asteraceae	<i>Symphyotrichum ericoides</i>	White Heath Aster		G5	S5				x	x	
904	Asteraceae	<i>Symphyotrichum laeve var. laeve</i>	Smooth Aster		G5T5	S5				x		L3
904	Asteraceae	<i>Symphyotrichum novae-angliae</i>	New England Aster		G5	S5				x	x	L5
904	Asteraceae	<i>Symphyotrichum pilosum</i>	Old Field Aster		G5	S5					x	

Phylo Order	Family Scientific	Scientific Name	Common Name	Introduced	G Rank	S Rank	COSEWIC	SARO	SARA	CUM	CUW	TRCA (2018)
904	Asteraceae	<i>Symphyotrichum pilosum var. pilosum</i>	Old Field Aster		G5T5	S5				x		L3
904	Asteraceae	<i>Tanacetum vulgare</i>	Common Tansy	TRUE	GNR	SNA				x		L+
904	Asteraceae	<i>Tussilago farfara</i>	Coltsfoot	TRUE	GNR	SNA				x		L+
904	Asteraceae	<i>Xanthium strumarium</i>	Rough Cocklebur		G5	S5					x	L5
908	Adoxaceae	<i>Sambucus canadensis</i>	Common Elderberry		G5	S5				x		L5
909	Caprifoliaceae	<i>Dipsacus fullonum</i>	Common Teasel	TRUE	GNR	SNA				x		L+
909	Caprifoliaceae	<i>Lonicera tatarica</i>	Tartarian Honeysuckle	TRUE	GNR	SNA				x	x	L+
916	Apiaceae	<i>Daucus carota</i>	Wild Carrot	TRUE	GNR	SNA				x	x	L+

**A4-2. Wildlife species list.**

Taxa	Family	Scientific Name	Common Name	Exotic	G Rank	S Rank	Breeding Bird Code	COSEWIC Status	SARA	SARO	Area Sensitive	CUM	CUW	TRCA (2018)
Amphibian	Ranidae	<i>Lithobates clamitans</i>	Green Frog		G5	S5						x	x	L4
Bird	Alcedinidae	<i>Megaceryle alcyon</i>	Belted Kingfisher		G5	S4B	PO						x	L4
Bird	Anatidae	<i>Anas rubripes</i>	American Black Duck		G5	S4	O						x	L3
Bird	Anatidae	<i>Branta canadensis</i>	Canada Goose		G5	S5	PO						x	L5
Bird	Anatidae	<i>Anas platyrhynchos</i>	Mallard		G5	S5	PR						x	L5
Bird	Anatidae	<i>Cygnus olor</i>	Mute Swan	SE	G5	SNA	PO						x	L+
Bird	Anatidae	<i>Mergus serrator</i>	Red-breasted Merganser		G5	S4B	PO	S5N			TRUE			
Bird	Ardeidae	<i>Ardea herodias</i>	Great Blue Heron		G5	S4	O					x	x	L3
Bird	Ardeidae	<i>Ardea alba</i>	Great Egret		G5	S2B	O						x	L3
Bird	Cardinalidae	<i>Cardinalis cardinalis</i>	Northern Cardinal		G5	S5	PR						x	L5
Bird	Cardinalidae	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak		G5	S4B	PO						x	L4
Bird	Cathartidae	<i>Cathartes aura</i>	Turkey Vulture		G5	S5B	O						x	L5
Bird	Charadriidae	<i>Charadrius vociferus</i>	Killdeer		G5	S5B	PR	S5N				x	x	L4
Bird	Columbidae	<i>Zenaida macroura</i>	Mourning Dove		G5	S5	PR					x	x	L5
Bird	Columbidae	<i>Columba livia</i>	Rock Pigeon	SE	G5	SNA	O					x		L+
Bird	Corvidae	<i>Corvus brachyrhynchos</i>	American Crow		G5	S5B	O						x	L5
Bird	Corvidae	<i>Cyanocitta cristata</i>	Blue Jay		G5	S5	O					x		L5
Bird	Fringillidae	<i>Spinus tristis</i>	American Goldfinch		G5	S5B	PR					x	x	L5
Bird	Fringillidae	<i>Haemorhous mexicanus</i>	House Finch	SE	G5	SNA	PR					x		L+
Bird	Fringillidae	<i>Haemorhous purpureus</i>	Purple Finch		G5	S4B	PO						x	L4
Bird	Hirundinidae	<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow		G5	S4B	O						x	L4
Bird	Hirundinidae	<i>Tachycineta bicolor</i>	Tree Swallow		G5	S4B	O						x	L4

Taxa	Family	Scientific Name	Common Name	Exotic	G Rank	S Rank	Breeding Bird Code	COSEWIC Status	SARA	SARO	Area Sensitive	CUM	CUW	TRCA (2018)
Bird	Icteridae	<i>Icterus galbula</i>	Baltimore Oriole		G5	S4B	PO						x	L5
Bird	Icteridae	<i>Molothrus ater</i>	Brown-headed Cowbird		G5	S4B	PO					x	x	L5
Bird	Icteridae	<i>Quiscalus quiscula</i>	Common Grackle		G5	S5B	PR					x	x	L5
Bird	Icteridae	<i>Agelaius phoeniceus</i>	Red-winged Blackbird		G5	S4	PR					x	x	L5
Bird	Mimidae	<i>Dumetella carolinensis</i>	Gray Catbird		G5	S4B	O					x		L4
Bird	Paridae	<i>Poecile atricapillus</i>	Black-capped Chickadee		G5	S5	C					x	x	L5
Bird	Parulidae	<i>Setophaga petechia</i>	Yellow Warbler		G5	S5B	PR					x	x	L5
Bird	Passerellidae	<i>Spizella passerina</i>	Chipping Sparrow		G5	S5B	PO					x		L5
Bird	Passerellidae	<i>Melospiza melodia</i>	Song Sparrow		G5	S5B	PR					x	x	L5
Bird	Phalacrocoracidae	<i>Phalacrocorax auritus</i>	Double-crested Cormorant		G5	S5B	O	NAR		NAR			x	L3
Bird	Picidae	<i>Picoides pubescens</i>	Downy Woodpecker		G5	S5	PO						x	L5
Bird	Podicipedidae	<i>Podiceps grisegena</i>	Red-necked Grebe		NAR	S3B	PO	S4N	NAR		TRUE			L3
Bird	Sturnidae	<i>Sturnus vulgaris</i>	European Starling	SE	G5	SNA	PR					x	x	L+
Bird	Turdidae	<i>Turdus migratorius</i>	American Robin		G5	S5B	C					x	x	L5
Bird	Tyrannidae	<i>Empidonax traillii</i>	Willow Flycatcher		G5	S5B	PR						x	L4
Bird	Vireonidae	<i>Vireo olivaceus</i>	Red-eyed Vireo		G5	S5B	PO					x		L4
Insect	Nymphalidae	<i>Danaus plexippus</i>	Monarch		SC	S2N		S4B	END	SC		x		
Insect	Pieridae	<i>Pieris rapae</i>	Cabbage White	SE	G5	SNA						x		
Mammal	Canidae	<i>Vulpes vulpes</i>	Red Fox		G5	S5							x	L4

**A4-3. List of Fish Species from sampling completed by CLOCA in Whitby Harbour.**

Scientific Name	Common Name	Exotic	G Rank	S Rank	COSEWIC Status	SARA	SARO	Area Sensitive
<i>Alosa pseudoharengus</i>	Alewife	SE	G5	SNA				
<i>Salmo salar</i>	Atlantic Salmon							
<i>Fundulus diaphanus</i>	Banded Killifish		G5	S5	NAR		NAR	
<i>Lepomis macrochirus</i>	Bluegill		G5	S5				
<i>Pimephales notatus</i>	Bluntnose Minnow		G5	S5	NAR		NAR	
<i>Amia calva</i>	Bowfin		G5	S4				
<i>Labidesthes sicculus</i>	Brook Silverside		G5	S4	NAR		NAR	
<i>Ameiurus nebulosus</i>	Brown Bullhead		G5	S5				
<i>Salmo trutta</i>	Brown Trout	SE	G5	SNA				
<i>Oncorhynchus tshawytscha</i>	Chinook Salmon	SE	G5	SNA	END			
<i>Cyprinus carpio</i>	Common Carp	SE	G5	SNA				
<i>Luxilus cornutus</i>	Common Shiner		G5	S5				
<i>Notropis atherinoides</i>	Emerald Shiner		G5	S5				
<i>Pimephales promelas</i>	Fathead Minnow		G5	S5				

Scientific Name	Common Name	Exotic	G Rank	S Rank	COSEWIC Status	SARA	SARO	Area Sensitive
<i>Aplodinotus grunniens</i>	Freshwater Drum		G5	S5				
<i>Dorosoma cepedianum</i>	Gizzard Shad		G5	S4				
<i>Notemigonus crysoleucas</i>	Golden Shiner		G5	S5				
<i>Etheostoma nigrum</i>	Johnny Darter		G5	S5				
<i>Micropterus salmoides</i>	Largemouth Bass		G5	S5				
<i>Percina caprodes</i>	Logperch		G5	S5				
<i>Esox lucius</i>	Northern Pike		G5	S5				
<i>Lepomis gibbosus</i>	Pumpkinseed		G5	S5				
<i>Oncorhynchus mykiss</i>	Rainbow Trout	SE	G5	SNA				
<i>Ambloplites rupestris</i>	Rock Bass		G5	S5				
<i>Neogobius melanostomus</i>	Round Goby	SE	G5	SNA				
<i>Micropterus dolomieu</i>	Smallmouth Bass		G5	S5				
<i>Cyprinella spiloptera</i>	Spotfin Shiner		G5	S4				
<i>Notropis hudsonius</i>	Spottail Shiner		G5	S5				
<i>Gasterosteus aculeatus</i>	Threespine Stickleback		G5	S4S5				
<i>Sander vitreus vitreus</i>	Walleye		G5T5	S5				
<i>Morone chrysops</i>	White Bass		G5	S4				
<i>Catostomus commersonii</i>	White Sucker		G5	S5				
<i>Perca flavescens</i>	Yellow Perch		G5	S5				

# APPENDIX B

## Stage 1 Archeological Assessment



# Stage 1 Archaeological Assessment Rowe Channel (Lot 27, Concession 1, and Lot 27, Broken Front, Former Township of Whitby, County of Ontario) Town of Whitby, Regional Municipality of Durham

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## Original Report

Prepared for:

## Resilient Consulting

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Whitby ON, L1N 5V3

Archaeological Licence: P1066 (Lytle)

PIF P1066-0211-2021

Archaeological Services Inc. File: 20EA-238

February 22, 2022



## Executive Summary

Archaeological Services Inc. (ASI) was contracted by Resilient Consulting to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Rowe Channel Upgrade Study project (Figure 1). This project involves a detailed study to examine several improvement alternatives for the Rowe Channel upgrade including the generation of a preliminary engineering design of the preferred alternative.

The Stage 1 background study and property inspection determined that the Study Area does not retain archaeological potential. The area may be considered clear of further archaeological concern.

In light of these results, the following recommendations are made:

- 1 The Study Area does not retain archaeological potential on account of deep and extensive land disturbance, low and wet conditions, or being previously assessed. These lands do not require further archaeological assessment; and,
- 2 Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.



## Project Personnel

- **Senior Project Manager:** Lisa Merritt, MSc. (P094) Partner, Director, Environmental Assessment Division
- **Project Coordinator:** Katrina Thach, Hon. BA (R1225), Archaeologist, Project Coordinator, Environmental Assessment Division
- **Project Administrator:** Hannah Brouwers, Hon. BA (R1270), Archaeologist, Project Administrator, Environmental Assessment Division
- **Project Director:** Jessica Lytle, MSc (P1066), Lead Archaeologist, Project Manager, Environmental Assessment Division
- **Project Manager:** Eliza Brandy, MA (R1109), Associate Archaeologist, Project Manager, Environmental Assessment Division
- **Field Director:** Hannah Brouwers
- **Report Preparation:** Hannah Brouwers
- **Graphics:** Andrew Clish, BES (P046), Senior Archaeologist, Senior Field Director, Laboratory and Fieldwork Services, Operations Division; Peter Bikoulis, PhD, Archaeologist, GIS Technician, Operation Division
- **Report Reviewer:** Lisa Merritt



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## 1.0 Project Context

Archaeological Services Inc. (ASI) was contracted by Resilient Consulting to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Rowe Channel Upgrade Study project (Figure 1). This project involves a detailed study to examine several improvement alternatives for the Rowe Channel upgrade including the generation of a preliminary engineering design of the preferred alternative.

Stage 1 scope involves the Rowe Channel located between the Whitby GO Station and the Front culvert outfall at Lake Ontario, in the Town of Whitby.

All activities carried out during this assessment were completed in accordance with the *Ontario Heritage Act* (Ontario Heritage Act, R.S.O. c. O.18, 1990, as amended in 2019) and the 2011 *Standards and Guidelines for Consultant Archaeologists (S & G)*, administered by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI 2011).

### 1.1 Development Context

All work has been undertaken as required by the *Environmental Assessment Act, RSO* (Environmental Assessment Act, R.S.O., 1990 as amended 2020) and regulations made under the Act, and are therefore subject to all associated legislation. This project is being conducted in accordance with the Municipal Engineers' Association document *Municipal Class Environmental Assessment* (Municipal Class Environmental Assessment, 2000, as amended 2015).

The *Archaeological Potential Model for Durham Region* (ASI, 2013) was also cited.

Authorization to carry out the activities necessary for the completion of the Stage 1 archaeological assessment and property inspection was granted by Resilient Consulting on April 29, 2021.



### 1.1.1 Treaties and Traditional Territories

The Study Area is within the Johnson-Butler Purchases and in the traditional territory of the Michi Saagiig and Chippewa Nations, collectively known as the Williams Treaties First Nations, including the Mississaugas of Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Scugog Island First Nation and the Chippewas of Beausoleil First Nation, Georgina Island First Nation and the Rama First Nation (Williams Treaties First Nations, 2017).

The purpose of the Johnson-Butler Purchases of 1787/1788 was to acquire from the Mississaugas the Carrying Place Trail and lands along the north shore of Lake Ontario from the Trent River to Etobicoke Creek.

As part of the Johnson-Butler Purchases, the British signed a treaty, sometimes referred to as the “Gunshot Treaty” with the Mississaugas in 1787 covering the north shore of Lake Ontario, beginning at the eastern boundary of the Toronto Purchase and continuing east to the Bay of Quinte, where it meets the Crawford Purchase. It was referred to as the “Gunshot Treaty” because it covered the land as far back from the lake as a person could hear a gunshot. Compensation for the land apparently included “approximately £2,000 and goods such as muskets, ammunition, tobacco, laced hats and enough red cloth for 12 coats” (Surtees, 1984, pp. 37–45). First discussions about acquiring this land are said to have come about while the land ceded in the Toronto Purchase of 1787 was being surveyed and paid for (Surtees 1984:37–45). During this meeting with the Mississaugas, Sir John Johnson and Colonel John Butler proposed the purchase of lands east of the Toronto Purchase (Fullerton & Mississaugas of the Credit First Nation, 2015). However, descriptions of the treaty differ between the British and Mississaugas, including the depth of the boundaries: “Rice Lake and Lake Simcoe, located about 13 miles and 48 miles north of Lake Ontario, respectively, were not mentioned as landmarks in the First Nations’ description of the lands to be ceded. Additionally, original descriptions provided by the Chiefs of Rice Lake indicate a maximum depth of ten miles, versus an average of 15-16 miles in Colonel Butler's description” (Fullerton & Mississaugas of the Credit First Nation, 2015).



However, records of the acquisition were not clear regarding the extent of lands agreed upon (Surtees 1984:37–45). To clarify this, in October and November of 1923, the governments of Canada and Ontario, chaired by A.S. Williams, signed treaties with the Chippewa and Michi Saagiig for three large tracts of land in central Ontario and the northern shore of Lake Ontario, the last substantial portion of land in southern Ontario that had not yet been ceded to the government (Crown-Indigenous Relations and Northern Affairs, 2013).

In 2018 the Government of Canada reached a settlement with the Williams Treaties First Nations reaffirming the recognized Treaty harvesting rights in the Williams Treaties territories of each of the seven nations.

## 1.2 Historical Context

### 1.2.1 Indigenous Land Use and Settlement

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier approximately 13,000 years before present (BP) (Ferris, 2013). Populations at this time would have been highly mobile, inhabiting a boreal-parkland similar to the modern sub-arctic. By approximately 10,000 BP, the environment had progressively warmed (Edwards & Fritz, 1988) and populations now occupied less extensive territories (Ellis & Deller, 1990).

Between approximately 10,000-5,500 BP, the Great Lakes basins experienced low-water levels, and many sites which would have been located on those former shorelines are now submerged. This period produces the earliest evidence of heavy wood working tools, an indication of greater investment of labour in felling trees for fuel, to build shelter, and watercraft production. These activities suggest prolonged seasonal residency at occupation sites. Polished stone and native copper implements were being produced by approximately 8,000 BP; the latter was acquired from the north shore of Lake Superior, evidence of extensive exchange networks throughout the Great Lakes region. The earliest evidence for cemeteries dates to approximately 4,500-3,000 BP and is indicative of increased social organization, investment of labour into social infrastructure, and the establishment of socially prescribed territories (J. Brown, 1995, p. 13; Ellis et al., 1990, 2009).





Between 3,000-2,500 BP, populations continued to practice residential mobility and to harvest seasonally available resources, including spawning fish. The Woodland period begins around 2,500 BP and exchange and interaction networks broaden at this time (Spence et al., 1990, pp. 136, 138) and by approximately 2,000 BP, evidence exists for small community camps, focusing on the seasonal harvesting of resources (Spence et al., 1990, pp. 155, 164). By 1,500 BP there is macro botanical evidence for maize in southern Ontario, and it is thought that maize only supplemented people's diet. There is earlier phytolithic evidence for maize in central New York State by 2,300 BP - it is likely that once similar analyses are conducted on Ontario ceramic vessels of the same period, the same evidence will be found (Birch & Williamson, 2013, pp. 13–15). As is evident in detailed Anishinaabek ethnographies, winter was a period during which some families would depart from the larger group as it was easier to sustain smaller populations (Rogers, 1962). It is generally understood that these populations were Algonquian-speakers during these millennia of settlement and land use.

From the beginning of the Late Woodland period at approximately 1,000 BP, lifeways became more similar to that described in early historical documents. Between approximately 1000-1300 Common Era (CE), the communal site is replaced by the village focused on horticulture. Seasonal disintegration of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson, 1990, p. 317). By 1300-1450 CE, this episodic community disintegration was no longer practised and populations now communally occupied sites throughout the year (Dodd et al., 1990, p. 343). From 1450-1649 CE this process continued with the coalescence of these small villages into larger communities (Birch & Williamson, 2013). Through this process, the socio-political organization of the First Nations, as described historically by the French and English explorers who first visited southern Ontario, was developed.

By 1600 CE, the communities within Simcoe County had formed the Confederation of Nations encountered by the first European explorers and missionaries. In the 1640s, the traditional enmity between the Haudenosaunee and the Huron-Wendat (and their Algonquian allies such as the Nipissing and



Odawa) led to the dispersal of the Huron-Wendat. Shortly afterwards, the Haudenosaunee established a series of settlements at strategic locations along the trade routes inland from the north shore of Lake Ontario. By the 1690s however, the Anishinaabeg were the only communities with a permanent presence in southern Ontario. From the beginning of the eighteenth century to the assertion of British sovereignty in 1763, there was no interruption to Anishinaabeg control and use of southern Ontario.

## Oral Histories

Oral histories from Indigenous communities are primary sources that can hold important historical information and their inclusion can provide an indigenous perspective to archaeological assessment reports. There are various understandings of the histories and movements of communities based on the study of different oral histories and written records and it is fair to say that there is no universally accepted narrative.

### Curve Lake First Nation

The following detailed Michi Saagiig oral history by Gitiga Migizi from 2017, a respected Elder and Knowledge Keeper of the Michi Saagiig Nation, was provided to ASI by Curve Lake First Nation:

“The traditional homelands of the Michi Saagiig (Mississauga Anishinaabeg) encompass a vast area of what is now known as southern Ontario. The Michi Saagiig are known as “the people of the big river mouths” and were also known as the “Salmon People” who occupied and fished the north shore of Lake Ontario where the various tributaries emptied into the lake. Their territories extended north into and beyond the Kawarthas as winter hunting grounds on which they would break off into smaller social groups for the season, hunting and trapping on these lands, then returning to the lakeshore in spring for the summer months.

The Michi Saagiig were a highly mobile people, travelling vast distances to procure subsistence for their people. They were also known as the “Peacekeepers” among Indigenous nations. The Michi Saagiig homelands were located directly between two very powerful Confederacies: The



Three Fires Confederacy to the north and the Haudenosaunee Confederacy to the south. The Michi Saagiig were the negotiators, the messengers, the diplomats, and they successfully mediated peace throughout this area of Ontario for countless generations.

Michi Saagiig oral histories speak to their people being in this area of Ontario for thousands of years. These stories recount the “Old Ones” who spoke an ancient Algonquian dialect. The histories explain that the current Ojibwa phonology is the 5th transformation of this language, demonstrating a linguistic connection that spans back into deep time. The Michi Saagiig of today are the descendants of the ancient peoples who lived in Ontario during the Archaic and Paleo-Indian periods. They are the original inhabitants of southern Ontario, and they are still here today.

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. This also includes all the tributaries that flow from the height of land north of Toronto like the Oak Ridges Moraine, and all of the rivers that flow into Lake Ontario (the Rideau, the Salmon, the Ganaraska, the Moira, the Trent, the Don, the Rouge, the Etobicoke, the Humber, and the Credit, as well as Wilmot and 16 Mile Creeks) through Burlington Bay and the Niagara region including the Welland and Niagara Rivers, and beyond. The western side of the Michi Saagiig Nation was located around the Grand River which was used as a portage route as the Niagara portage was too dangerous. The Michi Saagiig would portage from present-day Burlington to the Grand River and travel south to the open water on Lake Erie.

Michi Saagiig oral histories also speak to the occurrence of people coming into their territories sometime between 500-1000 A.D. seeking to establish villages and a corn growing economy – these newcomers included peoples that would later be known as the Huron-Wendat, Neutral, Petun/Tobacco Nations. The Michi Saagiig made Treaties with



these newcomers and granted them permission to stay with the understanding that they were visitors in these lands. Wampum was made to record these contracts, ceremonies would have bound each nation to their respective responsibilities within the political relationship, and these contracts would have been renewed annually (see Migizi & Kapyrka, 2015). These visitors were extremely successful as their corn economy grew as well as their populations. However, it was understood by all nations involved that this area of Ontario were the homeland territories of the Michi Saagiig

The Odawa Nation worked with the Michi Saagiig to meet with the Huron-Wendat, the Petun, and Neutral Nations to continue the amicable political and economic relationship that existed – a symbiotic relationship that was mainly policed and enforced by the Odawa people.

Problems arose for the Michi Saagiig in the 1600s when the European way of life was introduced into southern Ontario. Also, around the same time, the Haudenosaunee were given firearms by the colonial governments in New York and Albany which ultimately made an expansion possible for them into Michi Saagiig territories. There began skirmishes with the various nations living in Ontario at the time. The Haudenosaunee engaged in fighting with the Huron-Wendat and between that and the onslaught of European diseases, the Iroquoian speaking peoples in Ontario were decimated.

The onset of colonial settlement and missionary involvement severely disrupted the original relationships between these Indigenous nations. Disease and warfare had a devastating impact upon the Indigenous peoples of Ontario, especially the large sedentary villages, which mostly included Iroquoian speaking peoples. The Michi Saagiig were largely able to avoid the devastation caused by these processes by retreating to their wintering grounds to the north, essentially waiting for the smoke to clear. Michi Saagiig Elder Gitiga Migizi (2017) recounts:

*“We weren’t affected as much as the larger villages because we learned to paddle away for several years until everything settled*



*down. And we came back and tried to bury the bones of the Huron but it was overwhelming, it was all over, there were bones all over – that is our story.*

*There is a misnomer here, that this area of Ontario is not our traditional territory and that we came in here after the Huron-Wendat left or were defeated, but that is not true. That is a big misconception of our history that needs to be corrected. We are the traditional people, we are the ones that signed treaties with the Crown. We are recognized as the ones who signed these treaties and we are the ones to be dealt with officially in any matters concerning territory in southern Ontario.*

*We had peacemakers go to the Haudenosaunee and live amongst them in order to change their ways. We had also diplomatically dealt with some of the strong chiefs to the north and tried to make peace as much as possible. So we are very important in terms of keeping the balance of relationships in harmony.*

*Some of the old leaders recognized that it became increasingly difficult to keep the peace after the Europeans introduced guns. But we still continued to meet, and we still continued to have some wampum, which doesn't mean we negated our territory or gave up our territory – we did not do that. We still consider ourselves a sovereign nation despite legal challenges against that. We still view ourselves as a nation and the government must negotiate from that basis.”*

Often times, southern Ontario is described as being “vacant” after the dispersal of the Huron-Wendat peoples in 1649 (who fled east to Quebec and south to the United States). This is misleading as these territories remained the homelands of the Michi Saagiig Nation.

The Michi Saagiig participated in eighteen treaties from 1781 to 1923 to allow the growing number of European settlers to establish in Ontario. Pressures from increased settlement forced the Michi Saagiig to slowly move into small family groups around the present day communities:



Curve Lake First Nation, Hiawatha First Nation, Alderville First Nation, Scugog Island First Nation, New Credit First Nation, and Mississauga First Nation.

The Michi Saagiig have been in Ontario for thousands of years, and they remain here to this day.”

## 1.2.2 Post-Contact Settlement

Historically, the Study Area is located in the Former Whitby Township, County of Ontario in Lots 27, Concession 1 & Broken Front.

The S & G stipulates that areas of early Euro-Canadian settlement (pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches, and early cemeteries are considered to have archaeological potential. Early historical transportation routes (trails, passes, roads, railways, portage routes), properties listed on a municipal register or designated under the Ontario Heritage Act or a federal, provincial, or municipal historic landmark or site are also considered to have archaeological potential.

For the Euro-Canadian period, the majority of early nineteenth century farmsteads (i.e., those that are arguably the most potentially significant resources and whose locations are rarely recorded on nineteenth century maps) are likely to be located in proximity to water. The development of the network of concession roads and railroads through the course of the nineteenth century frequently influenced the siting of farmsteads and businesses. Accordingly, undisturbed lands within 100 metres of an early settlement road are also considered to have potential for the presence of Euro-Canadian archaeological sites.

The first Europeans to arrive in the area were transient merchants and traders from France and England, who followed Indigenous pathways and set up trading posts at strategic locations along the well-traveled river routes. All of these occupations occurred at sites that afforded both natural landfalls and convenient access, by means of the various waterways and overland trails, into



the hinterlands. Early transportation routes followed existing Indigenous trails, both along the lakeshore and adjacent to various creeks and rivers (ASI 2006).

## **Township of Whitby**

Whitby Township, when first laid out in the 1790s, was designated Township 9 although the name was changed shortly thereafter to Norwich. The first survey of this township was made in 1791 and the first settler arrived in 1794 (Armstrong 1985:148). The first settler was said to have been Benjamin Wilson, a Loyalist from Vermont, who settled along the lakeshore east of Oshawa (Farewell 1907:18). Whitby was quickly settled by a mixture of Loyalists, disbanded troops, and emigrants from the United States, the United Kingdom, and Ireland. Two major settlements were soon established in the southern half of the township, Whitby and Oshawa. These communities were advantageously located where watersheds (such as that of Lynde Creek) were crossed by the Kingston Road. Whitby further benefited from its harbour and from the construction of the Grand Trunk Railway in the 1850s. On January 1, 1968 the township was erected into a town, and on January 1, 1974, the town of Whitby became part of the Regional Municipality of Durham (Mika and Mika 1983:279).

## **Grand Trunk Railway**

The Grand Trunk Railway Company of Canada was incorporated by the Canadian government in 1852 and was planned to connect Toronto to Montreal. It began in 1853 by purchasing five existing railways: the St. Lawrence and Atlantic Railroad Company, the Quebec and Richmond Railroad Company, the Toronto and Guelph Railroad Company, the Grand Junction Railroad Company, and the Grand Trunk Railway Company of Canada East. By 1853, the Toronto and Guelph Railroad Company had already begun construction of its line. After its merge with the Grand Trunk Railway Company, the line was redirected from its original route and extended to Sarnia to be a hub for Chicago bound traffic. By 1856 the line had been built from Montreal to Sarnia via Toronto. The company fell into great debt in 1861 and while it was saved from bankruptcy by the Canadian government, in 1919 the company was bankrupt following its expansion west in an attempt to compete with the Canadian Pacific and Canadian Northern Railways (Library and Archives Canada, 2005).



## Railway History

The Lakeshore East Rail Corridor leaves downtown Toronto in an easterly direction, passing through Scarborough, Pickering, Whitby, Oshawa, Bowmanville, Newcastle, and finally reaching Port Hope. Although originally constructed through rural portions of the Townships of Scarboro, Pickering, Whitby, and Darlington, the City of Toronto east of the Don River has grown up around the corridor resulting in a series of important contextual alterations to the landscape.

It follows the track alignment originally completed by the Grand Trunk Railway (GTR) between Toronto and Port Hope in 1856. This work included the construction of a bridge, likely iron, over the Highland Creek. The GTR was incorporated in 1852 after the Canadian government introduced a plan to build a railway linking Montreal and Toronto. In the following decades, the GTR amalgamated with a number of railway companies in southern Ontario. In 1920, control of the GTR was assumed by the Canadian Government and three years later, in 1923, the GTR was amalgamated with CNR (Andreae, 1997). The CNR's Oshawa Subdivision, later the Kingston Subdivision, was partially acquired by Metrolinx in 2011, and shared with VIA Rail intercity passenger service and CNR freight train traffic.

### 1.2.3 Map Review

The *1860 Map of the County of Ontario* (Tremaine, 1860), the *1877 Historical Atlas of the County of Ontario* (Beers, 1877), the *1930 Topographic Map of Whitby* (Department of National Defence, 1930), the *1976 Topographic Map of Whitby* (Department of Energy, Mines and Resources, 1976), the *1994 NTS Map of Whitby* (Department of Energy, Mines and Resources, 1994) were examined to determine the presence of historic features within the Study Area during the nineteenth and twentieth centuries (Figures 2-6).

The 1860 map illustrates the historical town centre of Whitby, with Victoria Street, Charles Street, Watson Street West, Front Street and Brock Street historically surveyed. The map shows an unlabelled road within the Study Area that follows the path of the present Rowe Channel. The shoreline in the 1860





map shows it is relatively in the same location as the present shoreline. The Grand Trunk Railway can also be seen north of the Study Area. The 1877 map illustrates little changed to the Study Area from the previous 1860 mapping. The unlabelled road that was previously shown to follow the Rowe Channel has now been labeled as Colborne Street, connecting King Street (now Victoria Street) to Front Street. The mapping also illustrates that the historical centre of Whitby was surveyed for expansion, and many individual subdivision plots are shown east of the Study Area.

The 1930 map illustrates numerous buildings had been built east of the Study Area fronting Charles Street (see Figure 4). The previously identified Colborne Street is no longer illustrated. A marsh is noted surrounding the entire harbour, including in the southern portion of the Study Area. A single railway spur had been constructed that ran on the west side of the harbour, connecting the Grand Trunk Railway to the Ontario Hospital. This rail line disappears by the mid-twentieth century.

The 1976 map shows a small number of changes since 1930 within the Study Area, however a creek is shown running north to south within the area. Larger building including a jail have been illustrated adjacent to the Study Area in what is now a parking lot. The 1994 map illustrates the Study Area as very similar to what can be seen today, including the Rowe Channel, adjacent industrial buildings and marina. The jail is also still shown east of the Study Area.

#### **1.2.4 Aerial and Orthoimagery Review**

The 1954 aerial (Hunting Survey Corporation Limited, 1954) shows the Study Area to relatively undisturbed, except for the present Victoria Street and former rail spur seen on the 1930 map (Figure 4). The shoreline indicates part of the Study Area at this time would have been under water, within the harbour marsh area.

A review of available Google satellite imagery since 2004 shows the following impacts to the Study Area:



- Between August and September 2009, an additional Whitby GO Station parking lot was built northeast of Victoria Street West and Henry Street, adjacent to the Study Area. With the construction of the parking lot the northern section of the Study Area was disturbed and developed into a runoff pond that is now low and wet (Images 1-3).
- Between 2005 and 2009 a second residential building, including parking lot, was built northwest of the Rowe Channel and Watson Street West (Image 3).
- Between 2005 and 2009 a residential building was built southwest of the Rowe Channel and Victoria Street (Image 3).

## 1.3 Archaeological Context

This section provides background research pertaining to previous archaeological fieldwork conducted within and in the vicinity of the Study Area, its environmental characteristics (including drainage, soils or surficial geology and topography, etc.), and current land use and field conditions. Three sources of information were consulted to provide information about previous archaeological research: the site record forms for registered sites available online from the MHSTCI through “Ontario’s Past Portal”; published and unpublished documentary sources; and the files of ASI.

### 1.3.1 Current Land Use and Field Conditions

A property inspection conducted on May 21, 2021, confirmed the Study Area includes the length of the Rowe Channel, between the Whitby GO Station to the Front Street culvert outfall at Lake Ontario. The channel was constructed in 1989 as part of the Port Whitby (Rowe) Development and functions to convey drainage to Lake Ontario from a residential area north of Highway 401, the Whitby GO Station and areas south of Victoria Street West. Approximately 550 metres long, four metres wide and two metres deep, the channel was originally designed with a rectangle shape between Watson Street West and Front Street West, both lined with concrete and gabion baskets. The channel includes three culvert crossings, located at Victoria Street West, Watson Street West, and Front Street West. The Study Area passes between parking lots associated with the



Whitby GO Station, residential buildings, industrial properties, and private yacht clubs.

### 1.3.2 Geography

In addition to the known archaeological sites, the state of the natural environment is a helpful indicator of archaeological potential. Accordingly, a description of the physiography and soils are briefly discussed for the Study Area.

The S & G stipulates that primary water sources (lakes, rivers, streams, creeks, etc.), secondary water sources (intermittent streams and creeks, springs, marshes, swamps, etc.), ancient water sources (glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches, etc.), as well as accessible or inaccessible shorelines (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.) are characteristics that indicate archaeological potential.

Water has been identified as the major determinant of site selection and the presence of potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in Ontario since 5,000 BP (Karrow & Warner, 1990, p. Figure 2.16), proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location.

Other geographic characteristics that can indicate archaeological potential include elevated topography (eskers, drumlins, large knolls, and plateaux), pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground, distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings. Resource areas, including; food



or medicinal plants (migratory routes, spawning areas) are also considered characteristics that indicate archaeological potential (S & G, Section 1.3.1).

The Study Area is located with the clay plains of the Iroquois Plain physiographic region of southern Ontario which is a lowland region bordering Lake Ontario. This region is characteristically flat and formed by lacustrine deposits laid down by the inundation of Lake Iroquois, a body of water that existed during the late Pleistocene. This region extends from the Trent River, around the western part of Lake Ontario, to the Niagara River, spanning a distance of 300 kilometres (Chapman and Putnam 1984:190). The old shorelines of Lake Iroquois include cliffs, bars, beaches and boulder pavements. The old sandbars in this region are good aquifers that supply water to farms and villages. The gravel bars are quarried for road and building material, while the clays of the old lake bed have been used for the manufacture of bricks (Chapman and Putnam 1984:196).

Surficial geology in the Study Area consists of fine-textured glaciolacustrine deposits of silt and clay, minor sand and gravel. Soil within the Study Area includes Schomberg clay loam with good drainage, Lyons loam with poor drainage and Marsh saturated mineral soil with marsh vegetation, very poor drainage.

The Study Area is located along the Rowe Channel with the Pringle Creek Watershed. The Rowe Channel is located between the Whitby GO Station and the Front Street Culvert outfall to Lake Ontario, in the Town of Whitby. Constructed in 1989 as part of the Port Whitby (Rowe) development, the channel functions to convey drainage to Lake Ontario from, a residential area north of highway 401, the Whitby GO station and area south of Victoria Street West.

### **1.3.3 Previously Registered Archaeological Sites**

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD) maintained by the MHSTCI. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 kilometres east to west, and



approximately 18.5 kilometres north to south. Each Borden block is referenced by a four-letter designator, and sites within a block are numbered sequentially as they are found. The Study Area under review is located in Borden block *AlGr*.

According to the OASD, three previously registered archaeological sites are located within one kilometre of the Study Area (MHSTCI, 2021), one of which is located within 50 metres and does have further cultural heritage value of interest (see Section 1.3.4. for details). A summary of the sites is provided below in Table 1.

**Table 1: Registered Sites within One Kilometre of the Study Area**

<b>Borden number</b>	<b>Site Name</b>	<b>Temporal/ Cultural Affiliation</b>	<b>Site type</b>	<b>Researcher</b>
<i>AlGr-111</i>	<i>Maple Grove</i>	<i>Euro- Canadian</i>	<i>Homestead</i>	<i>ASI 1999</i>
AlGr-454	Castle Fox	Euro- Canadian	Homestead	This Land Archaeology Inc. 2015
AlGr-455	William Gordan	Euro- Canadian	Homestead	ASI 2018, Amec Foster Wheeler 2015

### 1.3.4 Previous Archaeological Assessments

According to the background research, one previous report details fieldwork within 50 metres of the Study Area:



## **(ASI, 1999) Stage 1-2 Archaeological Assessment of Plan of Subdivision 1600 Charles Street Part of Lots 10, 11, 12, & 13 Block 4, Plan H-50035, Town of Whitby, Regional Municipality of Durham, Ontario [CIF#1999-007-016]**

ASI was retained by Alex MacDonald Real Estate Co., Ltd to conduct a Stage 1 and 2 Archaeological Assessment at 1600 Charles Street, in the Town of Whitby. The project area was approximately 0.65 hectares in size and was located at the southwest corner of the intersection of Victoria Street West and Charles Street. Overlapping with a portion of the current Study Area, the area was subjected to test pit survey. The survey resulted in a small recovery of mid-nineteenth-century materials associated with the first mayor of Whitby, James Rowe and his family. A two-story house was located at the eastern end of the property, constructed circa 1856 and was registered as the Maple Grove Site (AlGr-111). The nineteenth century component of the site has been impacted by the excavation of a modern concrete basement and porch addition as well as other disturbances. The subject property was considered free of further archaeological concern.

## **2.0 Field Methods**

A Stage 1 property inspection must adhere to the S & G, Section 1.2, Standards 1-6, which are discussed below. The entire property and its periphery must be inspected. The inspection may be either systematic or random. Coverage must be sufficient to identify the presence or absence of any features of archaeological potential. The inspection must be conducted when weather conditions permit good visibility of land features. Natural landforms and watercourses are to be confirmed if previously identified. Additional features such as elevated topography, relic water channels, glacial shorelines, well-drained soils within heavy soils and slightly elevated areas within low and wet areas should be identified and documented, if present. Features affecting assessment strategies should be identified and documented such as woodlots, bogs or other permanently wet areas, areas of steeper grade than indicated on topographic mapping, areas of overgrown vegetation, areas of heavy soil, and recent land disturbance such as grading, fill deposits and vegetation clearing.



The inspection should also identify and document structures and built features that will affect assessment strategies, such as heritage structures or landscapes, cairns, monuments or plaques, and cemeteries.

The Stage 1 archaeological assessment property inspection was conducted under the field direction of Hannah Brouwers (R1270) of ASI, on May 21, 2021, in order to gain first-hand knowledge of the geography, topography, and current conditions and to evaluate and map archaeological potential of the Study Area. It was a systematic visual inspection from publicly accessible lands and public right-of-ways only and did not include excavation or collection of archaeological resources. Fieldwork was conducted when weather conditions were deemed clear with good visibility (sunny with seasonal temperatures), per S & G Section 1.2., Standard 2. Field observations are compiled onto the existing conditions of the Study Area in Section 8.0 (Figures 1-4) and associated photographic plates are presented in Section 7.0 (Images 1-10).

## 3.0 Analysis and Conclusions

The historical and archaeological contexts have been analyzed to help determine the archaeological potential of the Study Area. Results of the analysis of the Study Area property inspection and background research are presented in Section 3.1.

### 3.1 Analysis of Archaeological Potential

The S & G, Section 1.3.1, lists criteria that are indicative of archaeological potential. The Study Area meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites (See Table 1);
- Water sources: primary, secondary, or past water source (Rowe Channel, Lake Ontario);
- Early historic transportation routes (Grand Trunk Railway, Victoria Street, Brock Road);
- Proximity to early settlements (Town of Whitby); and
- Well-drained soils (Schomberg)



According to the S & G, Section 1.4 Standard 1e, no areas within a property containing locations listed or designated by a municipality can be recommended for exemption from further assessment unless the area can be documented as disturbed. The Municipal Heritage Register was consulted and no properties within the Study Area is Listed or Designated under the Ontario Heritage Act.

The Archaeological Potential Model for Durham Region (ASI, 2013) indicates that some of the Rowe Channel Study Area exhibits both Euro-Canadian and Pre-Contact Indigenous archaeological potential (ASI, 2013, p. 29).

These criteria are indicative of potential for the identification of archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbances as identified through Stage 1 assessment.

Part of the Study Area has been previously assessed and does not require further archaeological assessments (Figure 10: Rowe Channel Study Area – Results of the Stage 1 Figure 10: areas highlighted in orange).

A part of the Study Area is located within low lying wet areas, and according to the S & G Section 2.1 do not retain potential (Figures 1-4 areas highlighted in blue). These areas do not require further survey.

The remainder of the Study Area has been subjected to deep soil disturbance events due to construction from the Whitby GO Station parking lot, development of residential properties, and the construction of the Rowe Channel, as well as the artificially made lands in the south end of the Study Area. According to the S & G Section 1.3.2 these areas do not retain archaeological potential (Images 1-17: areas highlighted in yellow) and do not require further survey.

### 3.1 Conclusions

The Stage 1 background study and property inspection determined that the Study Area does not retain archaeological potential. The area may be considered clear of further archaeological concern.





## 4.0 Recommendations

In light of these results, the following recommendations are made:

- 1 The Study Area does not retain archaeological potential on account of deep and extensive land disturbance, low and wet conditions, or being previously assessed (Figure 10). These lands do not require further archaeological assessment; and,
- 2 Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

**NOTWITHSTANDING** the results and recommendations presented in this study, ASI notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the Ministry of Heritage, Sport, Tourism and Culture Industries should be immediately notified.

The above recommendations are subject to Ministry approval and it is an offence to alter any archaeological site without Ministry of Heritage, Sport, Tourism and Culture Industries concurrence. No grading or other activities that may result in the destruction or disturbance of any archaeological sites are permitted until notice of MHSTCI approval has been received.

## 5.0 Legislation Compliance Advice

ASI advises compliance with the following legislation:

- This report is submitted to the Ministry of Heritage, Sport, Tourism and Culture Industries as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, RSO 2005, 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 field work and report



recommendations ensure the conservation, preservation, and protection 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 Ministry of Heritage, Sport, Tourism and Culture Industries, a letter will be issued by the Ministry stating that there are no further concerns with regards to alterations to archaeological sites by the proposed development.

- 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 field work 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.
- 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 sec. 48 (1) of the Ontario Heritage Act.
- The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33, requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Consumer Services is also immediately notified.
- Archaeological sites recommended for further archaeological field work or protection remain subject to Section 48(1) of the Ontario Heritage Act and may not be altered, nor may artifacts be removed from them, except by a person holding an archaeological license.



## 6.0 Bibliography and Sources

Andreae, C. (1997). *Lines of Country: An Atlas of Railway and Waterway History in Canada*. Boston Mills Press.

Armstrong, F. H. (1985). *Handbook of Upper Canadian Chronology*. Dundurn Press.

ASI. (1999). *Stage 1-2 Archaeological Assessment of Plan of Subdivision 1600 Charles Street Part of Lots 10, 11, 12, & 13 Block 4, Plan H-50035, Town of Whitby, Regional Municipality of Durham, Ontario*.

ASI, (Archaeological Services Inc.). (2006). *Historical Overview and Assessment of Archaeological Potential Don River Watershed, City of Toronto*. Report on file with the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries.

ASI, (Archaeological Services Inc.). (2013). *Archaeological Potential Model for Durham Region* [Final Report]. On file with ASI.

Beers, J. H. (1877). *Illustrated Historical Atlas of the County of Ontario* [Map].

Birch, J., & Williamson, R. F. (2013). *The Mantle Site: An Archaeological History of an Ancestral Wendat Community*. Rowman & Littlefield Publishers, Inc.

Brown, J. (1995). On Mortuary Analysis – with Special Reference to the Saxe-Binford Research Program. In L. A. Beck (Ed.), *Regional Approaches to Mortuary Analysis* (pp. 3–23). Plenum Press.

Brown, R. (2013). *Rails Across Ontario: Exploring Ontario's Railway History*. Dundurn Press.

Chapman, L. J., & Putnam, F. (1984). *The Physiography of Southern Ontario* (Vol. 2). Ontario Ministry of Natural Resources.

Crown-Indigenous Relations and Northern Affairs. (2013). *Upper Canada Land Surrenders and the Williams Treaties (1781-1862/1923)*. <https://www.rcaanc-cirnac.gc.ca/eng/1360941656761/1360941689121>



Department of Energy, Mines and Resources. (1976). *Whitby Sheet 30M/15d* [Map].

Department of Energy, Mines and Resources. (1994). *National Topographic Map* [Map].

Department of National Defence. (1930). *Topographic Map Ontario Durham Sheet* (1930th ed.) [Topographic]. Geographical Section, General Staff, Department of National Defence.

Dodd, C. F., Poulton, D. R., Lennox, P. A., Smith, D. G., & Warrick, G. A. (1990). The Middle Ontario Iroquoian Stage. In C. J. Ellis & N. Ferris (Eds.), *The Archaeology of Southern Ontario to A.D. 1650* (pp. 321–360). Ontario Archaeological Society Inc.

Edwards, T. W. D., & Fritz, P. (1988). Stable-Isotope Palaeoclimate Records from Southern Ontario, Canada: Comparison of Results from Marl and Wood. *Canadian Journal of Earth Sciences*, 25, 1397–1406.

Ellis, C. J., & Deller, D. B. (1990). Paleo-Indians. In C. J. Ellis & N. Ferris (Eds.), *The Archaeology of Southern Ontario to A.D. 1650* (pp. 37–64). Ontario Archaeological Society Inc.

Ellis, C. J., Kenyon, I. T., & Spence, M. W. (1990). The Archaic. In C. J. Ellis & N. Ferris (Eds.), *The Archaeology of Southern Ontario to A.D. 1650* (pp. 65–124). Ontario Archaeological Society Inc.

Ellis, C. J., Timmins, P. A., & Martelle, H. (2009). At the Crossroads and Periphery: The Archaic Archaeological Record of Southern Ontario. In T. D. Emerson, D. L. McElrath, & A. C. Fortier (Eds.), *Archaic Societies: Diversity and Complexity across the Midcontinent*. (pp. 787–837). State University of New York Press.

Farewell, J. E. (1907). *County of Ontario. Short Notes as to the Early Settlement and Progress of the County and Brief References to the Pioneers and Some Ontario County Men who have taken a Prominent Part in Provincial and*



*Dominion Affairs*. Gazette-Chronicle Press (Reprinted by Mika Publishing, Belleville, 1973).

Ferris, N. (2013). Place, Space, and Dwelling in the Late Woodland. In M. K. Munson & S. M. Jamieson (Eds.), *Before Ontario: The Archaeology of a Province* (pp. 99–111). McGill-Queen’s University Press.  
<http://www.jstor.org/stable/j.ctt32b7n5.15>

Fullerton, K. A., & Mississaugas of the Credit First Nation. (2015). *The Rouge River Valley Tract Unsurrendered Traditional Lands, Mississaugas of the New Credit First Nation (Formerly Known As Mississaugas of the New Credit Indian Band)*. *Statement of Claim*. Submitted to the Government of Canada and the Government of Ontario.

Hunting Survey Corporation Limited. (1954). *Digital Aerial Photographs, Southern Ontario 1954*.  
[http://maps.library.utoronto.ca/data/on/AP\\_1954/index.html](http://maps.library.utoronto.ca/data/on/AP_1954/index.html)

Karrow, P. F., & Warner, B. G. (1990). The Geological and Biological Environment for Human Occupation in Southern Ontario. In *The Archaeology of Ontario to A.D. 1650* (pp. 5–36). London Chapter, Ontario Archaeological Society.

Library and Archives Canada. (2005). *The Grand Trunk Railway Company of Canada*. <http://www.collectionscanada.gc.ca/confederation/023001-3010.25-e.html>

Ontario Heritage Act, R.S.O. c. O.18, (1990).

MHSTCI, (Ministry of Heritage, Sport, Tourism and Culture Industries). (2021). *Ontario’s Past Portal*. PastPortal. <https://www.pastport.mtc.gov.on.ca>

Mika, N., & Mika, H. (1983). *Places In Ontario: Their Name Origins and History, Part III, N-Z*. Mika Publishing Company.

Environmental Assessment Act, R.S.O., (1990).



Ministry of Tourism and Culture. (2011). *Standards and Guidelines for Consultant Archaeologists*. Cultural Programs Branch, Ontario Ministry of Tourism and Culture.

Municipal Class Environmental Assessment, (2000).

Rogers, E. S. (1962). *The Round Lake Ojibwa* (Occasional Paper 5). Royal Ontario Museum.

Spence, M. W., Pihl, R. H., & Murphy, C. (1990). Cultural Complexes of the Early and Middle Woodland Periods. In C. J. Ellis & N. Ferris (Eds.), *The Archaeology of Southern Ontario to A.D. 1650*. Ontario Archaeological Society Inc.

Surtees, R. (1984). *Indian Land Surrenders in Ontario 1763-1867*. Research Branch, Corporate Policy, Department of Indian and Northern Affairs Canada.

Tremaine, G. C. (1860). *Tremaine's Map of the County of Ontario, Upper Canada* [Map]. George C. Tremaine.

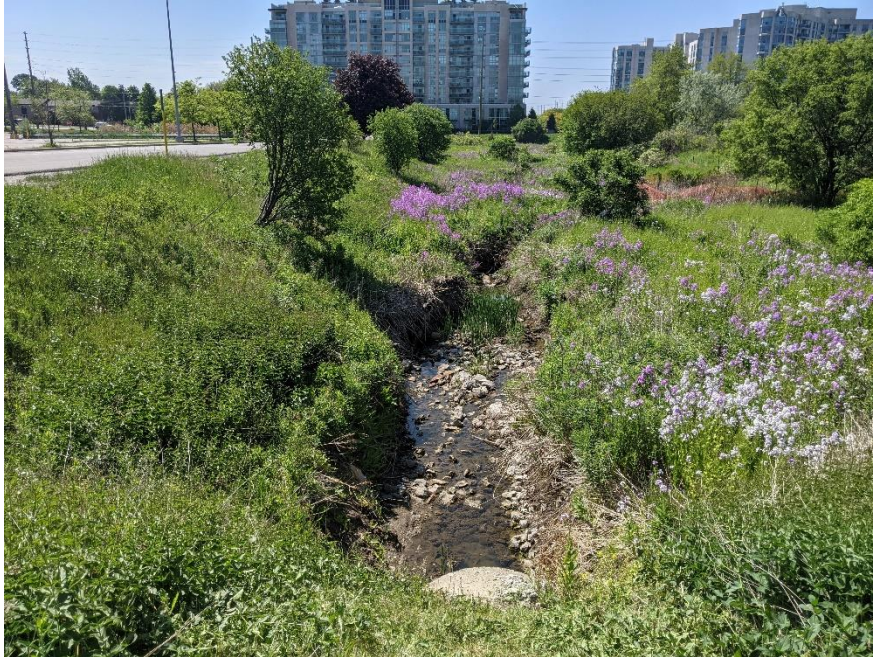
Williams Treaties First Nations. (2017). *About Williams Treaties First Nations*. <http://www.williamstreatiesfirstnations.ca/about/>

Williamson, R. F. (1990). The Early Iroquoian Period of Southern Ontario. In C. J. Ellis & N. Ferris (Eds.), *The Archaeology of Southern Ontario to A.D. 1650* (pp. 291–320). Ontario Archaeological Society Inc.



## 7.0 Images

### Field Photography



**Image 1: Area is disturbed and low and wet; no potential.**



**Image 2: Victoria Street beyond treeline; area is disturbed; no potential.**



**Image 3: Area is disturbed, no potential.**



**Image 4: View of culvert within Study Area; area is disturbed; no potential.**





**Image 5: Area is disturbed; no potential.**



**Image 6: Area is disturbed; no potential.**



**Image 7: Rowe Channel and storm water drain; area is disturbed; no potential.**



**Image 8: Whitby Port Marina; area is on made lands and is disturbed; no potential.**

## 8.0 Maps



Figure 1: Location of the Study Area

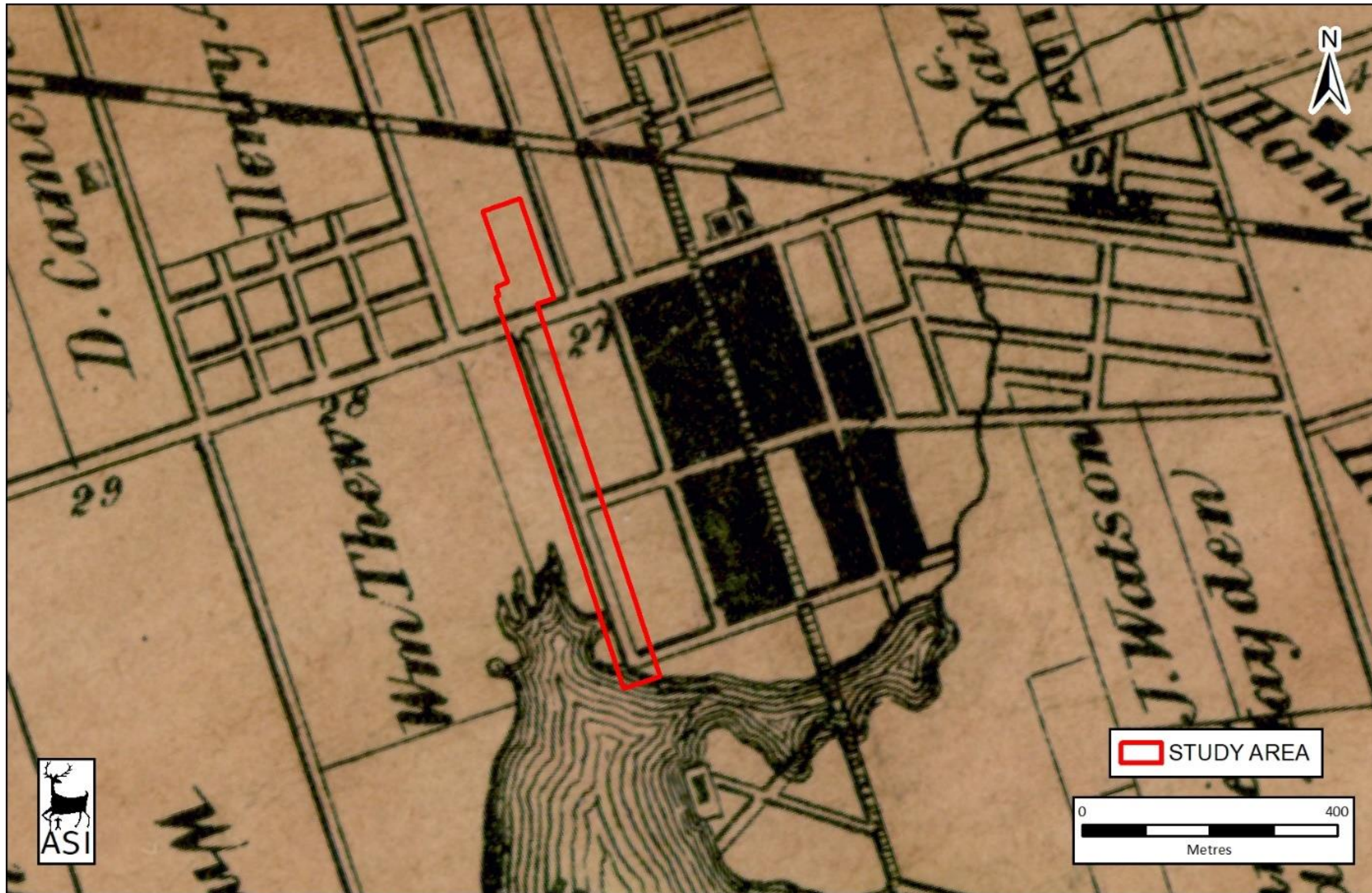


Figure 2: Study Area (Approximate Location) Overlaid on the 1860 Tremaine's Map of the County of Ontario.

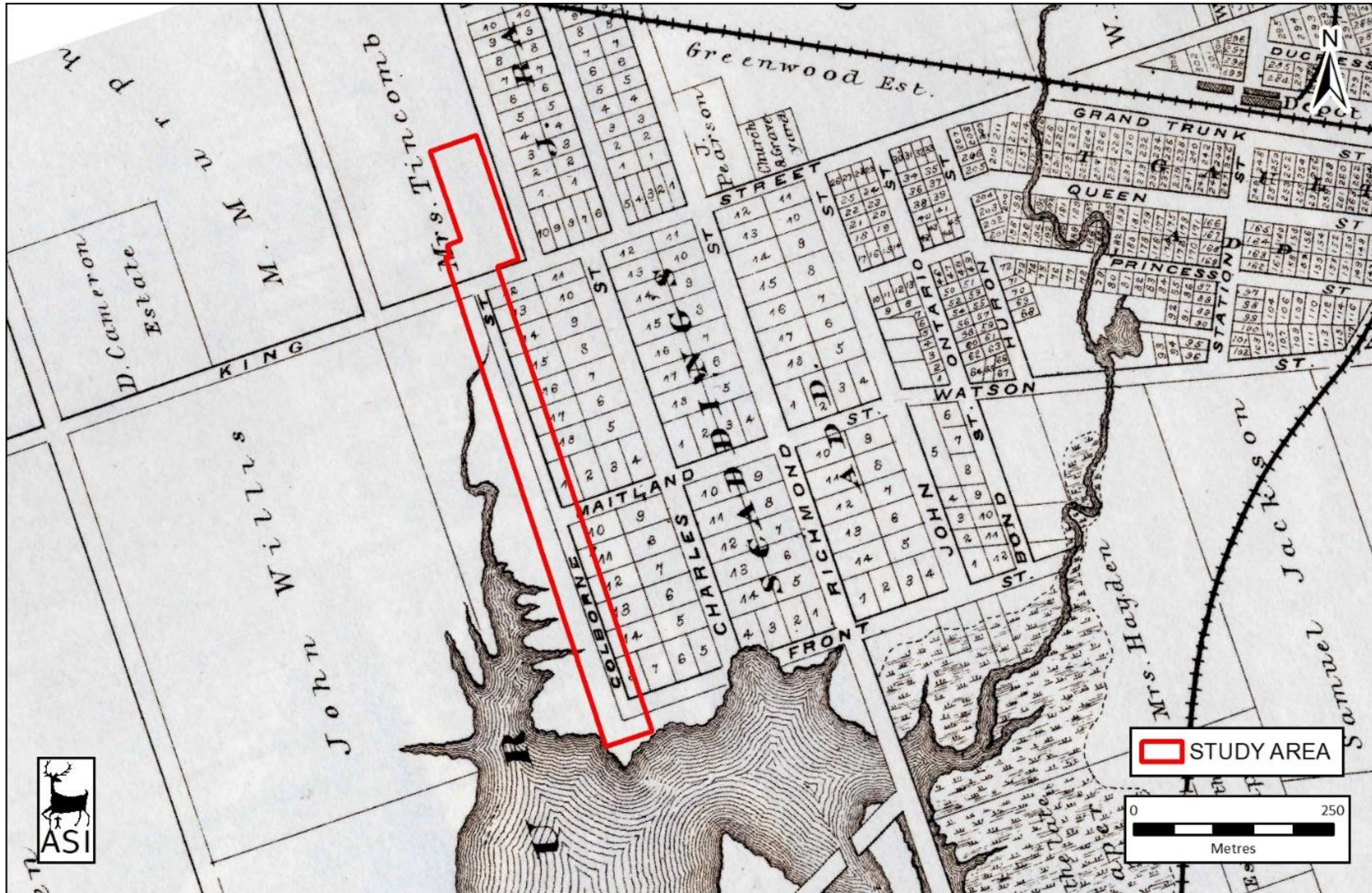


Figure 3: Study Area overlaid on the 1877 Historical Atlas of the County of Ontario.



Figure 4: Study Area overlaid on the 1930 topographic map of Whitby.

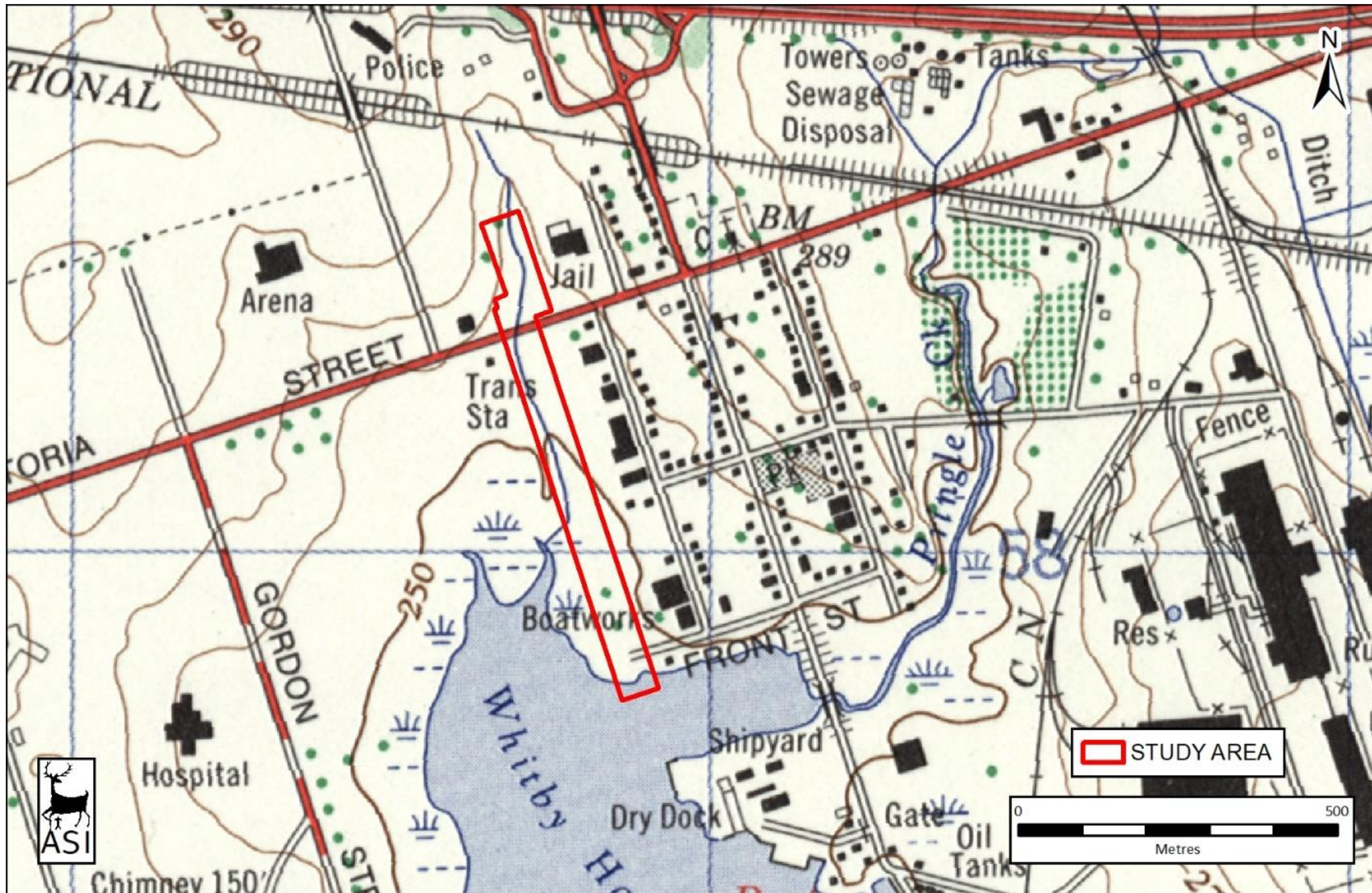


Figure 5: Study Area overlaid on a 1976 topographic map of Whitby.

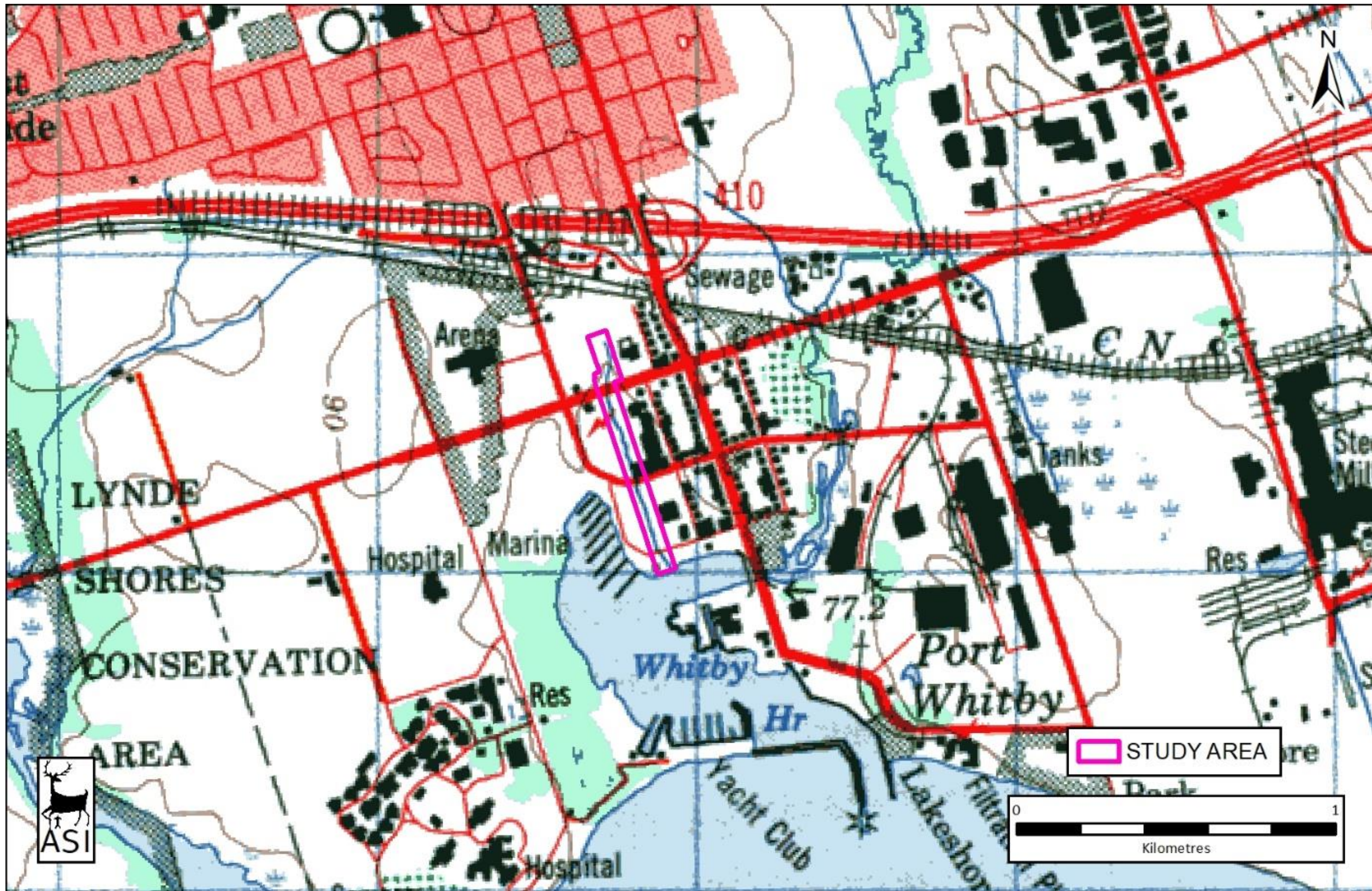


Figure 6: Study Area overlaid on the 1994 NTS map of Whitby.



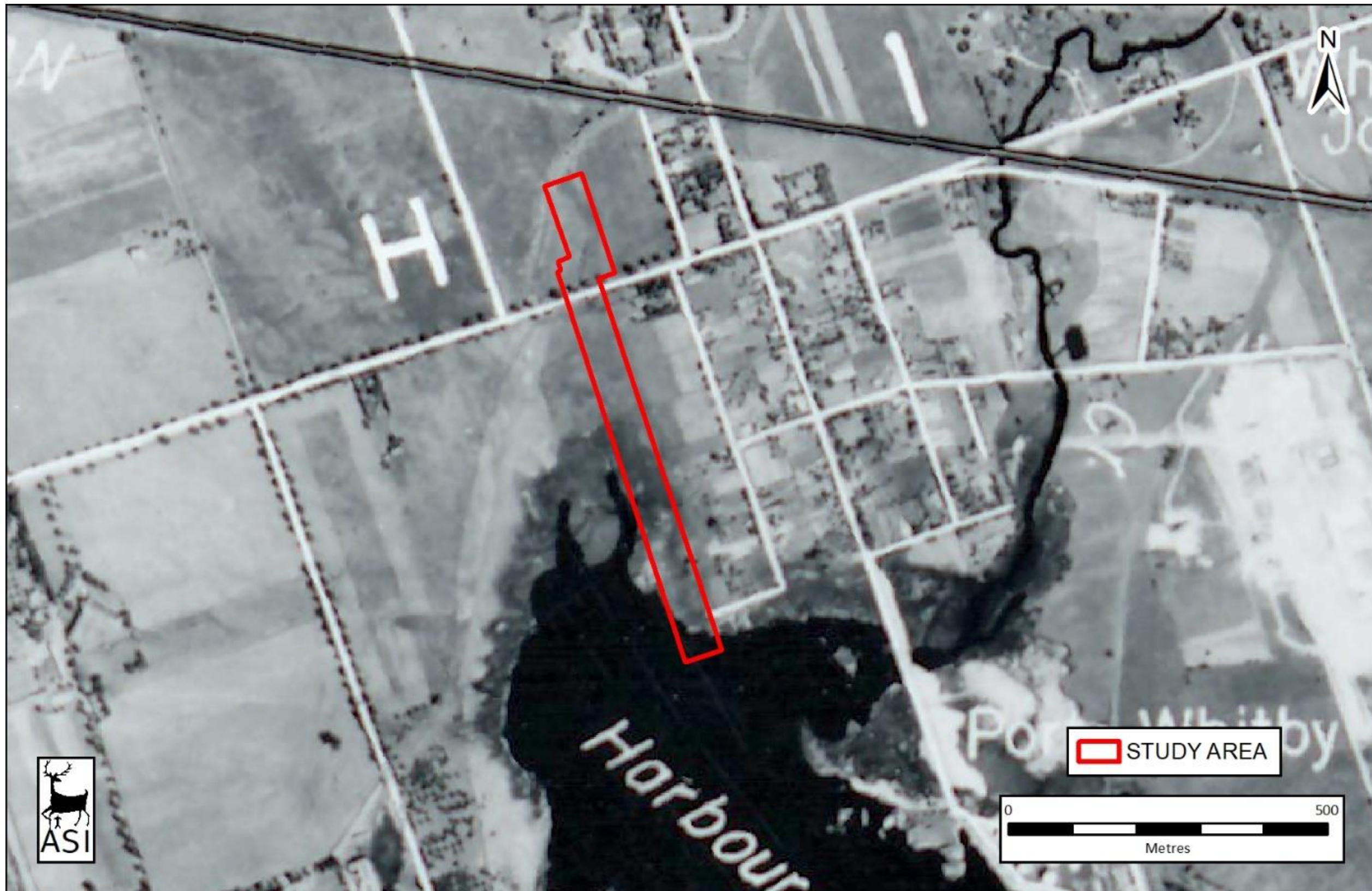


Figure 7: Study Area overlaid with a 1954 aerial photograph.

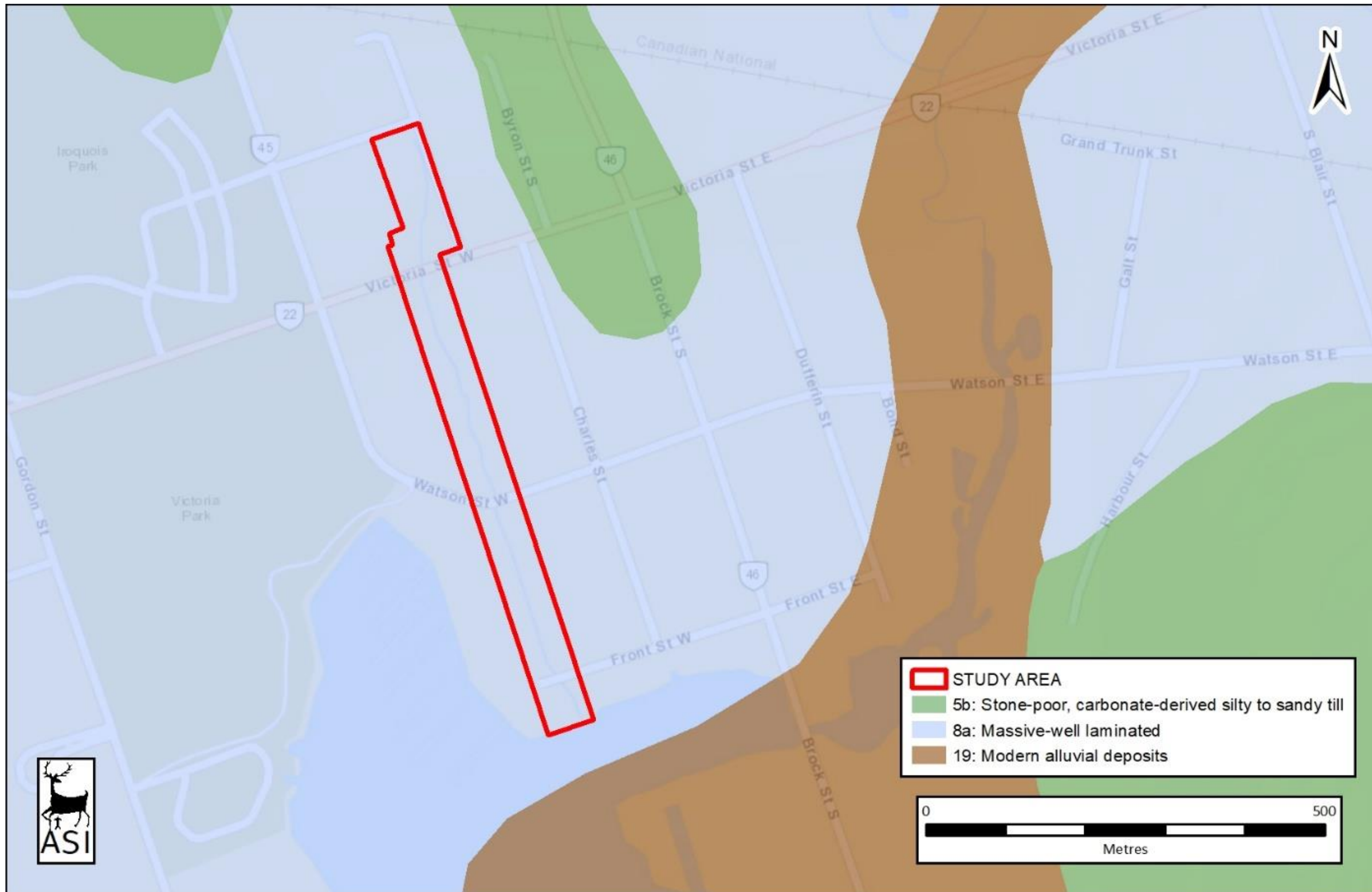


Figure 8: Study Area - Surficial Geology



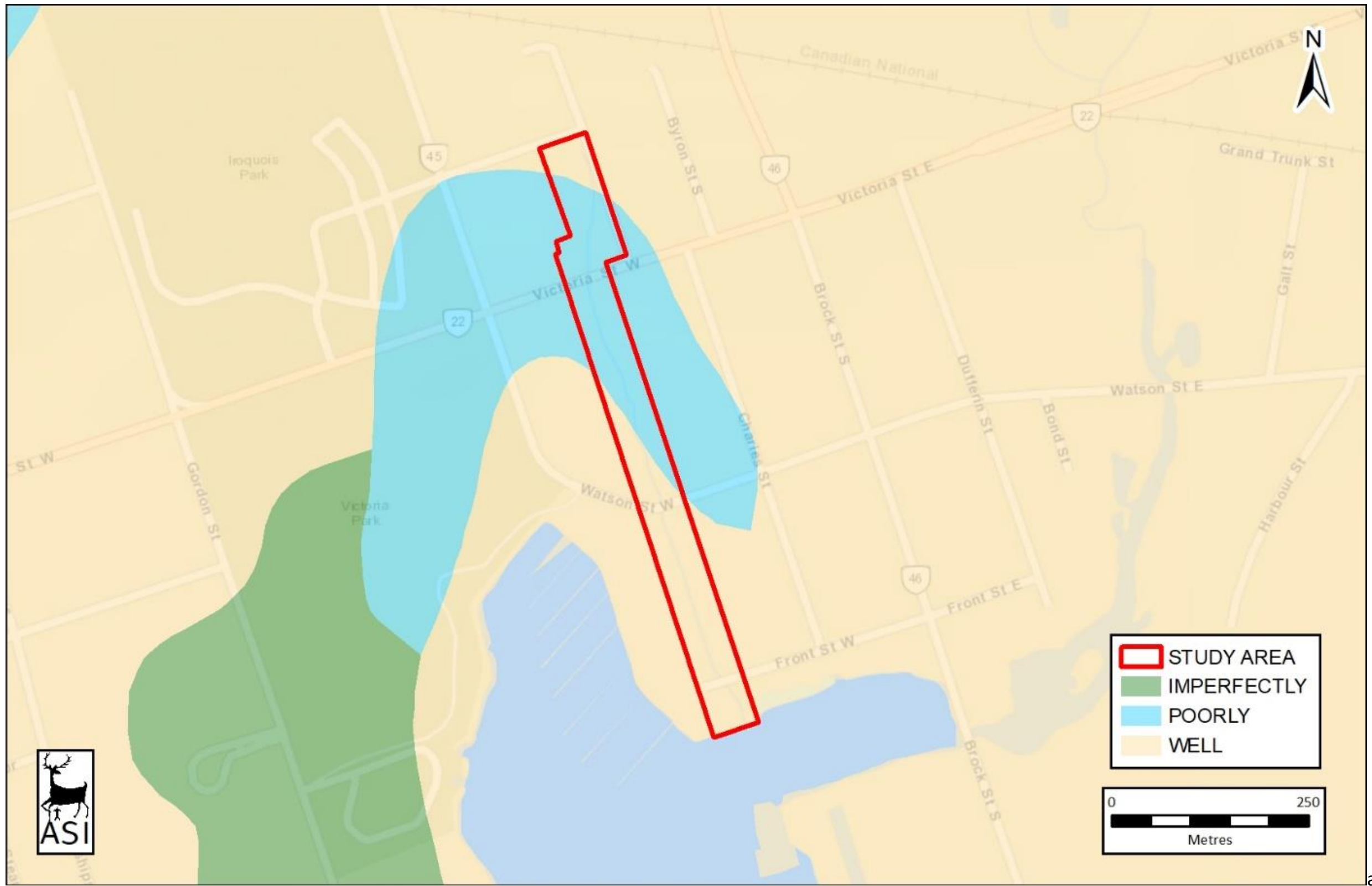


Figure 9: Study Area - Soil Drainage

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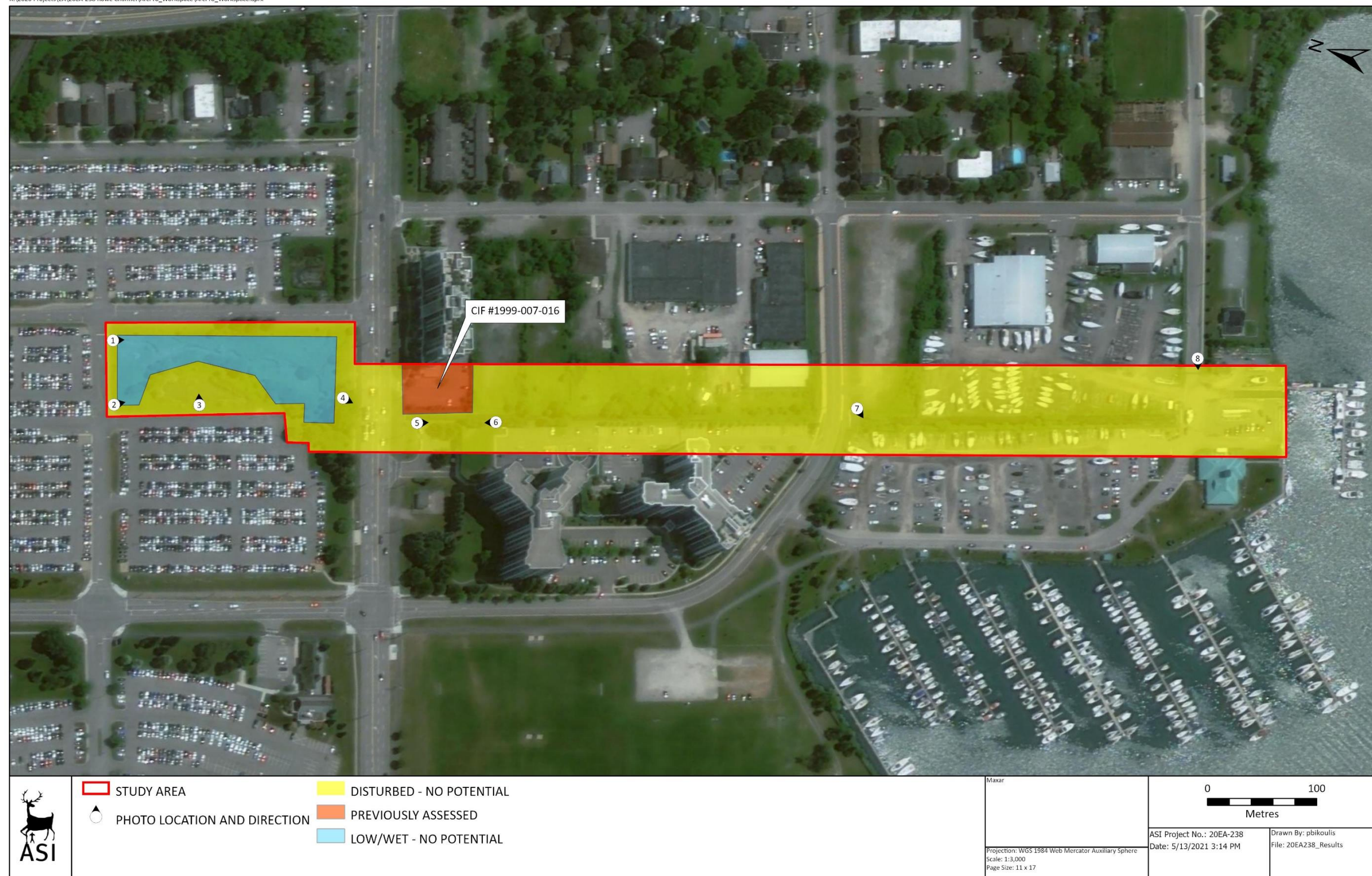


Figure 10: Rowe Channel Study Area – Results of the Stage 1

# APPENDIX C

## Hydrology and Hydraulic Analysis

## TECHNICAL MEMORANDUM #2

**TO:** Antony Manoharan, P.Eng, Town of Whitby  
**FROM:** Mark Bassingthwaite, Resilient Consulting Corporation  
**DATE:** July 12<sup>th</sup>, 2021

**SUBJECT:** Rowe Channel Upgrade Study  
Review of Contributing Drainage Area to Rowe Channel

Resilient Consulting ('Resilient') has been retained by the Town of Whitby ('Whitby'), in partnership with Central Lake Ontario Conservation Authority ('CLOCA'), to prepare a Municipal Class Environmental Assessment (Class EA) to assess possible improvement alternatives for Rowe Channel. During the preparation of Technical Memorandum #1 of the project, it was determined that the delineation of the contributing drainage area to Rowe Channel significantly varied across background reports, with the total contributing area noted to range between 80.08 ha and 114.72 ha.

The following Technical Memorandum has been prepared to summarize the different contributing drainage areas to Rowe Channel defined in previous reports, and detailed the approach used by Resilient to delineate the drainage area that will be utilized during the completion of the Class EA.

### **1 Previous Drainage Area Delineation**

#### **1.1 Pringle Creek Master Drainage Plan Update (MDPU) Report**

The Pringle Creek Master Drainage Plan was originally developed in 1989 by G.M. Sernas and Associates Ltd., and has since undergone various updates, with the most recent update completed in 2018 by Candevcon Limited ('Candevcon'). Rowe Channel is not considered a part of the Pringle Creek Watershed, however it was included within the 2018 Pringle Creek Master Drainage Plan Update ('MDPU') due to the channels close proximity to the watershed and its discharge location at the mouth of Pringle Creek. As per the MDPU, the total contributing drainage area to Rowe Channel is 67.7 ha, identified as catchment RC-1 within the report. To the north of HWY 401, the northern catchment boundary is defined just south of Dundas Street, between Dunlop Street W and Colborne Street W. The western boundary is located along King Street, and eastern boundary at Athol Street, east of Brock Street S. To the south of HWY 401, the catchment is defined by Henry Street to the west, Dufferin Street to the east, and Front Street W to the south. Iroquois Park Sports Centre is excluded from this drainage catchment.

Following further review and discussion with CLOCA, it is noted that catchment RC-1 of the MDPU has an actual contributing drainage area of 114.72 ha based on the delineated area shown on Drawing 3.1 of the report. The catchment area of 67.7 ha identified within the report only represents the contributing drainage area located to the north of HWY 401. The total drainage area of 114.72 ha is illustrated on **Figure DAP** attached to this memo.

#### **1.2 1606-1614 Charles Street Rowe Channel Floodplain Analysis (Private Development)**

Updated floodplain mapping for Rowe Channel, including the delineation of a revised contributing drainage area, was prepared by GHD Limited ('GHD') in May 2020 in support of a new residential

development at 1606-1614 Charles Street, Whitby. The revised contributing drainage area was noted to consist of both high and low residential developments, commercial properties, the Whitby GO station and associated parking, railway corridor development and the Iroquois Park Sports Centre. Drainage area to the north of HWY 401 was delineated using record drawings provided by the Region of Durham, with the northern catchment boundary defined at Burns Street, the western boundary along the rear lot limit of residential properties on Henrey Street, and the eastern boundary at Brock Street S. The total drainage directed to Rowe Channel from north of HWY 401 was determined to be approximately 19.1 ha.

To the south of HWY 401, the catchment contributing to Rowe Channel is largely comprised of the Iroquois Park Sport Centre (14.95 ha) and Whitby Go Station and parking (16.4 ha), in addition to residential and undeveloped lands that directly neighbour the channel.

The resulting total contributing drainage area to Rowe Channel based on the delineation by GHD is 80.08 ha, which has been illustrated on **Figure DAP**.

### 1.3 MTO Highway 401- Brock Street Interchange SWM Report

In support of the proposed upgrades at HWY 401 and its interchanges with Brock Street, the Ministry of Transportation ('MTO') prepared a Drainage and Stormwater Management Report to assess the impact of increased imperviousness from roadway widening on the existing storm sewer and culvert capacity. The existing culvert used to convey flows under HWY 401 to Rowe Channel, identified as WC106C, was included in the assessment.

As per the report, the total contributing drainage area to Rowe Channel from north of HWY 401 is 18.5 ha. The northern boundary of the catchment is defined at the intersection of King Street and Pitt St W, however only residential properties that front onto King Street are included within the catchment in this area. The western boundary of the catchment is located along the rear lot limit of residential properties on Henry Street, and the eastern boundary located along the rear lot limit of the properties that front onto Brock Street S. Contributing drainage areas to the south of HWY 401 were not included within the report. The contributing drainage area to the north of HWY 401 has been illustrated on **Figure DAP**.

### 1.4 Comparison of Previous Rowe Channel Drainage Areas

**Table 1** below summarizes the different contributing drainage areas that have been delineated to Rowe Channel within the background reports.

**Table 1. Comparison of Contributing Drainage Areas to Rowe Channel**

Source	Contributing Area North of Hwy 401 (ha)	Contributing Area South of Hwy 401 (ha)	Total Contributing Drainage Area (ha)
Master Drainage Plan Update, Candevcon 2018	67.70	47.02	114.72
606-1614 Charles Street Development, GHD 2020	19.10	60.90	80.08
HWY 401 and Brock Street Interchange, MTO 2018	18.50	N/A	N/A

## 2 Ground Truthed Drainage Area Delineation

On June 17<sup>th</sup>, 2021, Resilient completed a field visit to identify the northern boundary of the contributing drainage area located to the north of HWY 401. GPS survey equipment was used to collect survey points for verifying overland flow direction at the intersection of Burns Street and Centre Street S. Results of the verification survey indicated that runoff from Centre Street S north of Burns Street would be conveyed east along Burns. To the east of the Burns Street and Centre Street S intersection, runoff is conveyed towards Brock Street S and therefore excluded from the Rowe Channel drainage catchment.

Runoff from south of Burns is conveyed south to culvert WC106C under HWY 401, and ultimately discharged into Lake Ontario via Rowe Channel.

To confirm the contributing drainage area to the south of HWY 401, the following reports were reviewed:

- Whitby Station Temporary Parking Lot – Stormwater Management and Flood Analysis Report, IBI Group, October 2008;
- Iroquois Park Storm Sewer System Assessment, G.M.Sernas & Associates Ltd., April 1997;
- As Constructed Drawings, Victoria Street, Region of Durham, December 1999.

Runoff from the Whitby GO Station and Iroquois Park Sport Centre were confirmed to discharge into Rowe Channel via Victoria Street W. The proposed drainage area to Rowe Channel is illustrated on **Figure DAP**, with the area breakdown summarized in **Table 2** below.

**Table 2. Ground Truthed Drainage Area to Rowe Channel**

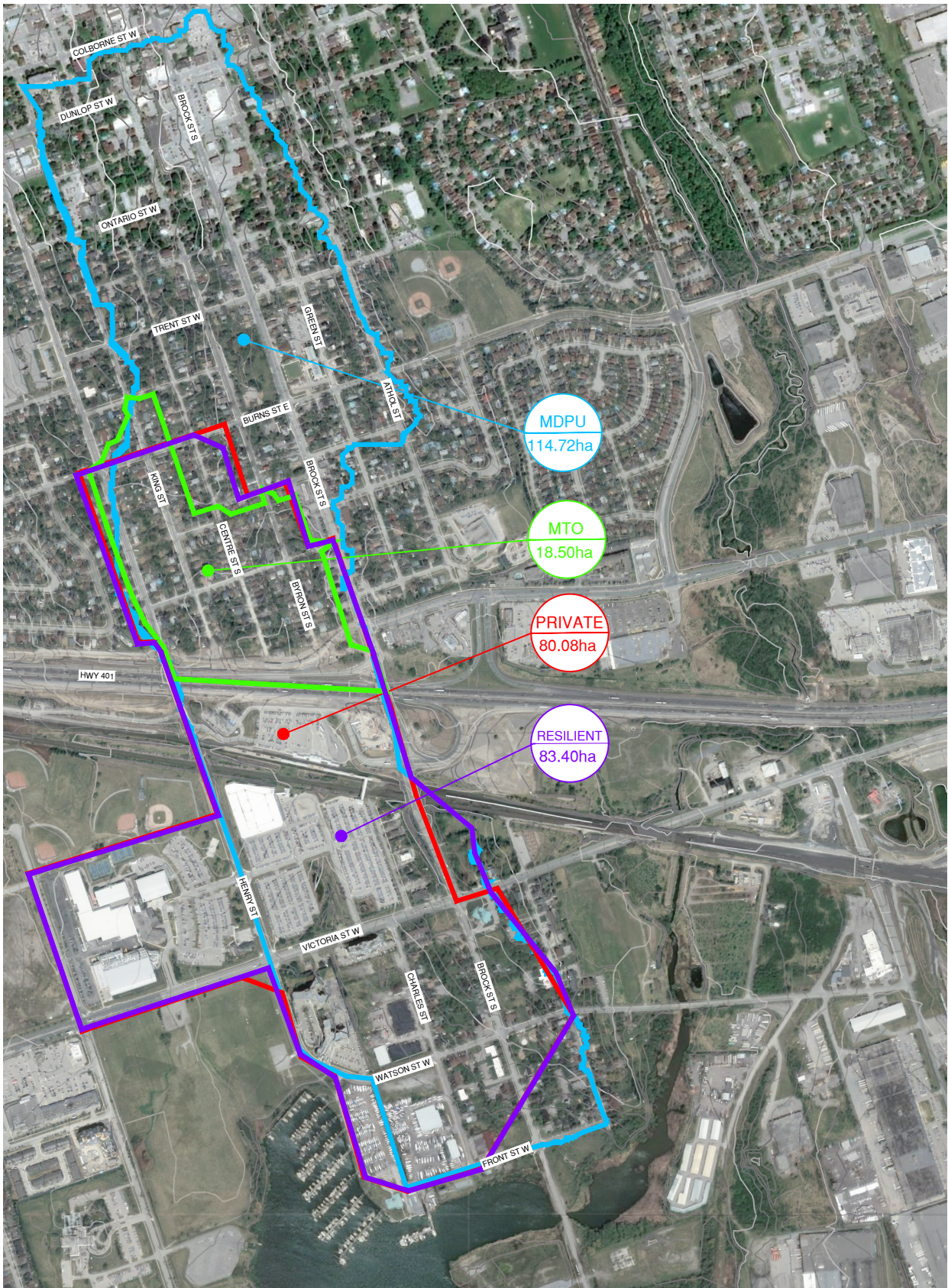
Source	Contributing Area North of Hwy 401 (ha)	Contributing Area South of Hwy 401 (ha)	Total Contributing Drainage Area (ha)
Ground Truthed Drainage Area, Resilient 2021	18.68	64.72	83.40

## 3 Next Steps

Using the proposed drainage area delineated by Resilient, the hydrologic assessment completed during the preparation of Technical Memorandum #1 will be updated accordingly to determine revised peak flow contributions to Rowe Channel. The revised peak flows will ultimately be used in sizing the upgrade alternatives developed as a part of the Class EA. The revised hydrology will be re-submitted to CLOCA for review and approval prior to proceeding with the design of the channel upgrade alternatives.

**Attachments:** Figure DAP- Contributing Drainage Area Comparison  
Town of Whitby Catchment Delineation





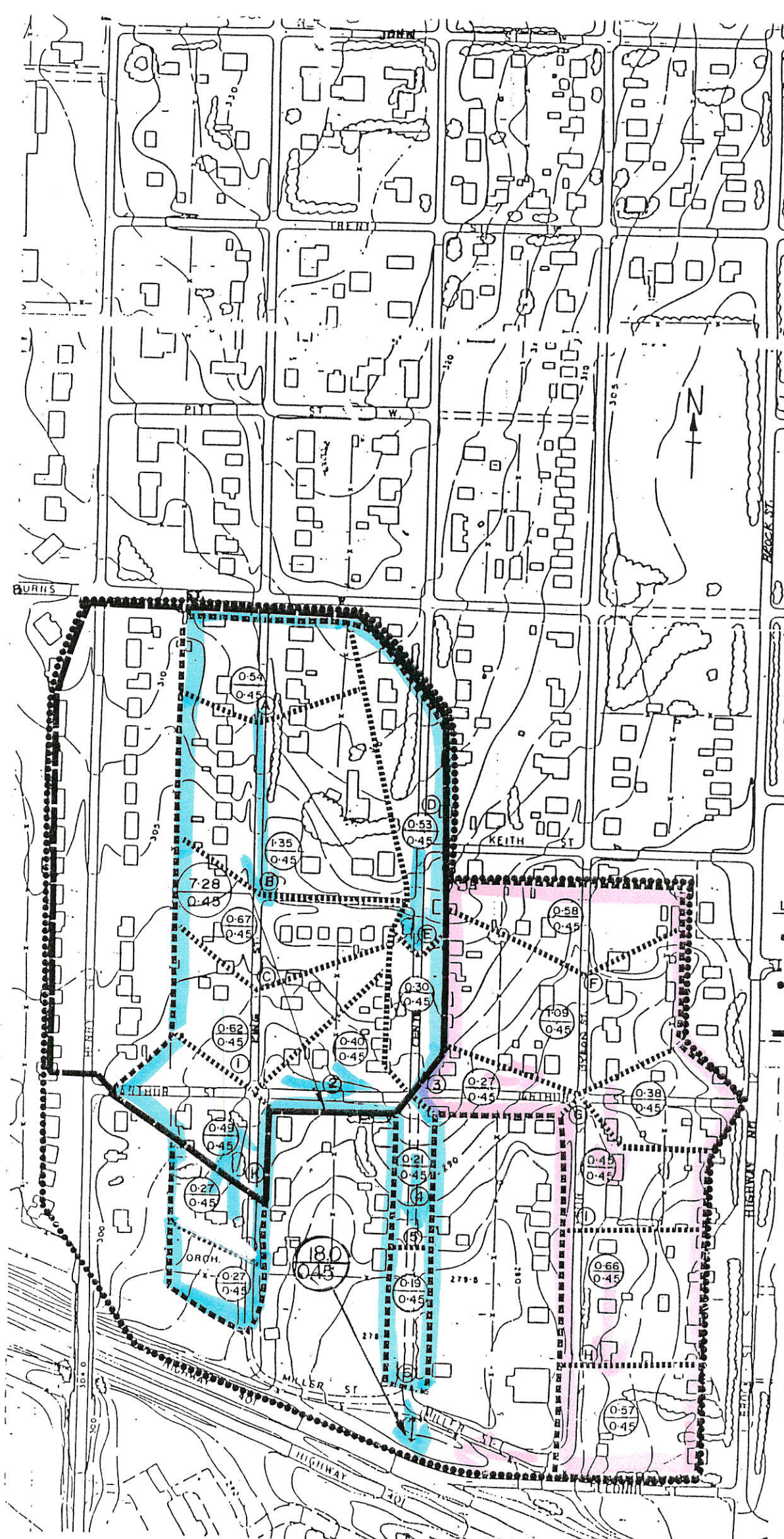
LEGEND

- RESILIENT  
83.40ha — DRAINAGE AREA SOURCE
- DRAINAGE AREA (ha)








ROWE CHANNEL DRAINAGE AREA PLAN  
ROWE CHANNEL IMPROVEMENT FEASIBILITY STUDY  
TOWN OF WHITBY


DATE:	JULY 2021	PROJECT No.:	2021-006
SCALE:	1:12 000	FIGURE No.:	DAP




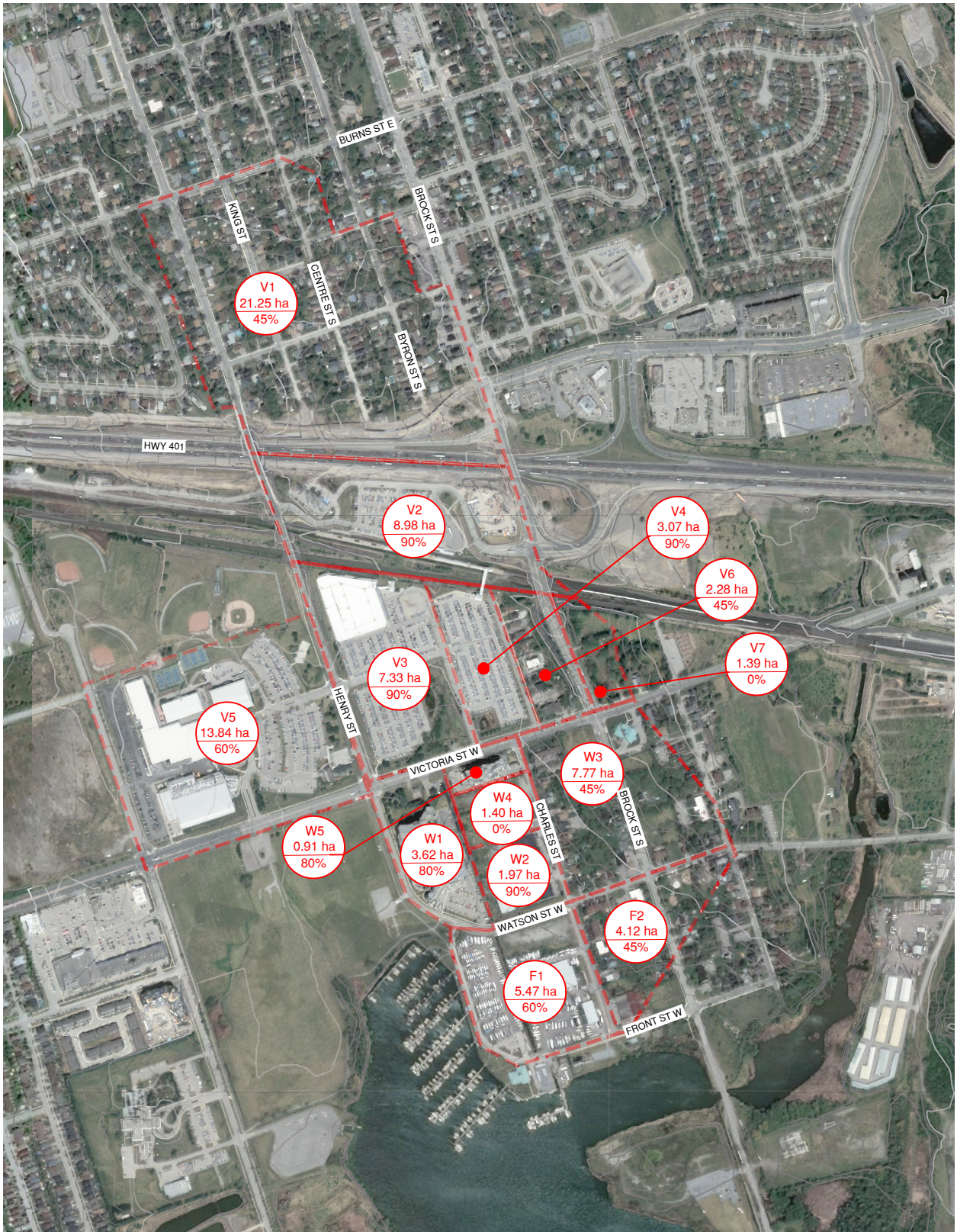
TOWN OF WHITBY  
 CONT. NO. 42-7529-W87-33  
 STORM DRAINAGE CONCEPT

- LEGEND
-  1.5 YEAR STORM AREAS
  -  100 YEAR STORM AREA TO MILLER ST.
  -  100 YEAR STM AREA TO ARTHUR ST.

 AREA (Ha)  
 RUNOFF COEFFICIENT  
 N. T. S.

 - flows rerouted down BYRON ST in 1993.

 - Actual flows down Centre as of 1993 BYRON reconst.



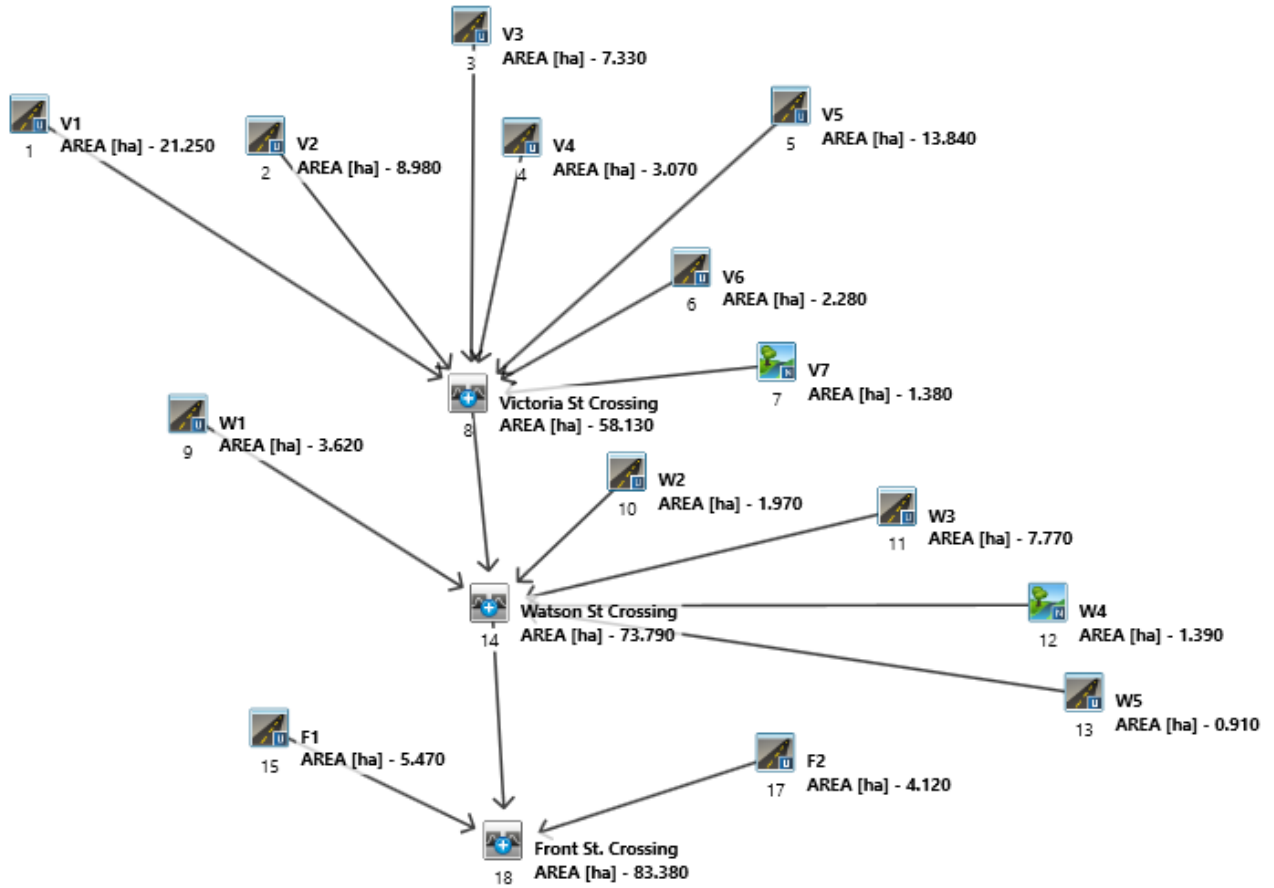
LEGEND

- - - - DRAINAGE AREA
- V5 — DRAINAGE AREA ID
- 13.86 ha — DRAINAGE AREA (ha)
- 90% — TIP %

**DRAINAGE CATCHMENT DELINEATIONS**  
 ROWE CHANNEL IMPROVEMENT FEASIBILITY STUDY  
 TOWN OF WHITBY

DATE:	MARCH 2022	PROJECT No.:	2021-006
SCALE:	1:10 000	FIGURE No.:	DAP-1

VO Model for Rowe Channel  
Rowe Channel Upgrade  
Prepared by Resilient Consulting  
August 2021



```

=====
V   V   I   SSSSS U   U   A   L           (v 6.2.2006)
V   V   I   SS   U   U   A A   L
V   V   I   SS   U   U   AAAAA L
V   V   I   SS   U   U   A   A   L
VV    I   SSSSS UUUUU A   A   LLLLL

```

```

    000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
O   O   T   T   H   H   Y   Y   MM MM O   O
O   O   T   T   H   H   Y   M   M   O   O
    000   T   T   H   H   Y   M   M   000

```

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\*\*\*\*\* D E T A I L E D O U T P U T \*\*\*\*\*

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat  
 Output filename: C:\Users\srayner\AppData\Local\Civica\XH5\d44dfdb9-d3fc-4710-8c1d-d224988ceda8\5eb205a9-a0  
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DATE: 08-05-2021 TIME: 11:27:55

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : Chicago 12 Hr 100 Year \*\*  
 \*\*\*\*\*

READ STORM	Filename: C:\Users\srayner\AppData\Local\Temp\6393ab7f-23b4-4b0e-b672-f4a304654a33\747c1d7d
Ptotal= 88.30 mm	Comments: C12HR100.STM

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.17	1.10	3.17	4.91	6.17	3.59	9.17	1.57
0.33	1.15	3.33	6.26	6.33	3.33	9.33	1.52
0.50	1.20	3.50	8.70	6.50	3.12	9.50	1.48
0.67	1.25	3.67	14.38	6.67	2.93	9.67	1.44
0.83	1.32	3.83	40.45	6.83	2.76	9.83	1.40
1.00	1.38	4.00	196.75	7.00	2.61	10.00	1.37
1.17	1.46	4.17	54.95	7.17	2.48	10.17	1.33
1.33	1.54	4.33	26.01	7.33	2.36	10.33	1.30
1.50	1.64	4.50	16.64	7.50	2.26	10.50	1.27
1.67	1.75	4.67	12.15	7.67	2.16	10.67	1.24
1.83	1.88	4.83	9.56	7.83	2.07	10.83	1.21
2.00	2.03	5.00	7.88	8.00	1.99	11.00	1.19
2.17	2.21	5.17	6.70	8.17	1.92	11.17	1.16
2.33	2.42	5.33	5.84	8.33	1.85	11.33	1.14
2.50	2.68	5.50	5.18	8.50	1.78	11.50	1.12
2.67	3.02	5.67	4.65	8.67	1.72	11.67	1.09
2.83	3.45	5.83	4.23	8.83	1.67	11.83	1.07
3.00	4.05	6.00	3.88	9.00	1.62	12.00	1.05

CALIB	Area (ha)= 1.38	Curve Number (CN)= 74.6
NASHYD ( 0007)	Ia (mm)= 2.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)= 0.16	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52

0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Unit Hyd Qpeak (cms)= 0.329

PEAK FLOW (cms)= 0.214 (i)  
 TIME TO PEAK (hrs)= 4.083  
 RUNOFF VOLUME (mm)= 42.912  
 TOTAL RAINFALL (mm)= 88.303  
 RUNOFF COEFFICIENT = 0.486

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 CALIB  
 STANDHYD ( 0001)  
 ID= 1 DT= 5.0 min  
 Area (ha)= 21.25  
 Total Imp(%)= 45.00 Dir. Conn.(%)= 23.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	9.56	11.69
Dep. Storage	(mm)=	1.60	1.60
Average Slope	(%)=	2.00	2.00
Length	(m)=	376.39	625.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21

1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)= 196.75 55.09  
over (min) 5.00 55.00  
Storage Coeff. (min)= 3.51 (ii) 50.12 (ii)  
Unit Hyd. Tpeak (min)= 5.00 55.00  
Unit Hyd. peak (cms)= 0.26 0.02

PEAK FLOW (cms)= 2.55 1.05 \*TOTALS\*  
TIME TO PEAK (hrs)= 4.00 4.83 2.690 (iii)  
RUNOFF VOLUME (mm)= 86.70 51.01 4.00  
TOTAL RAINFALL (mm)= 88.30 88.30 59.22  
RUNOFF COEFFICIENT = 0.98 0.58 88.30  
0.67

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
CALIB  
STANDHYD ( 0003)  
ID= 1 DT= 5.0 min  
Area (ha)= 7.33  
Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	6.60	0.73
Dep. Storage (mm)=	1.60	1.60
Average Slope (%)=	2.00	2.00
Length (m)=	221.06	240.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12

2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)= 196.75 47.73  
over (min) 5.00 35.00  
Storage Coeff. (min)= 2.55 (ii) 30.35 (ii)  
Unit Hyd. Tpeak (min)= 5.00 35.00  
Unit Hyd. peak (cms)= 0.29 0.04

\*TOTALS\*  
3.561 (iii)  
4.00  
82.37  
88.30  
0.93

PEAK FLOW (cms)= 3.55 0.06  
TIME TO PEAK (hrs)= 4.00 4.50  
RUNOFF VOLUME (mm)= 86.70 43.41  
TOTAL RAINFALL (mm)= 88.30 88.30  
RUNOFF COEFFICIENT = 0.98 0.49

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB  
STANDHYD ( 0004)  
ID= 1 DT= 5.0 min  
Area (ha)= 3.07  
Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.76	0.31
Dep. Storage (mm)=	1.60	1.60
Average Slope (%)=	2.00	2.00
Length (m)=	143.06	160.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05



Max.Eff.Inten.(mm/hr)=	196.75	63.07	
over (min)	5.00	25.00	
Storage Coeff. (min)=	1.96 (ii)	21.46 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.31	0.05	
			*TOTALS*
PEAK FLOW (cms)=	1.50	0.03	1.512 (iii)
TIME TO PEAK (hrs)=	4.00	4.33	4.00
RUNOFF VOLUME (mm)=	86.70	43.41	82.37
TOTAL RAINFALL (mm)=	88.30	88.30	88.30
RUNOFF COEFFICIENT =	0.98	0.49	0.93

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD ( 0005) ID= 1 DT= 5.0 min	Area (ha)= 13.84		
	Total Imp(%)= 60.00	Dir. Conn.(%)= 40.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.30	5.54
Dep. Storage (mm)=	1.60	1.60
Average Slope (%)=	2.00	2.00
Length (m)=	303.75	180.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)=	196.75	117.17	
over (min)	5.00	20.00	
Storage Coeff. (min)=	3.08 (ii)	19.42 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.27	0.06	
			*TOTALS*
PEAK FLOW (cms)=	2.93	1.10	3.382 (iii)
TIME TO PEAK (hrs)=	4.00	4.25	4.00

RUNOFF VOLUME (mm)= 86.70 52.52 66.19  
 TOTAL RAINFALL (mm)= 88.30 88.30 88.30  
 RUNOFF COEFFICIENT = 0.98 0.59 0.75

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 CALIB  
 STANDHYD ( 0006)  
 ID= 1 DT= 5.0 min  
 Area (ha)= 2.28  
 Total Imp(%)= 45.00 Dir. Conn.(%)= 23.00

IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 1.03 1.25  
 Dep. Storage (mm)= 1.60 1.60  
 Average Slope (%)= 2.00 2.00  
 Length (m)= 123.29 225.00  
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)= 196.75 105.83  
 over (min) 5.00 25.00  
 Storage Coeff. (min)= 1.79 (ii) 21.24 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 25.00  
 Unit Hyd. peak (cms)= 0.32 0.05

PEAK FLOW (cms)= 0.29 0.21 \*TOTALS\*  
 TIME TO PEAK (hrs)= 4.00 4.33 0.352 (iii)  
 RUNOFF VOLUME (mm)= 86.70 51.01 4.00  
 TOTAL RAINFALL (mm)= 88.30 88.30 88.30  
 RUNOFF COEFFICIENT = 0.98 0.58 0.67

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 74.6 Ia = Dep. Storage (Above)

- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB  
STANDHYD ( 0002)  
ID= 1 DT= 5.0 min

Area (ha)= 8.98  
Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.08	0.90
Dep. Storage	(mm)=	1.60	1.60
Average Slope	(%)=	2.00	2.00
Length	(m)=	244.68	270.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)=	196.75	47.73
over (min)	5.00	35.00
Storage Coeff. (min)=	2.71 (ii)	32.54 (ii)
Unit Hyd. Tpeak (min)=	5.00	35.00
Unit Hyd. peak (cms)=	0.29	0.03

PEAK FLOW (cms)=	4.33	0.07	*TOTALS*
TIME TO PEAK (hrs)=	4.00	4.50	4.343 (iii)
RUNOFF VOLUME (mm)=	86.70	43.41	4.00
TOTAL RAINFALL (mm)=	88.30	88.30	82.37
RUNOFF COEFFICIENT =	0.98	0.49	88.30
			0.93

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD ( 0008) |

1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0001):		21.25	2.690	4.00	59.22
+ ID2= 2 ( 0002):		8.98	4.343	4.00	82.37
=====					
ID = 3 ( 0008):		30.23	7.034	4.00	66.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0008) 3 + 2 = 1		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 3 ( 0008):		30.23	7.034	4.00	66.10
+ ID2= 2 ( 0003):		7.33	3.561	4.00	82.37
=====					
ID = 1 ( 0008):		37.56	10.594	4.00	69.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0008) 1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0008):		37.56	10.594	4.00	69.27
+ ID2= 2 ( 0004):		3.07	1.512	4.00	82.37
=====					
ID = 3 ( 0008):		40.63	12.106	4.00	70.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0008) 3 + 2 = 1		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 3 ( 0008):		40.63	12.106	4.00	70.26
+ ID2= 2 ( 0005):		13.84	3.382	4.00	66.19
=====					
ID = 1 ( 0008):		54.47	15.488	4.00	69.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0008) 1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0008):		54.47	15.488	4.00	69.23
+ ID2= 2 ( 0006):		2.28	0.352	4.00	59.21
=====					
ID = 3 ( 0008):		56.75	15.840	4.00	68.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0008) 3 + 2 = 1		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 3 ( 0008):		56.75	15.840	4.00	68.83
+ ID2= 2 ( 0007):		1.38	0.214	4.08	42.91
=====					
ID = 1 ( 0008):		58.13	16.019	4.00	68.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB		Area (ha)=		Curve Number (CN)=	
NASHYD ( 0012)		1.39		74.6	
ID= 1 DT= 5.0 min		Ia (mm)=	2.00	# of Linear Res.(N)=	3.00
		U.H. Tp(hrs)=	0.27		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52

0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Unit Hyd Qpeak (cms)= 0.197

PEAK FLOW (cms)= 0.157 (i)  
 TIME TO PEAK (hrs)= 4.250  
 RUNOFF VOLUME (mm)= 43.081  
 TOTAL RAINFALL (mm)= 88.303  
 RUNOFF COEFFICIENT = 0.488

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB  
 STANDHYD ( 0009)  
 ID= 1 DT= 5.0 min

Area (ha)= 3.62  
 Total Imp(%)= 80.00 Dir. Conn.(%)= 65.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.90	0.72
Dep. Storage	(mm)=	1.60	1.60
Average Slope	(%)=	2.00	2.00
Length	(m)=	155.35	240.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21

1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)= 196.75 146.33  
over (min) 5.00 20.00  
Storage Coeff. (min)= 2.06 (ii) 19.82 (ii)  
Unit Hyd. Tpeak (min)= 5.00 20.00  
Unit Hyd. peak (cms)= 0.31 0.06

PEAK FLOW (cms)= 1.28 0.18 \*TOTALS\*  
TIME TO PEAK (hrs)= 4.00 4.25 1.352 (iii)  
RUNOFF VOLUME (mm)= 86.70 55.82 4.00  
TOTAL RAINFALL (mm)= 88.30 88.30 75.89  
RUNOFF COEFFICIENT = 0.98 0.63 88.30  
0.86

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
CALIB  
STANDHYD ( 0010)  
ID= 1 DT= 5.0 min  
Area (ha)= 1.97  
Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

IMPERVIOUS PERVIOUS (i)  
Surface Area (ha)= 1.77 0.20  
Dep. Storage (mm)= 1.60 1.60  
Average Slope (%)= 2.00 2.00  
Length (m)= 114.60 160.00  
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12

2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)= 196.75 63.07  
over (min) 5.00 25.00  
Storage Coeff. (min)= 1.72 (ii) 21.22 (ii)  
Unit Hyd. Tpeak (min)= 5.00 25.00  
Unit Hyd. peak (cms)= 0.32 0.05

\*TOTALS\*  
0.973 (iii)  
4.00  
82.37  
88.30  
0.93

PEAK FLOW (cms)= 0.97 0.02  
TIME TO PEAK (hrs)= 4.00 4.33  
RUNOFF VOLUME (mm)= 86.70 43.41  
TOTAL RAINFALL (mm)= 88.30 88.30  
RUNOFF COEFFICIENT = 0.98 0.49

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB  
STANDHYD ( 0013)  
ID= 1 DT= 5.0 min  
Area (ha)= 0.91  
Total Imp(%)= 80.00 Dir. Conn.(%)= 65.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.73	0.18
Dep. Storage (mm)=	1.60	1.60
Average Slope (%)=	2.00	2.00
Length (m)=	77.89	60.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)=	196.75	218.15	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.36 (ii)	5.65 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.15	
			*TOTALS*
PEAK FLOW (cms)=	0.32	0.08	0.399 (iii)
TIME TO PEAK (hrs)=	4.00	4.08	4.00
RUNOFF VOLUME (mm)=	86.70	55.82	75.89
TOTAL RAINFALL (mm)=	88.30	88.30	88.30
RUNOFF COEFFICIENT =	0.98	0.63	0.86

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD ( 0011) ID= 1 DT= 5.0 min	Area (ha)= 7.77		
	Total Imp(%)= 45.00	Dir. Conn.(%)= 23.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.50	4.27
Dep. Storage (mm)=	1.60	1.60
Average Slope (%)=	2.00	2.00
Length (m)=	227.60	300.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)=	196.75	90.08	
over (min)	5.00	30.00	
Storage Coeff. (min)=	2.59 (ii)	27.24 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.29	0.04	
			*TOTALS*
PEAK FLOW (cms)=	0.96	0.60	1.118 (iii)
TIME TO PEAK (hrs)=	4.00	4.42	4.00



RUNOFF VOLUME	(mm)=	86.70	51.01	59.22
TOTAL RAINFALL	(mm)=	88.30	88.30	88.30
RUNOFF COEFFICIENT	=	0.98	0.58	0.67

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0014) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0010):  1.97  0.973  4.00  82.37
+ ID2= 2 ( 0011):  7.77  1.118  4.00  59.22
=====
ID = 3 ( 0014):  9.74  2.090  4.00  63.90

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0014) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0014):  9.74  2.090  4.00  63.90
+ ID2= 2 ( 0012):  1.39  0.157  4.25  43.08
=====
ID = 1 ( 0014):  11.13  2.172  4.00  61.30

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0014) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  11.13  2.172  4.00  61.30
+ ID2= 2 ( 0013):  0.91  0.399  4.00  75.89
=====
ID = 3 ( 0014):  12.04  2.572  4.00  62.40

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0014) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0014):  12.04  2.572  4.00  62.40
+ ID2= 2 ( 0008):  58.13  16.019  4.00  68.21
=====
ID = 1 ( 0014):  70.17  18.591  4.00  67.21

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0014) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0014):  70.17  18.591  4.00  67.21
+ ID2= 2 ( 0009):  3.62  1.352  4.00  75.89
=====
ID = 3 ( 0014):  73.79  19.943  4.00  67.64

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| STANDHYD ( 0015) |
| ID= 1 DT= 5.0 min |
-----
Area      (ha)=  5.47
Total Imp(%)= 60.00  Dir. Conn.(%)= 40.00

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)= 3.28	2.19
Dep. Storage	(mm)= 1.60	1.60
Average slope	(%)= 2.00	2.00
Length	(m)= 190.96	150.00
Mannings n	= 0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57
0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)=	196.75	135.71	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.33 (ii)	16.14 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.30	0.06	
			*TOTALS*
PEAK FLOW (cms)=	1.18	0.48	1.381 (iii)
TIME TO PEAK (hrs)=	4.00	4.25	4.00
RUNOFF VOLUME (mm)=	86.70	52.52	66.19
TOTAL RAINFALL (mm)=	88.30	88.30	88.30
RUNOFF COEFFICIENT =	0.98	0.59	0.75

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----			
CALIB			
STANDHYD ( 0017)	Area (ha)=	4.12	
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)= 23.00
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.85	2.27	
Dep. Storage (mm)=	1.60	1.60	
Average Slope (%)=	2.00	2.00	
Length (m)=	165.73	350.00	
Mannings n =	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.10	3.083	4.91	6.083	3.59	9.08	1.57

0.167	1.10	3.167	4.91	6.167	3.59	9.17	1.57
0.250	1.15	3.250	6.26	6.250	3.33	9.25	1.52
0.333	1.15	3.333	6.26	6.333	3.33	9.33	1.52
0.417	1.20	3.417	8.70	6.417	3.12	9.42	1.48
0.500	1.20	3.500	8.70	6.500	3.12	9.50	1.48
0.583	1.25	3.583	14.38	6.583	2.93	9.58	1.44
0.667	1.25	3.667	14.38	6.667	2.93	9.67	1.44
0.750	1.32	3.750	40.45	6.750	2.76	9.75	1.40
0.833	1.32	3.833	40.45	6.833	2.76	9.83	1.40
0.917	1.38	3.917	196.75	6.917	2.61	9.92	1.37
1.000	1.38	4.000	196.75	7.000	2.61	10.00	1.37
1.083	1.46	4.083	54.95	7.083	2.48	10.08	1.33
1.167	1.46	4.167	54.95	7.167	2.48	10.17	1.33
1.250	1.54	4.250	26.01	7.250	2.36	10.25	1.30
1.333	1.54	4.333	26.01	7.333	2.36	10.33	1.30
1.417	1.64	4.417	16.64	7.417	2.26	10.42	1.27
1.500	1.64	4.500	16.64	7.500	2.26	10.50	1.27
1.583	1.75	4.583	12.15	7.583	2.16	10.58	1.24
1.667	1.75	4.667	12.15	7.667	2.16	10.67	1.24
1.750	1.88	4.750	9.56	7.750	2.07	10.75	1.21
1.833	1.88	4.833	9.56	7.833	2.07	10.83	1.21
1.917	2.03	4.917	7.88	7.917	1.99	10.92	1.19
2.000	2.03	5.000	7.88	8.000	1.99	11.00	1.19
2.083	2.21	5.083	6.70	8.083	1.92	11.08	1.16
2.167	2.21	5.167	6.70	8.167	1.92	11.17	1.16
2.250	2.42	5.250	5.84	8.250	1.85	11.25	1.14
2.333	2.42	5.333	5.84	8.333	1.85	11.33	1.14
2.417	2.68	5.417	5.18	8.417	1.78	11.42	1.12
2.500	2.68	5.500	5.18	8.500	1.78	11.50	1.12
2.583	3.02	5.583	4.65	8.583	1.72	11.58	1.09
2.667	3.02	5.667	4.65	8.667	1.72	11.67	1.09
2.750	3.45	5.750	4.23	8.750	1.67	11.75	1.07
2.833	3.45	5.833	4.23	8.833	1.67	11.83	1.07
2.917	4.05	5.917	3.88	8.917	1.62	11.92	1.05
3.000	4.05	6.000	3.88	9.000	1.62	12.00	1.05

Max.Eff.Inten.(mm/hr)= 196.75 79.63  
over (min) 5.00 35.00  
Storage Coeff. (min)= 2.14 (ii) 30.55 (ii)  
Unit Hyd. Tpeak (min)= 5.00 35.00  
Unit Hyd. peak (cms)= 0.31 0.04

\*TOTALS\*

PEAK FLOW (cms)= 0.51 0.29 0.579 (iii)  
TIME TO PEAK (hrs)= 4.00 4.50 4.00  
RUNOFF VOLUME (mm)= 86.70 51.01 59.21  
TOTAL RAINFALL (mm)= 88.30 88.30 88.30  
RUNOFF COEFFICIENT = 0.98 0.58 0.67

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 74.6 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD ( 0018)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 ( 0014):	73.79	19.943	4.00	67.64
+ ID2= 2 ( 0015):	5.47	1.381	4.00	66.19
=====				
ID = 3 ( 0018):	79.26	21.324	4.00	67.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0018)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 ( 0018):	79.26	21.324	4.00	67.54
+ ID2= 2 ( 0017):	4.12	0.579	4.00	59.21
=====				
ID = 1 ( 0018):	83.38	21.903	4.00	67.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



## Imperviousness Calculations VO Model for Rowe Channel

Project No. 2021-006  
Design By: S. Rayner, P.Eng.

**Table 1- Summary of Land Use Types (For Future Conditions as per MDPU)**

	Total Impervious Value (TIMP)	Directly Connected Impervious (XIMP)
Crop and Improved	0%	0%
Industrial and Commercial	90%	90%
Landfill and Aggregate	50%	50%
Lakes and Wetlands	0%	0%
Manicured Greenspace	0%	0%
Pasture and Unimproved	0%	0%
Transportation and Utility	50%	50%
Woodlots and Forest	0%	0%
High Density Residential	80%	65%
Medium Density Residential	60%	40%
Low Density Residential	45%	23%
Mixed Use	90%	90%

Note: Areas with percent impervious >=20% are STANDHYD, <20% are NASHYD

**Table 2- Imperviousness of Contributing Drainage Areas**

Discharge Location - Crossing	Area ID	Land Use	Total Area (ha)	TIMP	XIMP	VO Command
Victoria Street Crossing	V1	Low Density Residential	21.25	45%	23%	STANDHYD
	V2	Whitby GO	8.98	90%	90%	STANDHYD
	V3	Whitby GO Parking	7.33	90%	90%	STANDHYD
	V4	Whitby GO Parking	3.07	90%	90%	STANDHYD
	V5	Sport Complex	13.84	60%	40%	STANDHYD
	V6	Low Density Residential	2.28	45%	23%	STANDHYD
	V7	Open Space	1.39	0%	0%	NASHYD
Watson Street Crossing	W1	High Density Residential	3.62	80%	65%	STANDHYD
	W2	Industrial/ Commercial/Institutional	1.97	90%	90%	STANDHYD
	W3	Low Density Residential	7.77	45%	23%	STANDHYD
	W4	Undeveloped Land	1.40	0%	0%	NASHYD
	W5	High Density Residential	0.91	80%	65%	STANDHYD
Front Street Crossing	F1	Marina	5.47	60%	40%	STANDHYD
	F2	Low Density Residential	4.12	45%	23%	STANDHYD
<b>Total Area</b>			<b>83.40</b>	<b>60%</b>	<b>46%</b>	



### NASHYD Input Parameters VO Model for Rowe Channel

Project No. 2021-006  
Design By: S.Rayner, P.Eng.

**Table 1 - NASHYD Input Parameters**

Parameter	Unit	Description	V7	W4
Area	ha	Watershed Area	1.39	1.40
TP	hr	Unit Hydrograph Time to Peak	0.16	0.27
DT	min	Time Step Increment	5.00	5.00
DWF	cms	Dry Weather Flow	0.00	0.00
CN	-	Curve Number	74.60	74.60
IA	mm	Initial Abstraction	2.0	
N	-	Number of Linear Reservoirs	3	
Rain	mm/hr	Optional Rainfall Intensities	0- Without Rainfall	

**Table 2- Time of Concentration Calculation**

Area Number	Area	C	CN	L	Sw	Tc (Airport)	Tp
	(ha)			(m)	(%)	(min)	(hr)
V7	1.39	0.25	74.6	44	2.00	14.63	0.16
W4	1.40	0.25	74.6	124	2.00	24.58	0.27

(b) Airport Formula

$$T_c = \frac{3.26 \cdot (1.1 - C) \cdot L^{0.5}}{S_w^{0.01}}$$

where:

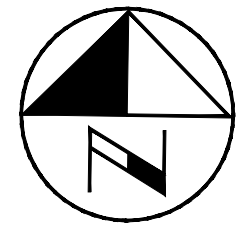
$T_c$  = Time of concentration, min  
 $L$  = Watershed length, m  
 $S_w$  = Watershed slope, %  
 $A$  = Watershed area, ha

If  $C < 0.40$ , using Airport Method, if  $C > 0.40$  using Bransby-Williams

**STANDHYD Input Parameters  
VO Model for Rowe Channel**

**Table 1 - STANDHYD Input Parameters**

Parameter	Unit	Description	V1	V2	V3	V4	V5	V6	W1	W2	W3	W5	F1	F2
AREA	ha	Watershed Area	21.25	8.98	7.33	3.07	13.84	2.28	3.62	1.97	7.77	0.91	5.47	4.12
XIMP	%	Impervious Area	23%	90%	90%	90%	40%	23%	65%	90%	23%	65%	40%	23%
TIMP	%	Total Impervious Area	45%	90%	90%	90%	60%	45%	80%	90%	45%	80%	60%	45%
LGI	m	Overland Flow Length (Impervious)	376.39	244.68	221.06	143.06	303.75	123.29	155.35	114.60	227.60	77.89	190.96	165.73
SLPI	%	Average Slope (Impervious)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
DT	-	Time Step Increment	5											
DWF	-	Dry Weather Flow (Base Flow)	0											
LOSS	-	Rainfall Loss Method	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm	CN=74.6,IA=1.6mm
SLPP	%	Average Slope (Pervious)	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
LGP	m	Overland Flow Length (Pervious)	625.00	270.00	240.00	160.00	180.00	225	240.00	160.00	300.00	60.00	150.00	350.00
MNP	-	Manning's Roughness Coefficient (Pervious)	0.25											
DPSI	-	Depression Storage (Impervious)	1.6											
MNI	-	Manning's Roughness Coefficient (Impervious)	0.013											



80.64 855.4  
80.53

79.16 818.6  
79.09

78.94 746.7  
78.90

78.17 643.1  
77.75

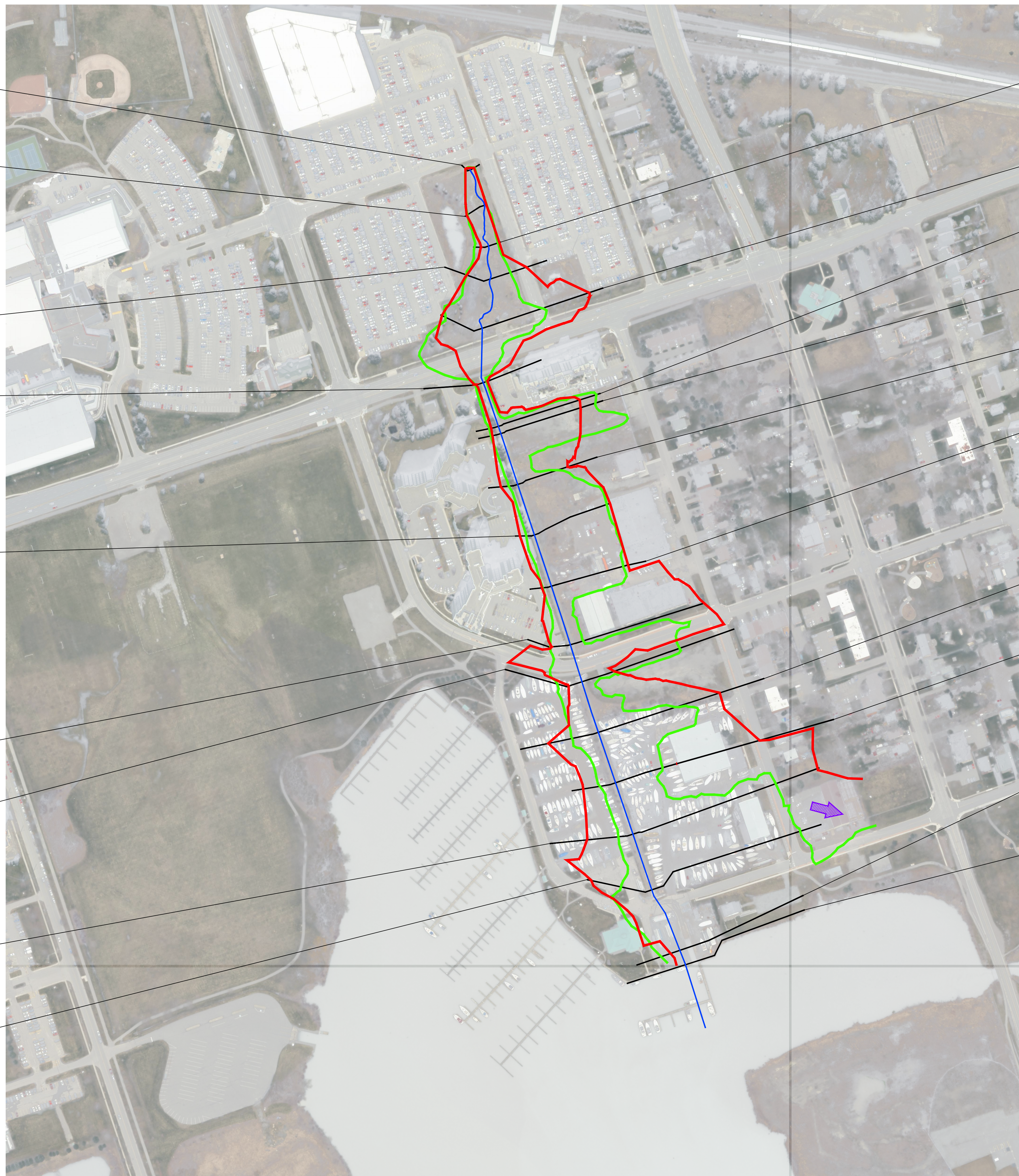
77.40 493.2  
77.50

77.38 385.3  
77.49

76.74 349.1  
76.62

76.62 199.1  
76.93

76.55 144.2  
76.93



778.2 78.94  
78.84

694.2 78.96  
78.90

600.0 N/A  
77.69

592.9 78.12  
N/A

542.9 77.85  
77.47

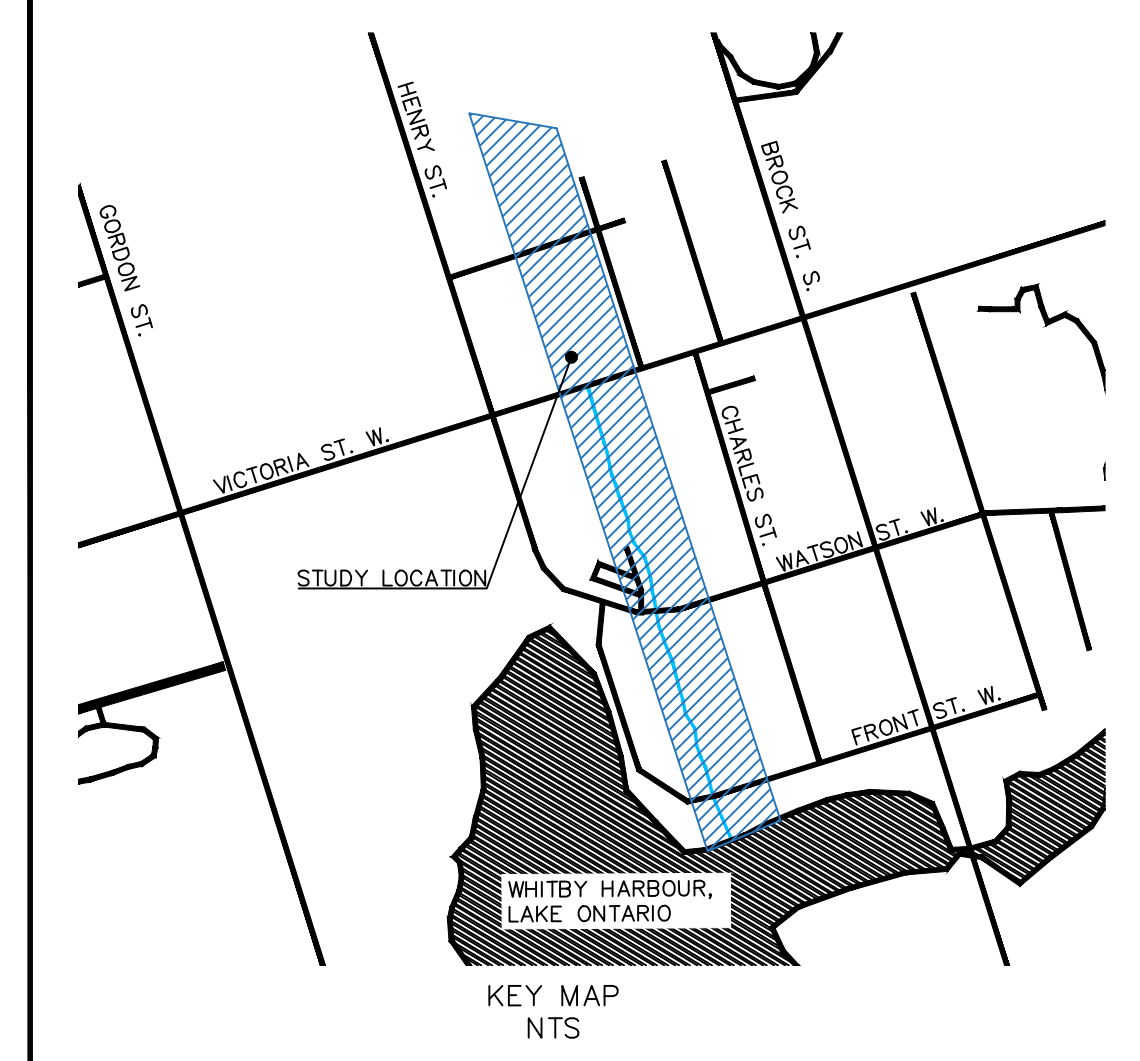
442.8 77.39  
77.49

299.5 76.74  
76.94

249.8 76.68  
76.93

78.0 76.17  
N/A

64.2 N/A  
76.05



LEGEND

- ROWE CHANNEL LOCATION
- EXISTING 100 YEAR FLOODLINE PLOTTED IN MDP (CANDEVCON, 2018)
- UPDATED 100 YEAR FLOODLINE PLOTTED (RESILIENT, 2021)
- ➔ FLOODPLAIN SPILL LOCATION

MDPU EXISTING 100-YR WSEL: 77.85 542.9

RESILIENT UPDATED 100-YR WSEL: 77.45

CROSS SECTION ID

NO.	DATE	NAME	REVISIONS
3.	08/27/21	MFB	UPDATED FLOODPLAIN MAPPING
2.	12/20/19	MFB	DRAFT SUBMISSION FOR REVIEW
1.	12/11/19	MFB	PRELIMINARY DESIGN ISSUED FOR DISCUSSION

CAUTION: UTILITIES INVESTIGATIONS HAVE NOT BEEN COMPLETED AS PART OF THIS DRAWING PREPARATION. CONTRACTOR TO TAKE RESPONSIBILITY FOR ALL U/G & OVERHEAD UTILITIES.

RESILIENT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

SURVEY DATA DATE 2019 11 20	
SCALE 1:2000	

DRAWN: SR	DATE: 2019 11 20
DESIGN: SR	DATE: 2019 12 10
CHECKED: MB	DATE: 2019 12 10
APPROVED: MB	DATE: 2019 12 10

**RESILIENT CONSULTING**

RESILIENT CONSULTING  
PO BOX 643  
WHITBY ON L1N 5V3  
289-943-4651  
info@resilientconsulting.ca

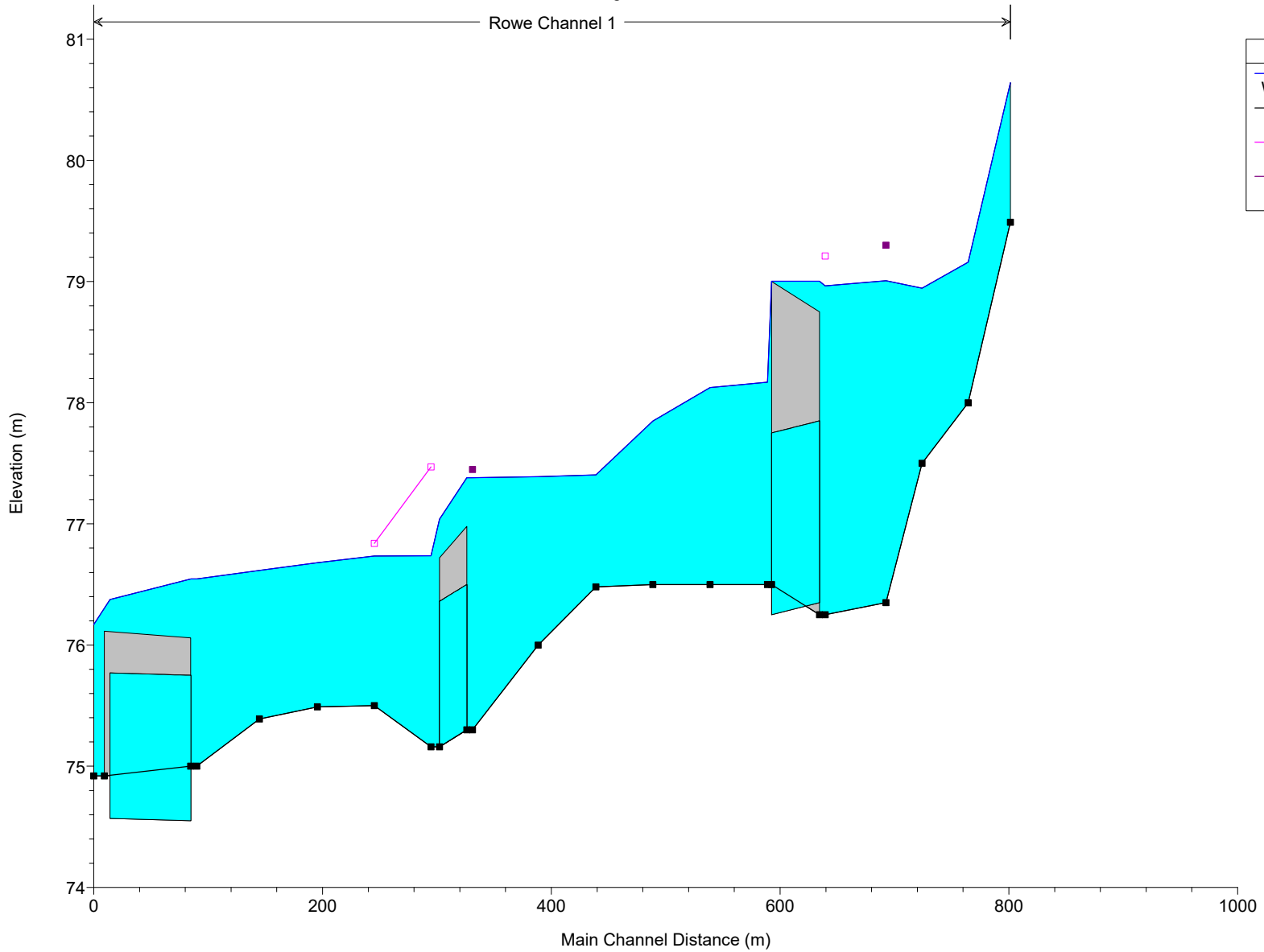
ROWE CHANNEL  
EXISTING FLOODPLAIN MAPPING  
TOWN OF WHITBY

DRAWING NUMBER FP-1	PROJECT NUMBER 2021-006	SHEET NUMBER 1
------------------------	----------------------------	-------------------

Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd

Rowe Channel 1



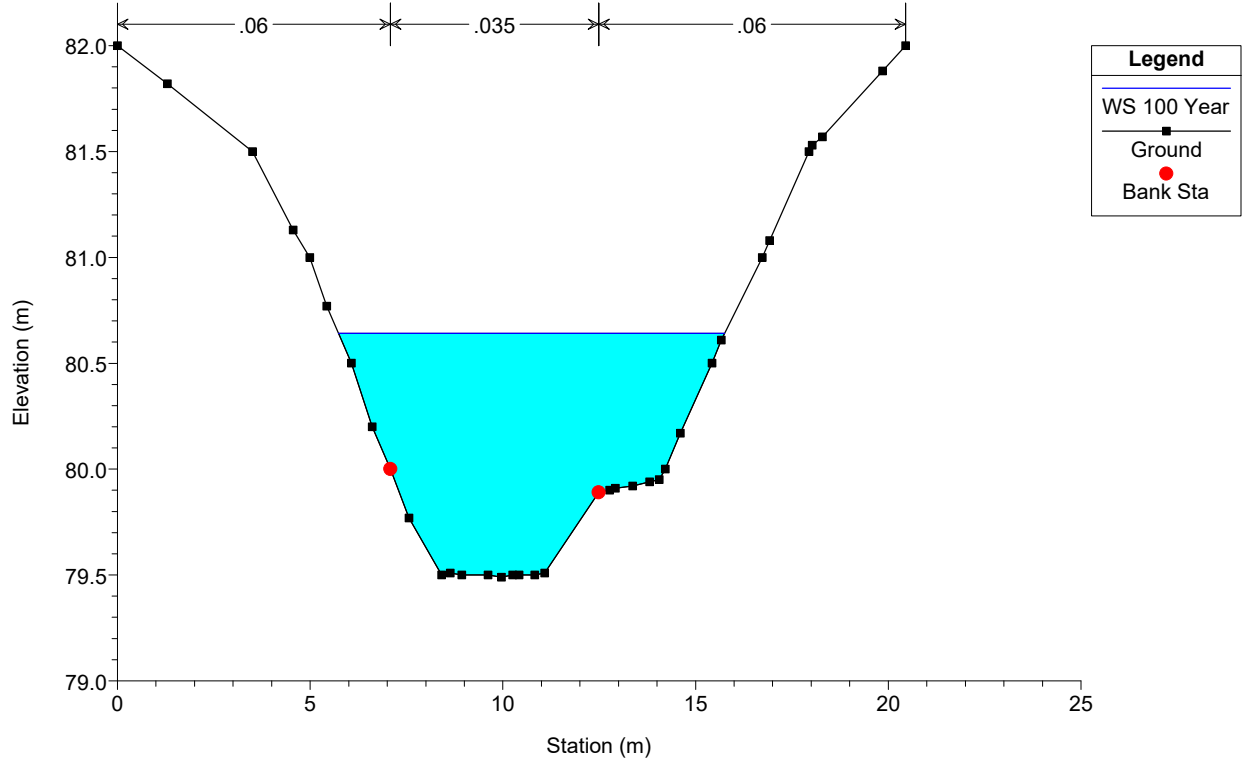
**Legend**

- WS 100 Year
- Ground
- Left Levee
- Right Levee



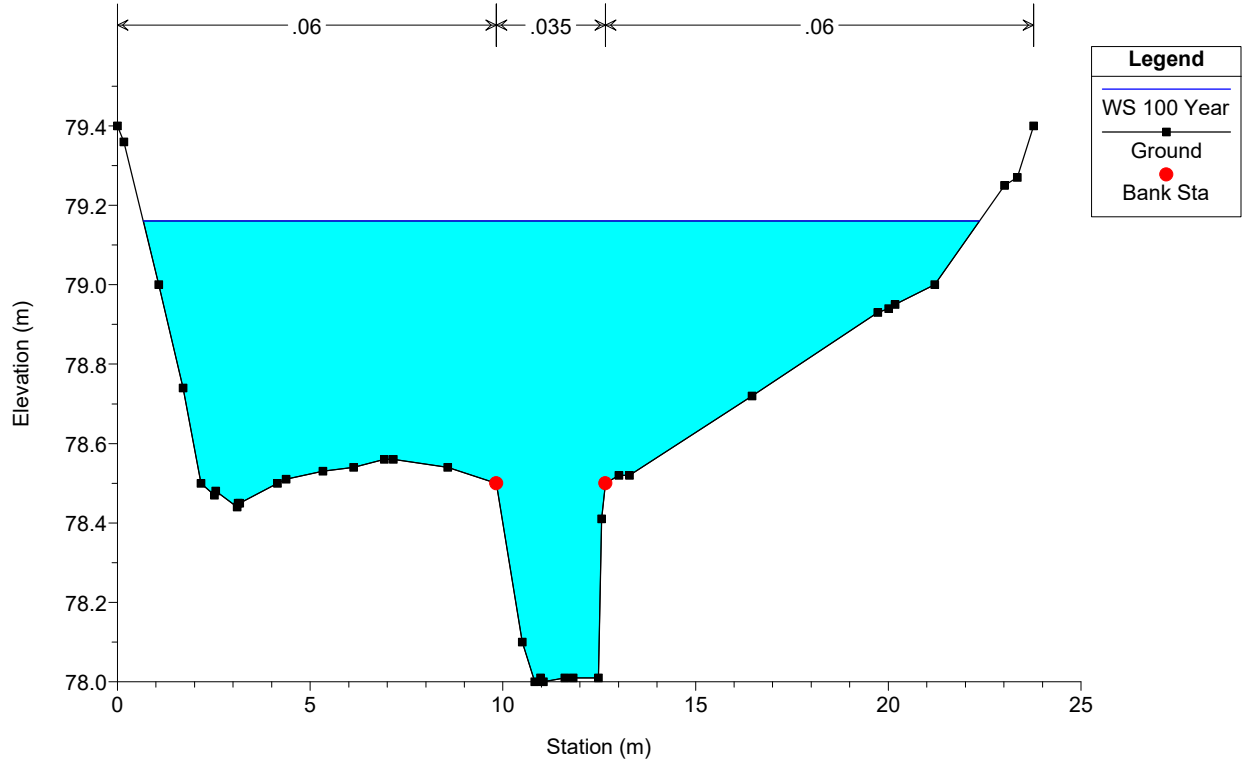
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
River = Rowe Channel Reach = 1 RS = 855.4



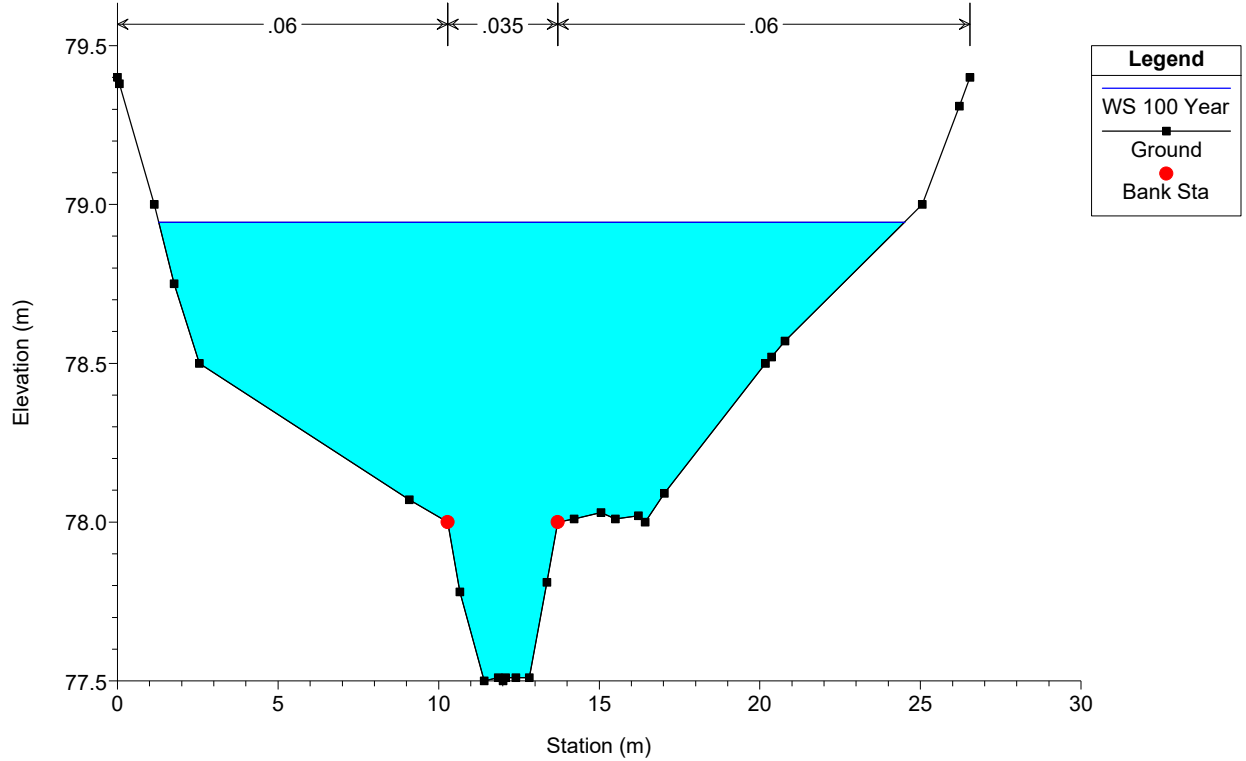
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
River = Rowe Channel Reach = 1 RS = 818.6



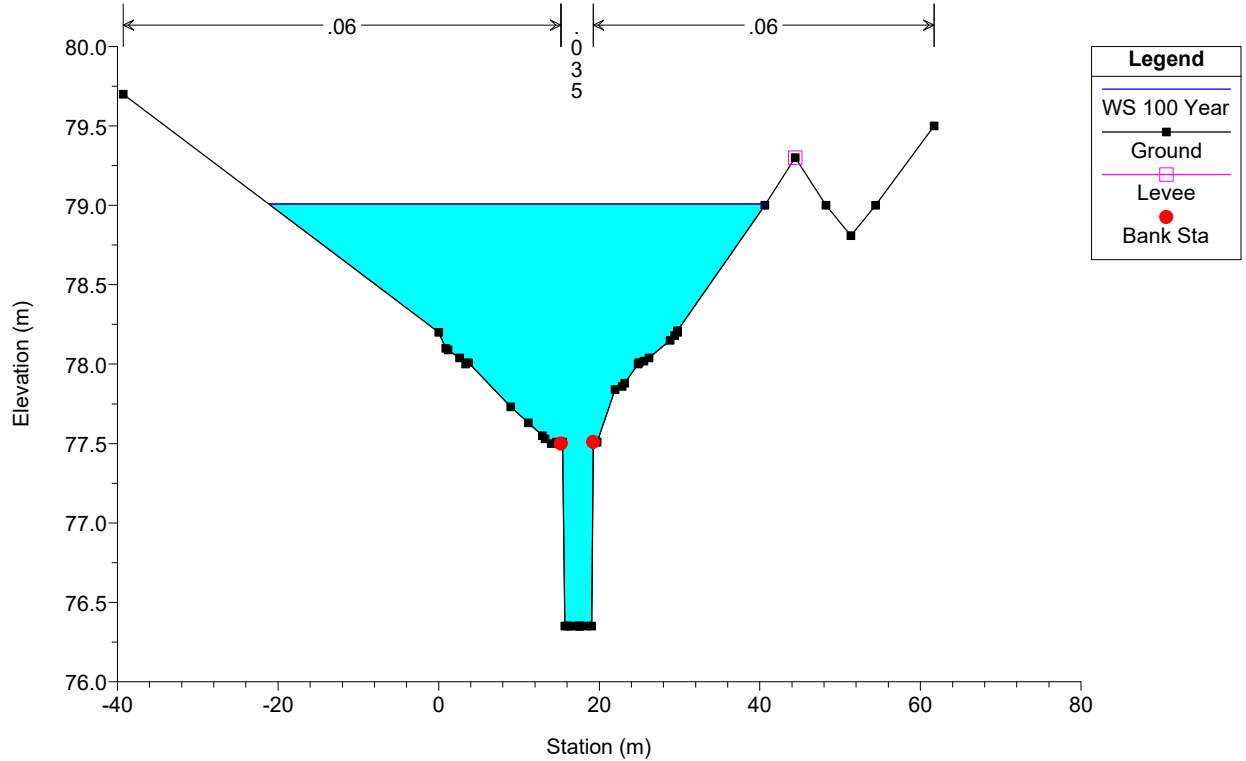
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
 River = Rowe Channel Reach = 1 RS = 778.2

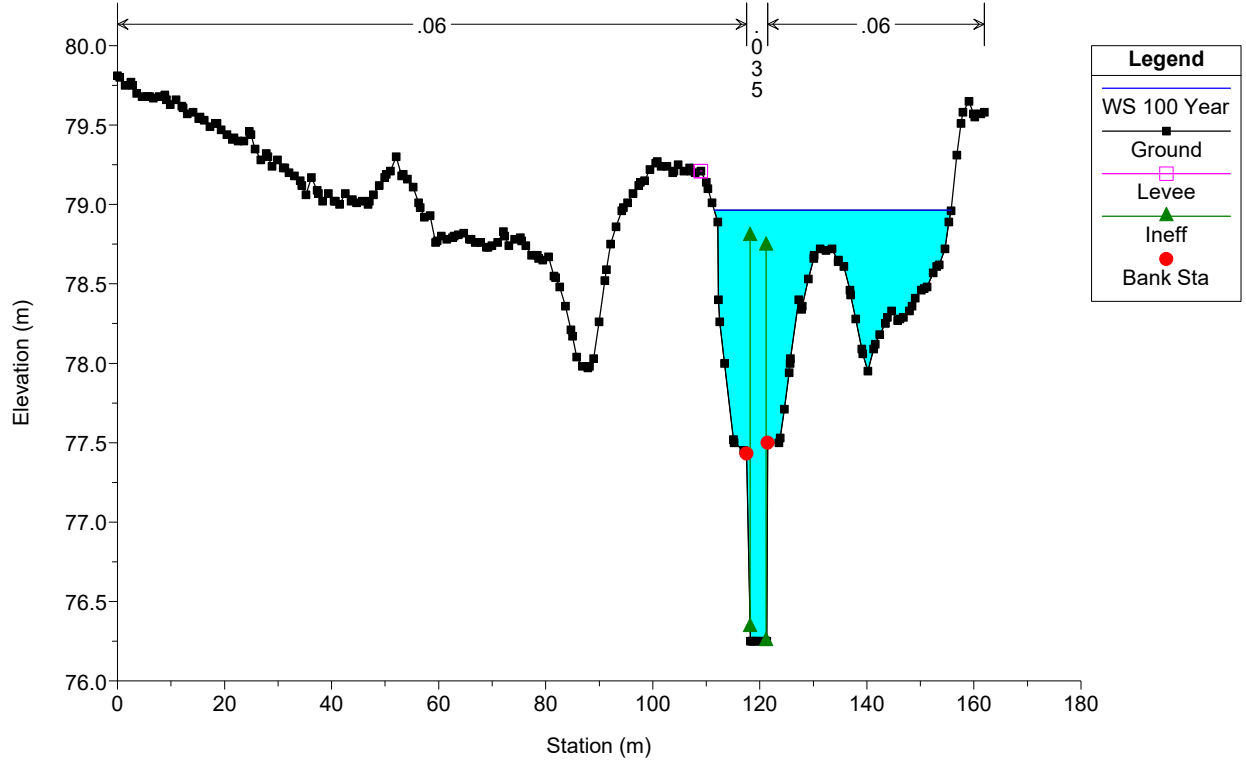


Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

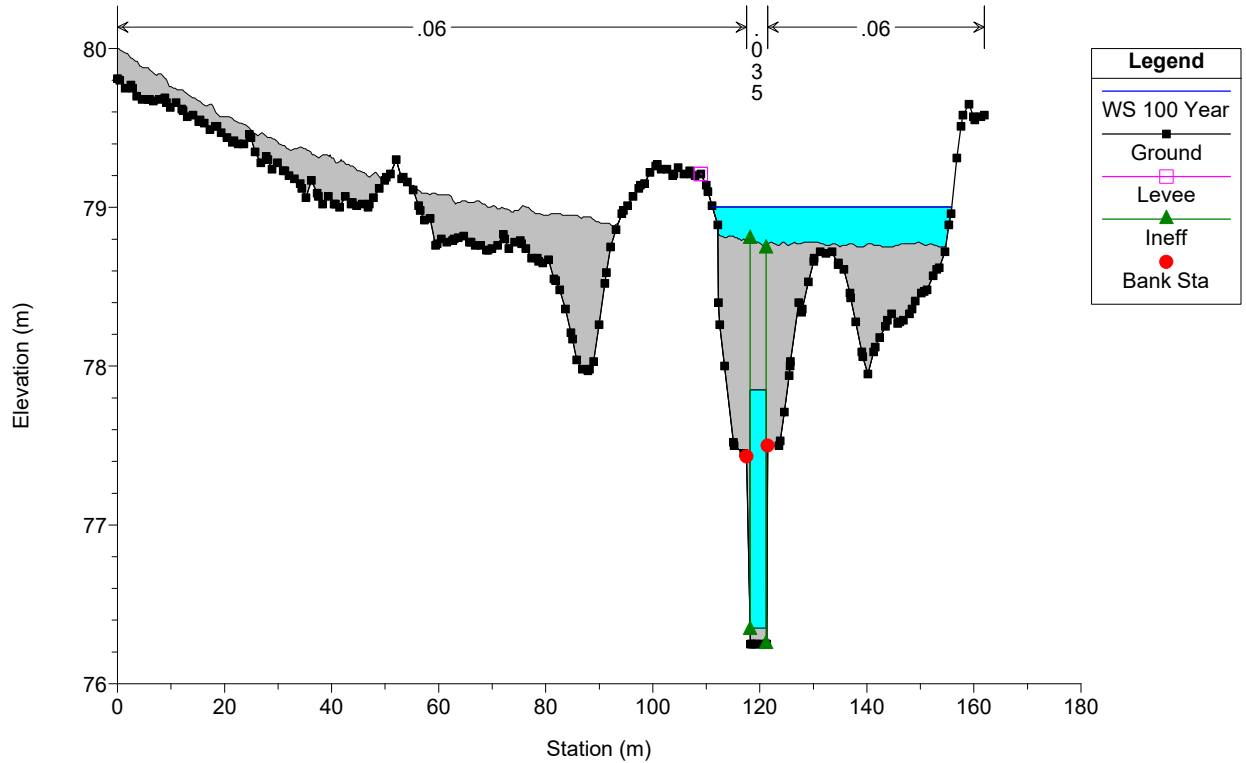
Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
 River = Rowe Channel Reach = 1 RS = 746.7



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17  
 Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
 River = Rowe Channel Reach = 1 RS = 694.2 Victoria Street Culvert - Upstream Section



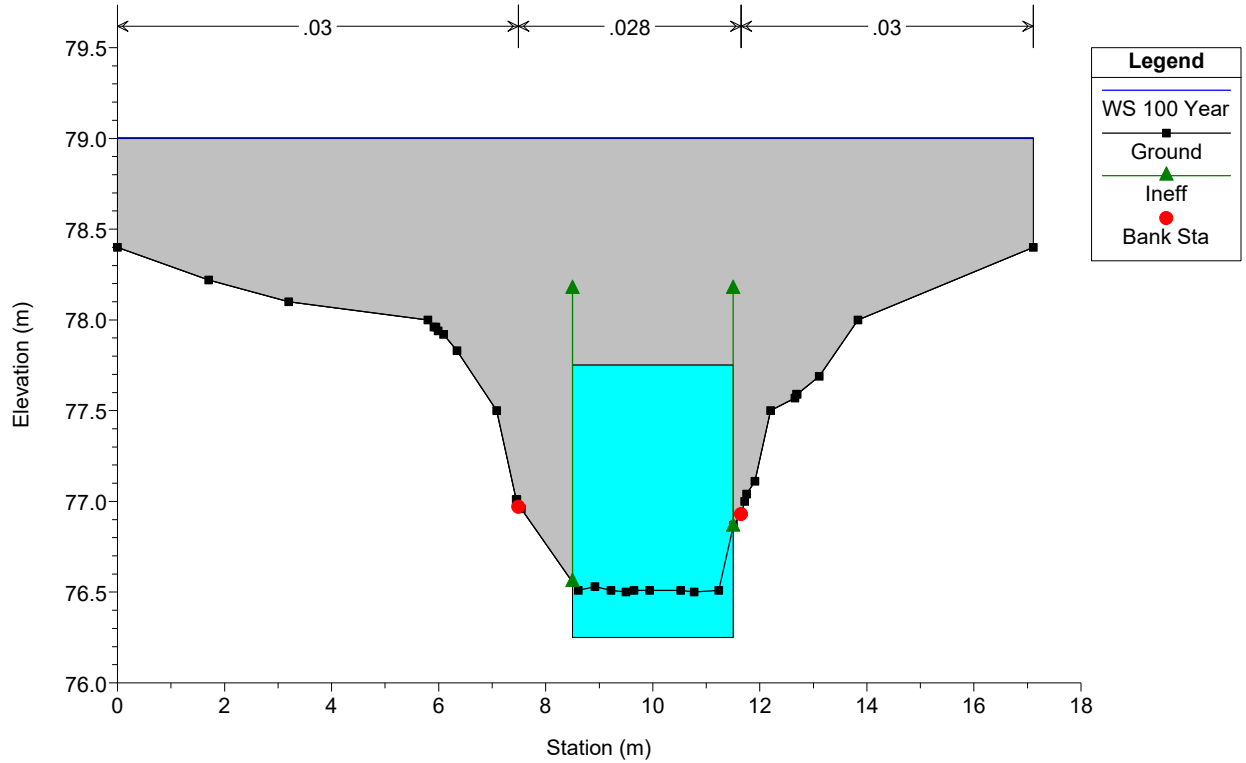
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17  
 Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
 River = Rowe Channel Reach = 1 RS = 680 Culv #S32 (Victoria Street 1.5m x 3.0m concrete box culvert)



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd

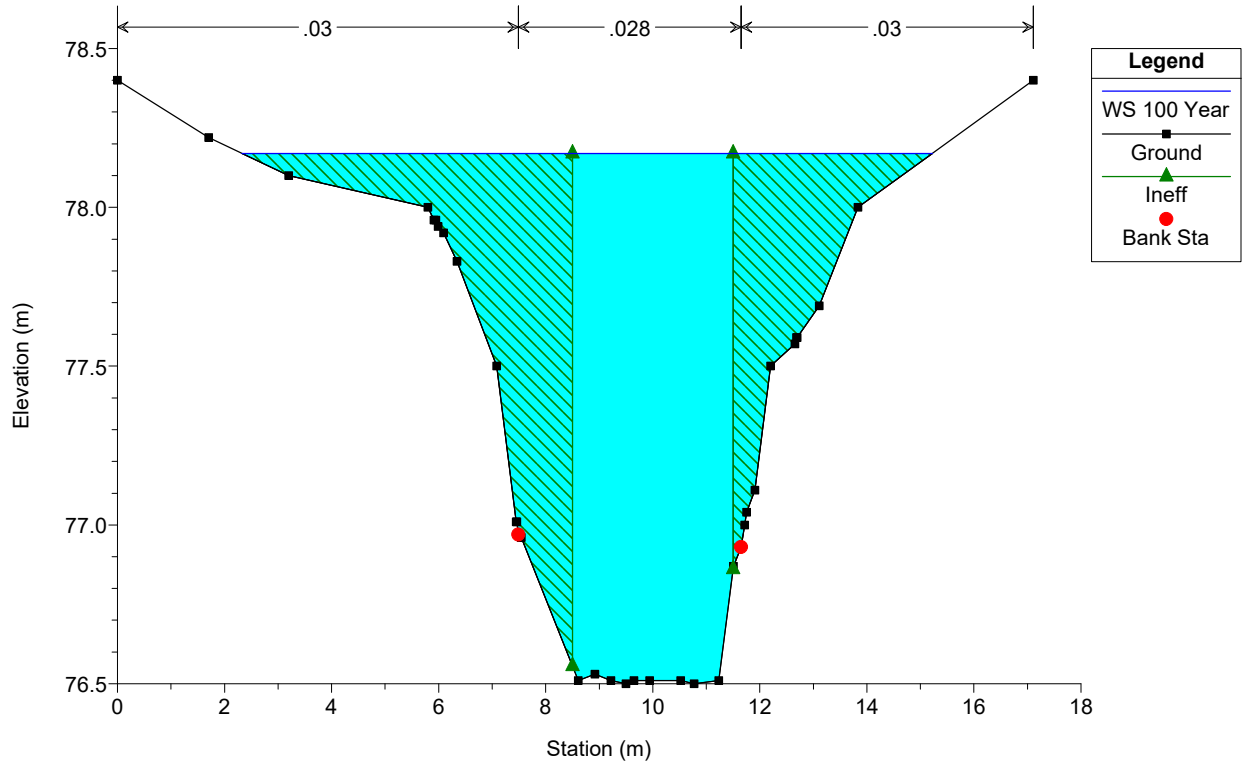
River = Rowe Channel Reach = 1 RS = 680 Culv #S32 (Victoria Street 1.5m x 3.0m concrete box culvert)



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

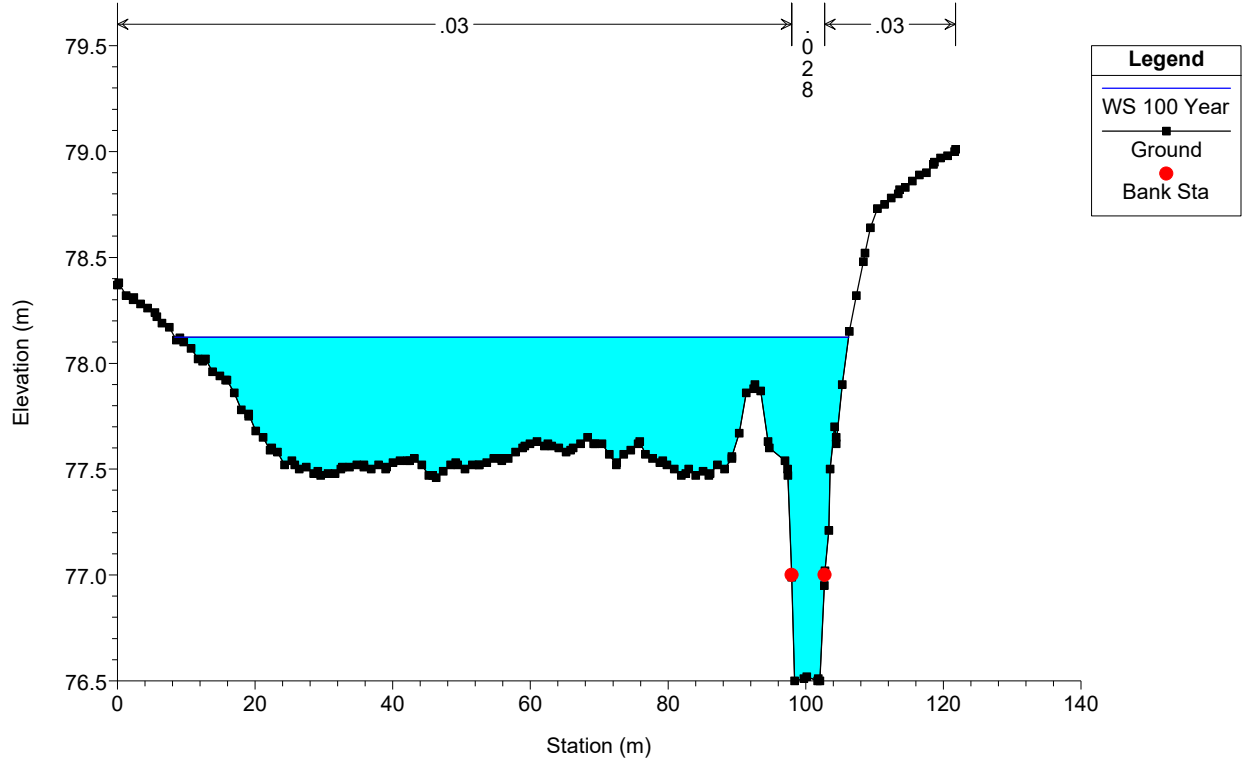
Geom: Existing Feb. 2018- MDPU Candevcon Ltd

River = Rowe Channel Reach = 1 RS = 643.1 Victoria Street Culvert - Downstream Section



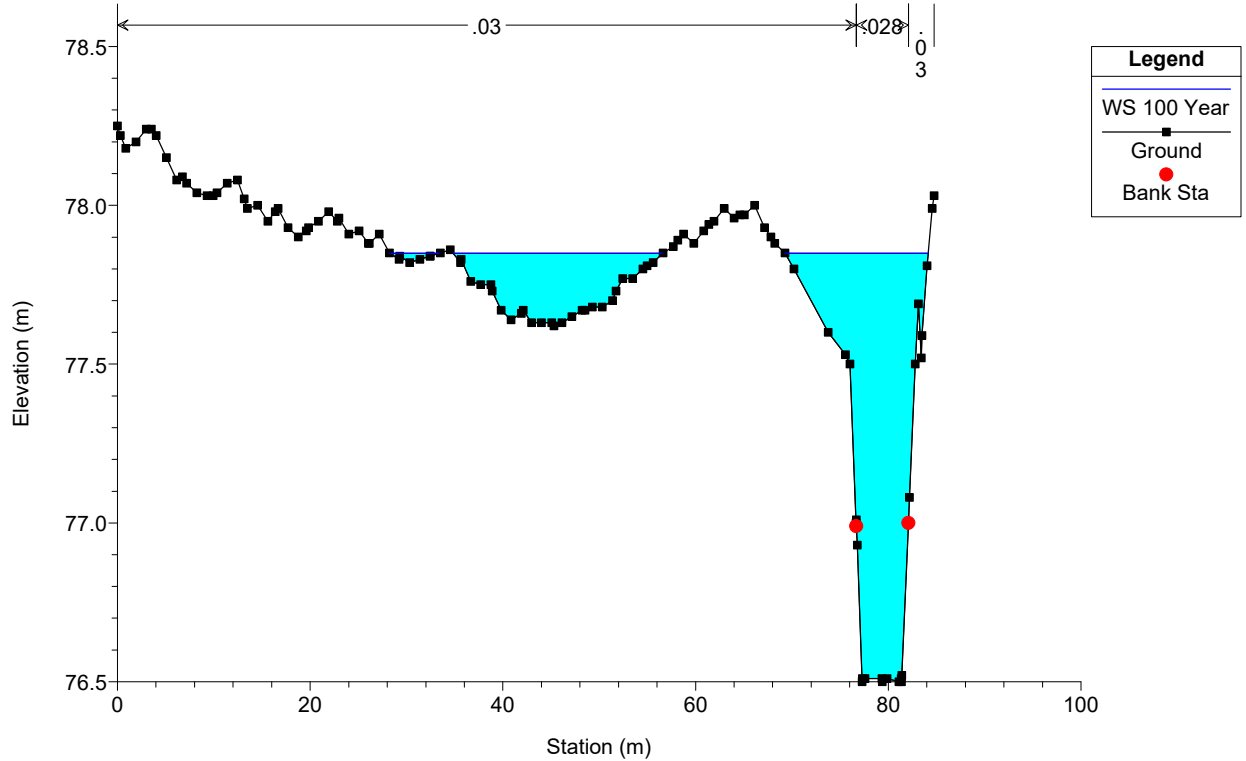
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
River = Rowe Channel Reach = 1 RS = 592.9



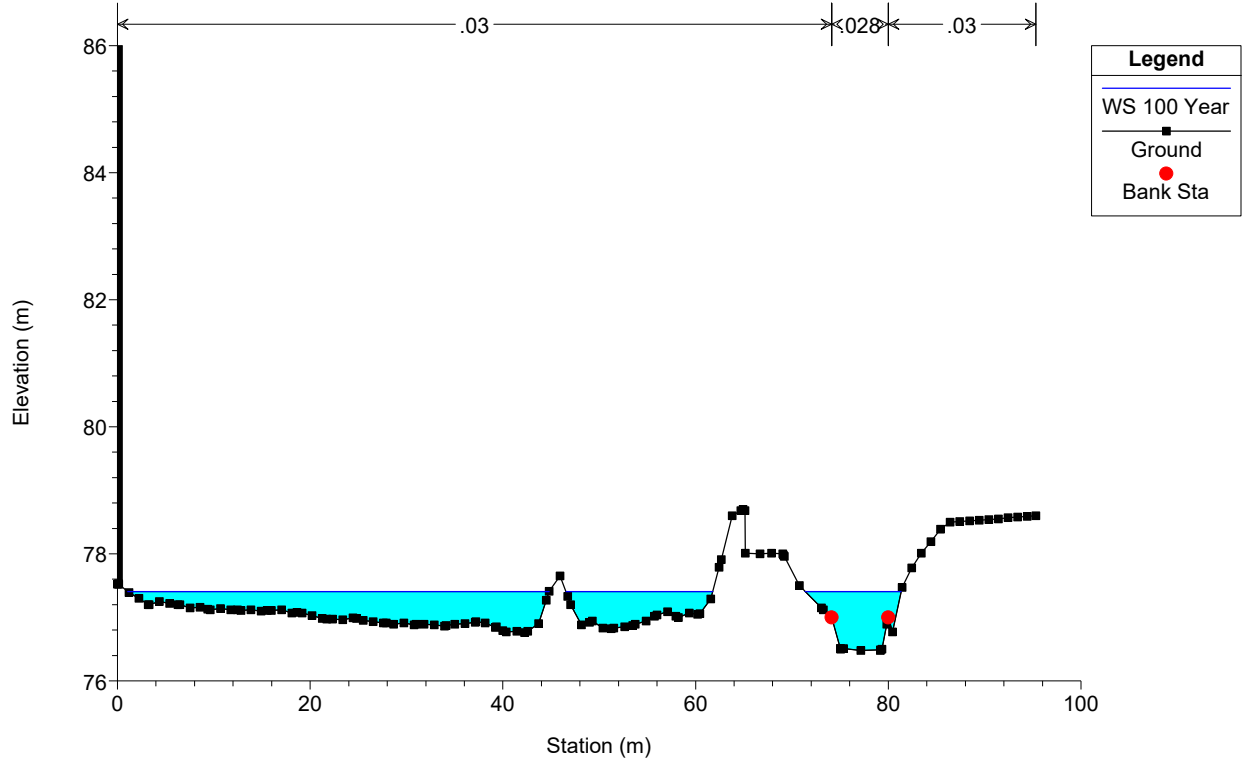
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
River = Rowe Channel Reach = 1 RS = 542.9



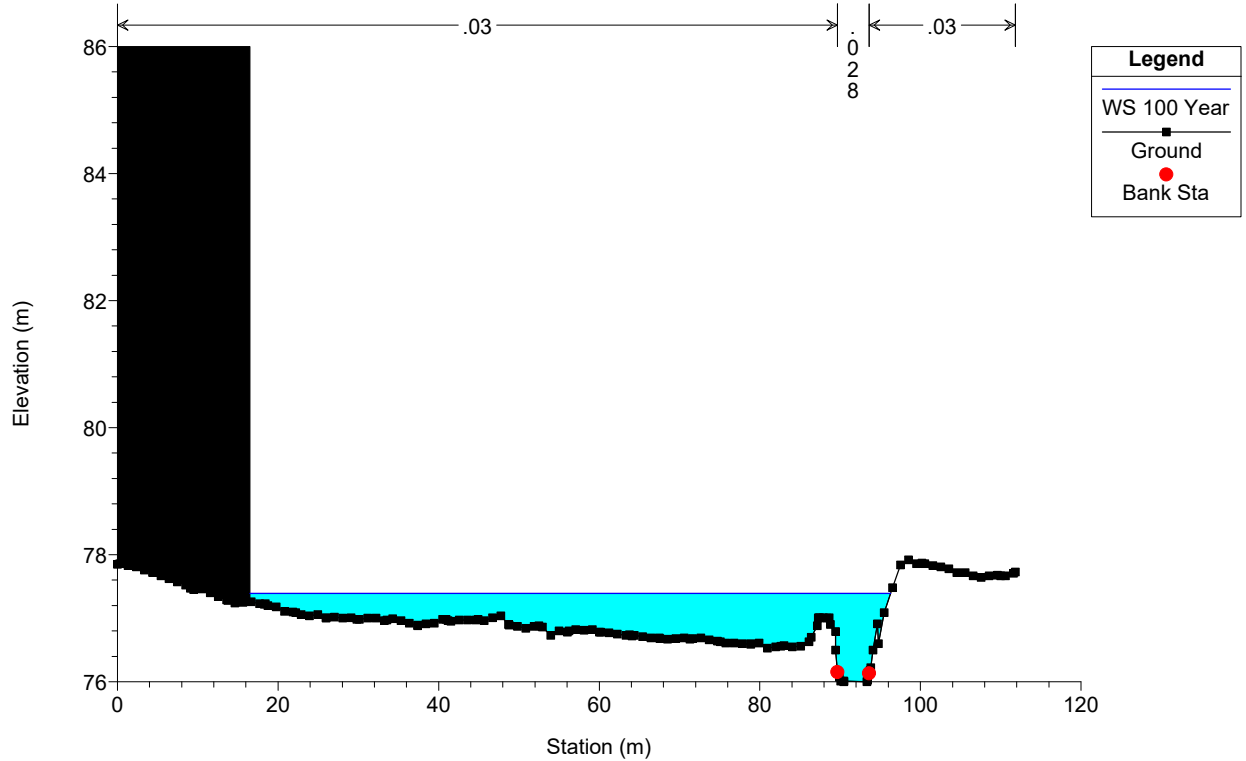
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
River = Rowe Channel Reach = 1 RS = 493.2

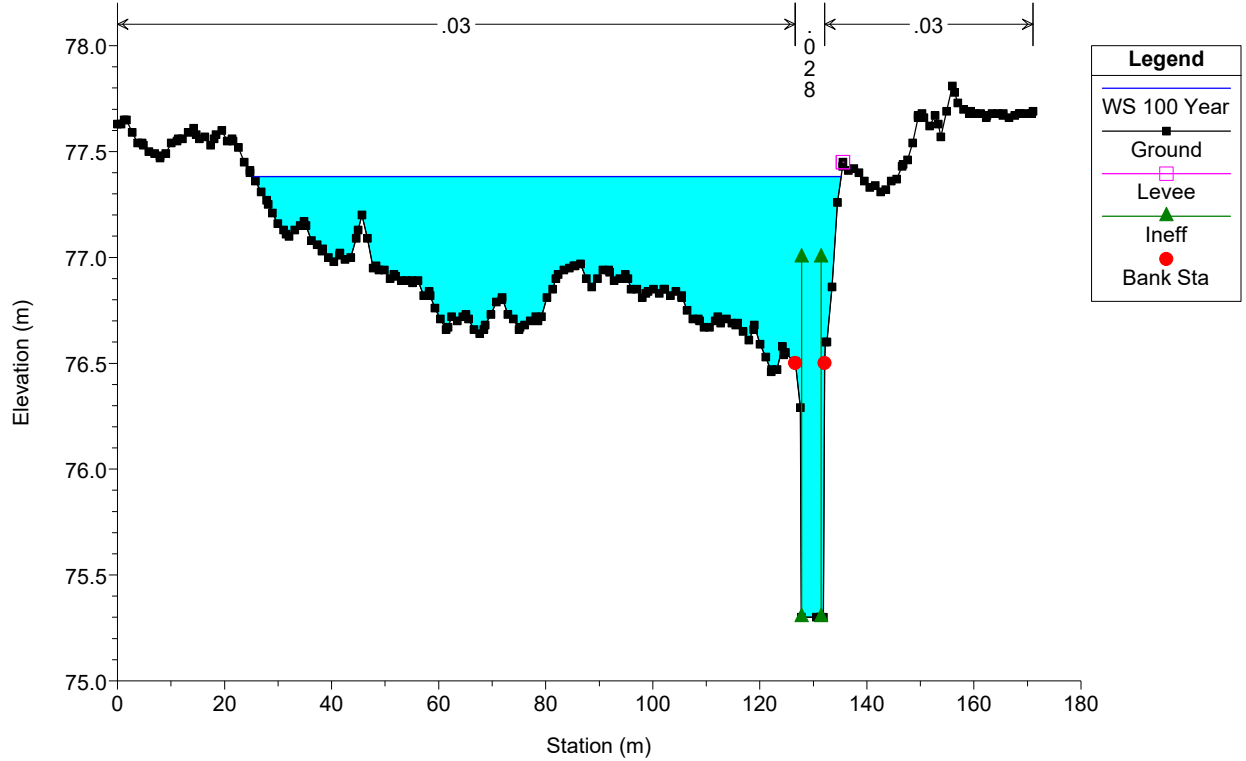


Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

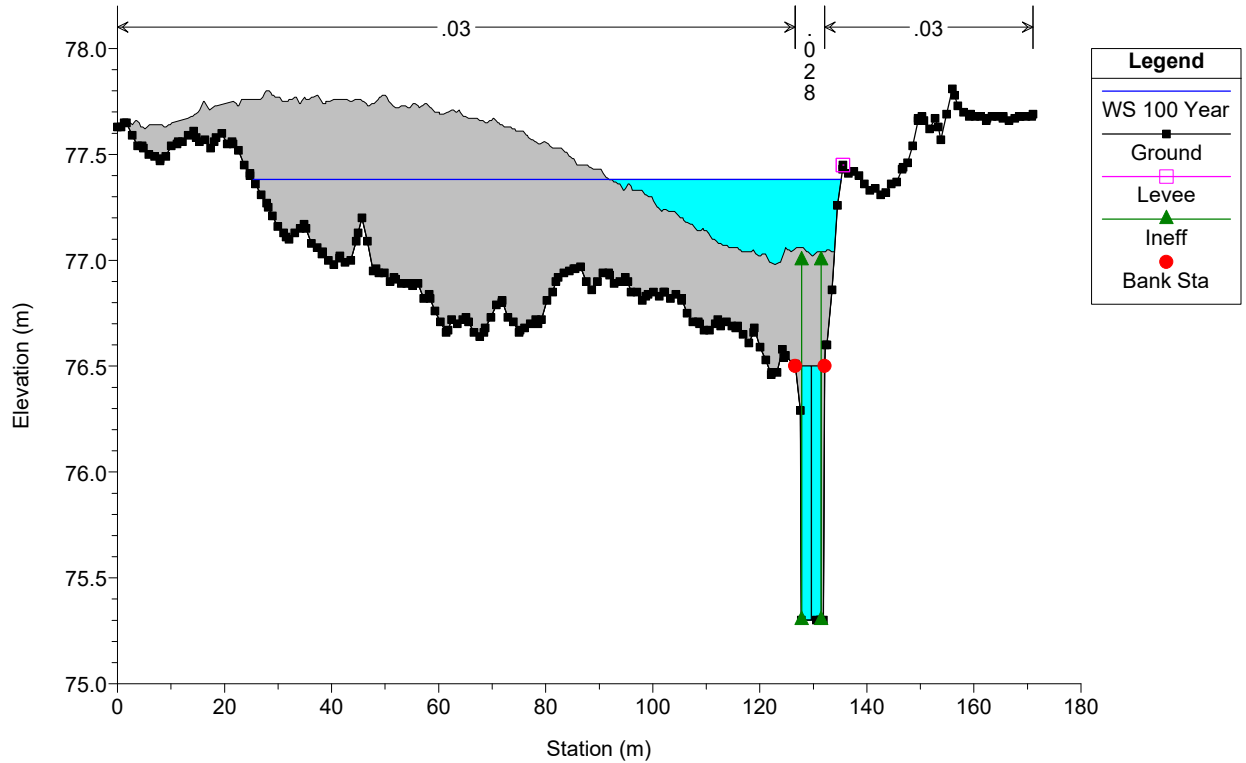
Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
River = Rowe Channel Reach = 1 RS = 442.8



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17  
 Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
 River = Rowe Channel Reach = 1 RS = 385.3 Watson Street Culvert - Upstream Section



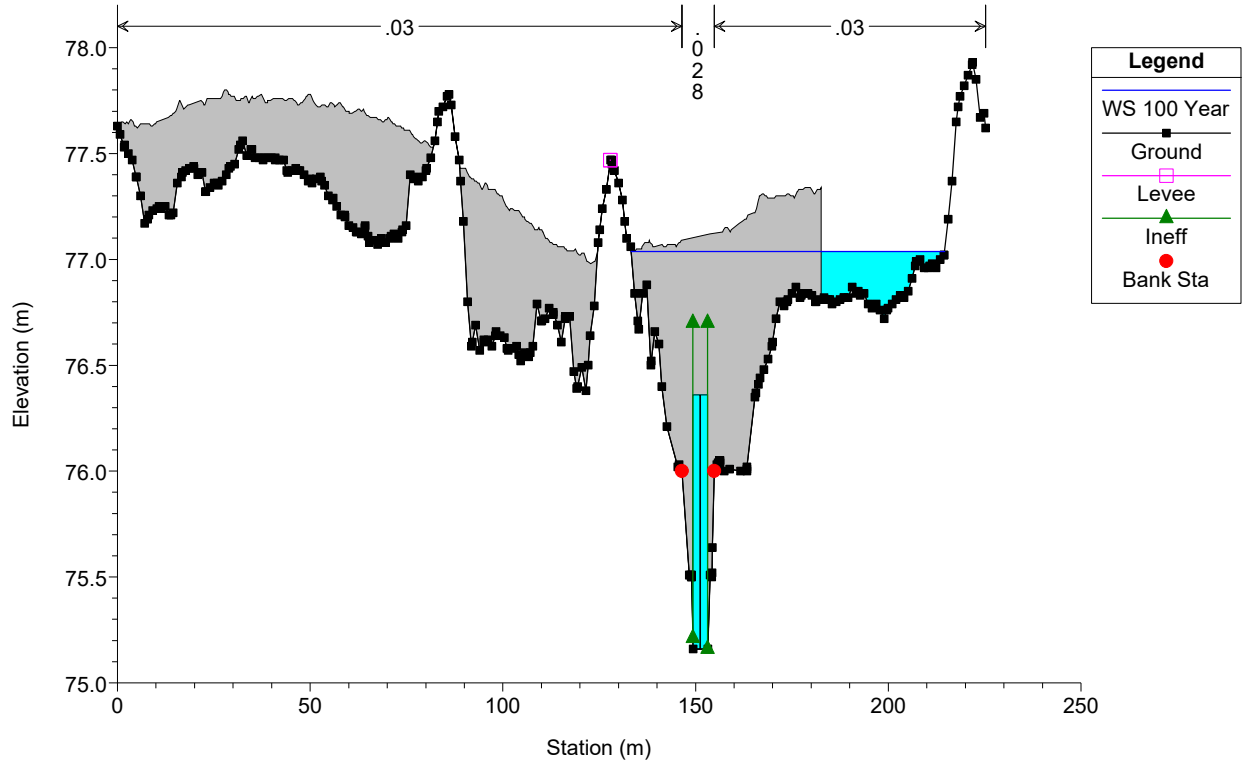
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17  
 Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
 River = Rowe Channel Reach = 1 RS = 379.7 Culv #S33 (Watson Street Culvert - 2 - 1.2m x 1.8m concrete box culve



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd

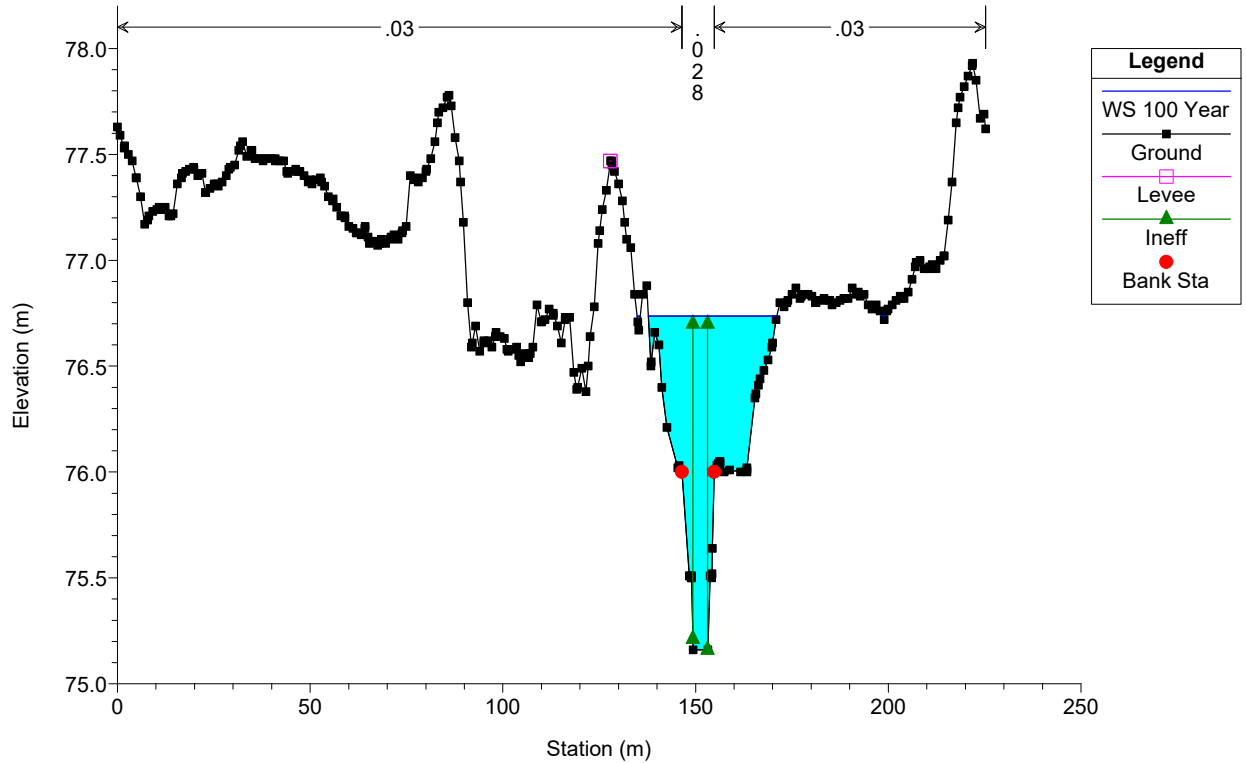
River = Rowe Channel Reach = 1 RS = 379.7 Culv #S33 (Watson Street Culvert - 2 - 1.2m x 1.8m concrete box culve



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd

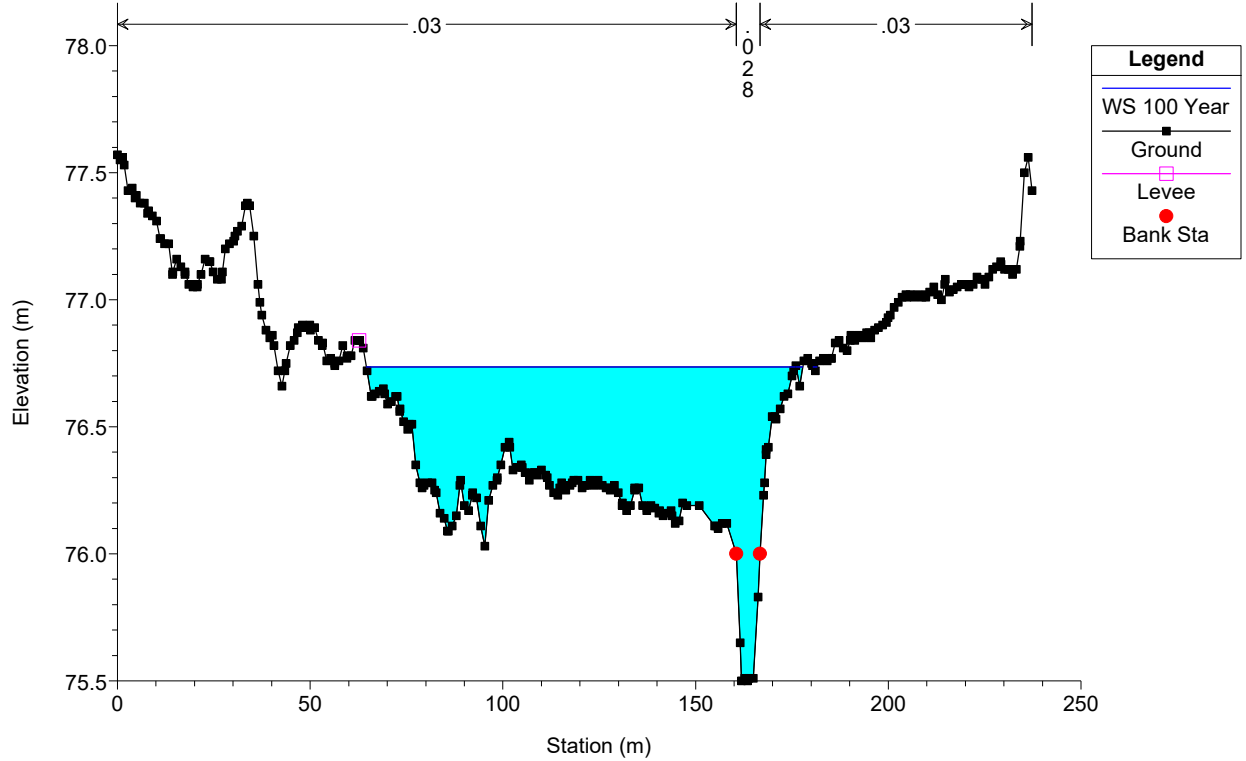
River = Rowe Channel Reach = 1 RS = 349.1 Watson Street Culvert - Downstream Section





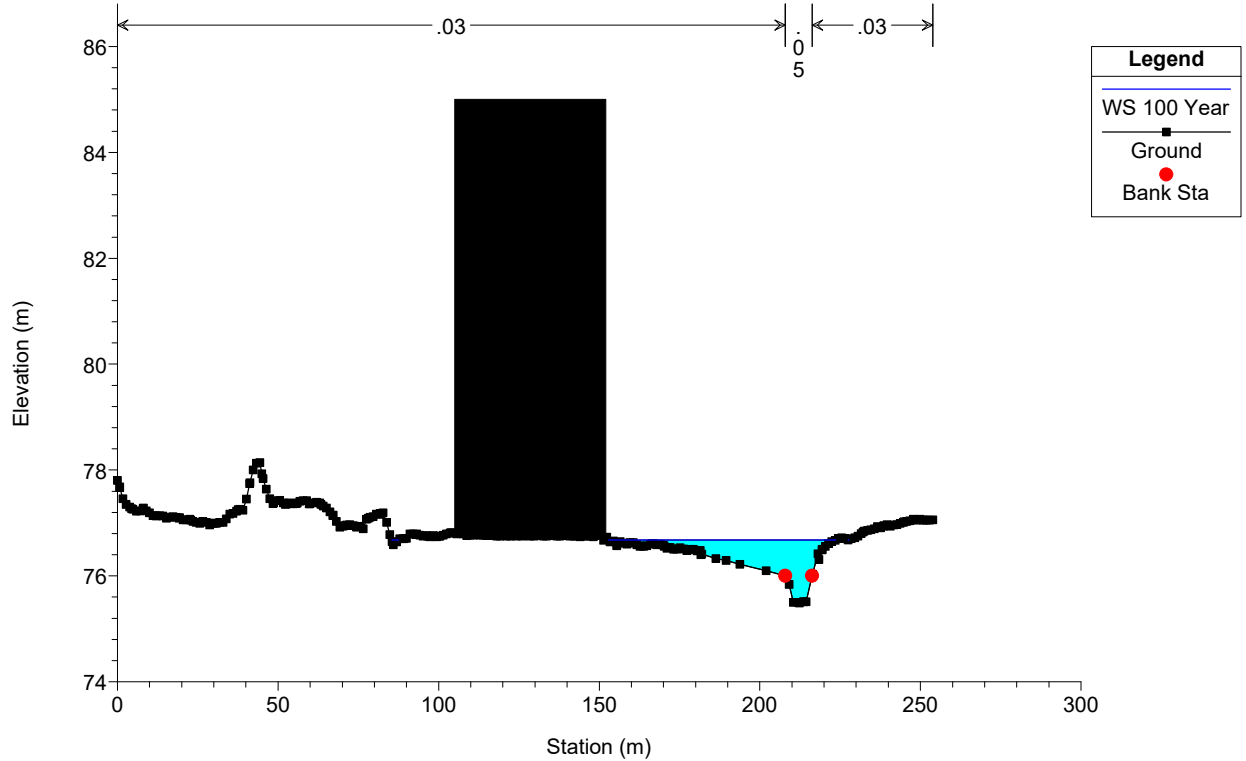
Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
 River = Rowe Channel Reach = 1 RS = 299.5



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

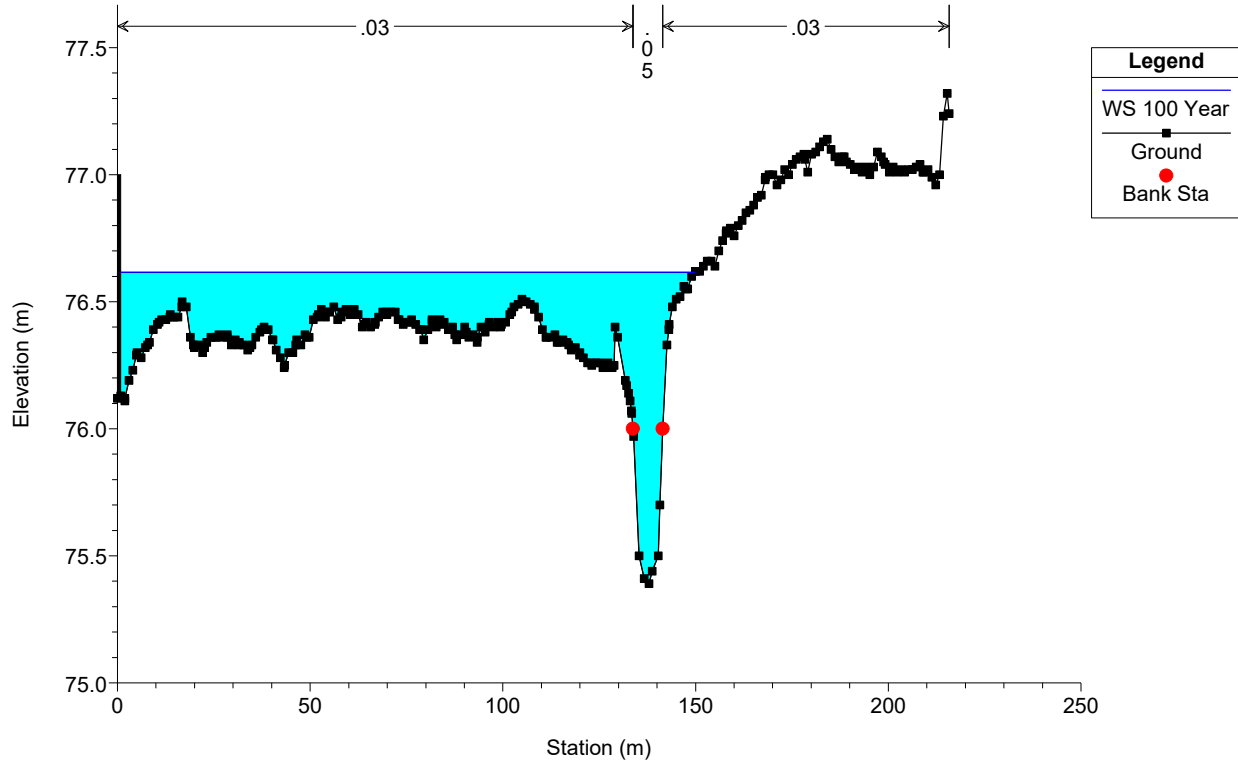
Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
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Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd

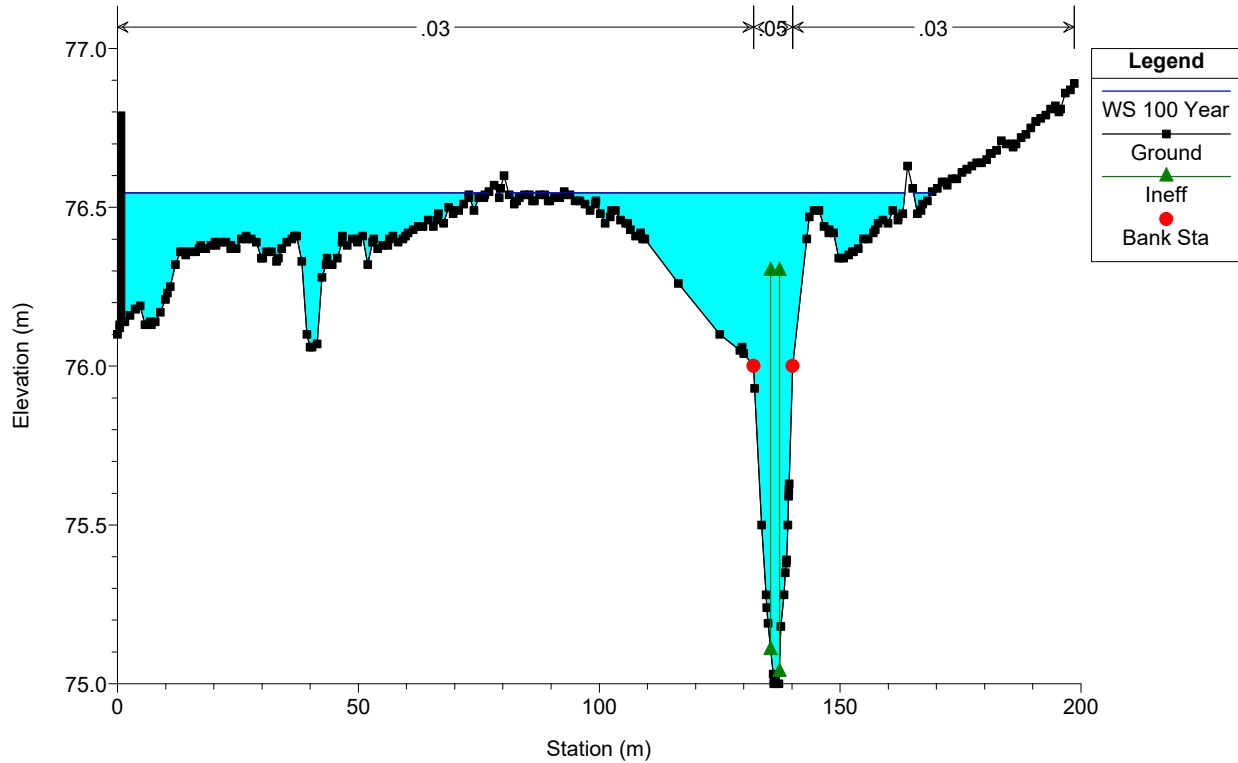
River = Rowe Channel Reach = 1 RS = 199.1



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd

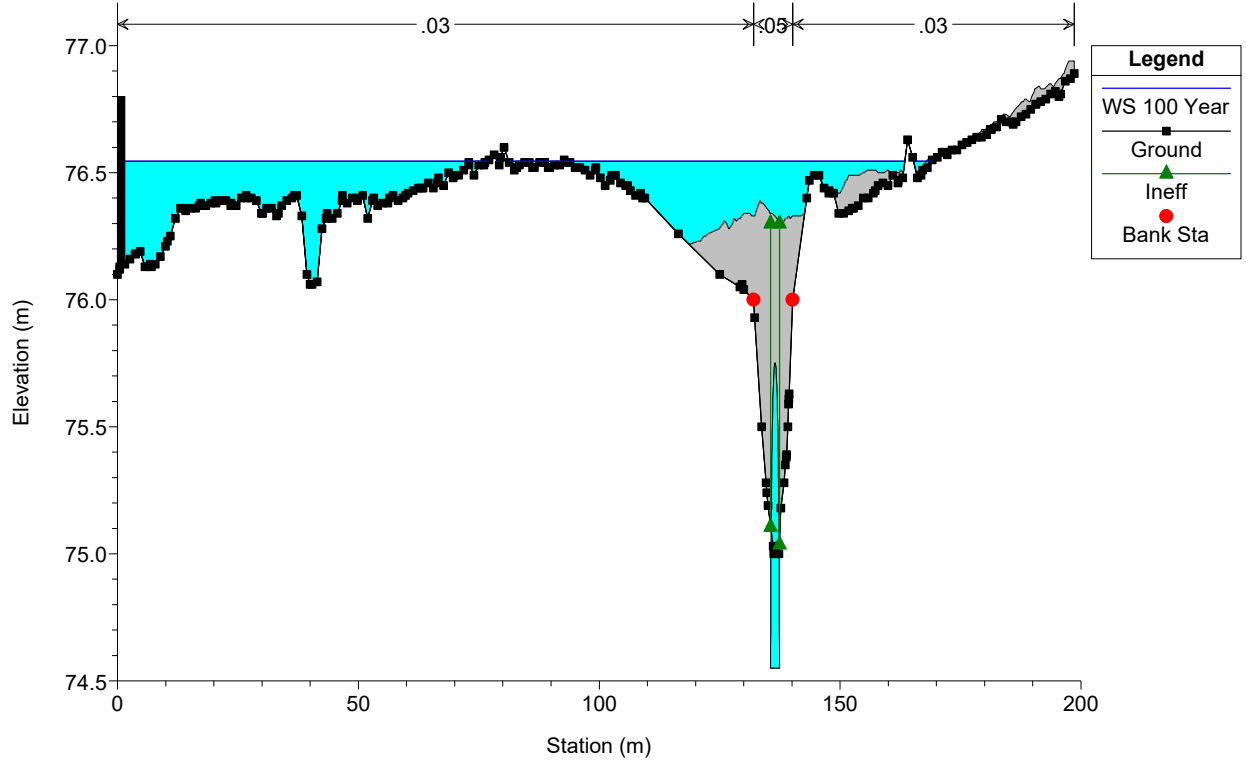
River = Rowe Channel Reach = 1 RS = 144.2 Front Street Culvert - Upstream Section



Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd

River = Rowe Channel Reach = 1 RS = 138.5 Culv #S34 (Front Street Culvert 1.2m x 1.8m arch culvert)

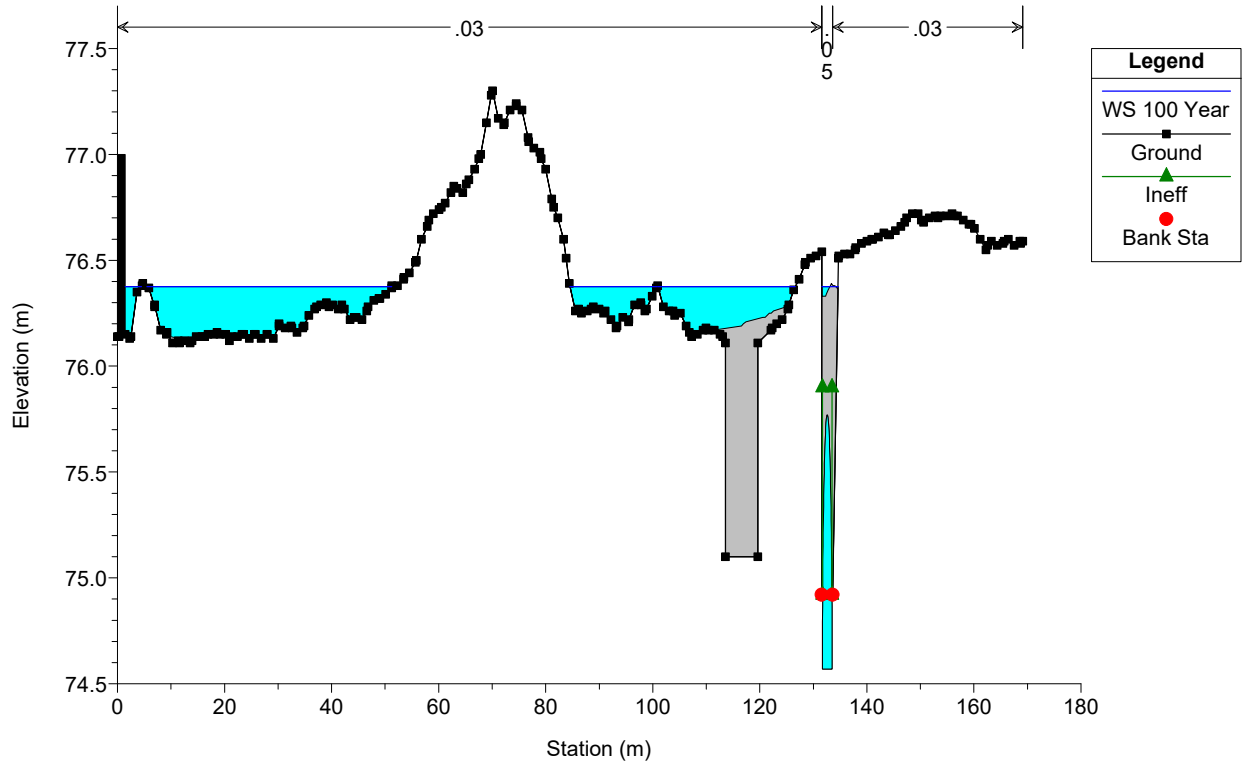


Legend	
—	WS 100 Year
■	Ground
▲	Ineff
●	Bank Sta

Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17

Geom: Existing Feb. 2018- MDPU Candevcon Ltd

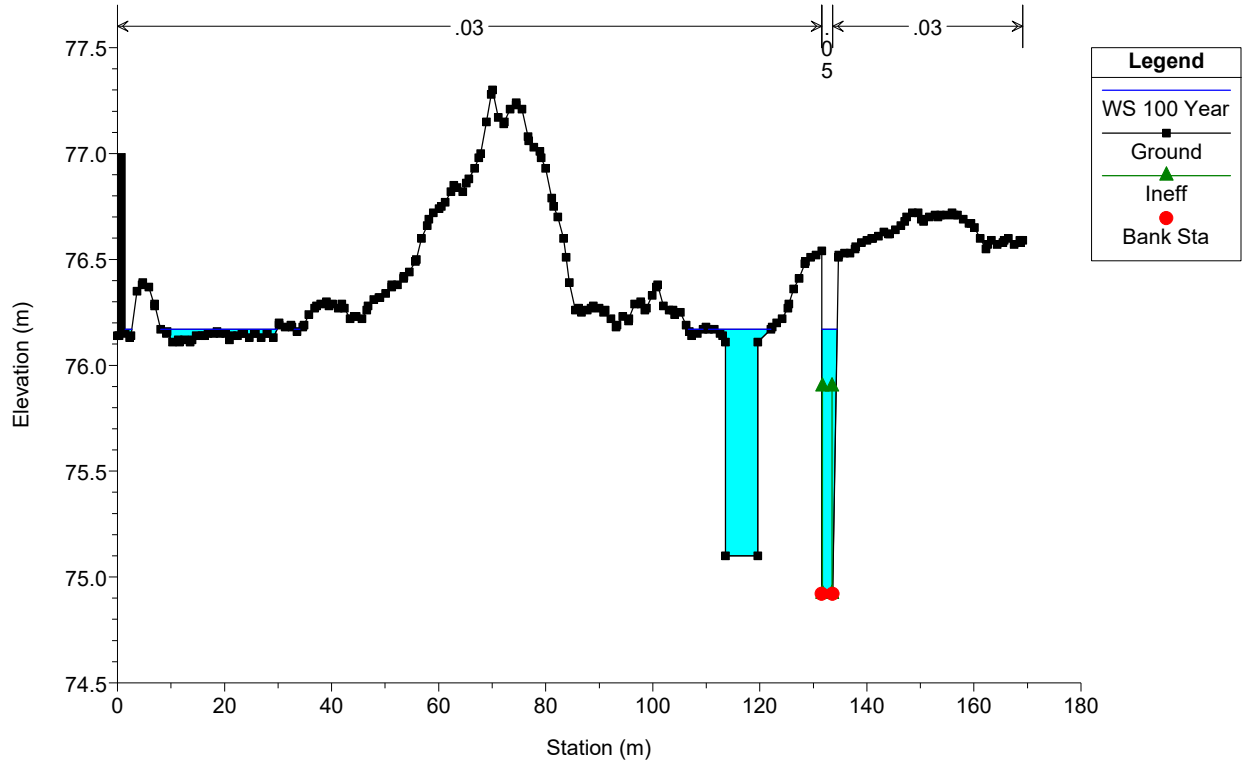
River = Rowe Channel Reach = 1 RS = 138.5 Culv #S34 (Front Street Culvert 1.2m x 1.8m arch culvert)



Legend	
—	WS 100 Year
■	Ground
▲	Ineff
●	Bank Sta

Pringle Creek Resilient March2022 Plan: February 2018 2022-03-17



Geom: Existing Feb. 2018- MDPU Candevcon Ltd  
River = Rowe Channel Reach = 1 RS = 78.0

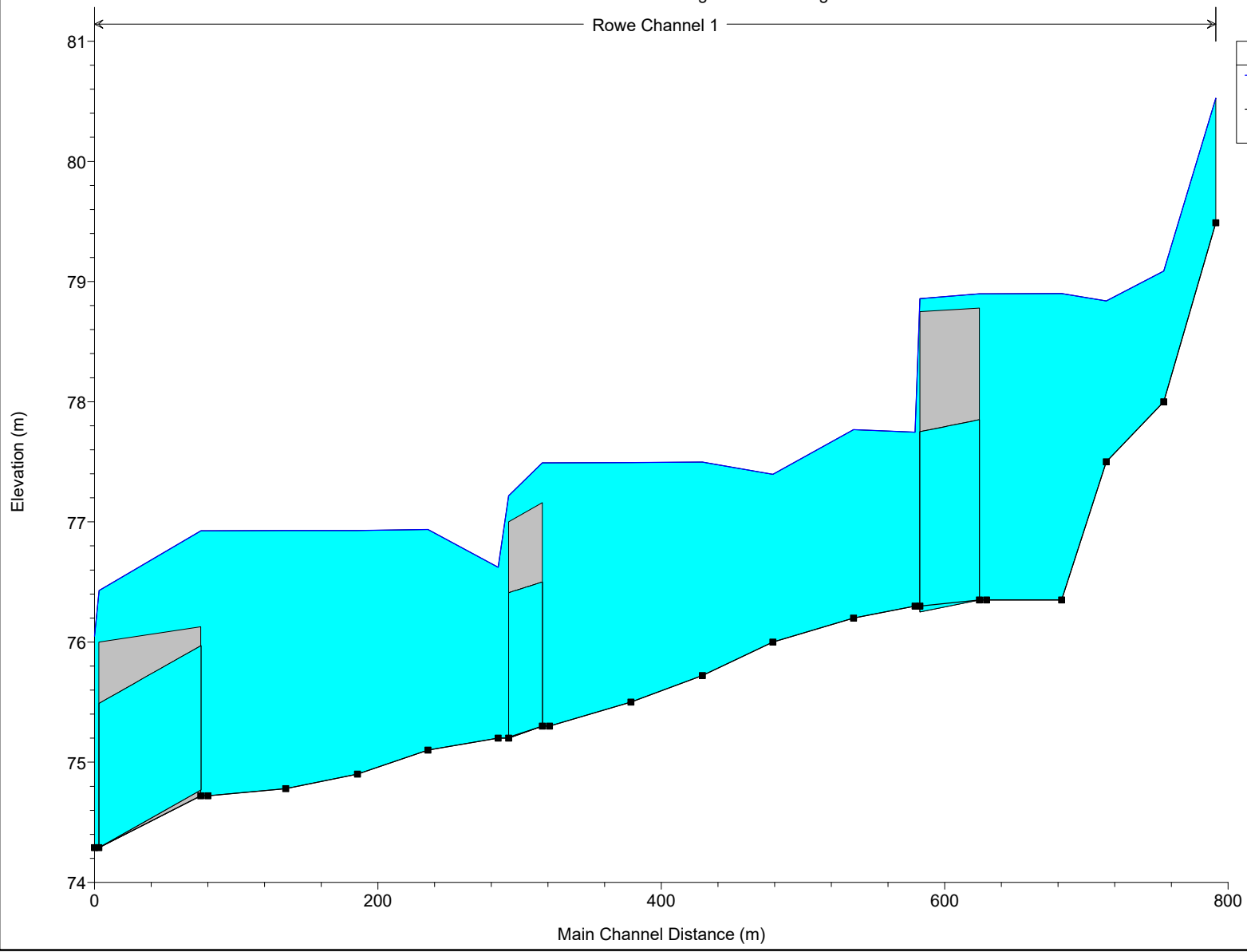


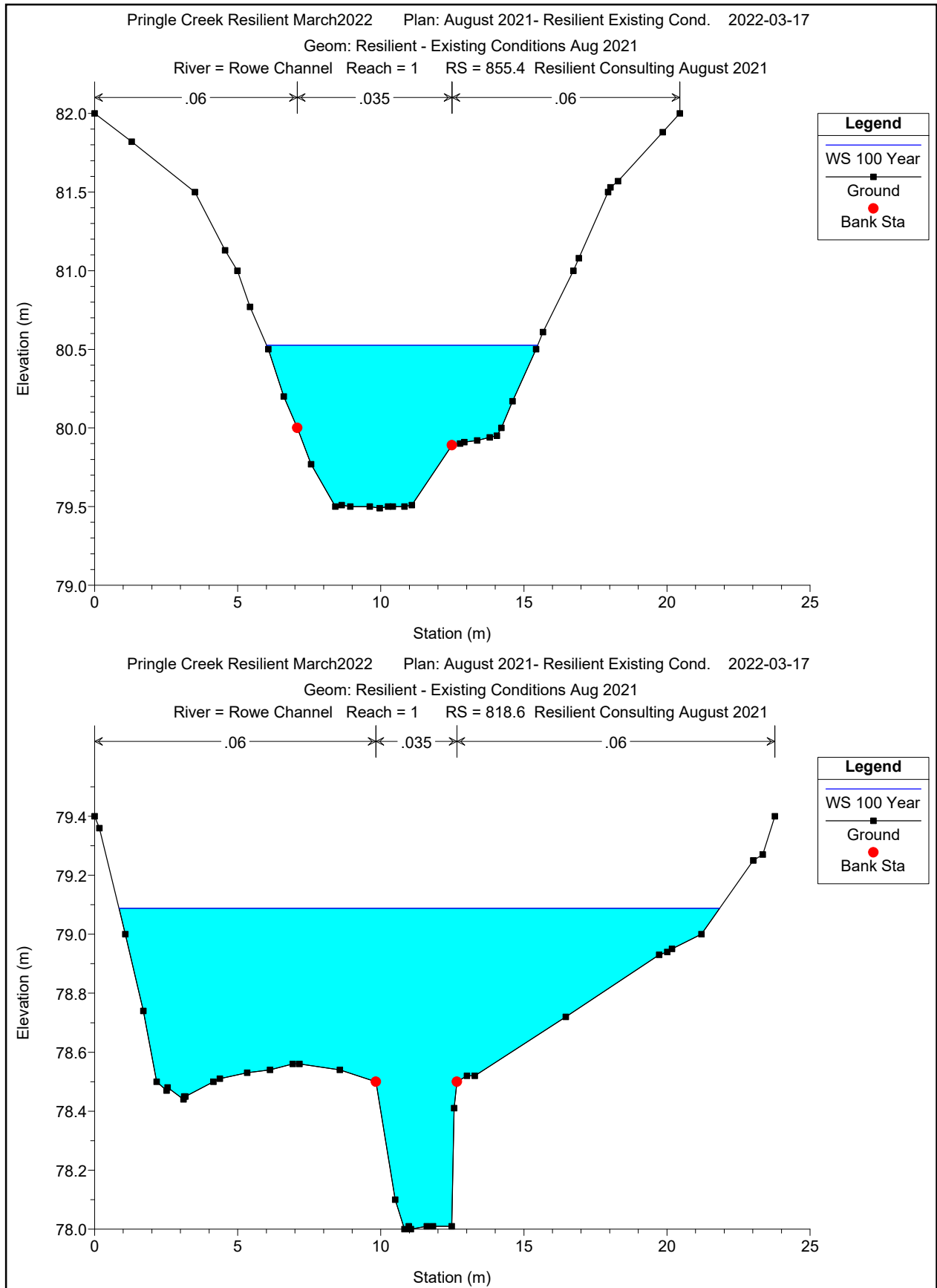
Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

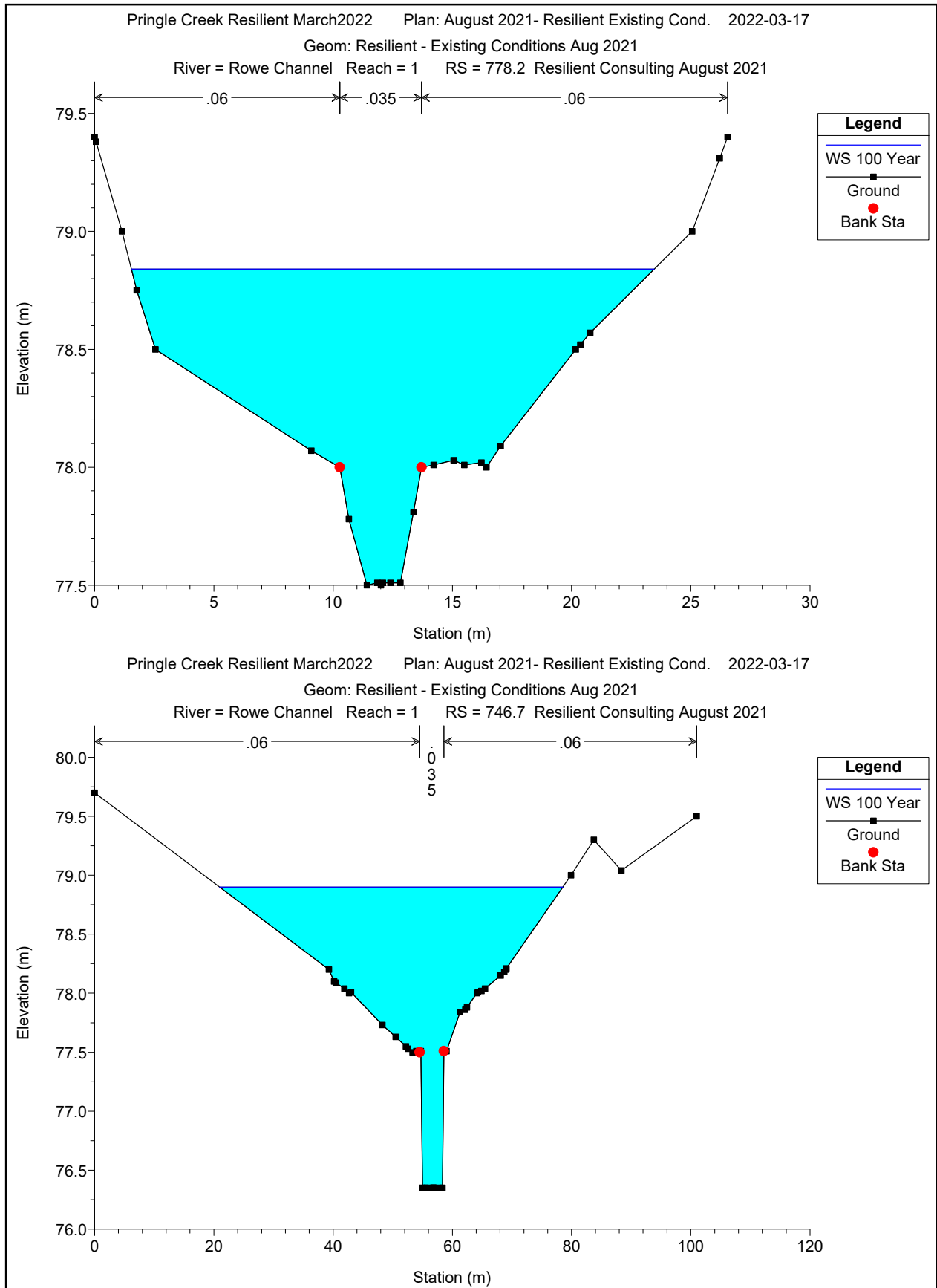
Geom: Resilient - Existing Conditions Aug 2021

Rowe Channel 1

Legend	
	WS 100 Year
	Ground



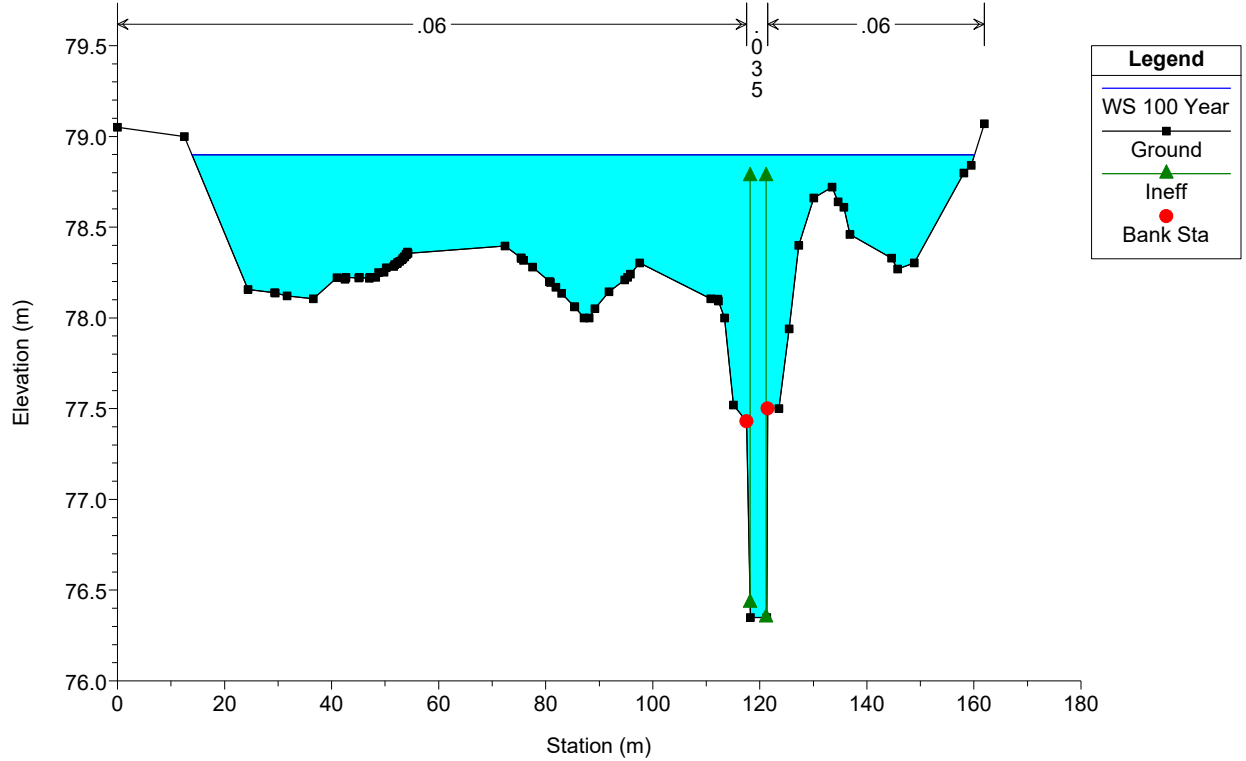




Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

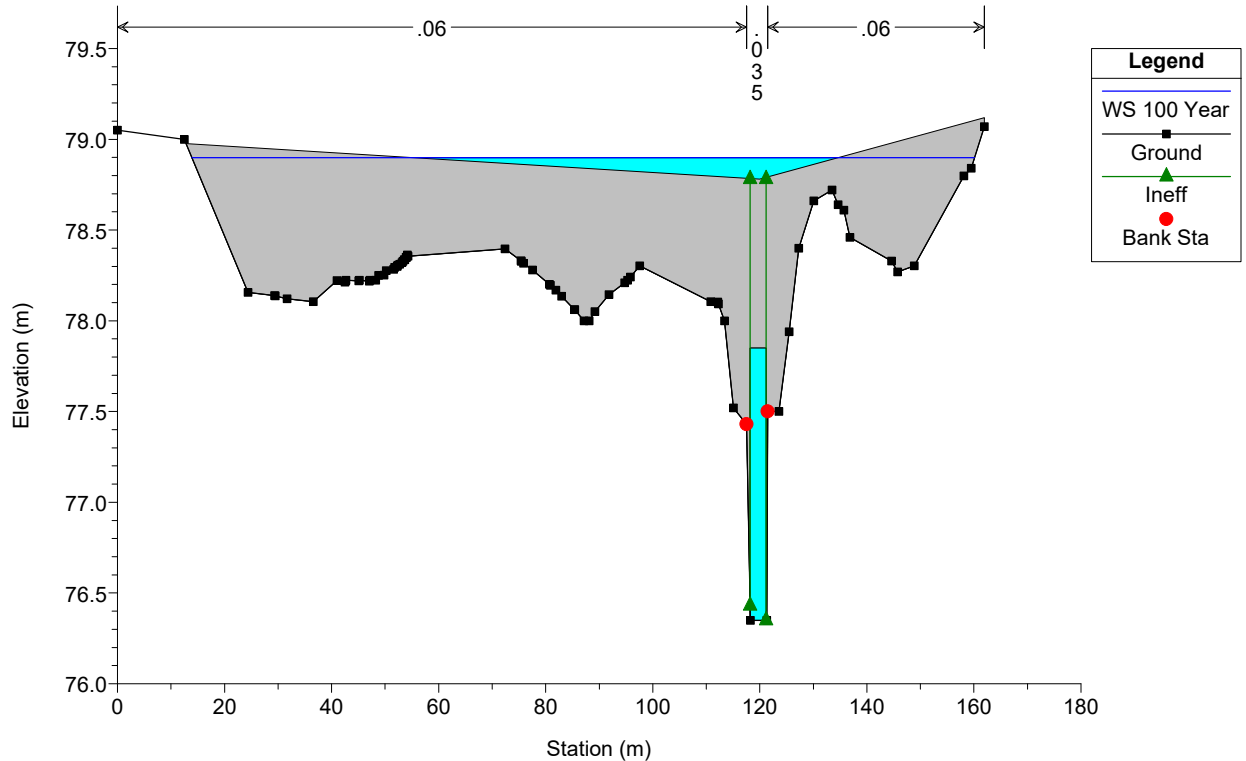
River = Rowe Channel Reach = 1 RS = 694.2 Victoria Street Culvert- US Section



Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

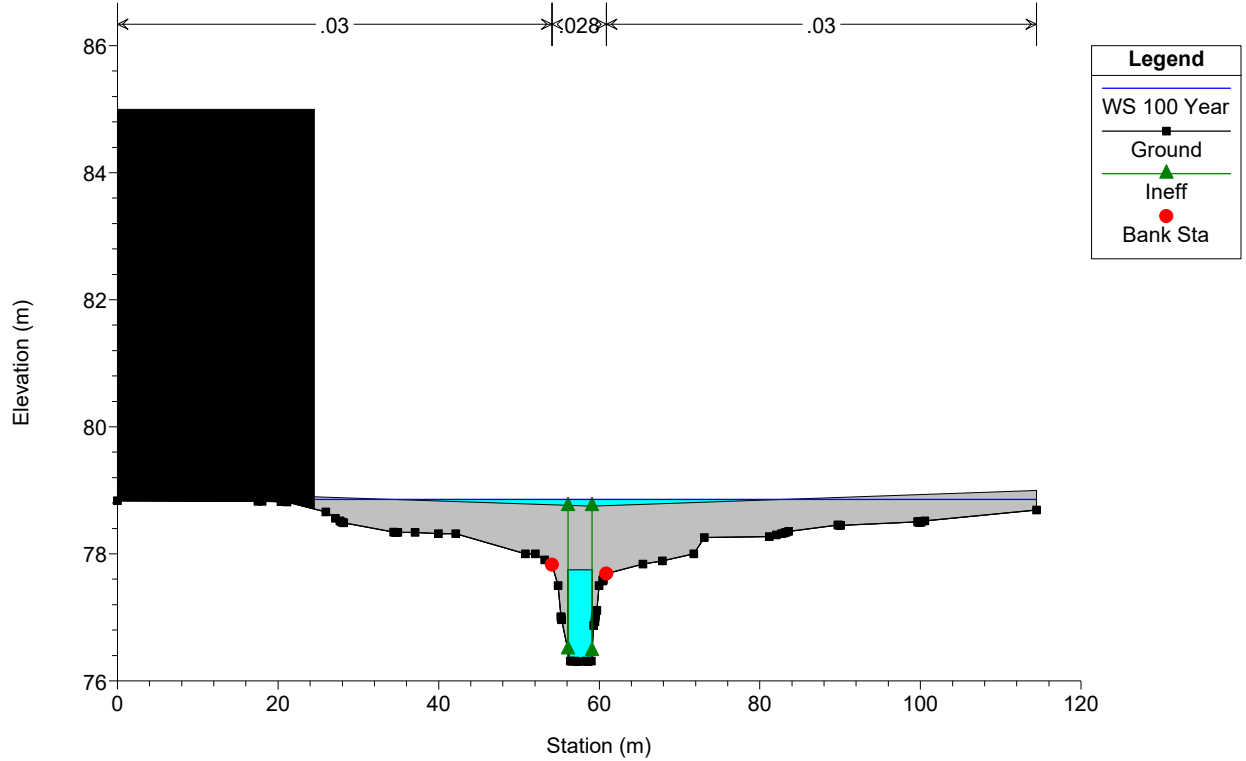
Geom: Resilient - Existing Conditions Aug 2021

River = Rowe Channel Reach = 1 RS = 680 Culv #S32 (Victoria Street 1.5m x 3.0m concrete box culvert)

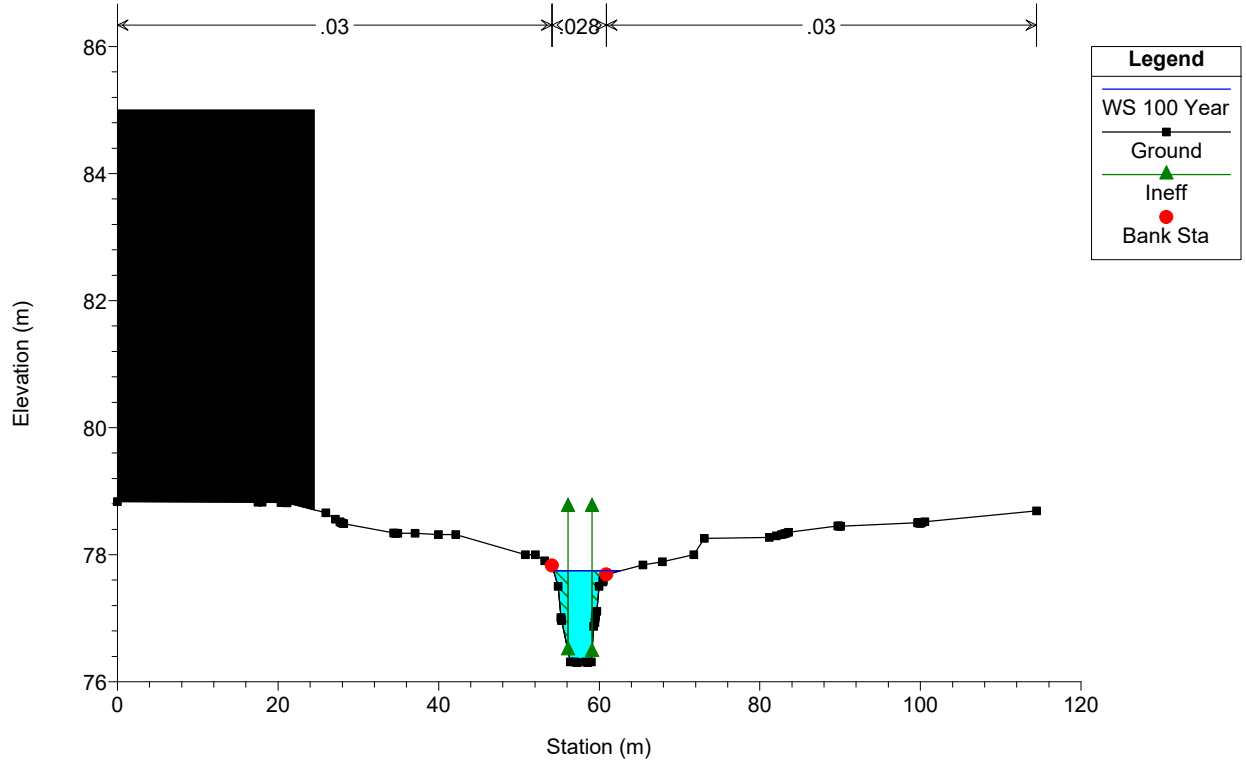


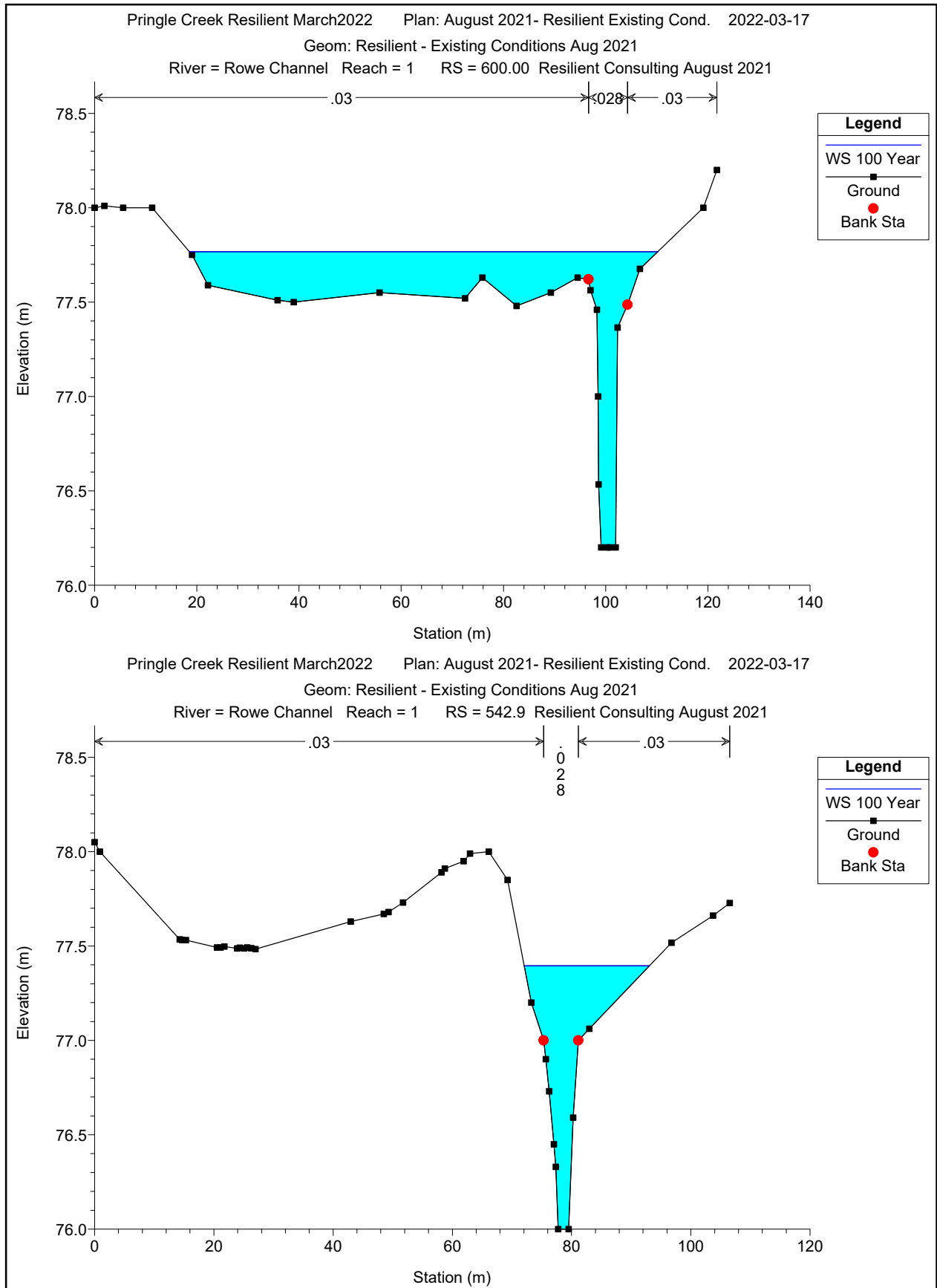


Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17  
 Geom: Resilient - Existing Conditions Aug 2021  
 River = Rowe Channel Reach = 1 RS = 680 Culv #S32 (Victoria Street 1.5m x 3.0m concrete box culvert)



Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17  
 Geom: Resilient - Existing Conditions Aug 2021  
 River = Rowe Channel Reach = 1 RS = 643.1 Victoria Street Culvert - DS Section

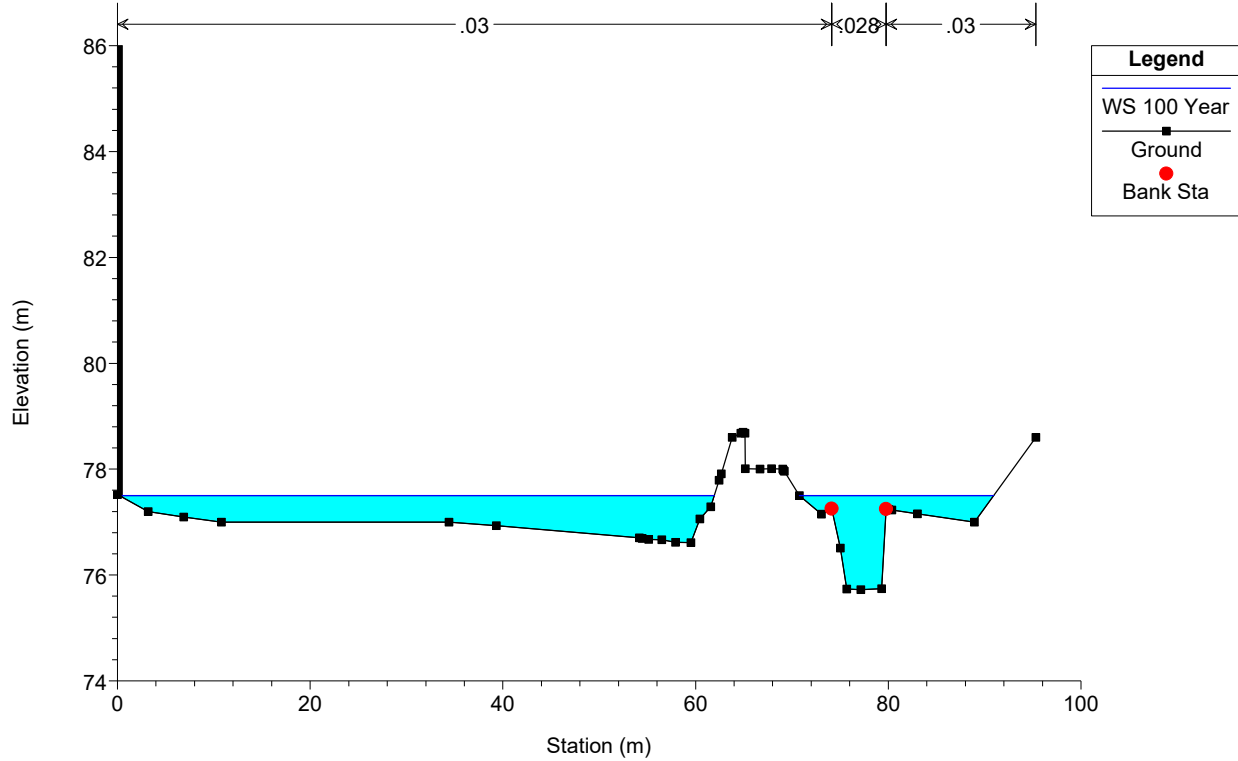




Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

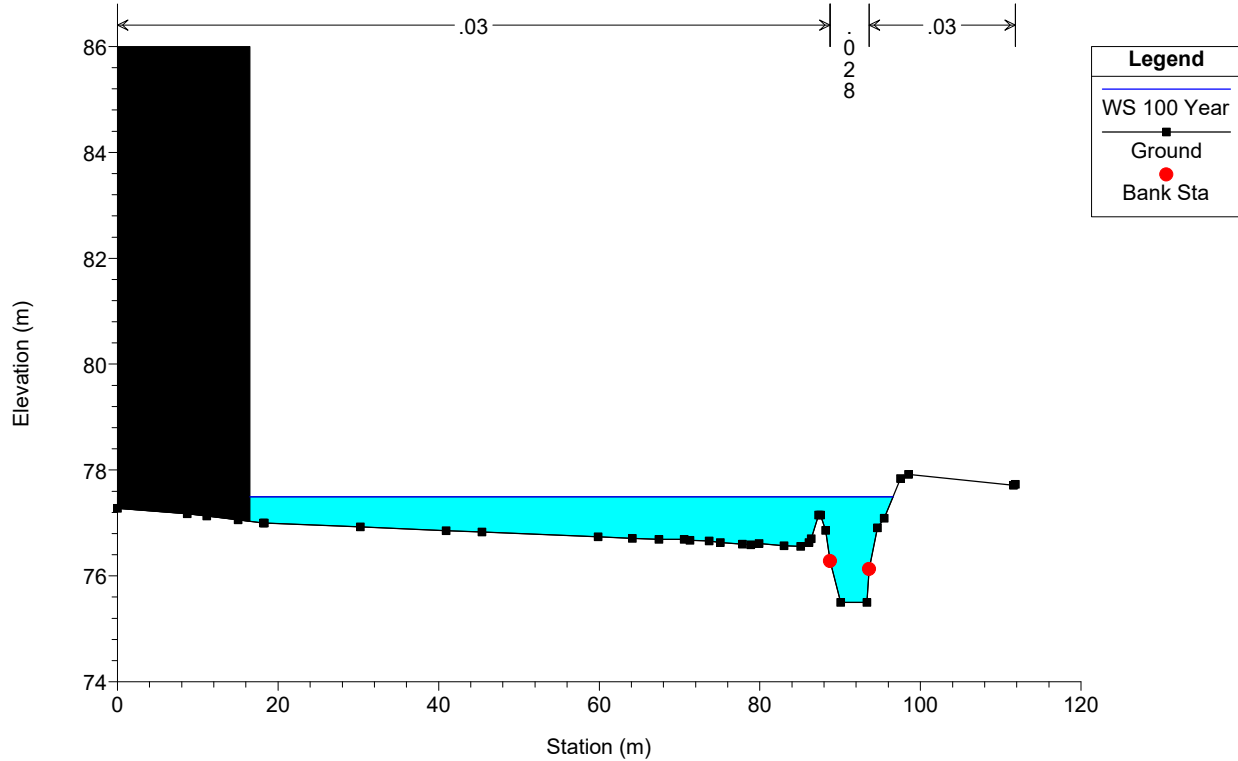
River = Rowe Channel Reach = 1 RS = 493.2 Resilient Consulting August 2021

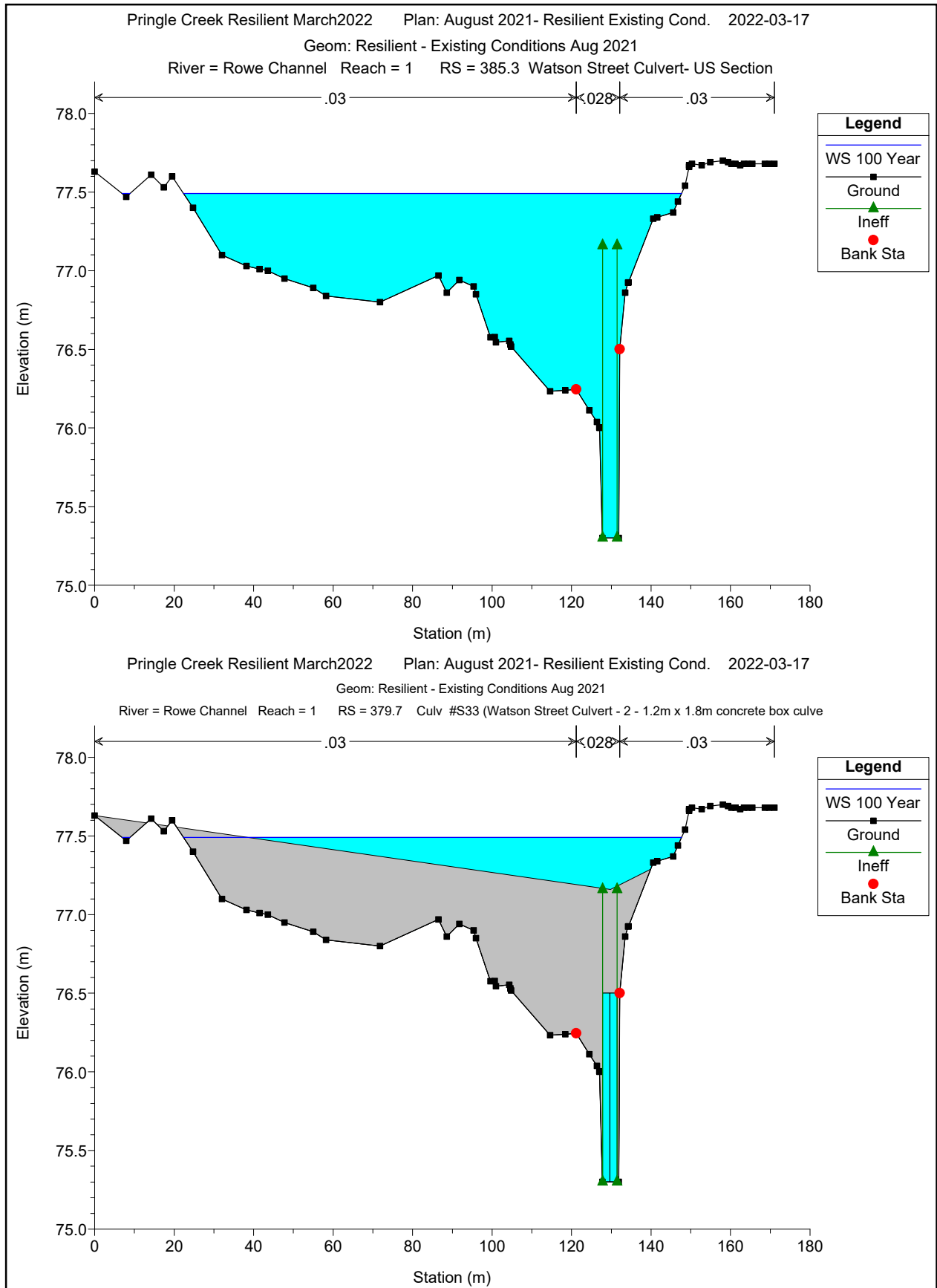


Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

River = Rowe Channel Reach = 1 RS = 442.8 Resilient Consulting August 2021

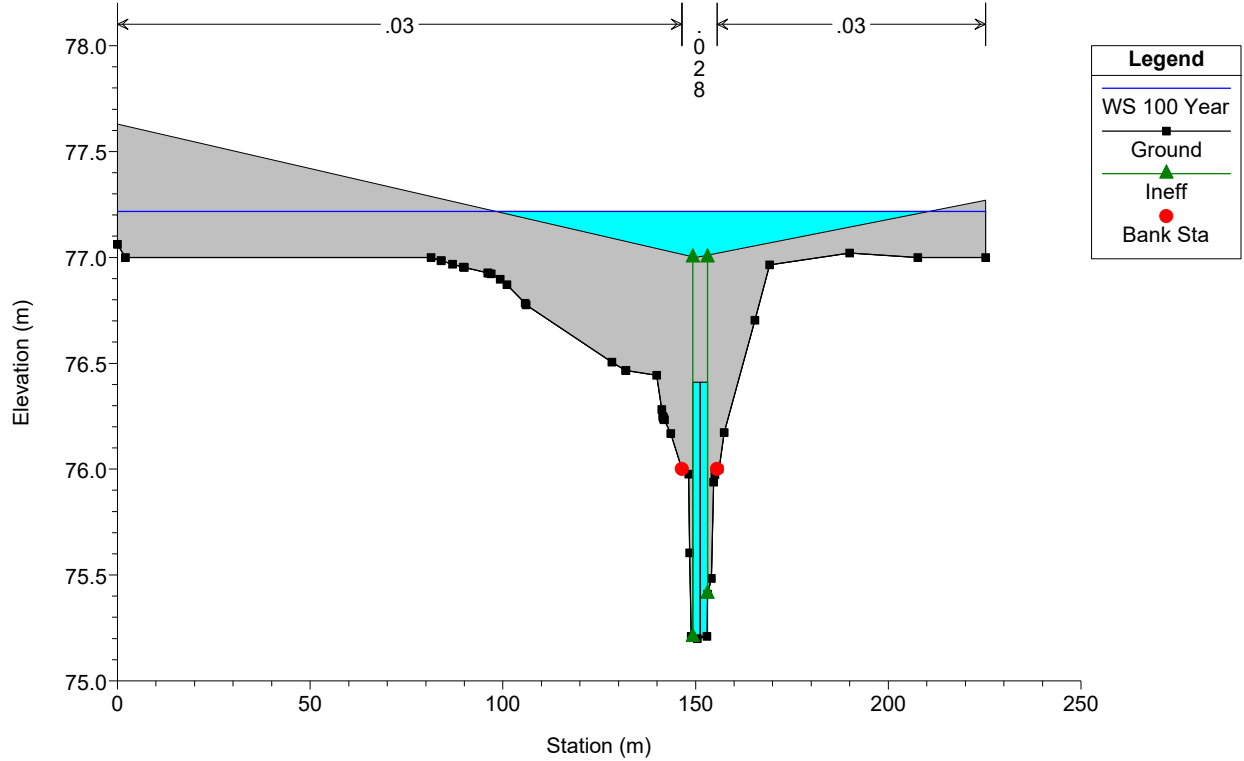




Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

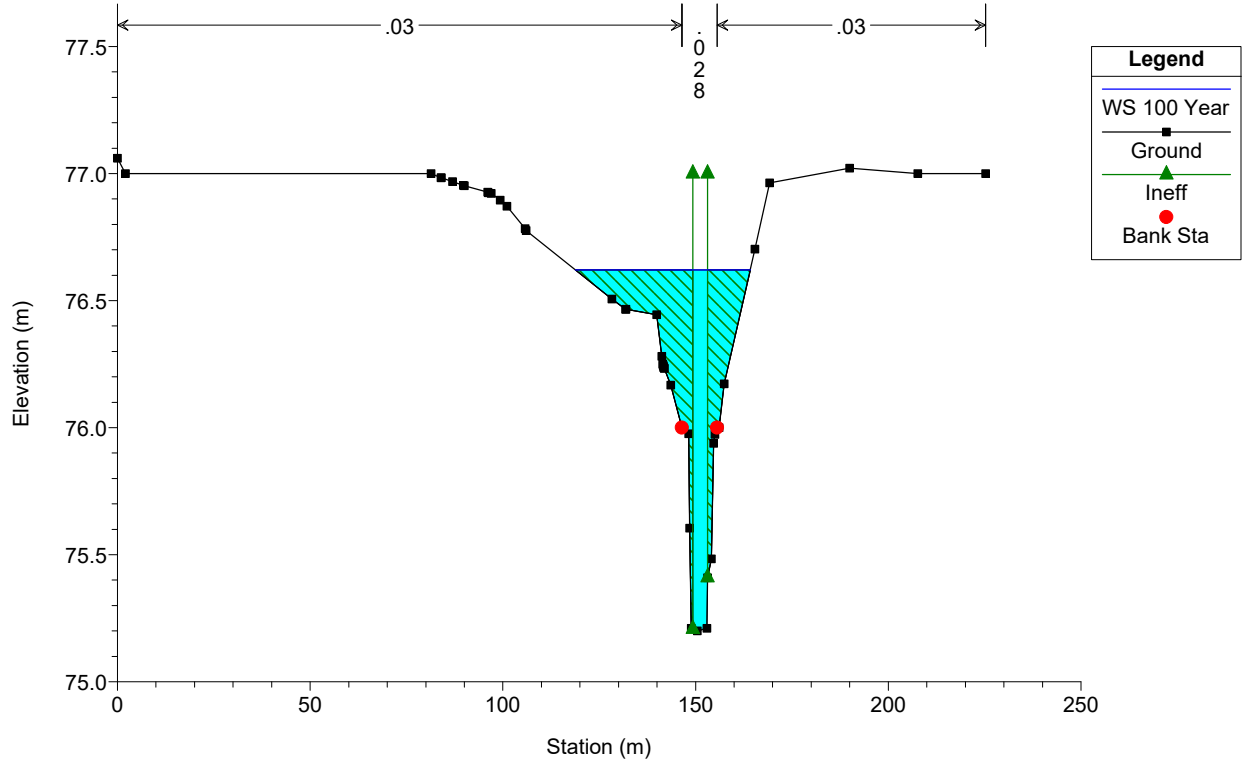
River = Rowe Channel Reach = 1 RS = 379.7 Culv #S33 (Watson Street Culvert - 2 - 1.2m x 1.8m concrete box culve

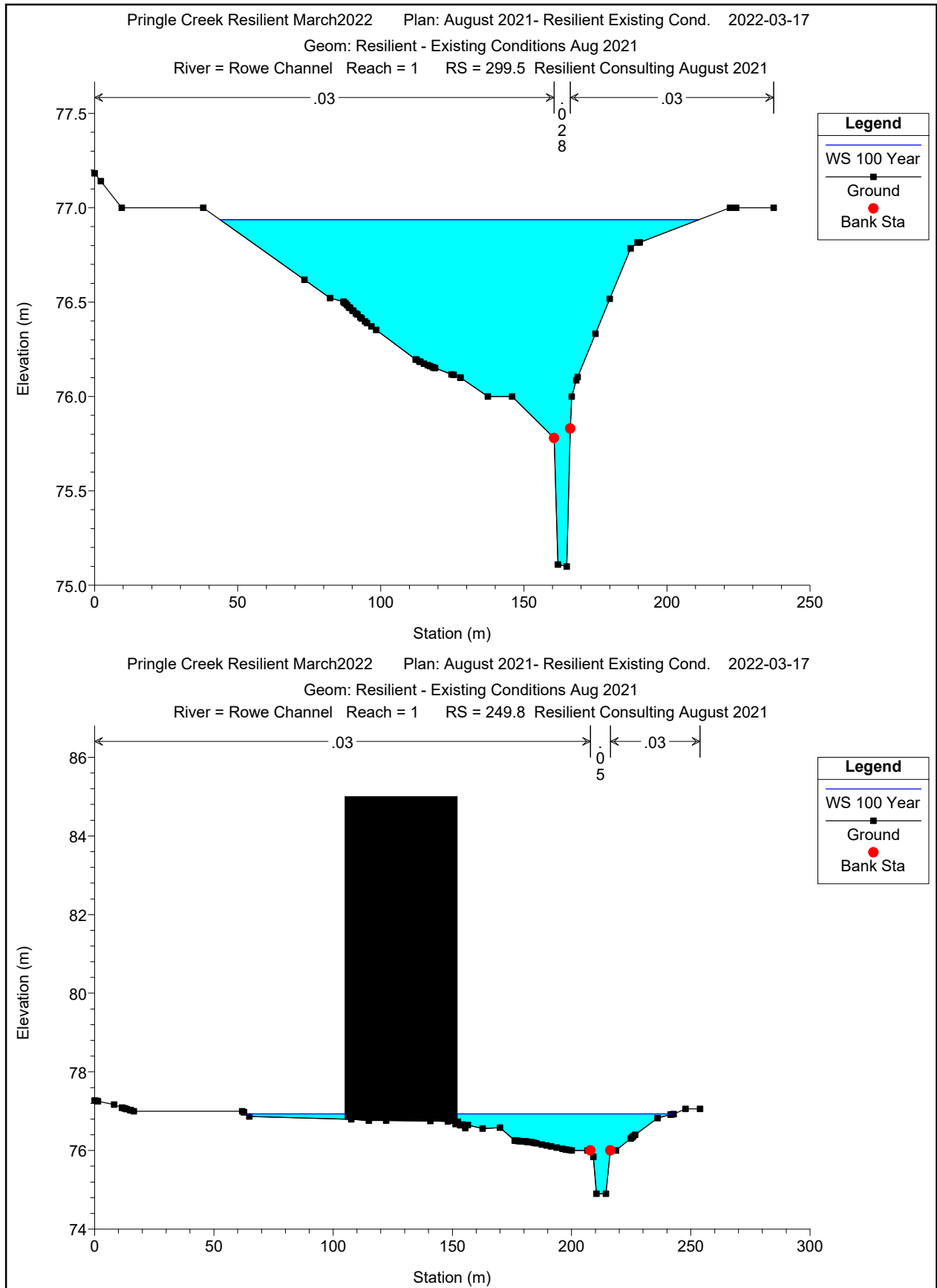


Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

River = Rowe Channel Reach = 1 RS = 349.1 Watson Street Culvert- DS Section

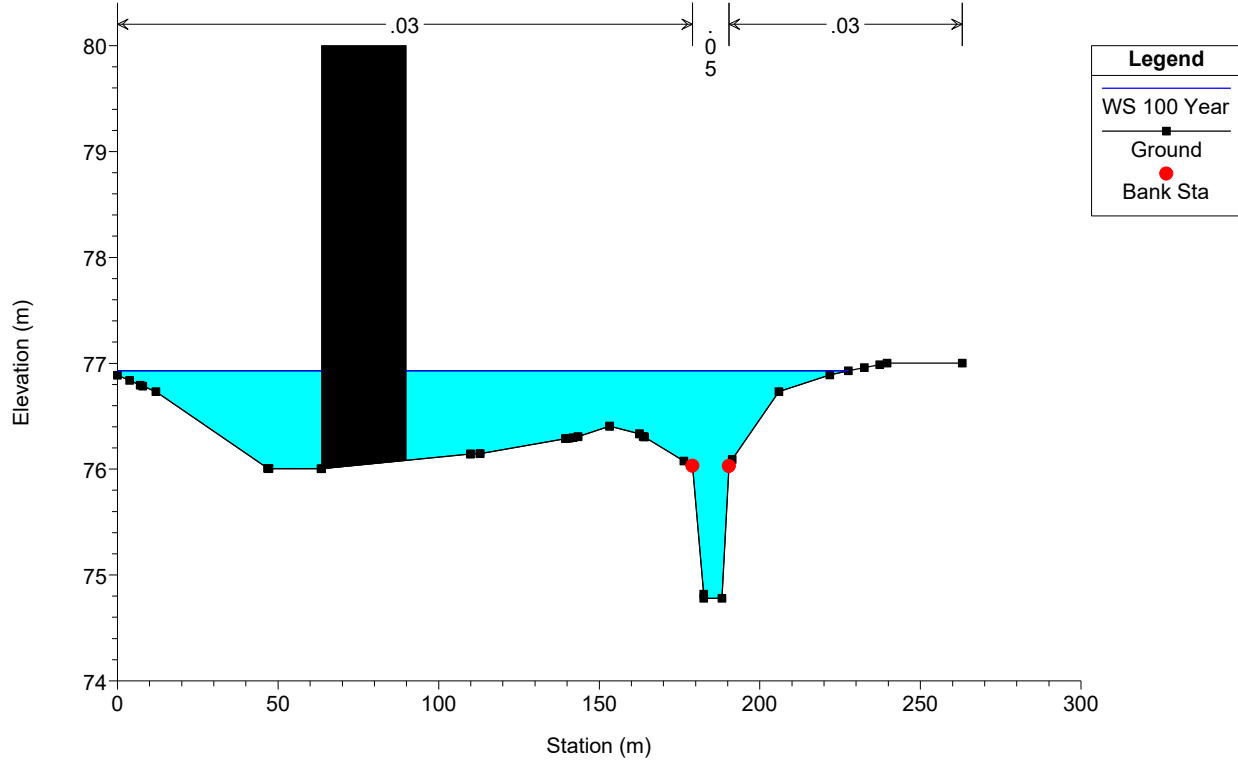




Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

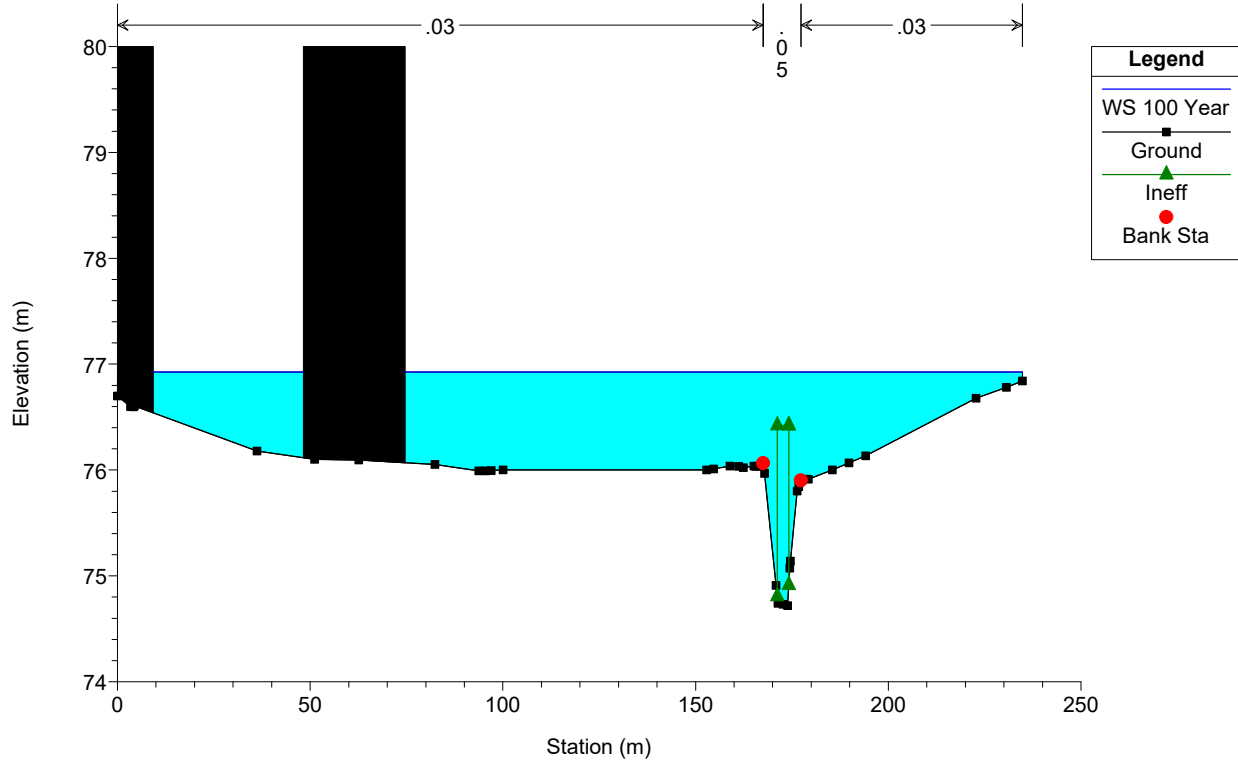
River = Rowe Channel Reach = 1 RS = 199.1 Resilient Consulting August 2021



Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

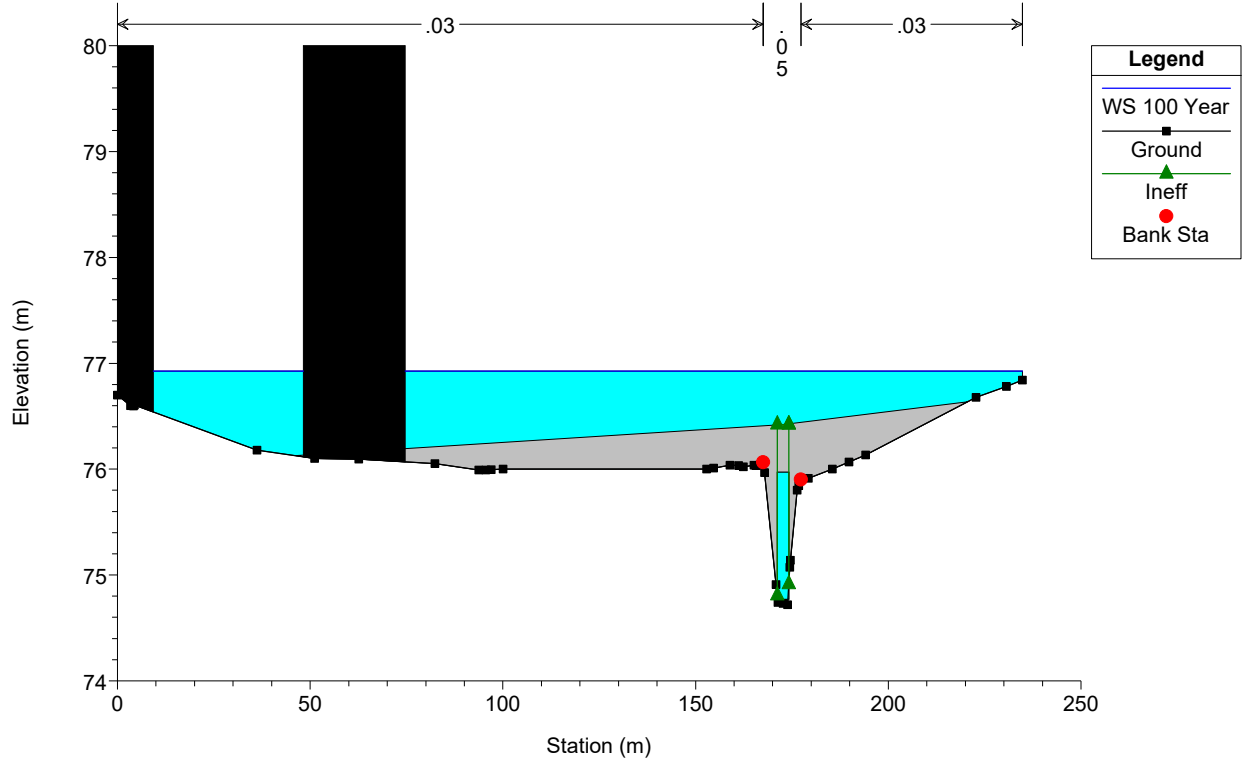
River = Rowe Channel Reach = 1 RS = 144.2 Front Street Culvert - US Section



Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

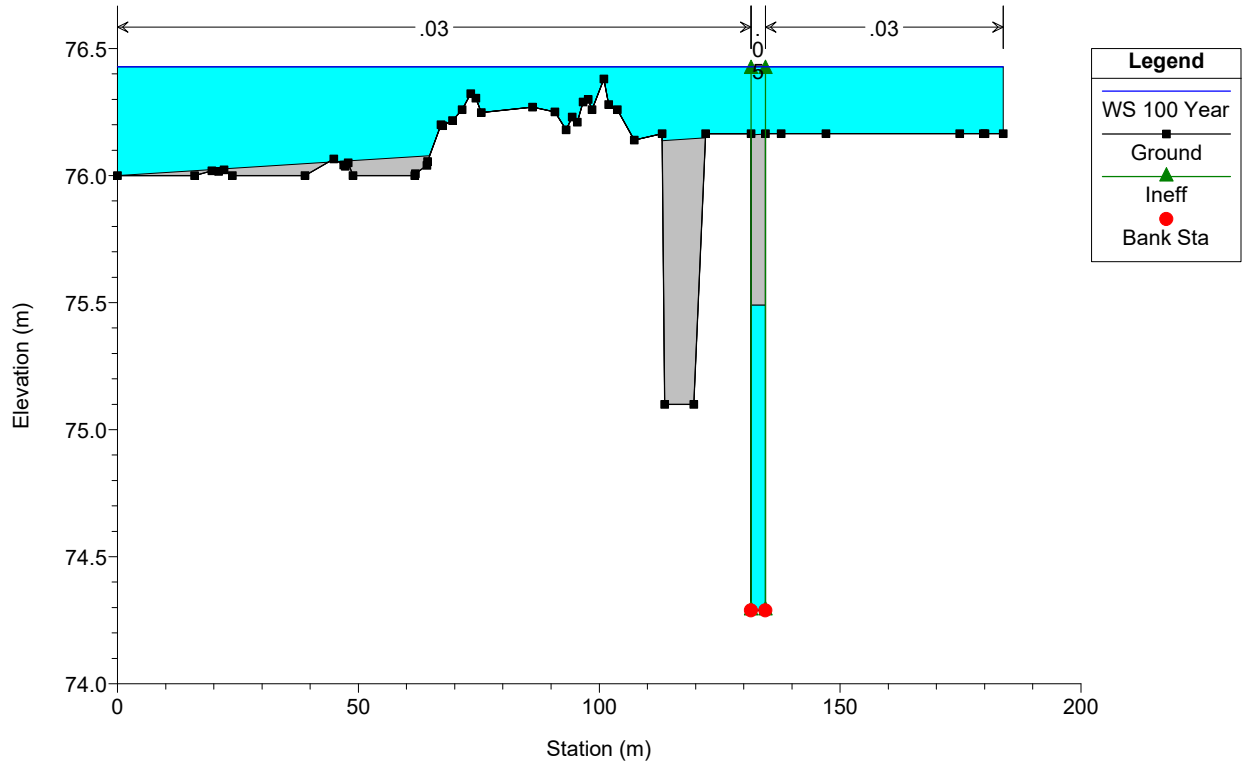
River = Rowe Channel Reach = 1 RS = 138.5 Culv #S34 (Front Street Culvert 3.0m x 1.2m box culvert)



Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

River = Rowe Channel Reach = 1 RS = 138.5 Culv #S34 (Front Street Culvert 3.0m x 1.2m box culvert)

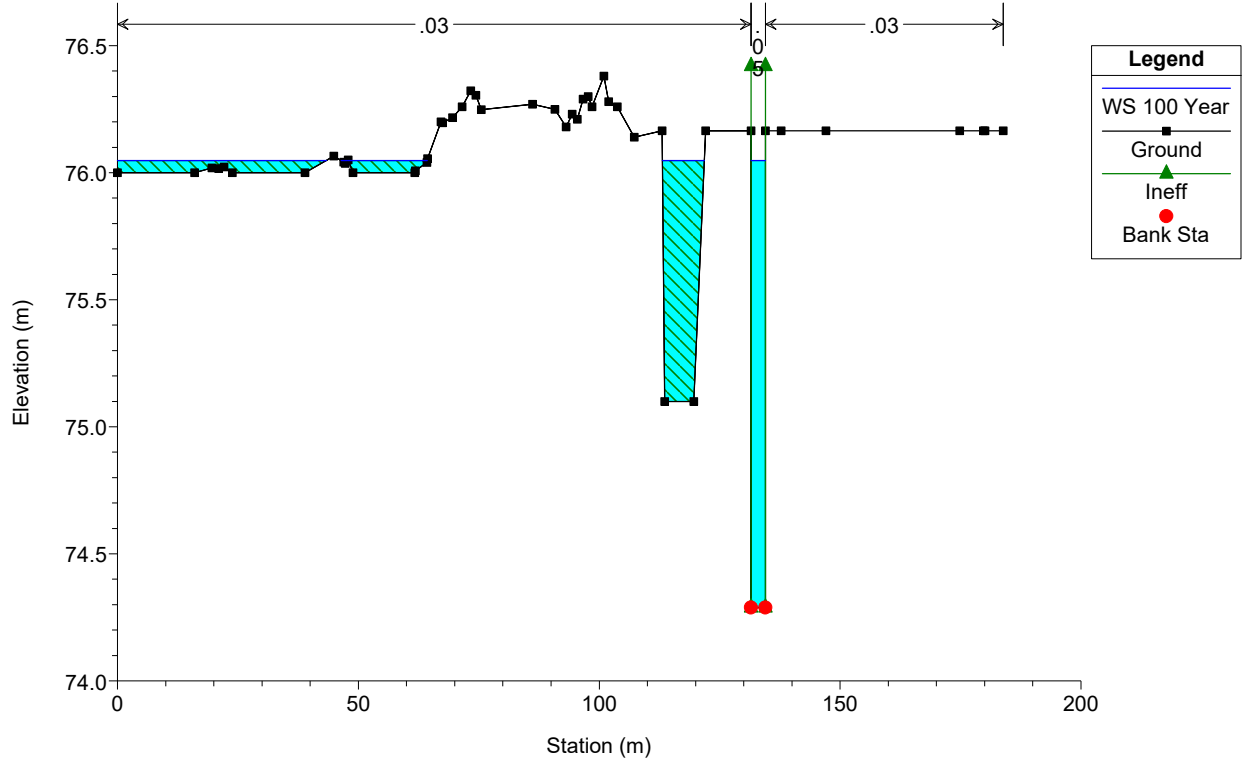




Pringle Creek Resilient March2022 Plan: August 2021- Resilient Existing Cond. 2022-03-17

Geom: Resilient - Existing Conditions Aug 2021

River = Rowe Channel Reach = 1 RS = 64.2 Front Street Culvert- DS Section



**Table A – Updates to HEC-RAS Existing Condition Geometry by Resilient Consulting**

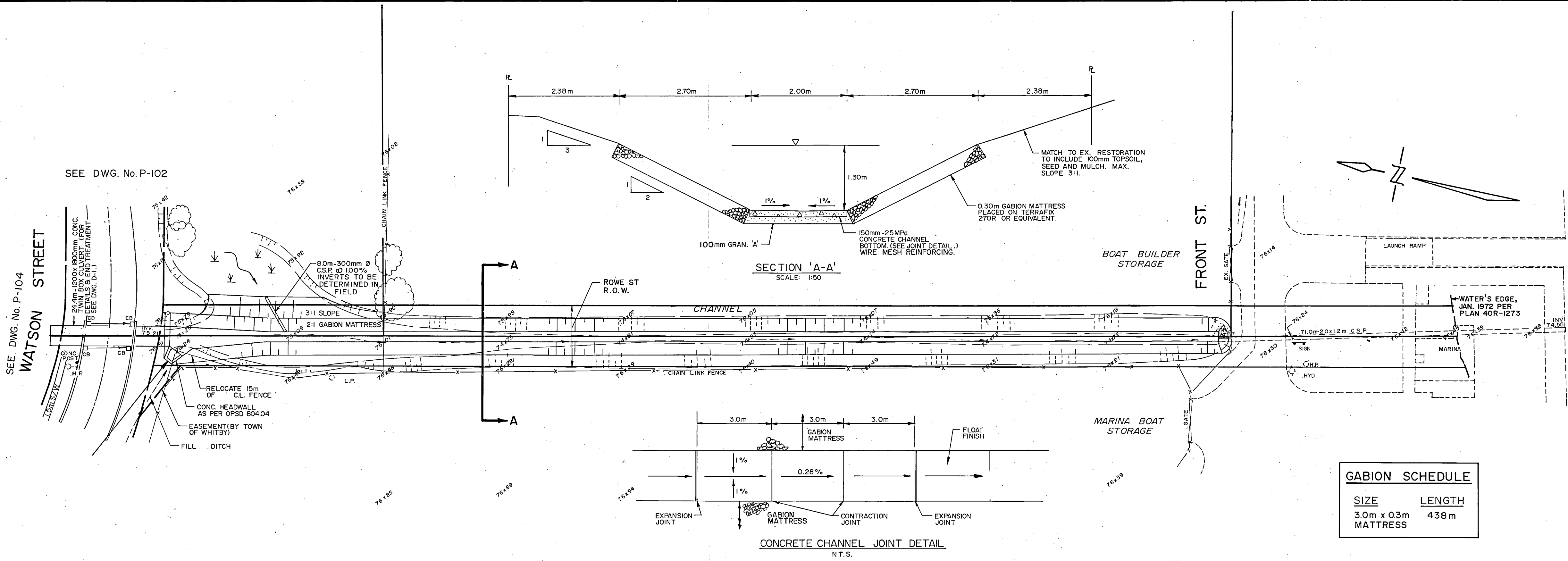
<b>Cross-Section ID</b>	<b>Revisions in Channel Geometry</b>
XS 694.2	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Revised channel invert to match Victoria Street W culvert crossing</li> </ul>
Culvert #S32- Victoria Street W Crossing	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Revised road deck elevations based on as-builts from Region</li> <li>- Revised culvert invert based on as-built</li> </ul>
XS 643.1	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Cross-section width increased to fully capture spill over Victoria Street W</li> <li>- Bottom of channel elevation revised to match Victoria Street W culvert crossing</li> <li>- New obstruction added (1600 Charles Street)</li> </ul>
XS 600	<ul style="list-style-type: none"> <li>- Replacement of XS 592.9 with XS 600, which better represents channel geometry and corresponds with new survey completed by Resilient in November 2019</li> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> </ul>
XS 542.9	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Width of channel revised based on survey by Resilient</li> <li>- Bottom of channel elevation revised to match as-builts based on 0.35% slope</li> </ul>
XS 493.2	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Bottom of channel elevation revised to match as-builts based on 0.35% slope</li> </ul>
XS 442.8	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Bottom of channel elevation revised to match as-builts based on 0.35% slope</li> </ul>
XS 385.3	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Revised channel invert to match Watson Street W culvert crossing</li> </ul>
Culvert #S33- Watson Street W Crossing	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Revised road deck elevations based on as-builts from Town</li> <li>- Revised culvert invert based on as-built</li> </ul>
XS 349.1	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Revised channel invert to match Watson Street W culvert crossing</li> </ul>

	<ul style="list-style-type: none"> <li>- Removal of berm not identified during survey or in DEM</li> </ul>
XS 299.5	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Bottom of channel elevation revised to match as-builts based on 0.28% slope</li> </ul>
XS 249.8	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Bottom of channel elevation revised to match as-builts based on 0.28% slope</li> </ul>
XS 199.1	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Bottom of channel elevation revised to match as-builts based on 0.28% slope</li> <li>- New obstruction added (1710 Charles Street)</li> </ul>
XS 144.2	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Revised channel invert to match Front Street W culvert crossing</li> <li>- New obstructions added (1710 Charles Street, 1729 Charles Street)</li> </ul>
Culvert #S34- Front Street W Crossing	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Revised road deck elevations based on as-builts from Town</li> <li>- Replacement of existing arch culvert crossing with 3.0m x 1.2m concrete box culvert as per as-builts (2015)</li> </ul>
XS 64.2	<ul style="list-style-type: none"> <li>- Updated geometry based on DEM, as-builts and survey by Resilient (2019)</li> <li>- Revised channel invert to match Front Street W culvert crossing</li> </ul>

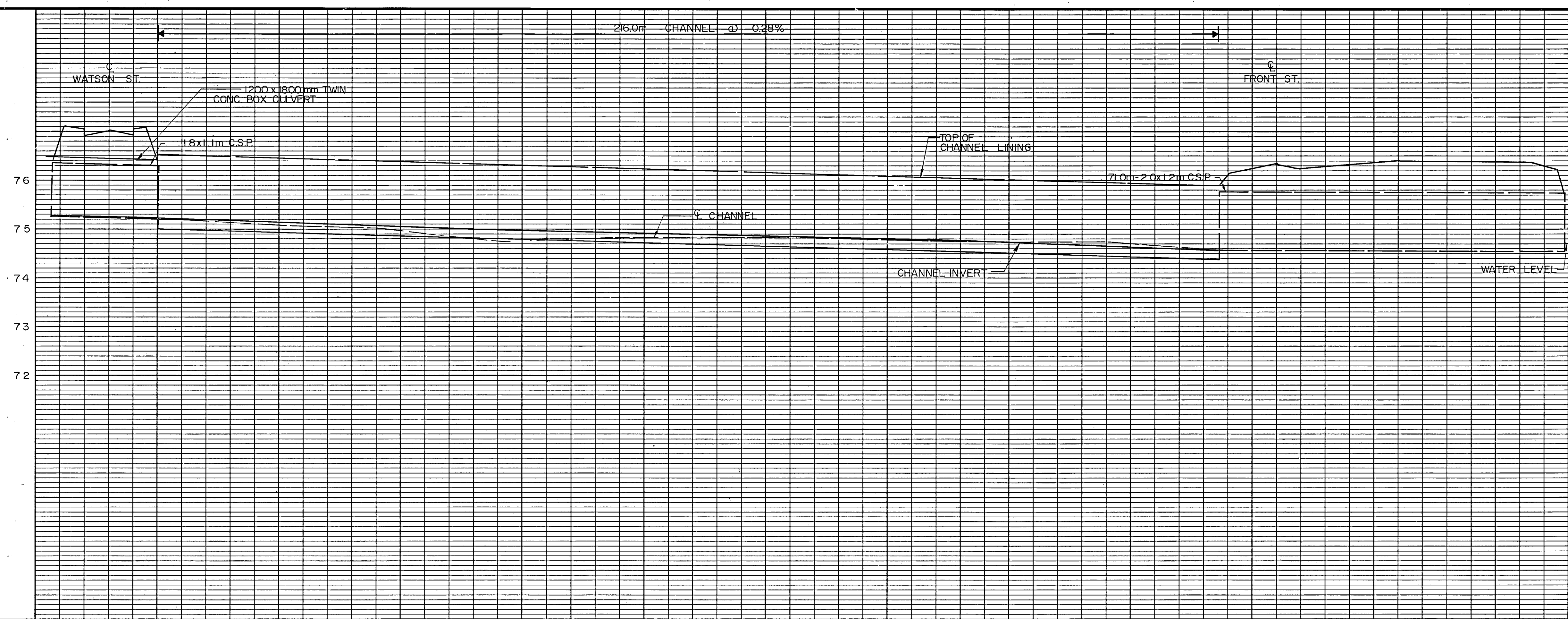
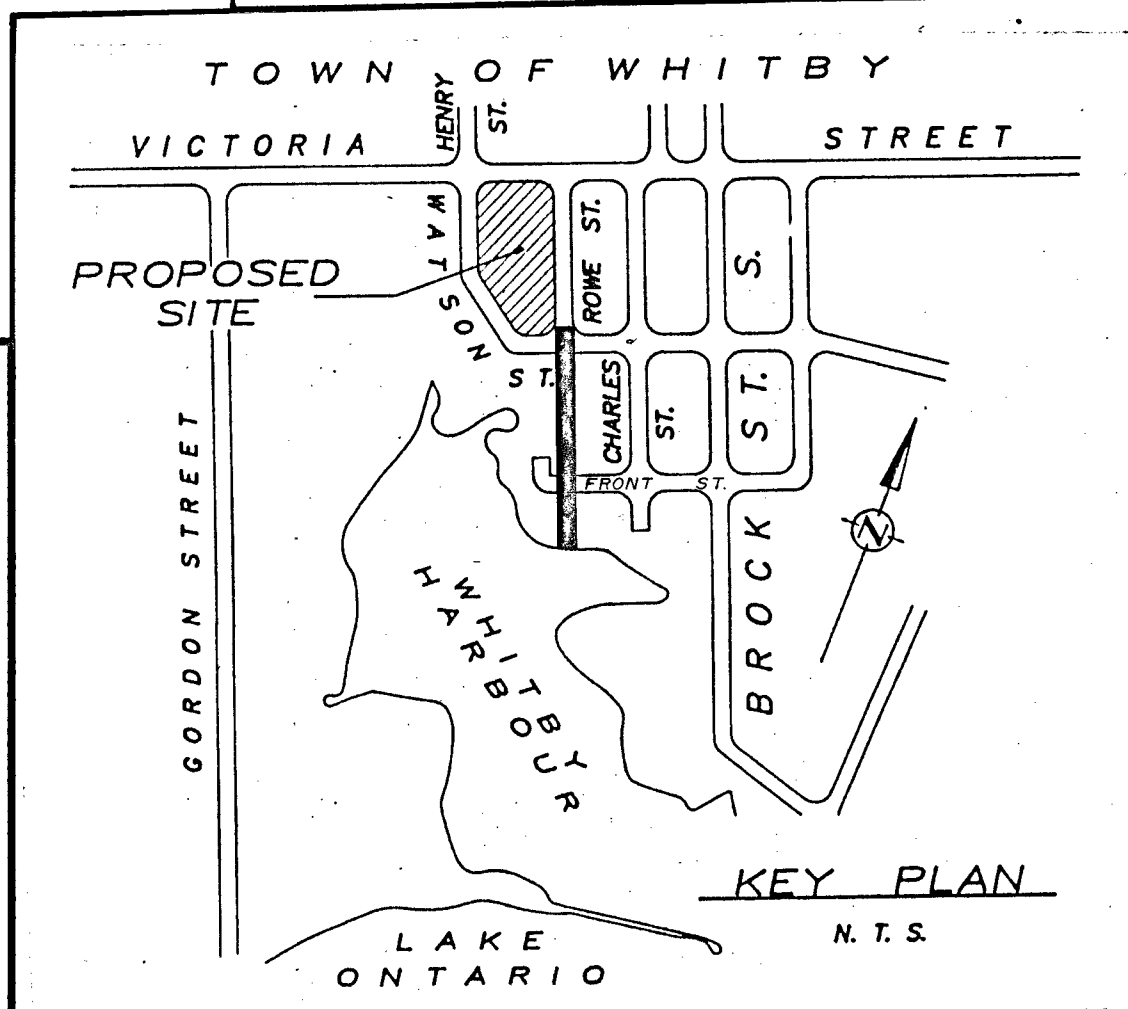
# APPENDIX D

## Alternative Sizing Calculations

NOTE  
FOR GENERAL NOTES AND LEGEND SEE DWG-G-101.



CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING, FOR STAKE OUT. THE CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.



APPROVED  
Director Of Public Works  
Town Of Whitby  
Date: Sept. 27, 1989

APPROVED  
Department Of Works  
Region Of Durham  
Date:

REVISIONS

No.	DESCRIPTION	DATE	BY	APPROVED
1	AS CONSTRUCTED	DEC. 1991	C.D.	

CORPORATION OF THE TOWN OF WHITBY  
Department Of Public Works

PORT WHITBY DEVELOPMENTS

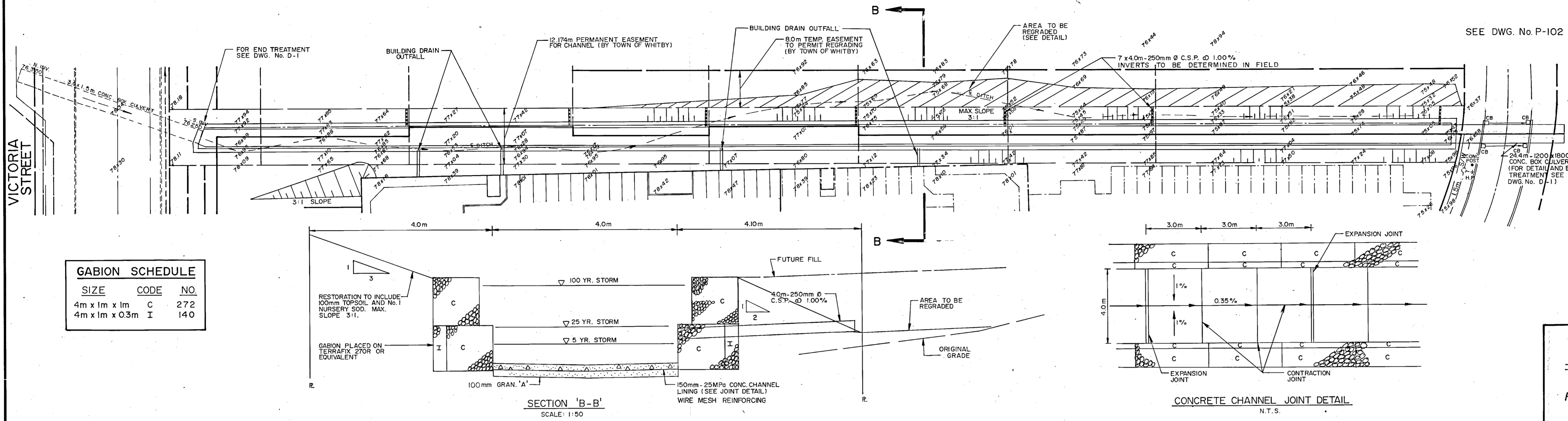
CHANNEL DETAIL  
FROM STA. 0+000.0 TO STA. 0+300.0

CONSULTING ENGINEERS:  
**G. M. SERNAS & ASSOC. LTD.**  
110 SCOTIA COURT, UNIT 41  
WHITBY, ONTARIO, L1N 8Y7  
TEL: 432-7878

	SCALE: HORIZ. 1:500 VERT. 1:50	PROJECT No. 85054
	DRAWN BY: K.G.T.	DRAWING No. P-103
	DESIGNED BY: R.H.	
	CHECKED BY: D.G. DATE: JULY, 1989	

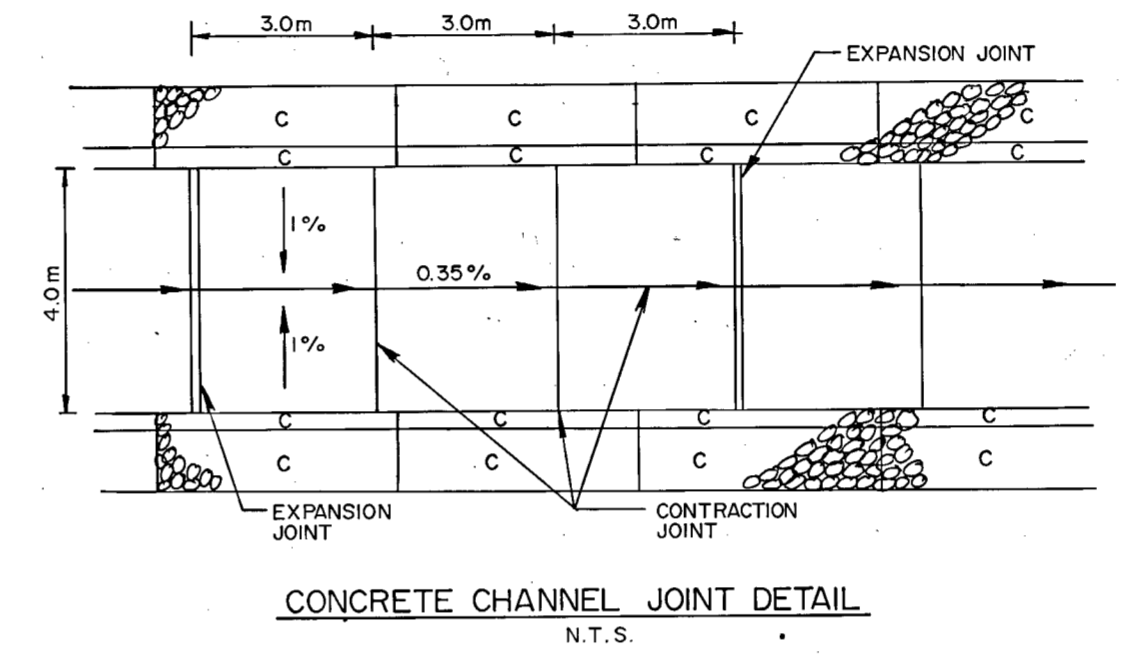
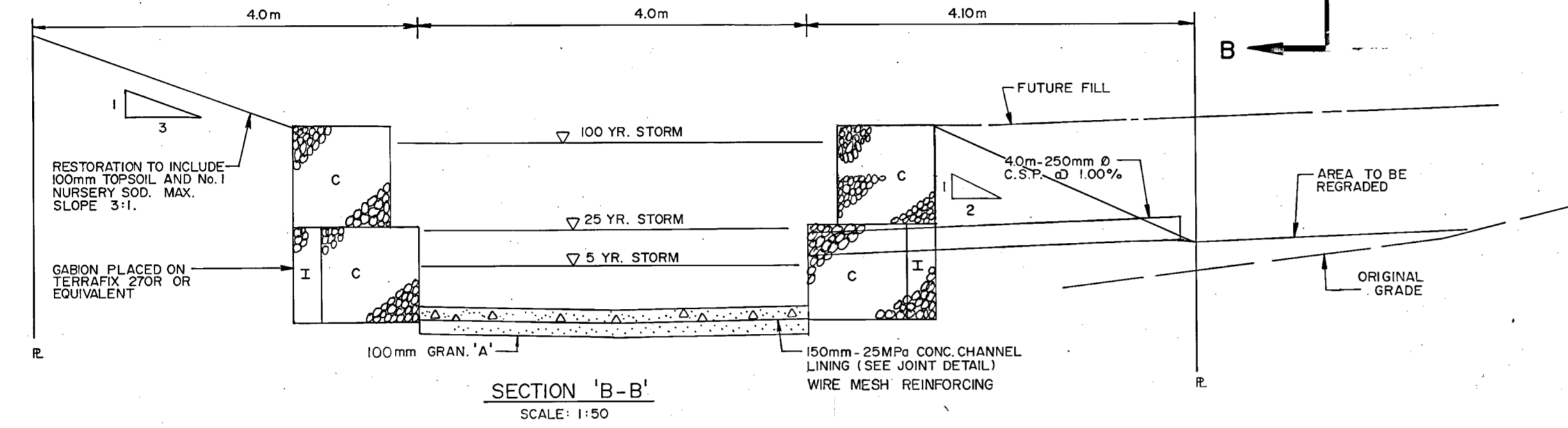
ROAD GRADE	74 600	74 622	74 692	74 762	74 832	74 902	74 972	75 028	75 098	75 168	75 21
CHANNEL INV.											
SAN SEWER INV.											
CHAINAGE	0-225.0	0-200.0	0-175	0-150	0-125	0-100.0	0-075.0	0-050.0	0-025.0	0-000.0	

NOTE  
FOR GENERAL NOTES AND LEGEND SEE DWG.G-101.

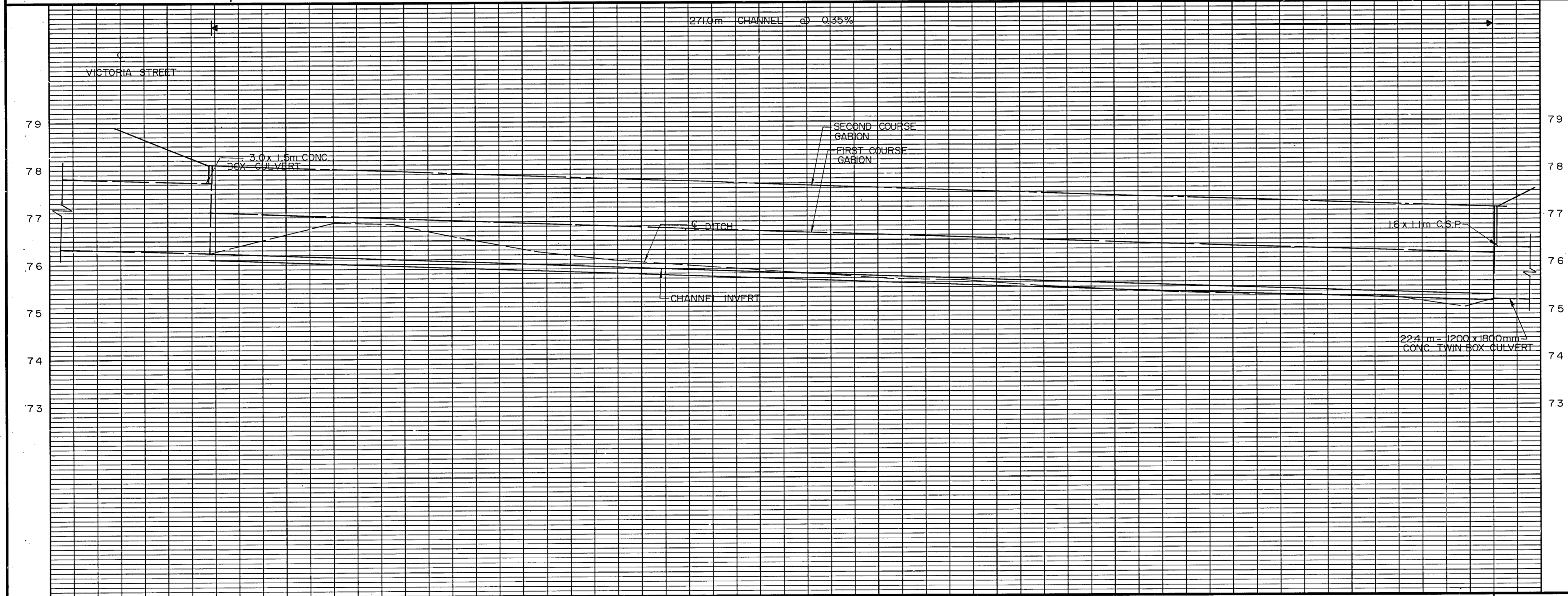
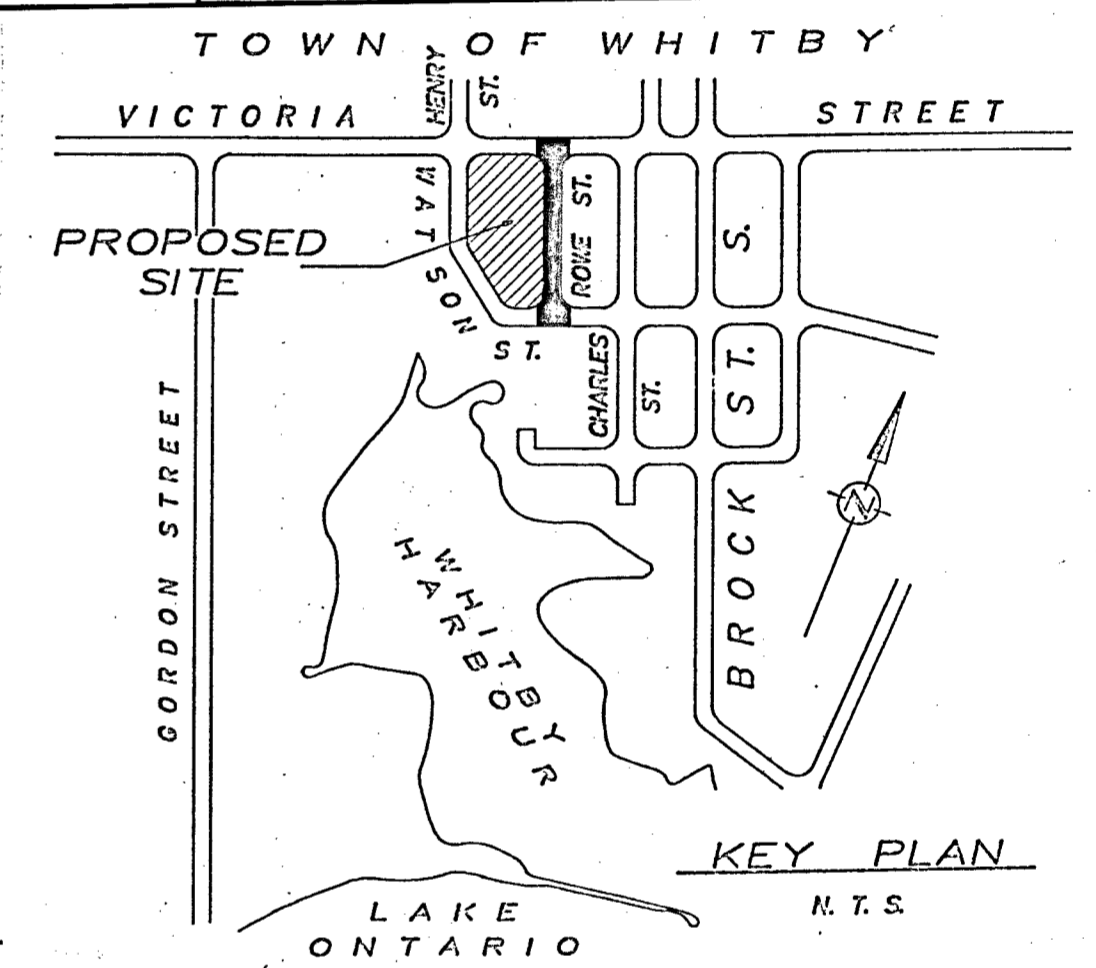


**GABION SCHEDULE**

SIZE	CODE	NO.
4m x 1m x 1m	C	272
4m x 1m x 0.3m	I	140



CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXISTING U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING. FOR STAKE OUT THE CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.



APPROVED \_\_\_\_\_ P. Eng.  
Director Of Public Works  
Town Of Whitby  
Date: Sept. 27, 1989

APPROVED \_\_\_\_\_ P. Eng.  
Department Of Works  
Region Of Durham  
Date:

REVISIONS

No.	DESCRIPTION	DATE	BY	APPROVED
2	AS CONSTRUCTED	DEC 1991	CO	
1	CHANNEL SECTION REVISED	OCT. 23	RH	

CORPORATION OF THE TOWN OF WHITBY  
Department Of Public Works

PORT WHITBY DEVELOPMENTS

CHANNEL DETAIL  
FROM STA. 0+000.0 TO STA. 0+290.0

CONSULTING ENGINEERS:  
**G. M. SERNAS & ASSOC. LTD.**  
110 SCOTTA COURT, UNIT 41  
WHITBY, ONTARIO, L1N 8Y7  
TEL: 432-7878

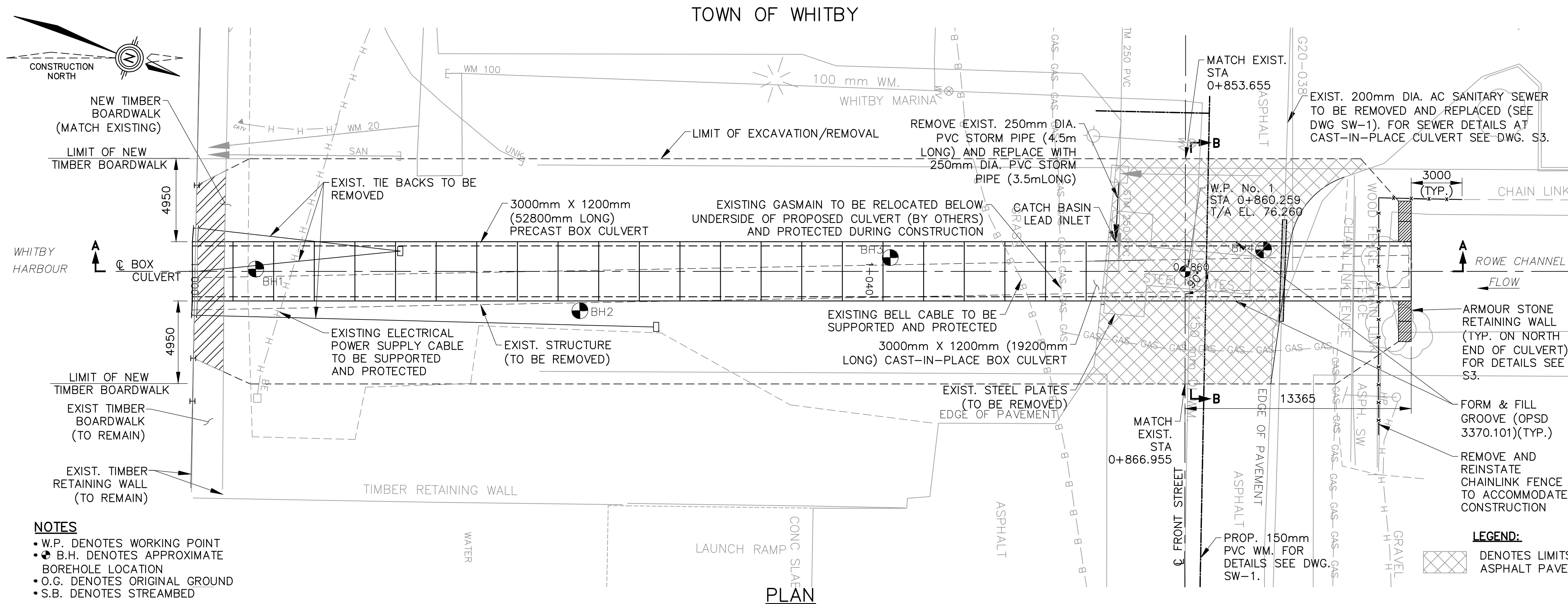
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79.00	76.25		0+000.0
78.00	76.246		0+025.0
77.00			0+050.0
76.00			0+075.0
75.00			0+100.0
74.00			0+125.0
73.00			0+150.0
			0+175.0
			0+200.0
			0+225.0
			0+250.0
			0+275.0

SCALE: HORIZ. 1:500  
VERT. 1:50

DRAWN BY: K.G.T.  
DESIGNED BY: R.H.  
CHECKED BY: D.G.  
DATE: JULY, 1989

PROJECT No. 85054  
DRAWING No. P-104

14/09/89  
PROVINCE OF ONTARIO



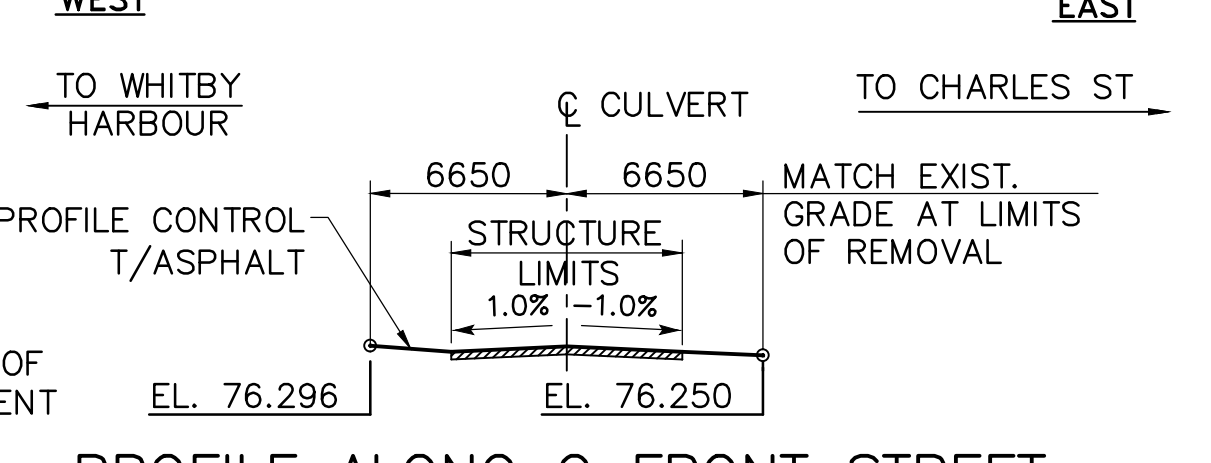
- NOTES**
- W.P. DENOTES WORKING POINT
  - B.H. DENOTES APPROXIMATE BOREHOLE LOCATION
  - O.G. DENOTES ORIGINAL GROUND
  - S.B. DENOTES STREAMBED

- NOTES SPECIFICATIONS**
- ONTARIO PROVINCIAL STANDARD SPECIFICATIONS, MUNICIPAL-ORIENTED, LATEST VERSION.
  - CANADIAN HIGHWAY BRIDGE DESIGN CODE, CAN/CSA-S6-06.
  - LIVE LOAD-CL-625-ONT.

- CONCRETE**
- ALL CONCRETE .....35 MPa
  - MAXIMUM AGGREGATE SIZE .....19mm

- REINFORCING STEEL:**
- CLEAR COVER TO REINFORCING STEEL UNLESS NOTED.....70±20
  - ALL REINFORCING STEEL SHALL BE IN ACCORDANCE WITH C.S.A. STANDARD CAN/CSA-G30.18-M92 (LATEST REVISION), GRADE 400W.
  - BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
  - REINFORCING STEEL SHALL BE FIELD CUT AS DIRECTED BY THE ENGINEER AND AS A NON-PAY ITEM.

- CONSTRUCTION:**
- ALL EXPOSED CONCRETE EDGES TO BE CHAMFERED 20mm UNLESS NOTED.
  - BACKFILL BOTH SIDES OF STRUCTURE SIMULTANEOUSLY IN 250mm LAYERS, KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
  - MAX. ALLOWABLE BEARING CAPACITY  
AT SLS = 200 kPa  
AT ULS = 300 kPa



CONTRACTOR TO BE RESPONSIBLE FOR LOCATION OF ALL EXIST. U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING. FOR STAKE OUT. THE CONSULTANT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

REVISIONS				
No.	REVISION	DATE	BY	APPROVED

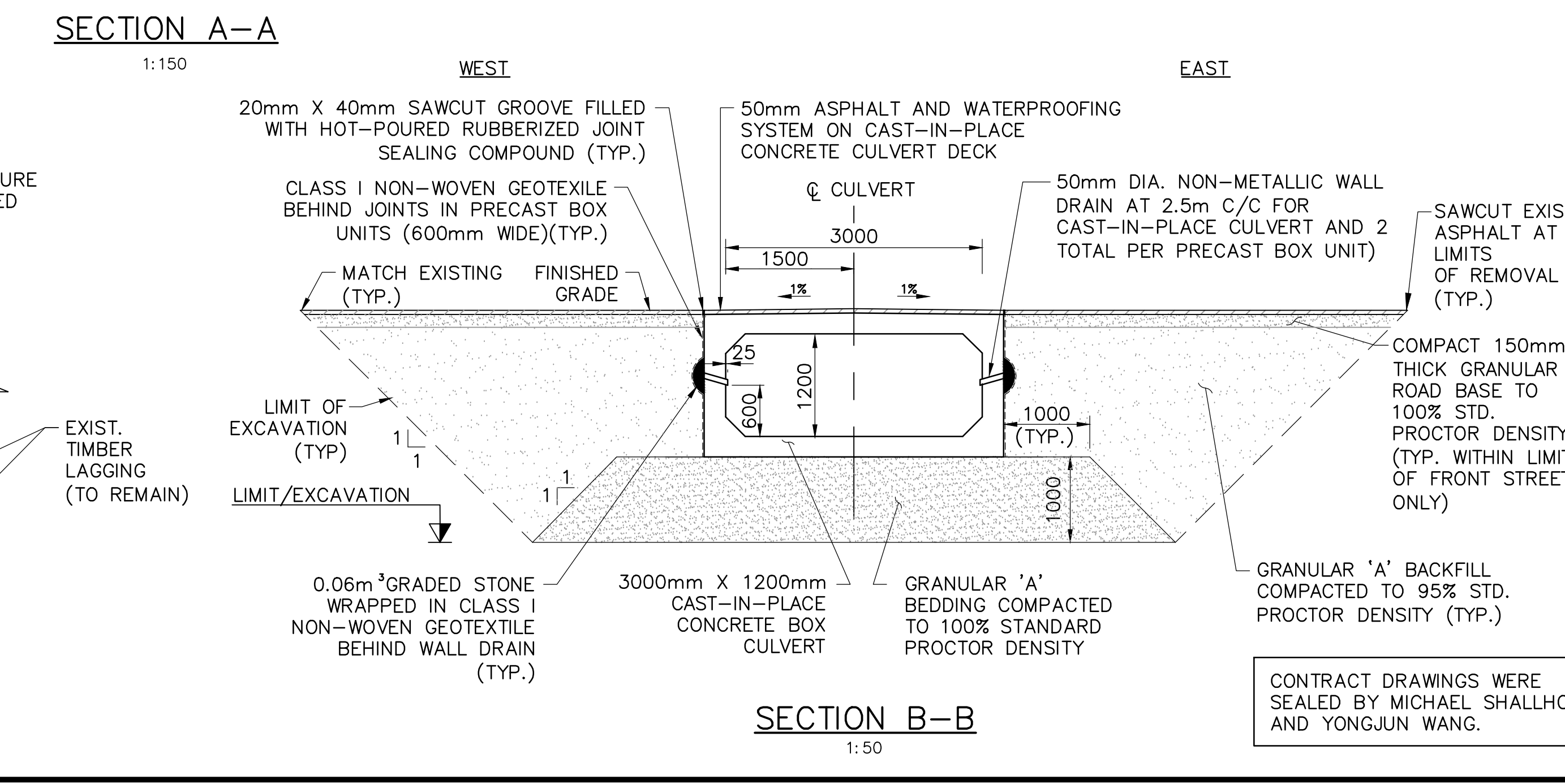
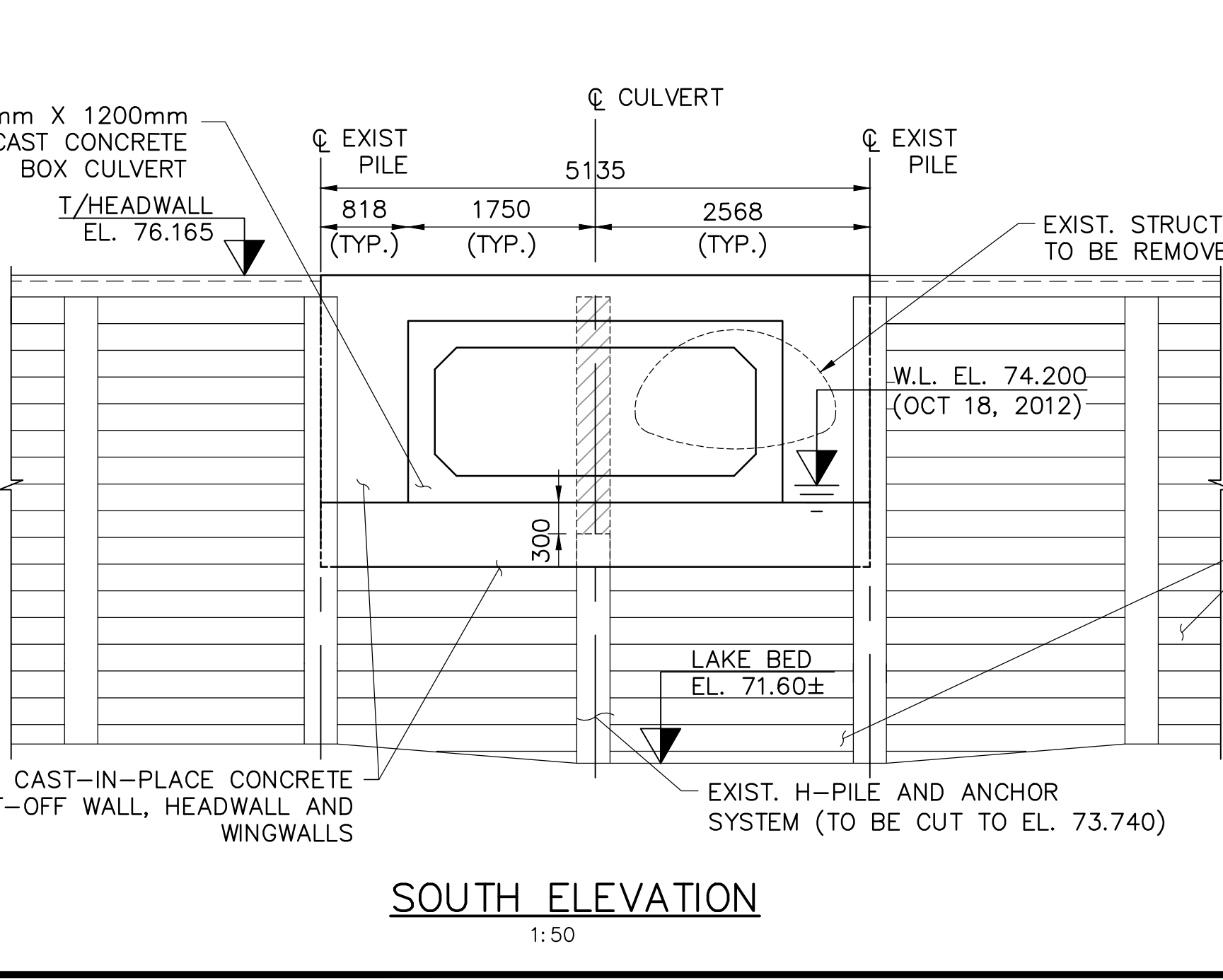
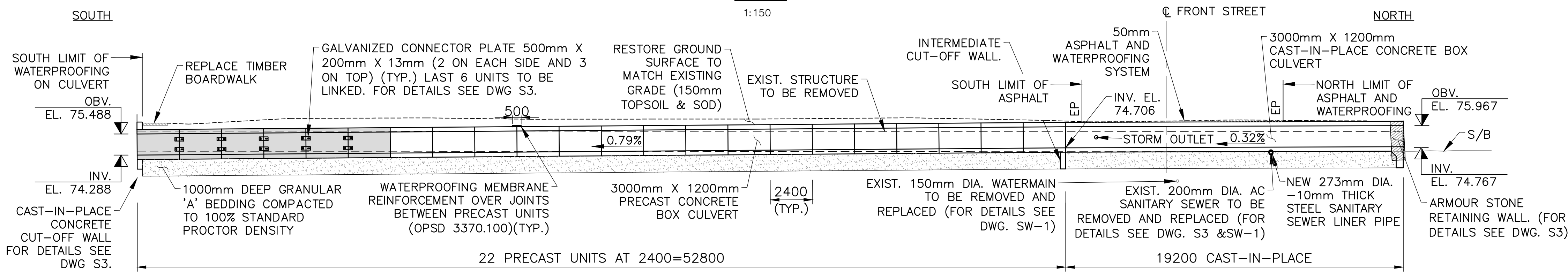
THE CORPORATION OF THE  
**TOWN OF WHITBY**  
PUBLIC WORKS DEPARTMENT

**GHD**  
GHD  
65 Sunray Street  
Whitby Ontario L1N 8Y3  
T 905 686 6402 F 905 432 7877  
E ytomail@ghd.com W www.ghd.com

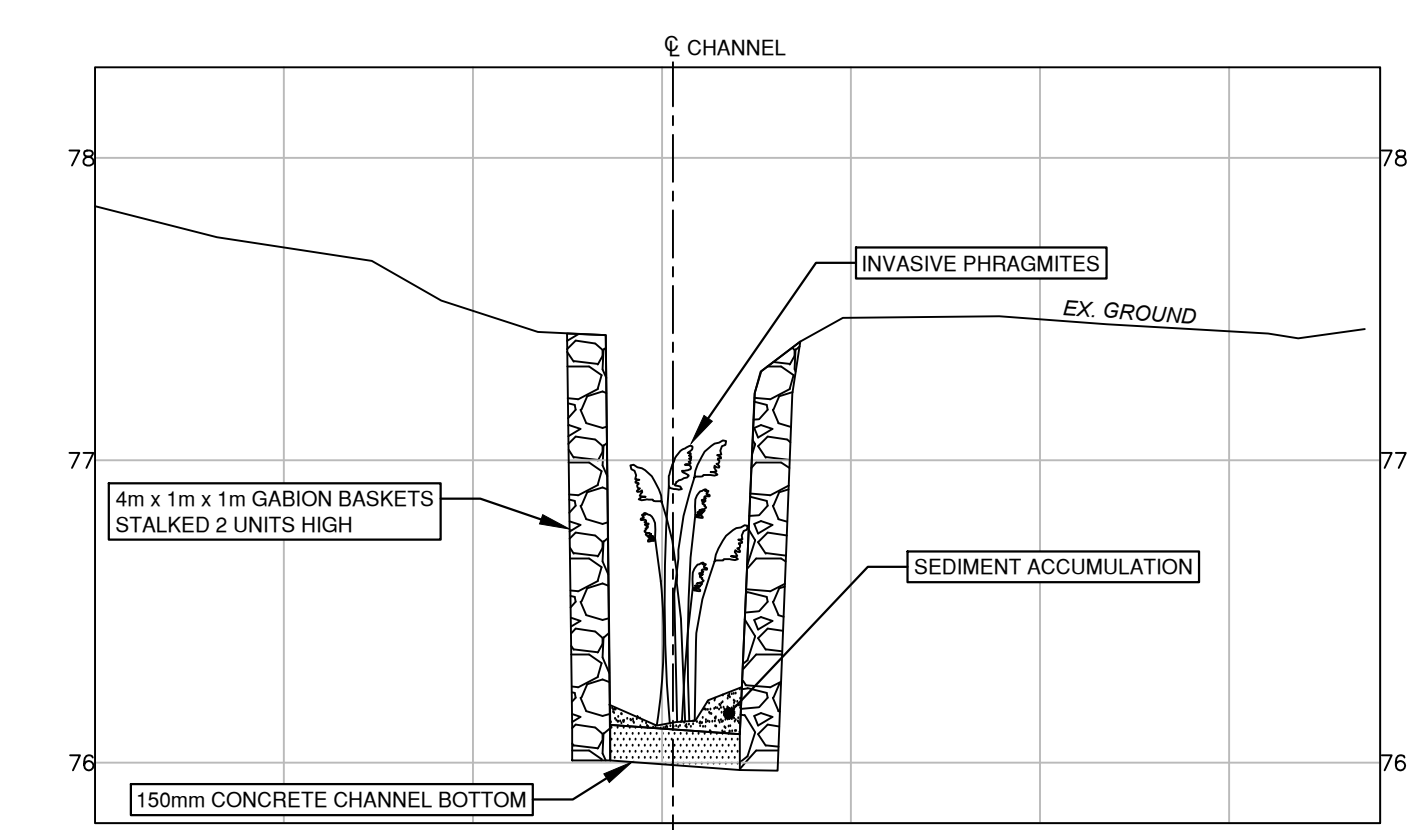
APPROVED \_\_\_\_\_ P. Eng.  
Public Works Department  
Town of Whitby  
Date: \_\_\_\_\_

**FRONT STREET CULVERT REPLACEMENT  
GENERAL ARRANGEMENT  
ROWE CHANNEL**

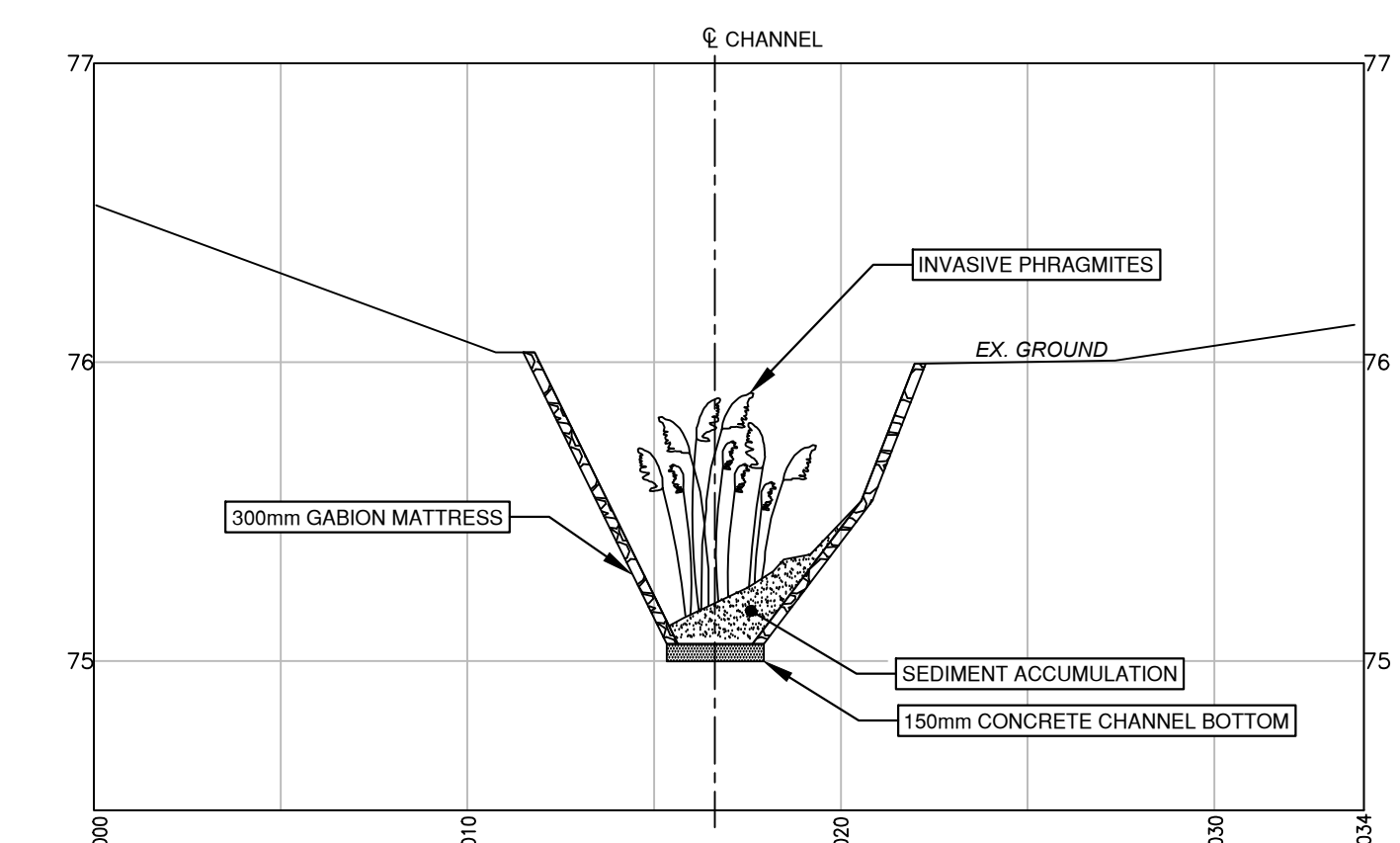
DESIGNED BY: <b>Y.W.</b>	SCALES: AS SHOWN	CONTRACT No. <b>T-119-2015</b>
CHECKED BY: <b>M.S.</b>		SHEET No <b>2 OF 5</b>
DRAWN BY: <b>A.J.</b>		<b>S1</b> DRAWING NUMBER
DATE: <b>JANUARY 2015</b>		



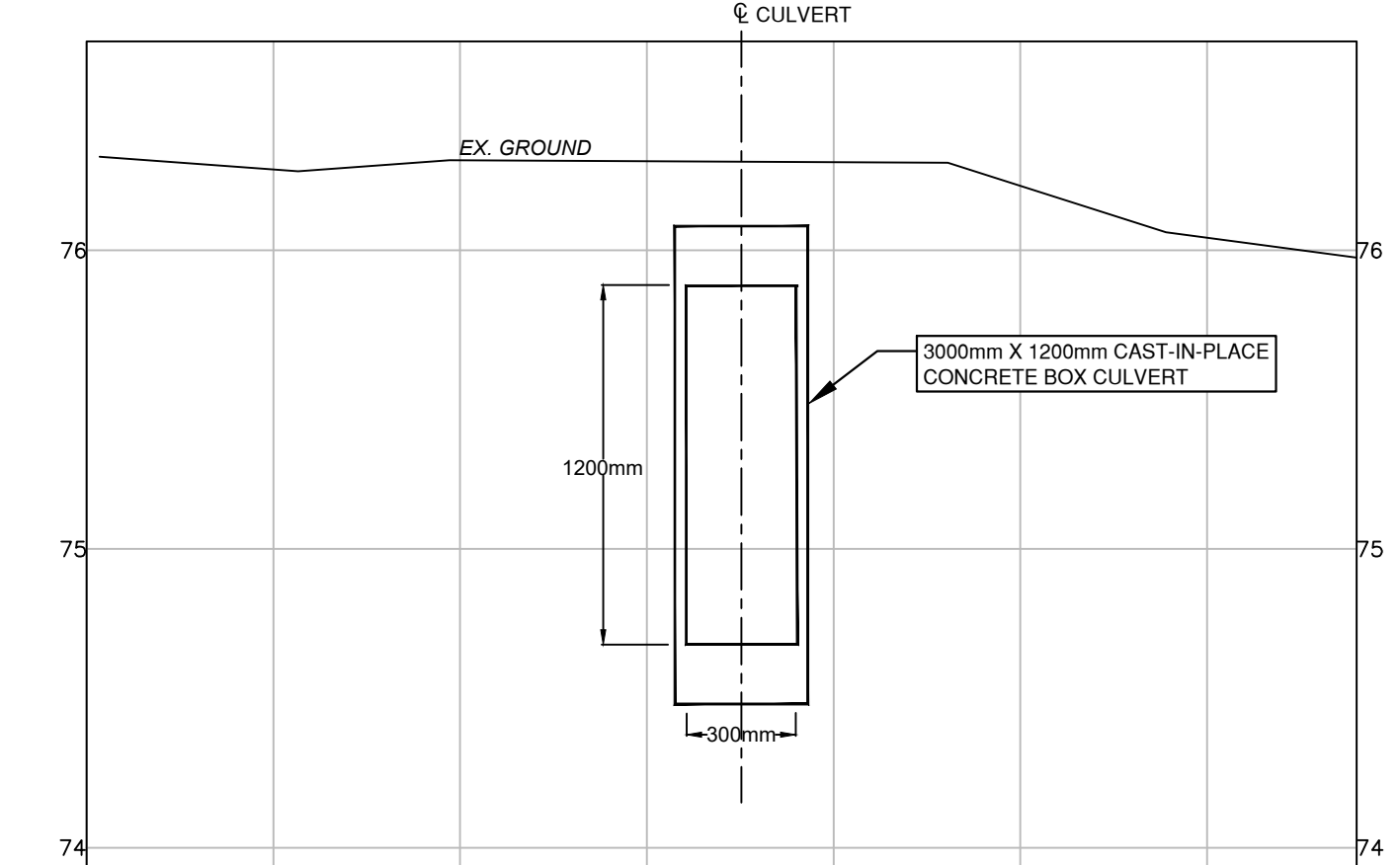
CONTRACT DRAWINGS WERE SEALED BY MICHAEL SHALLHORN AND YONGJUN WANG.



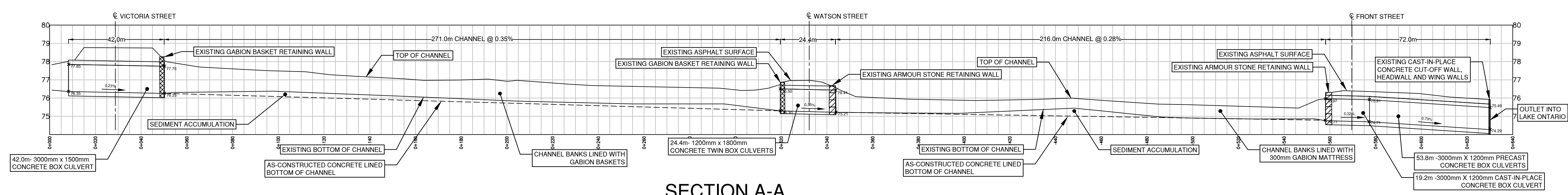
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H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION C-C**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION D-D**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION A-A**  
H. SCALE = 1:1000  
V. SCALE = 1:125



LEGEND

DATE	NAME	REVISIONS
01/21/22	SEA	DRAFT ALTERNATIVE DESIGN FOR PROJECT FILE
09/14/21	SEA	DRAFT ALTERNATIVE DESIGN FOR REVIEW

CAUTION: UTILITIES INVESTIGATIONS HAVE NOT BEEN COMPLETED AS PART OF THIS DRAWING PREPARATION. CONTRACTOR TO TAKE RESPONSIBILITY FOR ALL U/G & OVERHEAD UTILITIES.

RESILIENT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

SCALE  
1:1500  
OR AS SHOWN

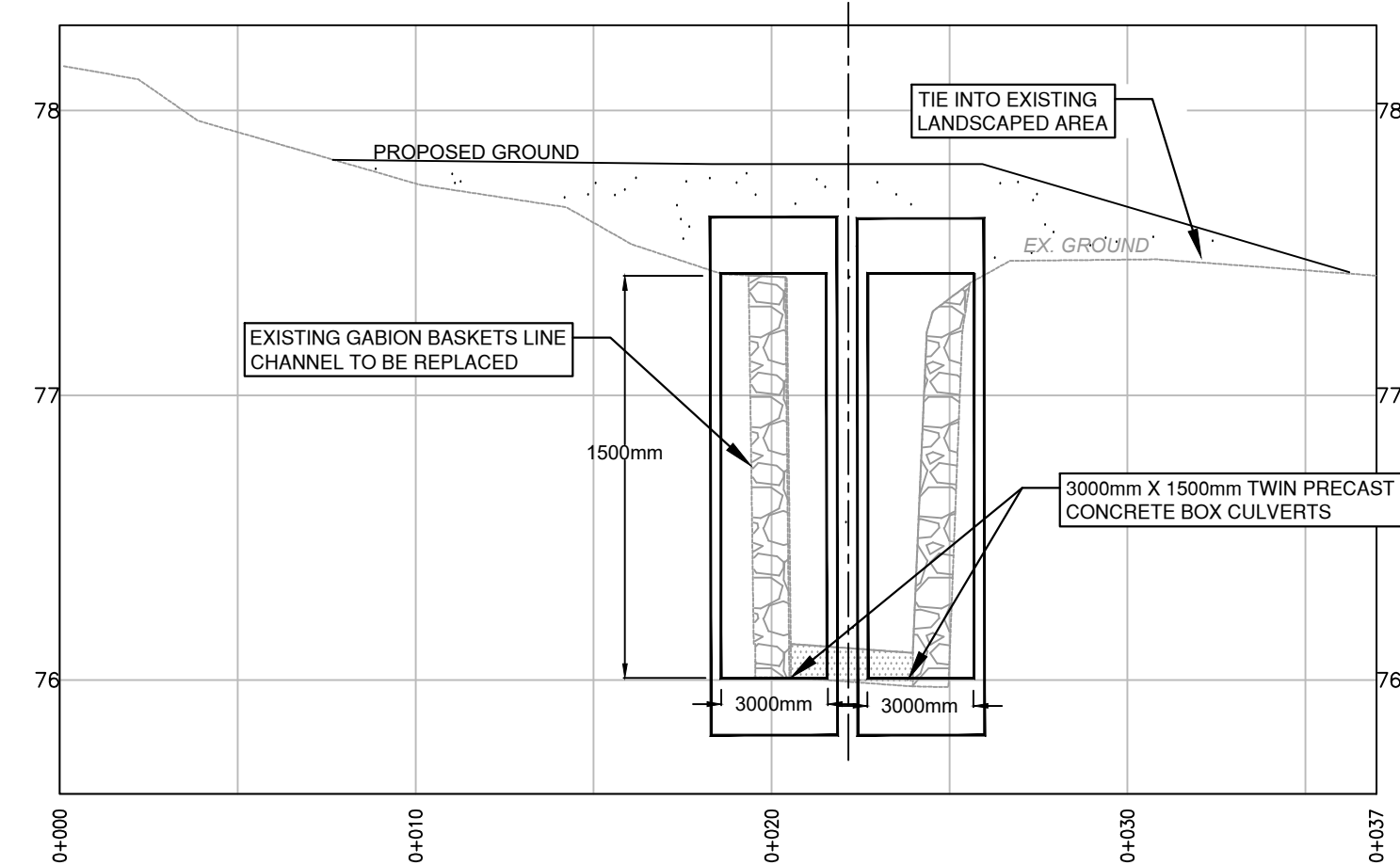
DRAWN: SR DATE: 2021 09 14  
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 CHECKED: MB DATE: 2021 09 14  
 APPROVED: MB DATE: 2021 09 14

**RESILIENT CONSULTING**  
 214 CENTRE ST N  
 WHITBY ON L1N 4T1  
 289-943-4651  
 info@resilientconsulting.ca

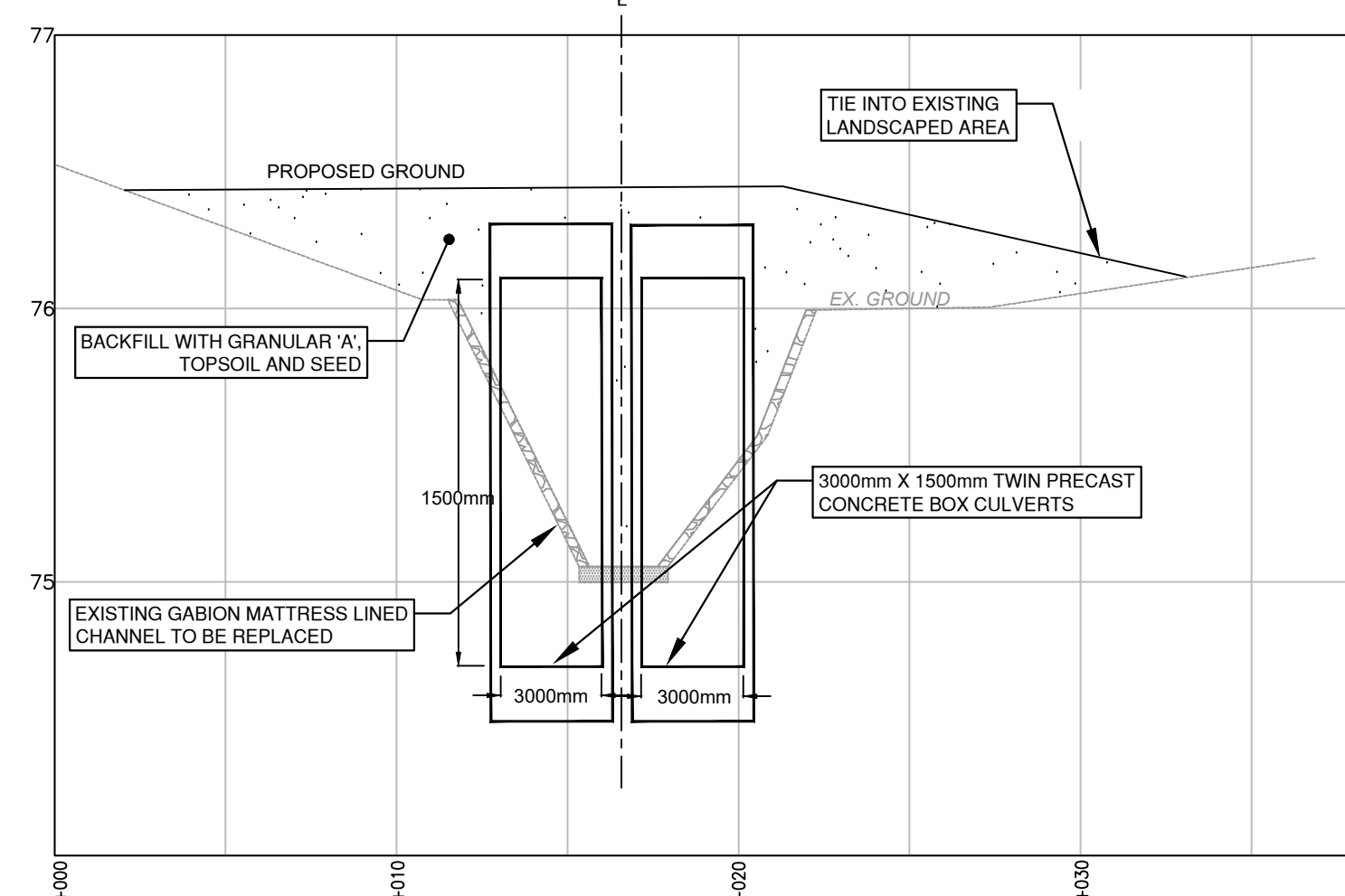
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ALTERNATIVE 1- DO NOTHING  
TOWN OF WHITBY

DRAWING NUMBER	PROJECT NUMBER	SHEET NUMBER
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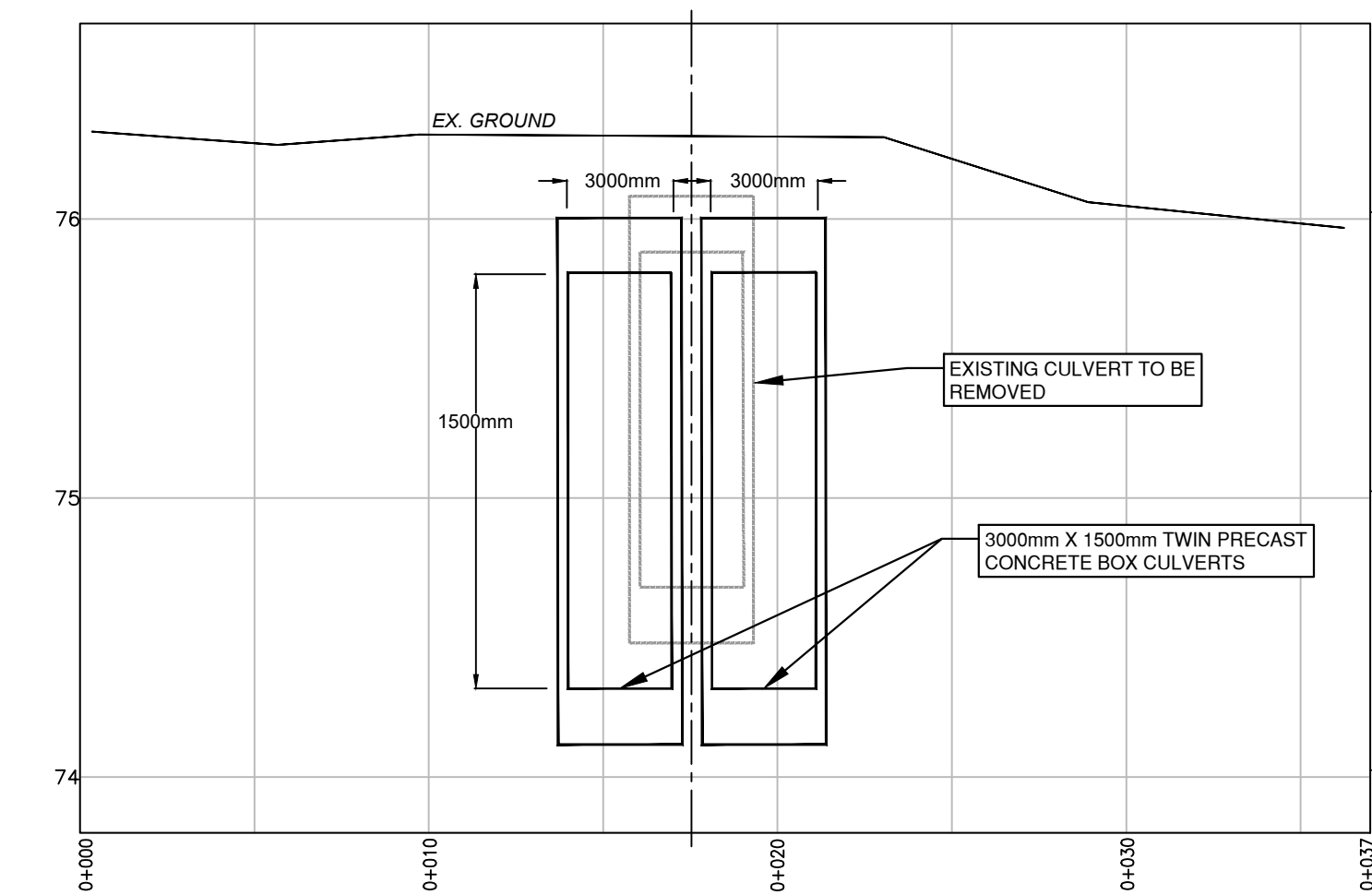




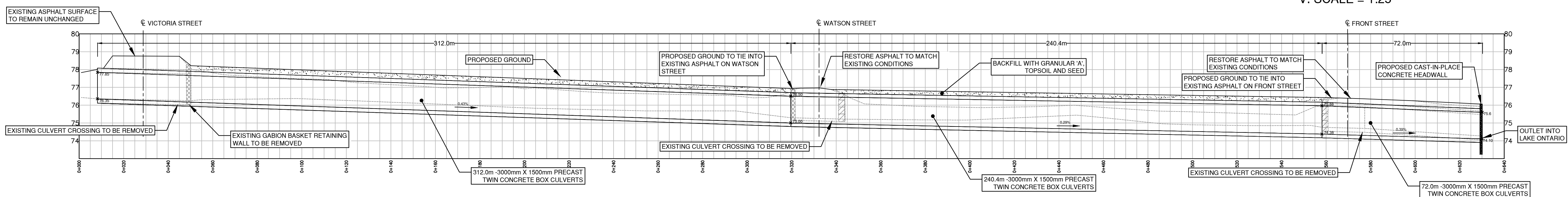
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H. SCALE = 1:200  
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**SECTION D-D**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION A-A**  
H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.



LEGEND

DATE	NAME	REVISIONS
01/21/22	SEA	DRAFT ALTERNATIVE DESIGN FOR PROJECT FILE
09/14/21	SEA	DRAFT ALTERNATIVE DESIGN FOR REVIEW

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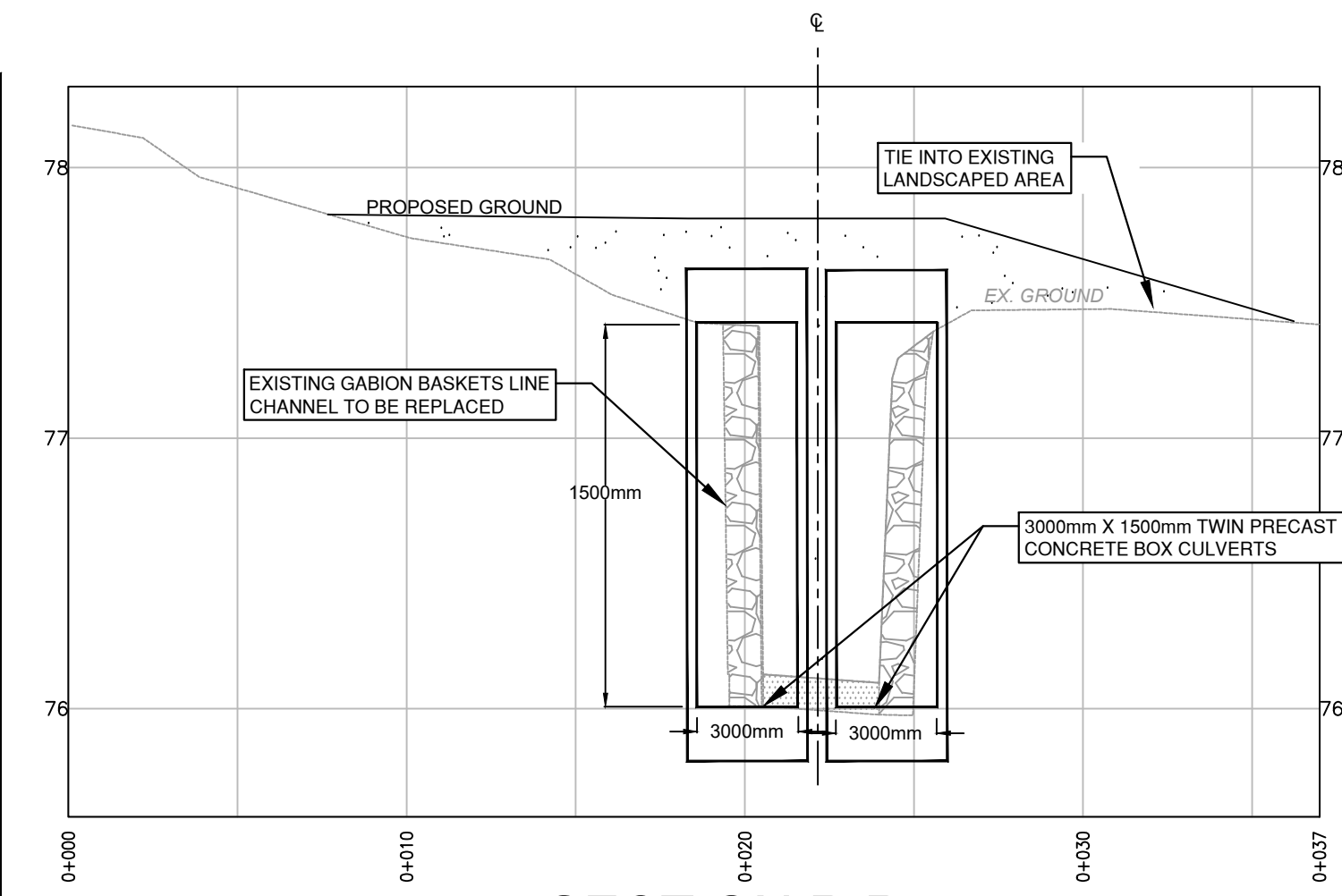
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DESIGN: SR DATE: 2021 09 14  
CHECKED: MB DATE: 2021 09 14  
APPROVED: MB DATE: 2021 09 14

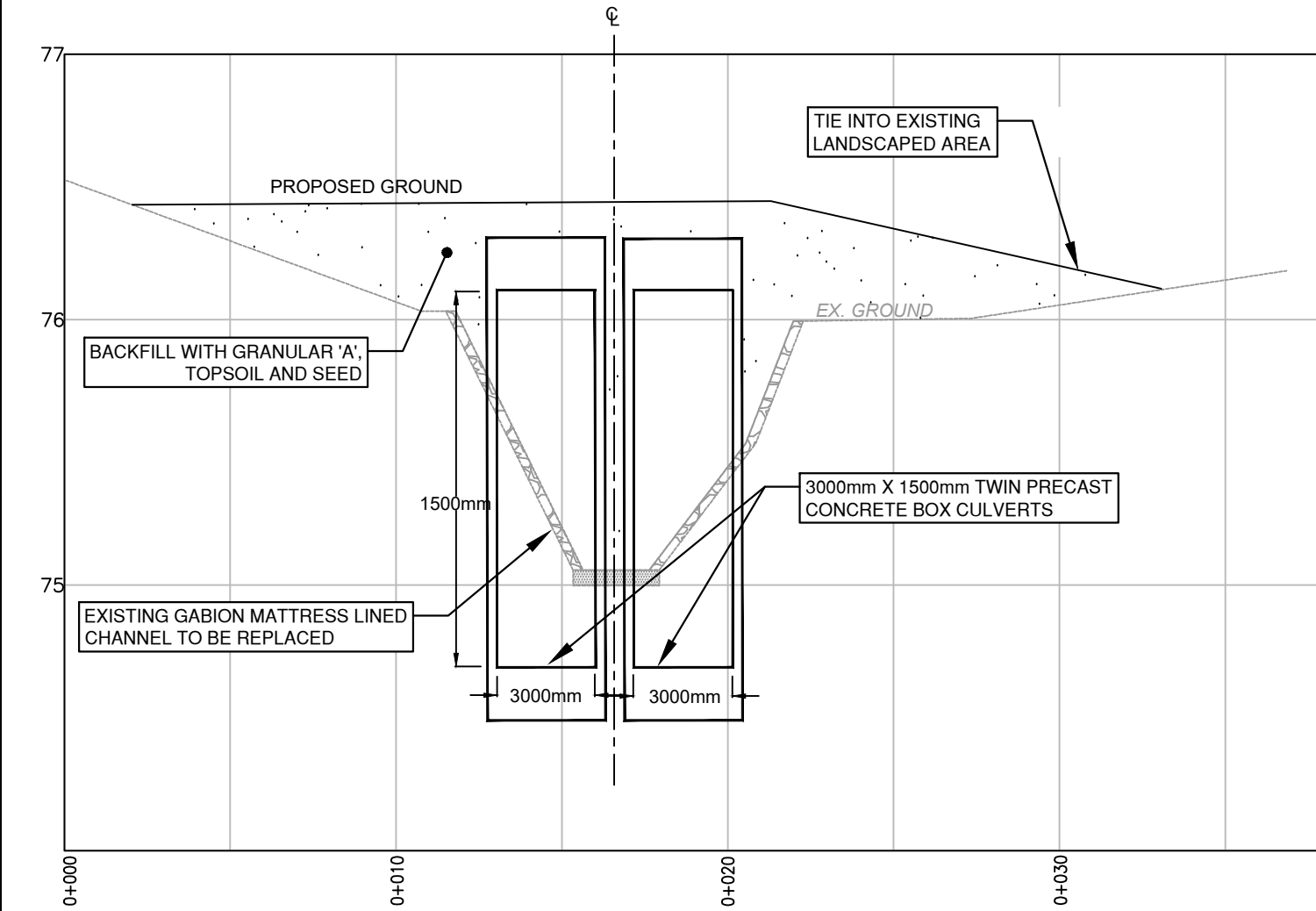


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TOWN OF WHITBY

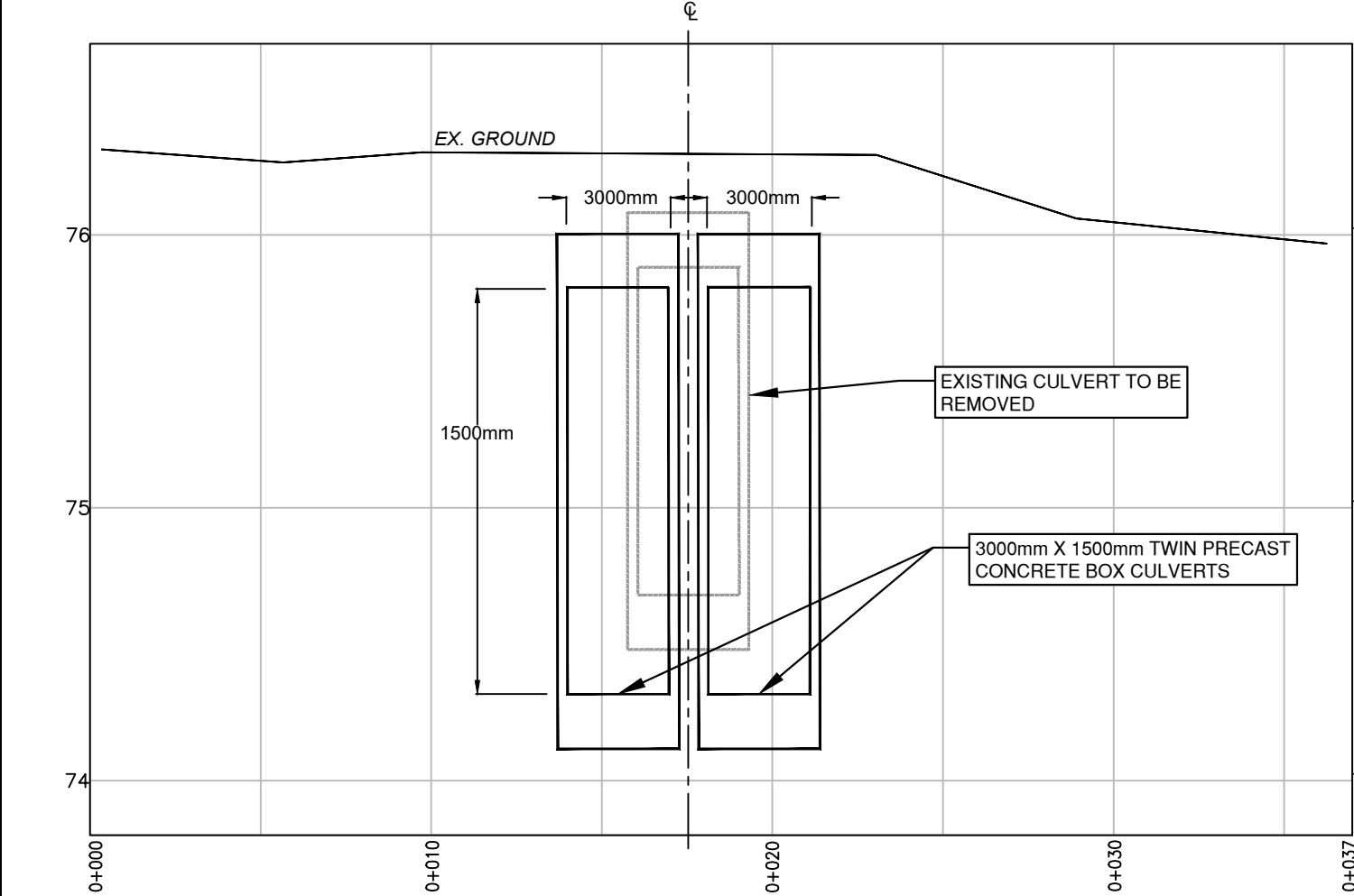
DRAWING NUMBER	PROJECT NUMBER	SHEET NUMBER
ALT-1	2021-006	1



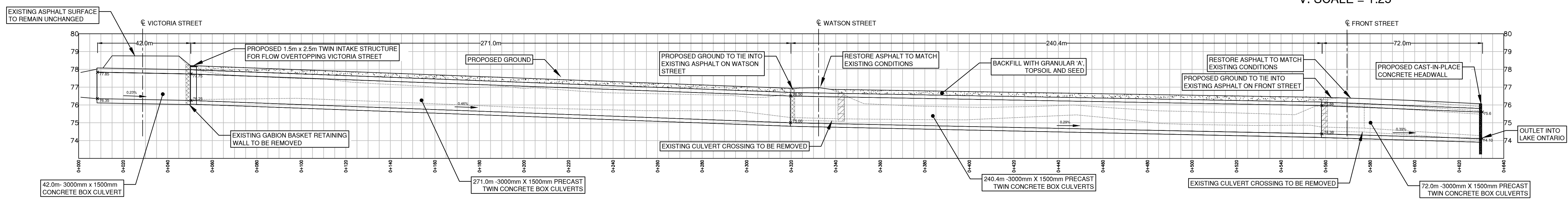
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**SECTION C-C**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION D-D**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION A-A**  
H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.



KEY MAP  
NTS

LEGEND

NO.	DATE	BY	REVISIONS
1.	01/21/22	SEA	DRAFT ALTERNATIVE DESIGN FOR PROJECT FILE
1.	09/14/21	SEA	DRAFT ALTERNATIVE DESIGN FOR REVIEW

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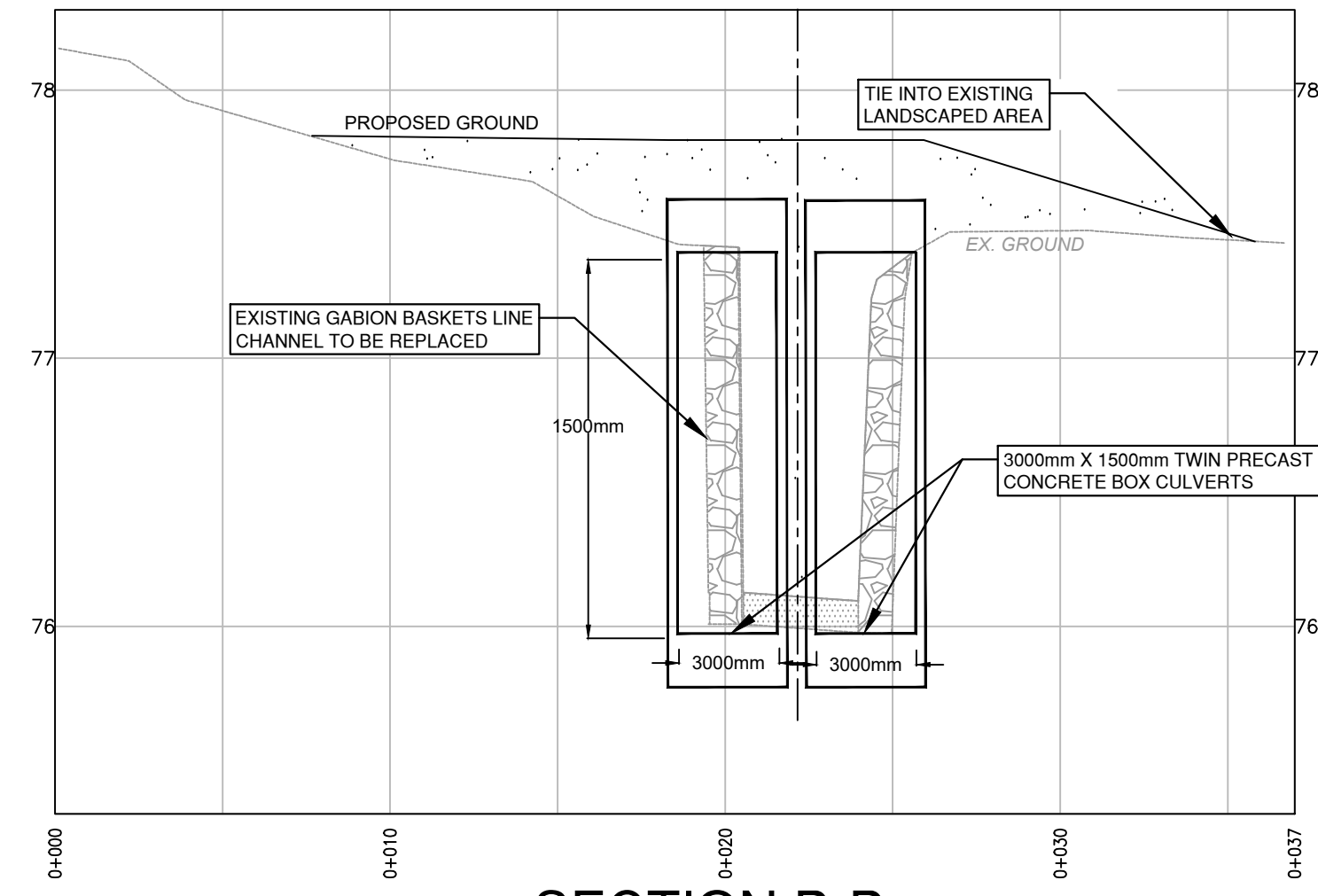
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DESIGN: SR	DATE: 2021 09 14
CHECKED: MB	DATE: 2021 09 14
APPROVED: MB	DATE: 2021 09 14

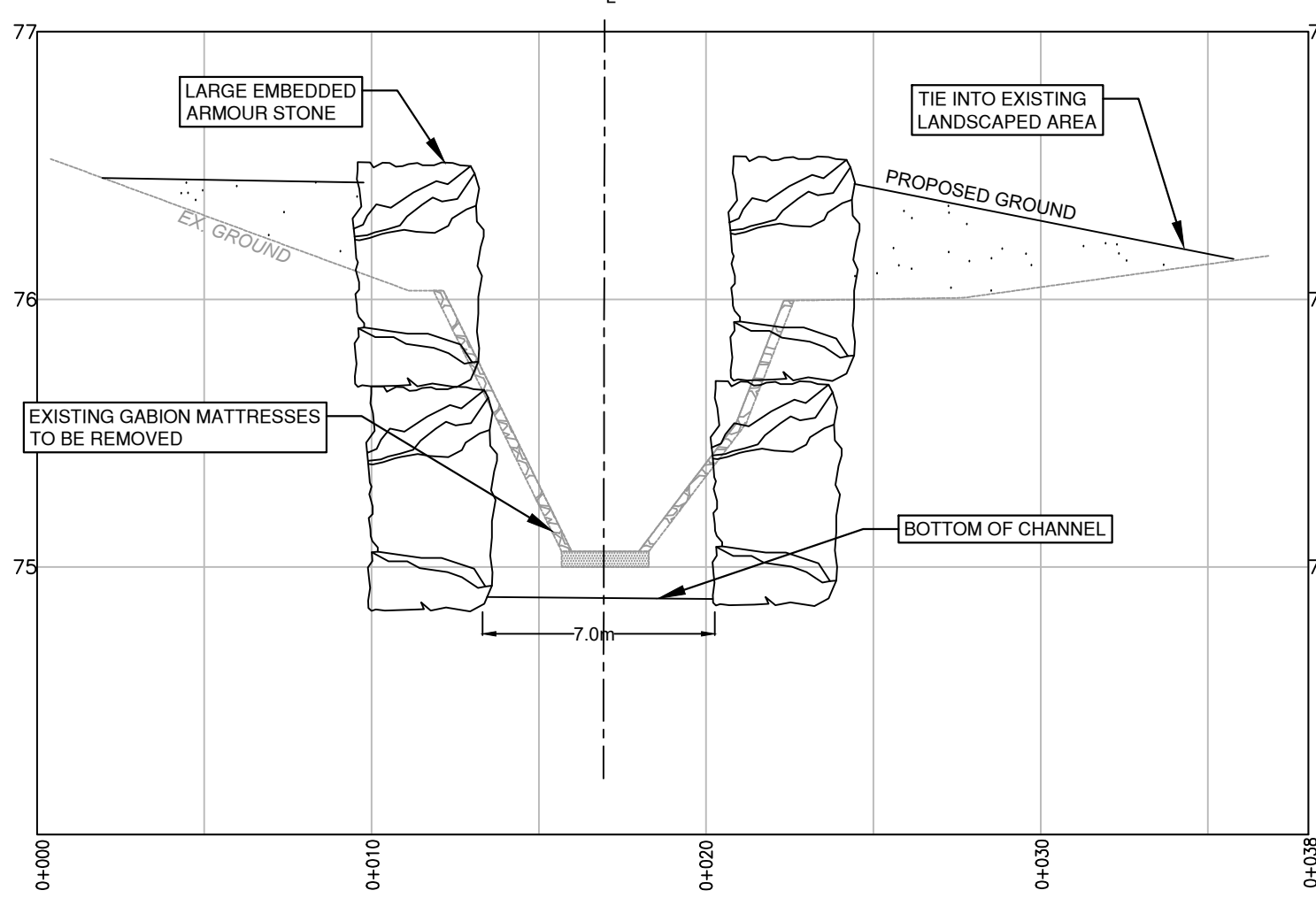
**RESILIENT CONSULTING**  
214 CENTRE ST N  
WHITBY ON L1N 4T1  
289-943-4651  
info@resilientconsulting.ca

ROWE CHANNEL  
ALTERNATIVE 3- FULL PIPE REPLACEMENT  
EXCLUDING VICTORIA STREET W  
TOWN OF WHITBY

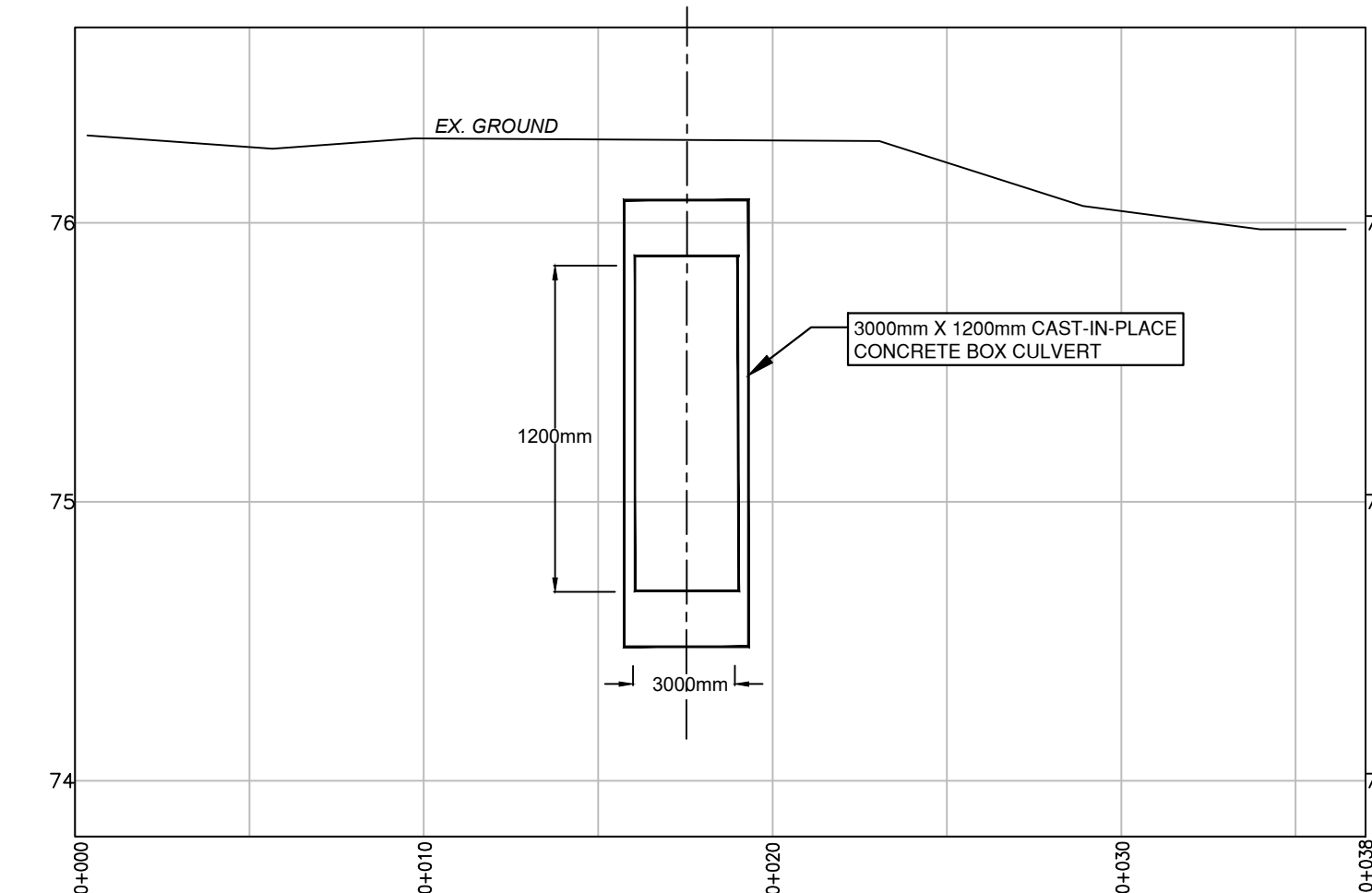
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ALT-1	2021-006	1



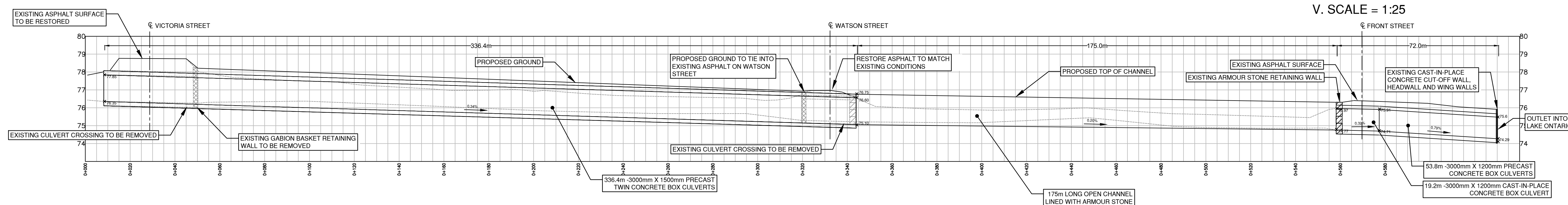
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**SECTION C-C**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION D-D**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION A-A**  
H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.



LEGEND

NO.	DATE	BY	DESCRIPTION
1.	01/21/22	SEA	DRAFT ALTERNATIVE DESIGN FOR PROJECT FILE
1.	09/14/21	SEA	DRAFT ALTERNATIVE DESIGN FOR REVIEW

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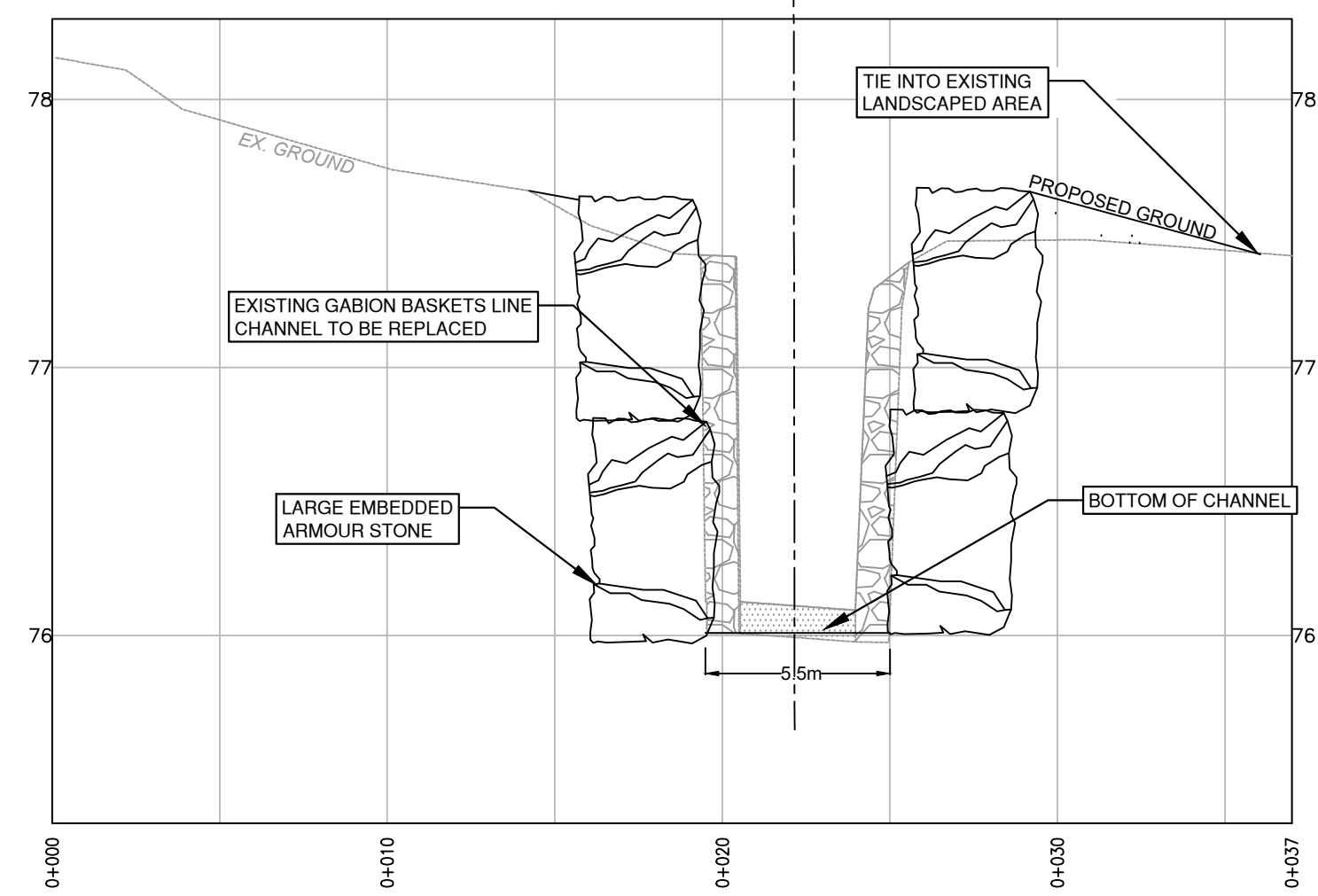
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CHECKED: MB	DATE: 2021 09 14
APPROVED: MB	DATE: 2021 09 14

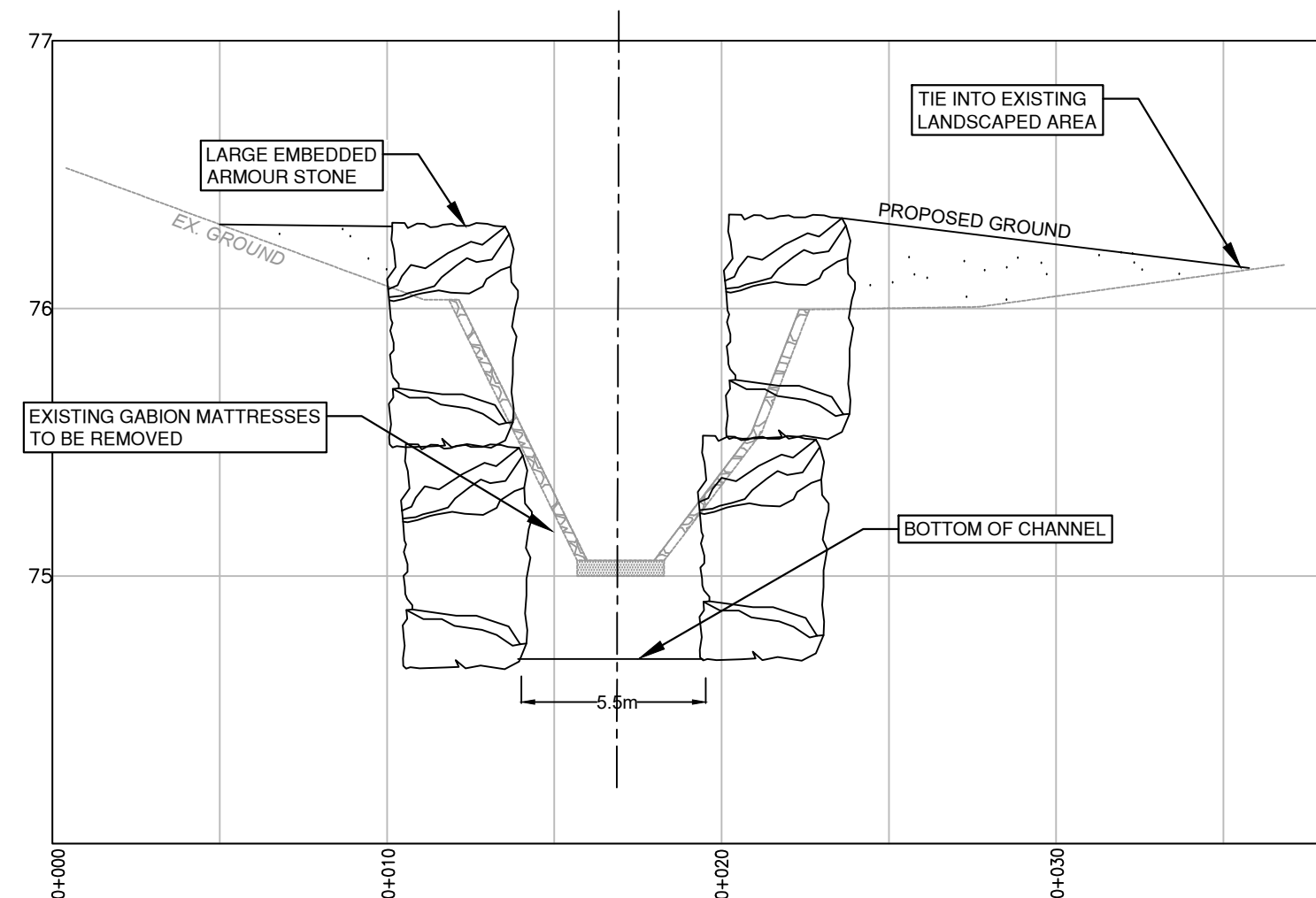
**RESILIENT CONSULTING**  
214 CENTRE ST N  
WHITBY ON L1N 4T1  
289-943-4651  
info@resilientconsulting.ca

ROWE CHANNEL  
ALTERNATIVE 4- PARTIAL PIPE  
REPLACEMENT  
TOWN OF WHITBY

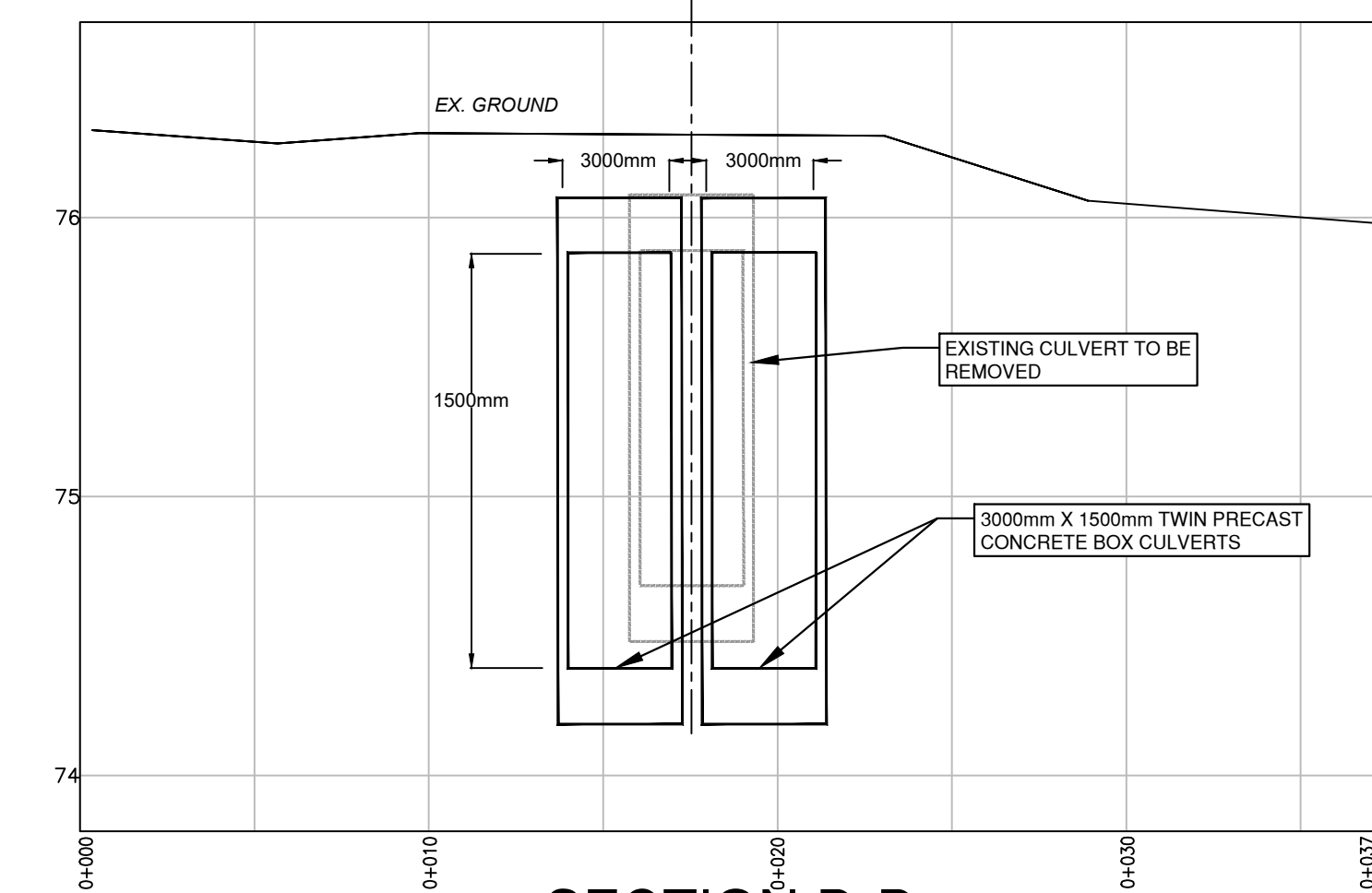
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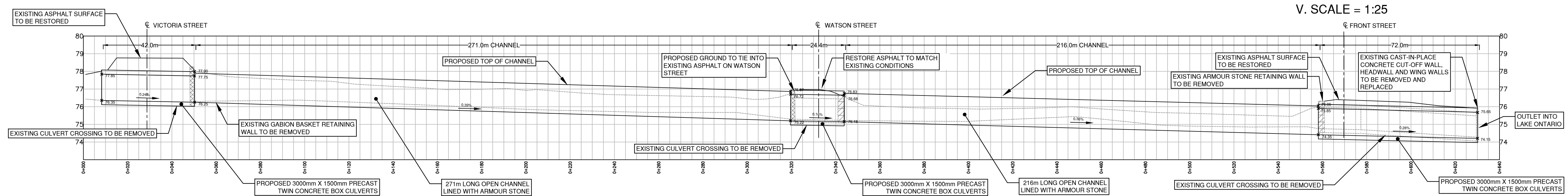
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V. SCALE = 1:25



**SECTION C-C**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION D-D**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION A-A**  
H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.



LEGEND

DATE	NAME	REVISIONS
01/21/22	SEA	DRAFT ALTERNATIVE DESIGN FOR PROJECT FILE
09/14/21	SEA	DRAFT ALTERNATIVE DESIGN FOR REVIEW

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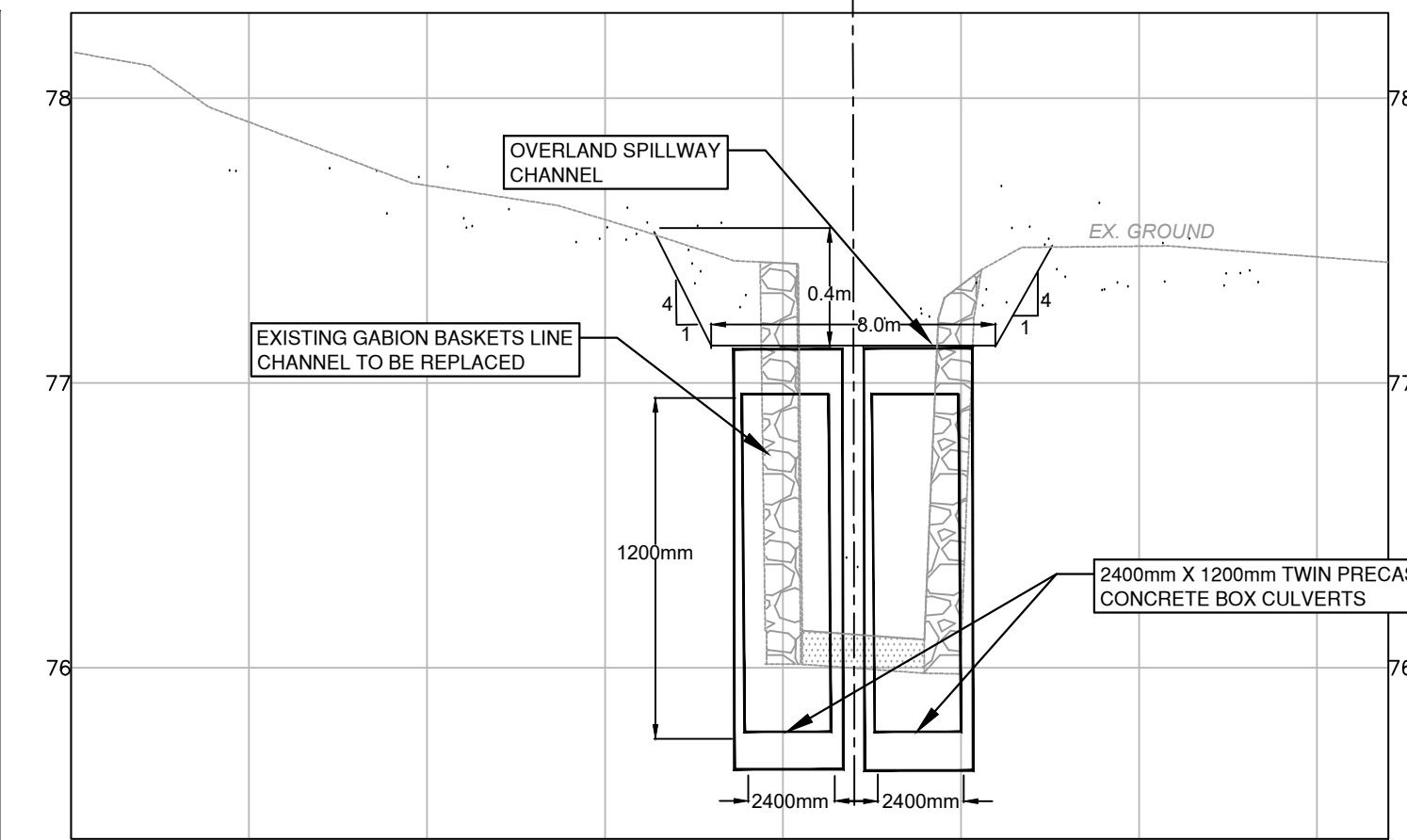
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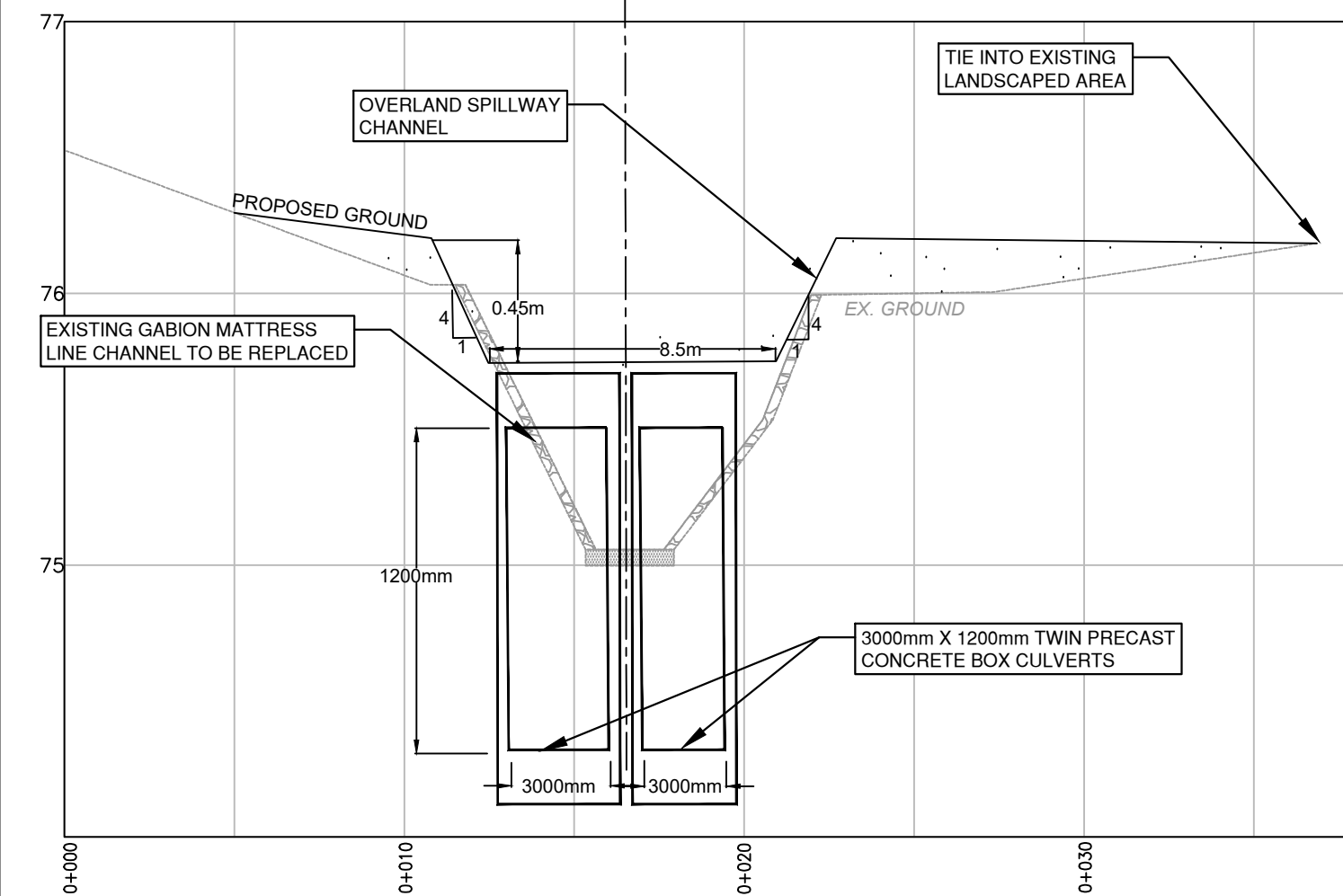
**RESILIENT CONSULTING**  
RESILIENT CONSULTING  
214 CENTRE ST N  
WHITBY ON L1N 4T1  
289-943-4651  
info@resilientconsulting.ca

ROWE CHANNEL  
ALTERNATIVE 5- ARMOUR STONE  
OPEN CHANNEL  
TOWN OF WHITBY

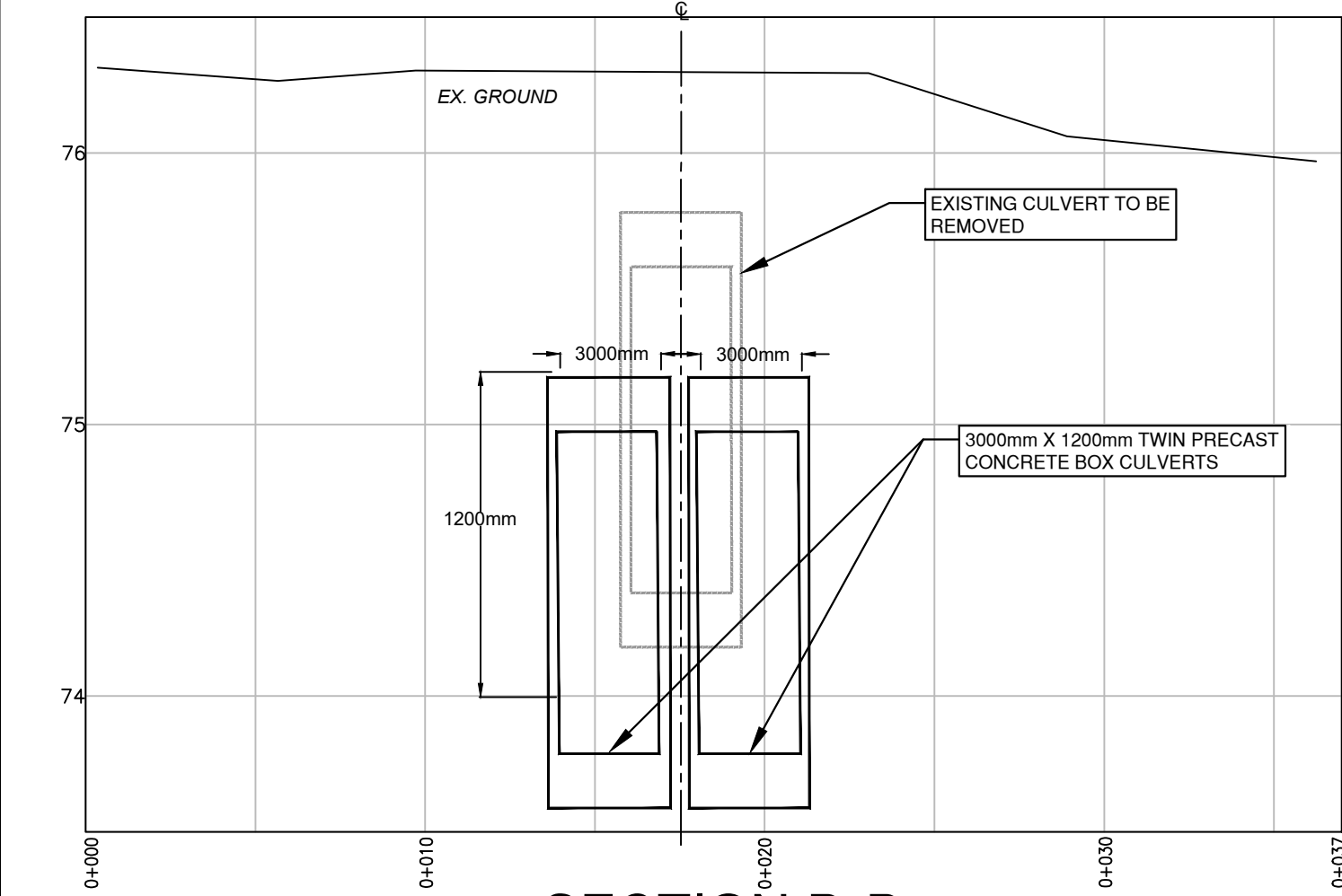
DRAWING NUMBER	PROJECT NUMBER	SHEET NUMBER
ALT-1	2021-006	1



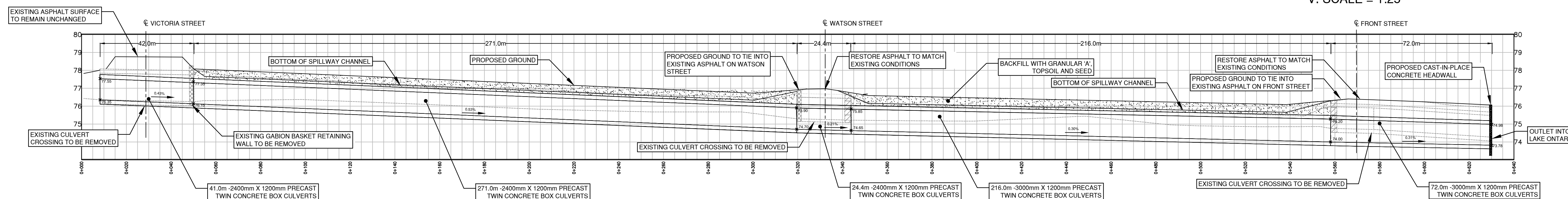
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V. SCALE = 1:25



**SECTION C-C**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION D-D**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION A-A**  
H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.



LEGEND  
➔ OVERLAND SPILL

NO.	DATE	BY	REVISIONS
1.	01/21/22	SEA	DRAFT ALTERNATIVE DESIGN FOR PROJECT FILE
1.	09/14/21	SEA	DRAFT ALTERNATIVE DESIGN FOR REVIEW

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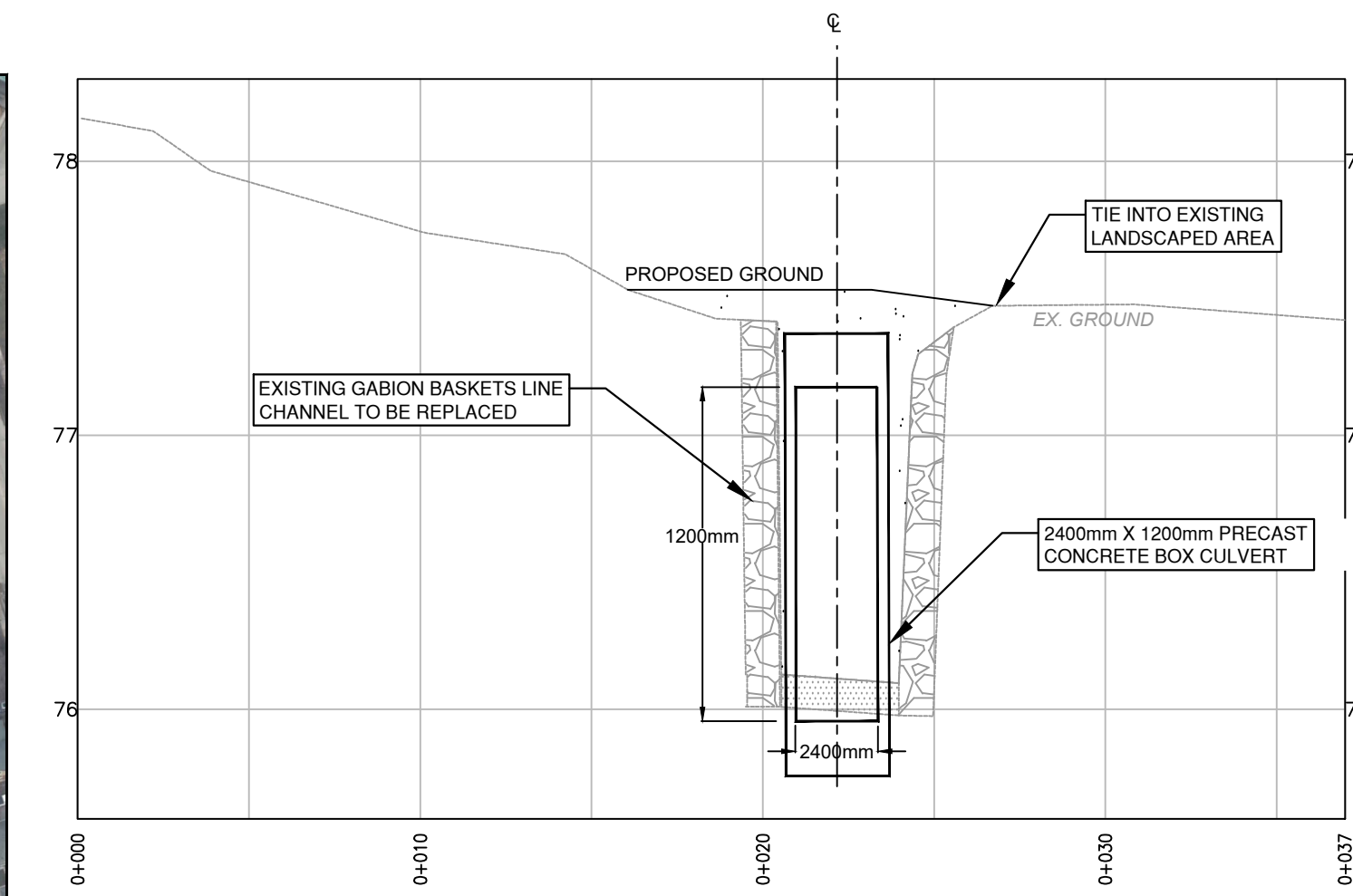
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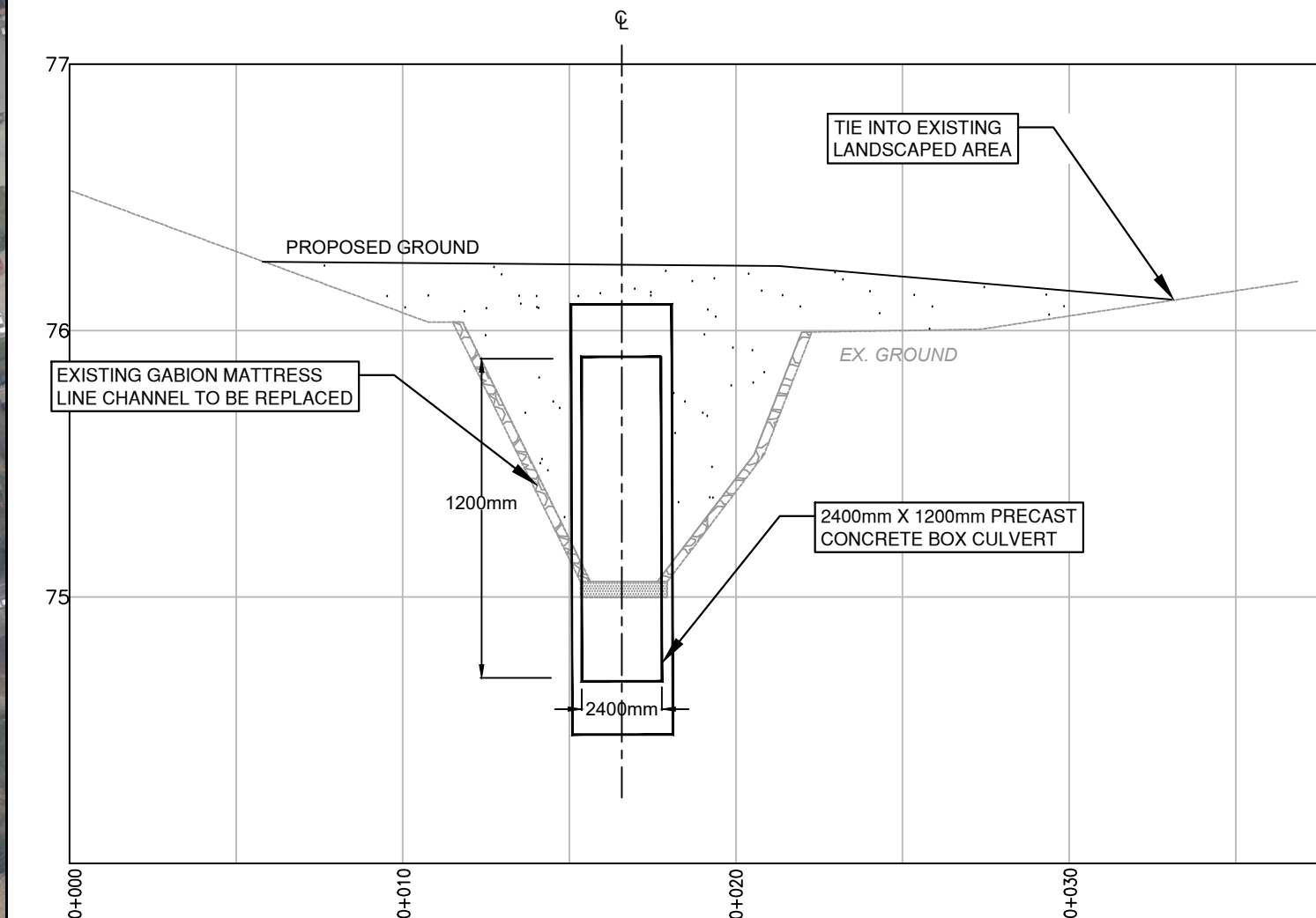
**RESILIENT CONSULTING**  
214 CENTRE ST N  
WHITBY ON L1N 4T1  
289-943-4651  
info@resilientconsulting.ca

ROWE CHANNEL  
ALTERNATIVE 6- MAJOR MINOR FLOW SPLIT  
TOWN OF WHITBY

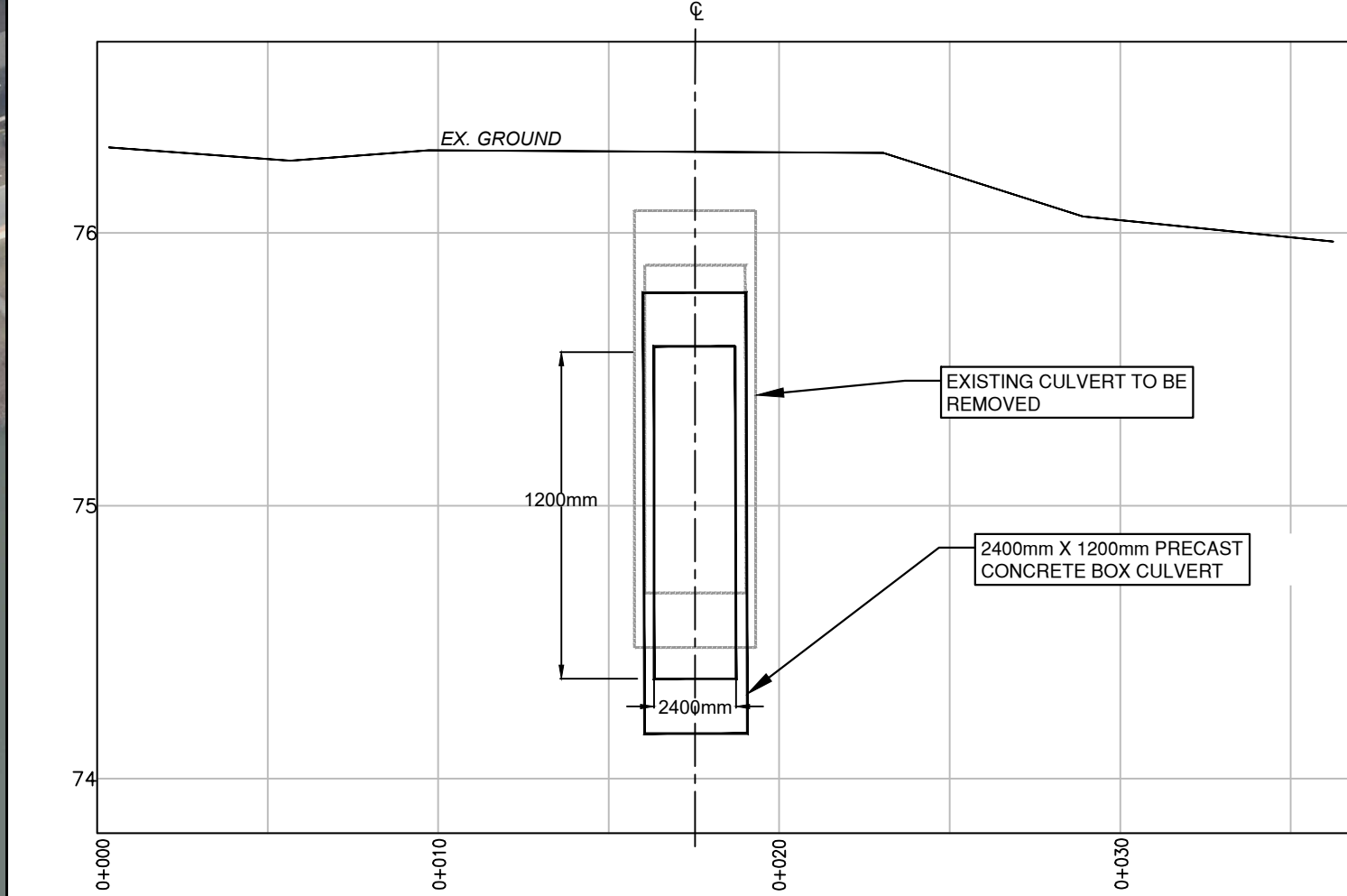
DRAWING NUMBER ALT-1	PROJECT NUMBER 2021-006	SHEET NUMBER 1
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**SECTION B-B**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION C-C**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION D-D**  
H. SCALE = 1:200  
V. SCALE = 1:25



LEGEND

NO.	DATE	BY	DESCRIPTION
1.	01/21/22	SEA	DRAFT ALTERNATIVE DESIGN FOR PROJECT FILE
1.	09/14/21	SEA	DRAFT ALTERNATIVE DESIGN FOR REVIEW

CAUTION: UTILITIES INVESTIGATIONS HAVE NOT BEEN COMPLETED AS PART OF THIS DRAWING PREPARATION. CONTRACTOR TO TAKE RESPONSIBILITY FOR ALL U/G & OVERHEAD UTILITIES.

RESILIENT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

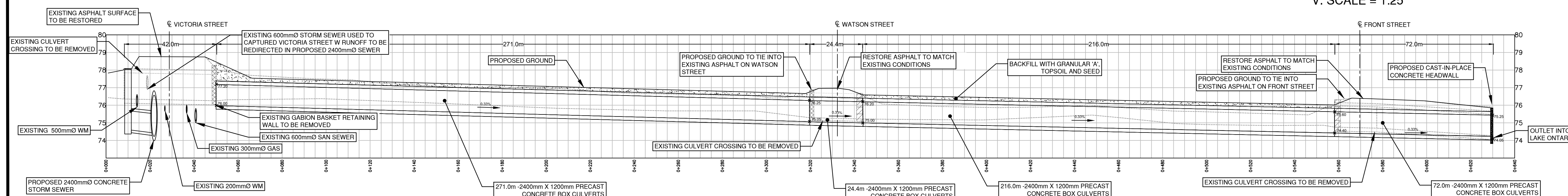
SCALE  
1:1500  
OR AS SHOWN

DRAWN: SR	DATE: 2021 09 14
DESIGN: SR	DATE: 2021 09 14
CHECKED: MB	DATE: 2021 09 14
APPROVED: MB	DATE: 2021 09 14

**RESILIENT CONSULTING**  
214 CENTRE ST N  
WHITBY ON L1N 4T1  
289-943-4651  
info@resilientconsulting.ca

ROWE CHANNEL  
ALTERNATIVE 7 - VICTORIA STREET W  
DIVERSION  
TOWN OF WHITBY

DRAWING NUMBER ALT-1	PROJECT NUMBER 2021-006	SHEET NUMBER 1
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**SECTION A-A**  
H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW. THE LOCATION OF ALL EXISTING SEWERS AND UTILITIES ARE TO BE CONFIRMED DURING DETAILED DESIGN.



**Alternative #2- Full Channel Replacement with Pipe  
100 Year Storm Sewer Design Sheet**

Project No. 2021-006  
 Date 04-Jan-22  
 Design By: S. Rayner, P.Eng.  
 Approved By: M. Bassingthwaite, P.Eng.

LOCATION			100-Yr Design	SEWER DATA										
Name	From	To	Flow 'Q' L/s	Manning's 'n'	Length m	Slope %	Number of Culverts	Span (m)	Rise (m)	Pipe Capacity L/s	Velocity m/s	Time of flow Min.	Percent Full %	Check
Rowe Channel, Whitby	Upstream of Victoria St. W.	Upstream of Watson St. W	19940.0	0.013	312.0	0.43%	2	3.00	1.50	28688.1	3.19	1.63	70	OKAY
Rowe Channel, Whitby	Upstream of Watson St. W	Upstream of Front St. W	21900.0	0.013	240.4	0.29%	2	3.00	1.50	23365.2	2.60	1.54	94	OKAY
Rowe Channel, Whitby	Upstream of Front St. W	Outlet in Lake Ontario	21900.0	0.013	72.0	0.39%	2	3.00	1.50	27197.3	3.02	0.40	81	OKAY



**Alternative #3- Partial Channel Replaced Excluding Victoria Street W  
100 Year Storm Sewer Design Sheet**

Project No. 2021-006  
Date 04-Jan-22  
Design By: S. Rayner, P.Eng.  
Approved By: M. Bassingthwaite, P.Eng.

LOCATION			100-Yr Design	SEWER DATA										
Name	From	To	Flow 'Q' L/s	Manning's 'n'	Length m	Slope %	Number of Culverts	Span (m)	Rise (m)	Pipe Capacity L/s	Velocity m/s	Time of flow Min.	Percent Full %	Check
Rowe Channel, Whitby	Upstream Victoria St. W	Downstream Victoria St. W	16020.0	0.013	41.0	0.24%	1	3.00	1.50	10682.9	2.37	0.29	150	SURCHARGED
Rowe Channel, Whitby	Downstream Victoria St. W	Upstream of Watson St. W	19940.0	0.013	271.0	0.46%	2	3.00	1.50	29619.8	3.29	1.37	67	OKAY
Rowe Channel, Whitby	Upstream of Watson St. W	Upstream of Front St. W	21900.0	0.013	240.4	0.29%	2	3.00	1.50	23365.2	2.60	1.54	94	OKAY
Rowe Channel, Whitby	Upstream of Front St. W	Outlet in Lake Ontario	21900.0	0.013	72.0	0.39%	2	3.00	1.50	27197.3	3.02	0.40	81	OKAY

**Intake Grate Capacity Check - Downstream of Victoria Street W**

100-Yr Design				Preliminary Grate Design									
Flow 'Q' L/s	Pipe Capacity L/s	Overland Conveyance L/s	Overland Conveyance cms	Intake Grate Length	Intake Grate Width (m)	Number of Grates	Total Grate Area (m <sup>2</sup> )	Openess Ratio *	Max Ponding Depth (m)	Orifice Coeff.	Equivalent Orifice Area (m <sup>2</sup> )	0% Blockage Capacity (cms)	50% Blockage (cms)
16020.00	10682.87	5337.13	5.34	1.5	2.5	2	7.5	0.8	0.50	0.80	6.00	15.03	7.52

\*Openess Ratio based on Standard Honeycomb Grate





**Alternative #4- Partial Channel Replacement excluding the Front Street W Crossing  
100 Year Storm Sewer Design Sheet**

Project No. 2021-006  
 Date 04-Jan-22  
 Design By: S. Rayner, P.Eng.  
 Approved By: M. Bassingthwaite, P.Eng.

LOCATION			100-Yr Design	SEWER DATA										
Name	From	To	Flow 'Q' L/s	Manning's 'n'	Length m	Slope %	Number of Culverts	Span (m)	Rise (m)	Pipe Capacity L/s	Velocity m/s	Time of flow Min.	Percent Full %	Check
Rowe Channel, Whitby	Upstream of Victoria St. W.	Upstream of Watson St. W	19940.0	0.013	336.4	0.37%	2	3.00	1.50	26585.2	2.95	1.90	75	OKAY
Rowe Channel, Whitby	Upstream of Watson St. W	Upstream of Front St. W	OPEN CHANNEL											
Rowe Channel, Whitby	Upstream of Front St. W	Outlet in Lake Ontario	21900.0	0.013	72.0	0.67%	1	3.00	1.20	12879.5	3.58	0.34	170	OH-NO

## Alternative #4- Open Channel Between Watson St W and Front St W

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	0.200 %
Bottom Width	7.00 m
Discharge	21,900.00 L/s
Results	
Normal Depth	1.63 m
Flow Area	11.4 m <sup>2</sup>
Wetted Perimeter	10.3 m
Hydraulic Radius	1.11 m
Top Width	7.00 m
Critical Depth	1.00 m
Critical Slope	0.857 %
Velocity	1.92 m/s
Velocity Head	0.19 m
Specific Energy	1.82 m
Froude Number	0.480
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 m
Length	0.0 m
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	0.00 m/s
Upstream Velocity	0.00 m/s
Normal Depth	1.63 m
Critical Depth	1.00 m
Channel Slope	0.200 %
Critical Slope	0.857 %



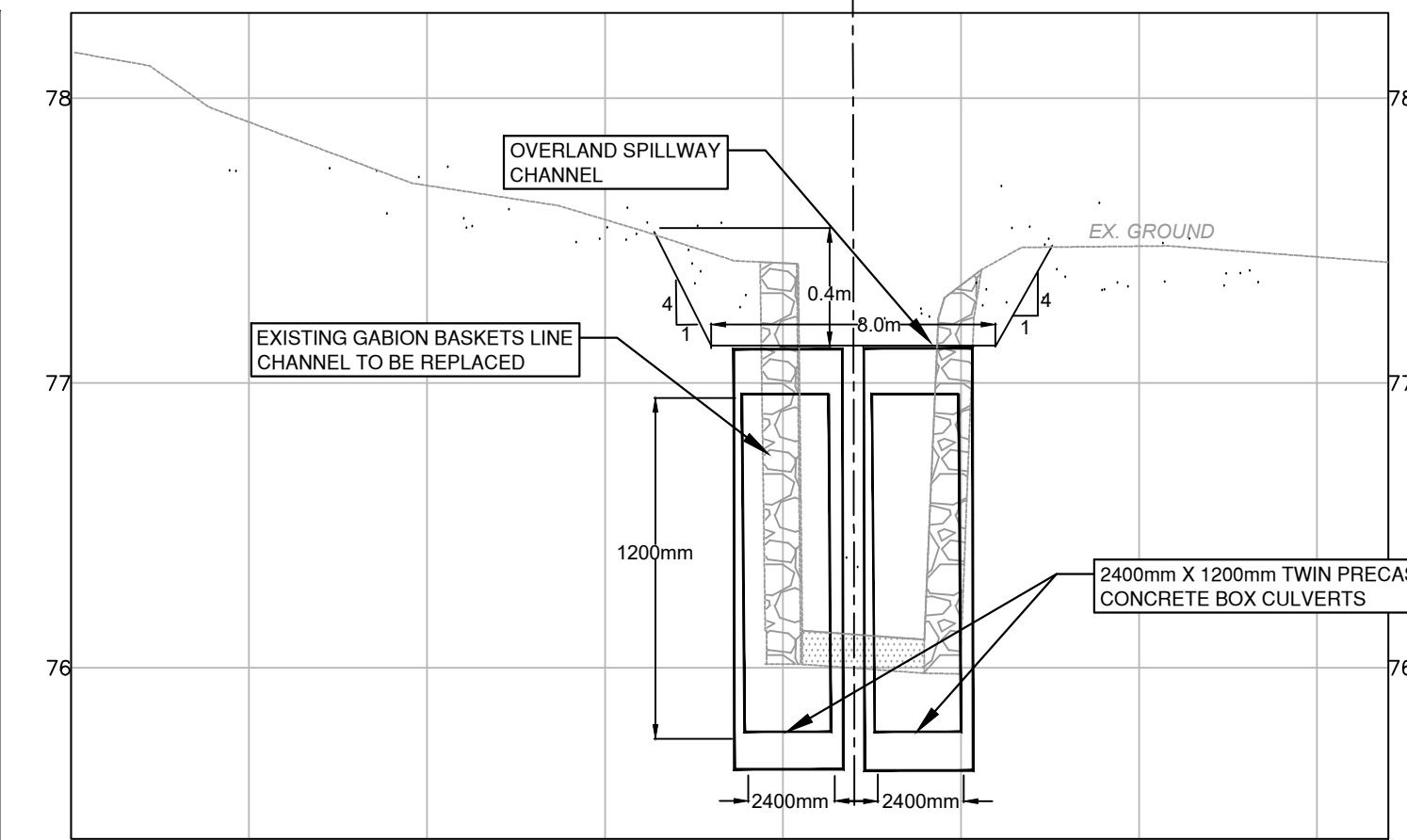
**Alternative #5- Open Channel with Armour Stone Protection  
100 Year Storm Sewer Design Sheet**

Project No. 2021-006  
 Date 04-Jan-22  
 Design By: S. Rayner, P.Eng.  
 Approved By: M. Bassingthwaite, P.Eng.

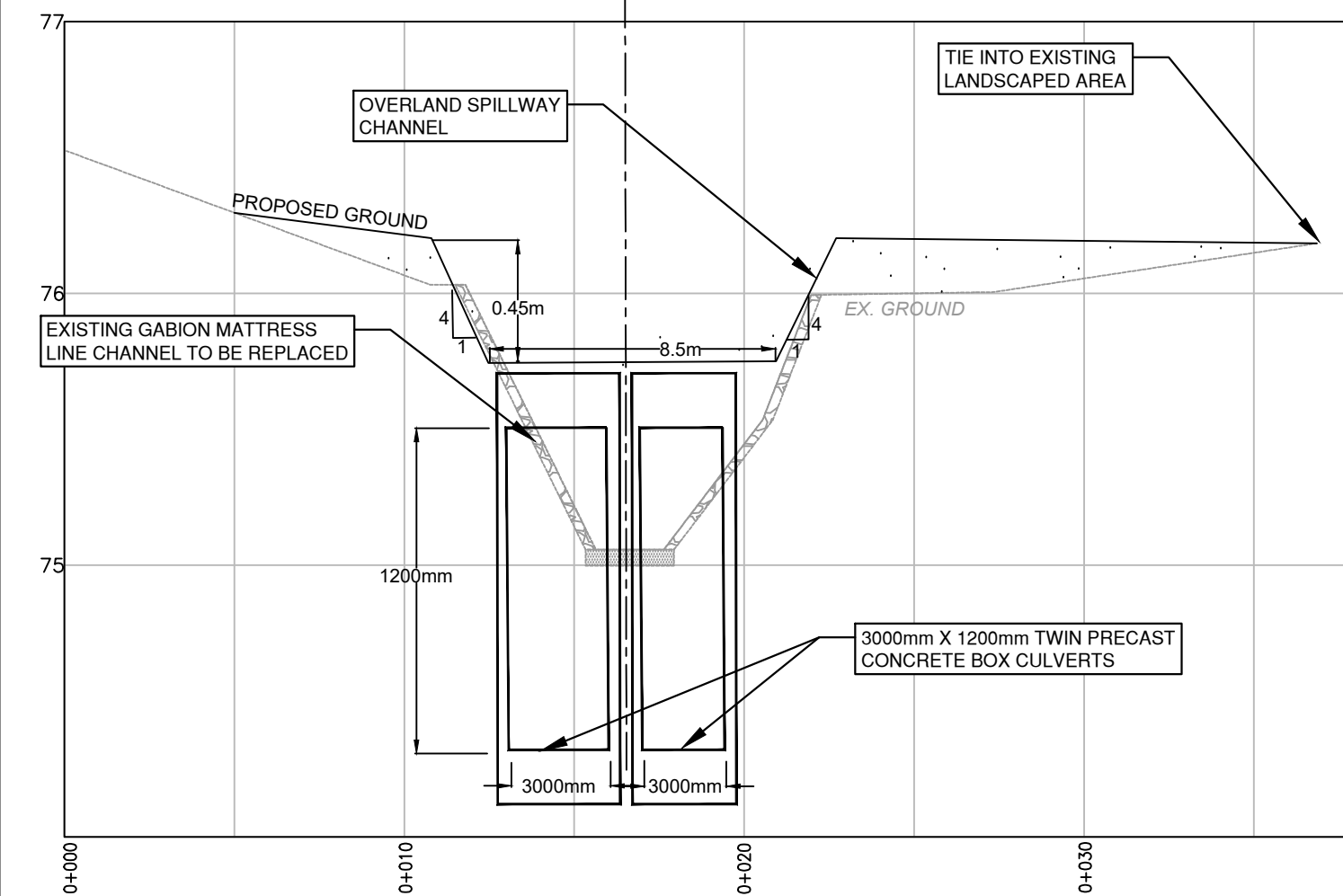
LOCATION			100-Yr Design	SEWER DATA										
Name	From	To	Flow 'Q' L/s	Manning's 'n'	Length m	Slope %	# of Barrels	Span (m)	Rise (m)	Pipe Capacity L/s	Velocity m/s	Time of flow Min.	Percent Full %	Check
Rowe Channel, Whitby	Upstream Victoria St. W	Downstream Victoria St. W	16019.0	0.013	41.0	0.24%	2	3.00	1.50	21366	2.37	0.29	75	OKAY
Rowe Channel, Whitby	Downstream Victoria St. W	Upstream of Watson St. W	19940.0	<b>Open Channel</b>										
Rowe Channel, Whitby	Upstream of Watson St. W	Downstream of Watson St. W	19940.0	0.013	24.4	0.16%	2	3.00	1.50	27692	3.08	0.13	72	OKAY
Rowe Channel, Whitby	Downstream of Watson St. W	Upstream of Front St. W	21900.0	<b>Open Channel</b>										
Rowe Channel, Whitby	Upstream of Front St. W	Outlet in Lake Ontario	21900.0	0.013	72.0	0.28%	2	3.00	1.50	23078	2.56	0.47	95	OKAY

## Alternative #5 - Open Channel Between Victoria St W and Watson St W

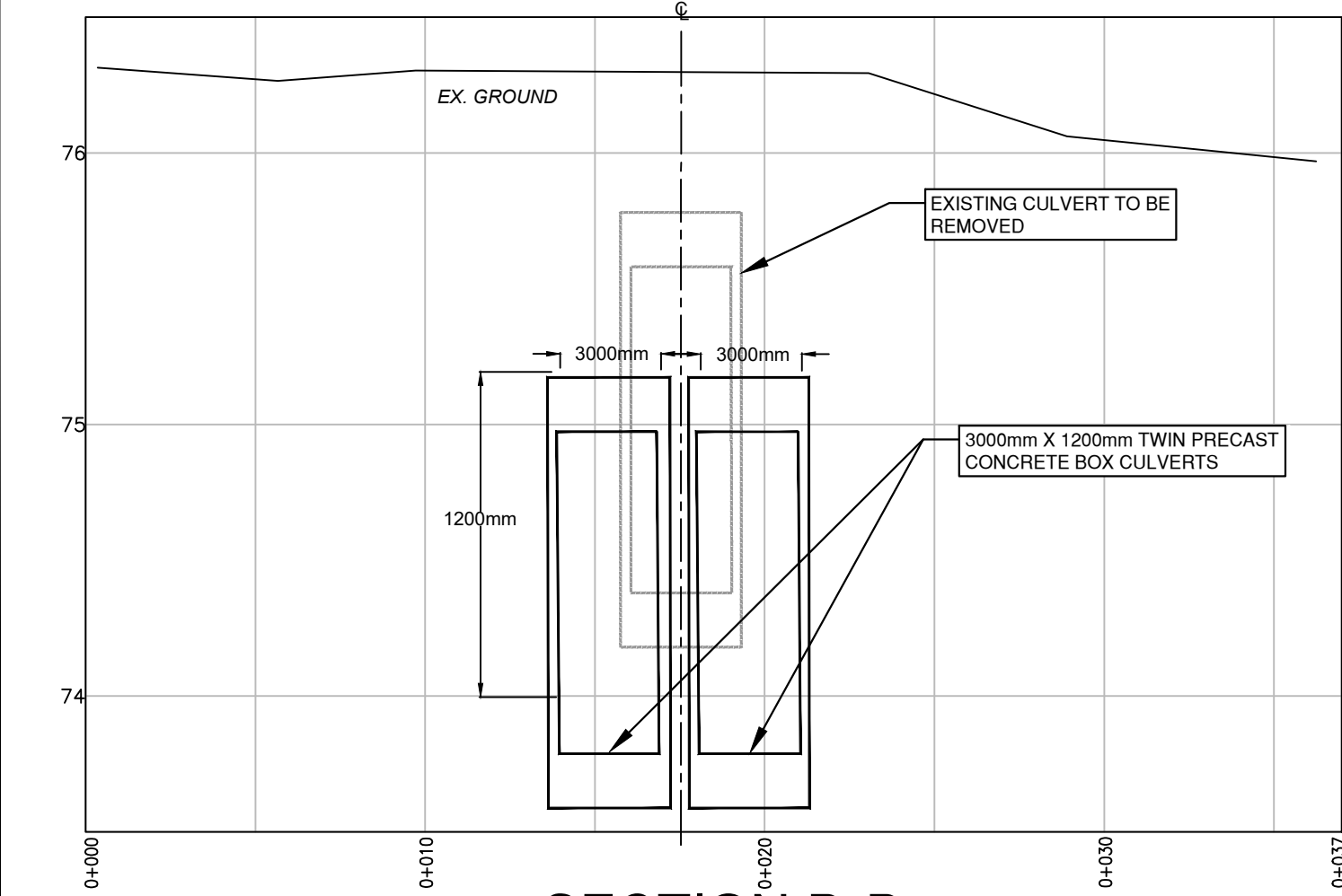
Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	0.390 %
Bottom Width	5.50 m
Discharge	19,940.00 L/s
Results	
Normal Depth	1.49 m
Flow Area	8.2 m <sup>2</sup>
Wetted Perimeter	8.5 m
Hydraulic Radius	0.96 m
Top Width	5.50 m
Critical Depth	1.10 m
Critical Slope	0.930 %
Velocity	2.44 m/s
Velocity Head	0.30 m
Specific Energy	1.79 m
Froude Number	0.639
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 m
Length	0.0 m
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	1.49 m
Critical Depth	1.10 m
Channel Slope	0.390 %
Critical Slope	0.930 %



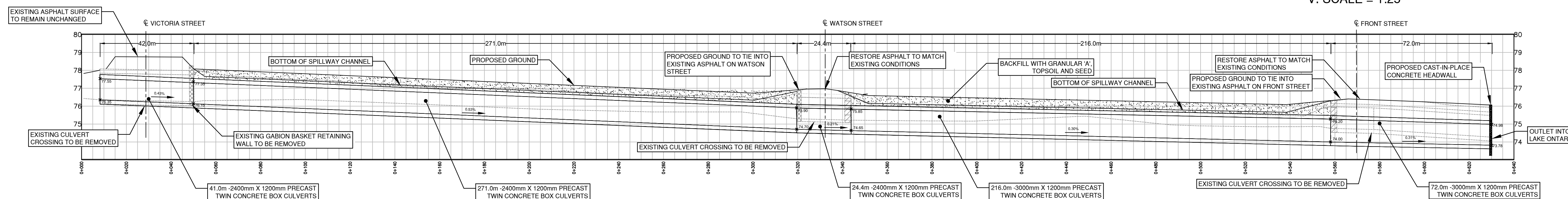
**SECTION B-B**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION C-C**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION D-D**  
H. SCALE = 1:200  
V. SCALE = 1:25



**SECTION A-A**  
H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.



LEGEND

➔ OVERLAND SPILL

NO.	DATE	BY	REVISIONS
1.	01/21/22	SEA	DRAFT ALTERNATIVE DESIGN FOR PROJECT FILE
1.	09/14/21	SEA	DRAFT ALTERNATIVE DESIGN FOR REVIEW

CAUTION: UTILITIES INVESTIGATIONS HAVE NOT BEEN COMPLETED AS PART OF THIS DRAWING PREPARATION. CONTRACTOR TO TAKE RESPONSIBILITY FOR ALL U/G & OVERHEAD UTILITIES.

RESILIENT ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING UTILITIES AS INDICATED ON THIS DRAWING.

SCALE  
1:1500  
OR AS SHOWN

DRAWN: SR	DATE: 2021 09 14
DESIGN: SR	DATE: 2021 09 14
CHECKED: MB	DATE: 2021 09 14
APPROVED: MB	DATE: 2021 09 14

**RESILIENT CONSULTING**  
214 CENTRE ST N  
WHITBY ON L1N 4T1  
289-943-4651  
info@resilientconsulting.ca

ROWE CHANNEL  
ALTERNATIVE 6- MAJOR MINOR FLOW SPLIT  
TOWN OF WHITBY

DRAWING NUMBER	PROJECT NUMBER	SHEET NUMBER
ALT-1	2021-006	1

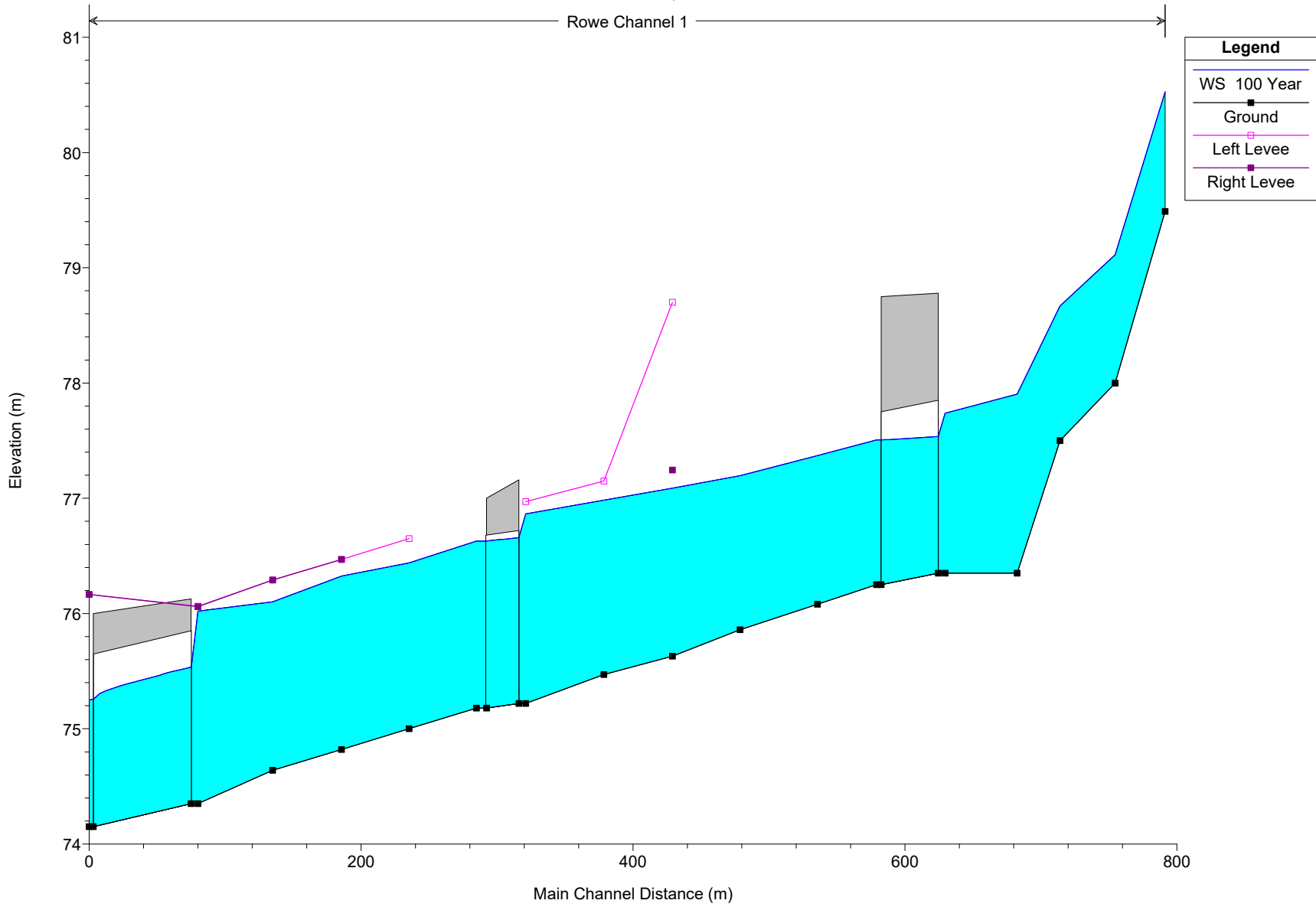
## Alternative #5 - Open Channel Between Watson St W and Front St W

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	0.360 %
Bottom Width	5.50 m
Discharge	21,900.00 L/s
Results	
Normal Depth	1.63 m
Flow Area	9.0 m <sup>2</sup>
Wetted Perimeter	8.8 m
Hydraulic Radius	1.02 m
Top Width	5.50 m
Critical Depth	1.17 m
Critical Slope	0.933 %
Velocity	2.44 m/s
Velocity Head	0.30 m
Specific Energy	1.94 m
Froude Number	0.610
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 m
Length	0.0 m
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	0.00 m/s
Upstream Velocity	0.00 m/s
Normal Depth	1.63 m
Critical Depth	1.17 m
Channel Slope	0.360 %
Critical Slope	0.933 %

Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

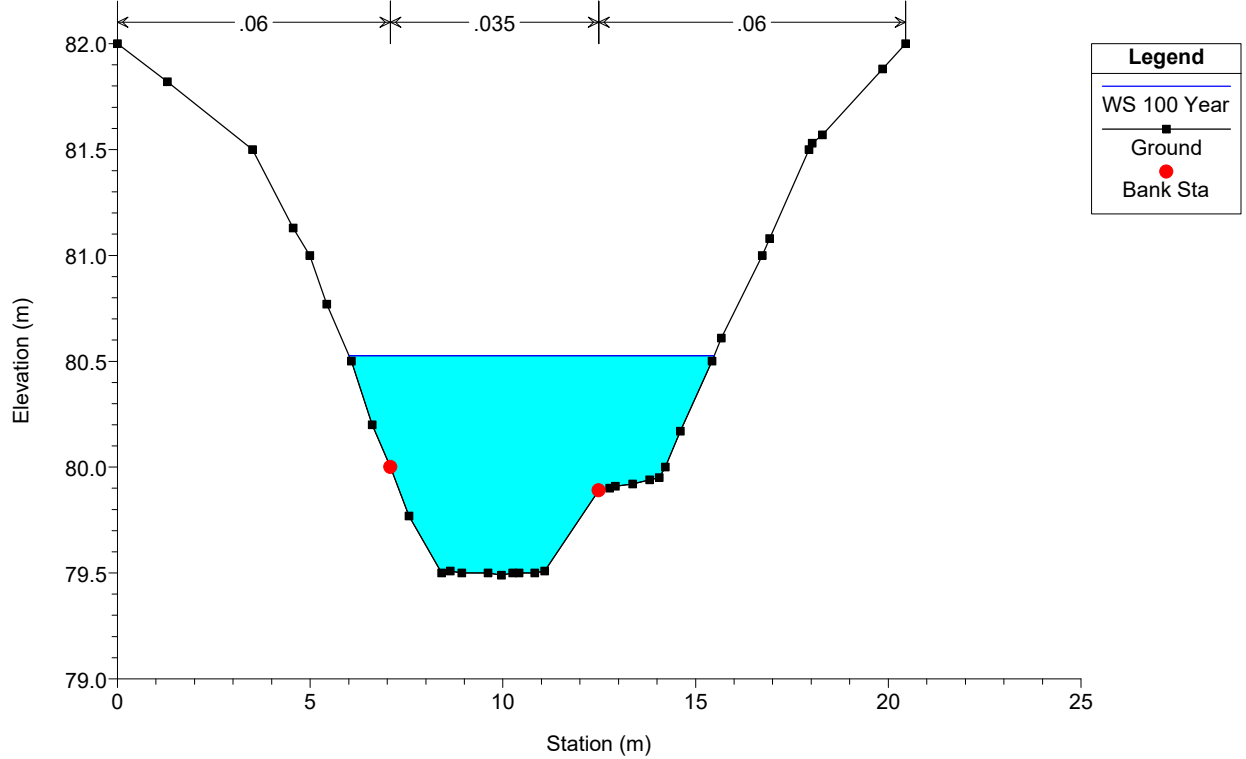
Rowe Channel 1



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

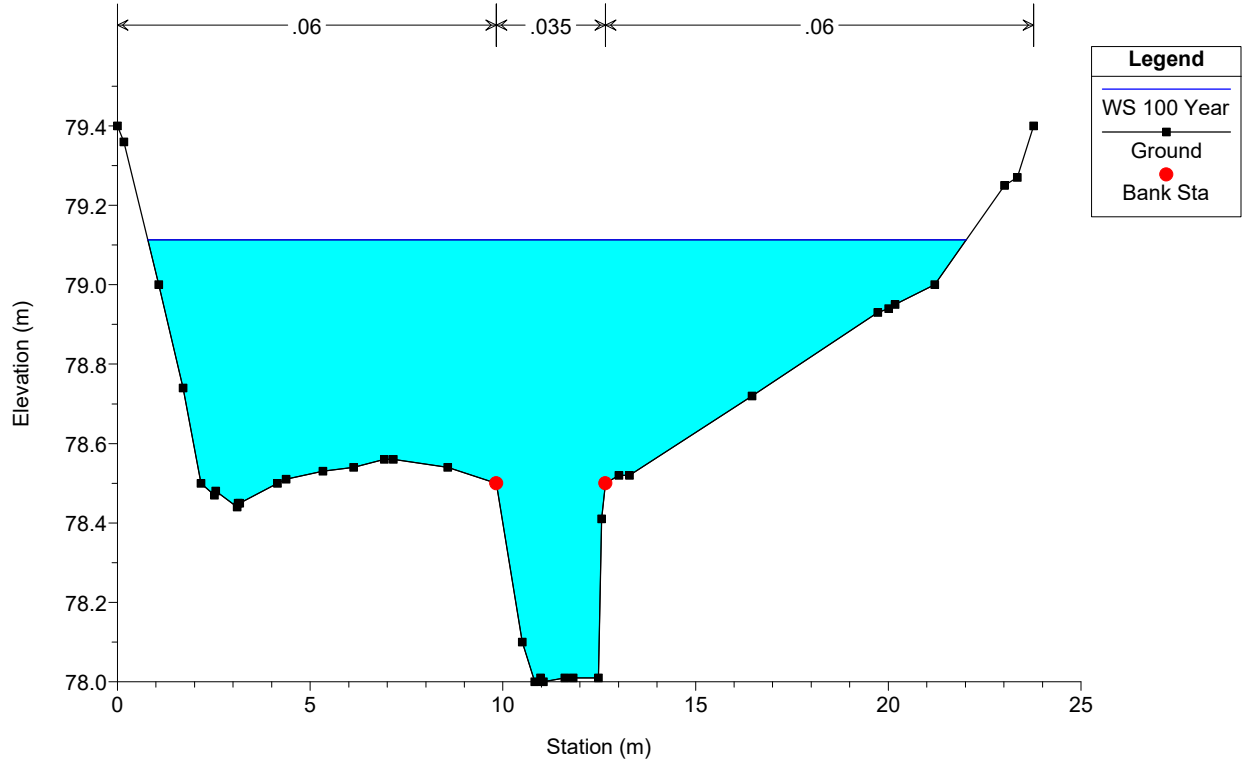
River = Rowe Channel Reach = 1 RS = 855.4 Resilient Consulting December 2019



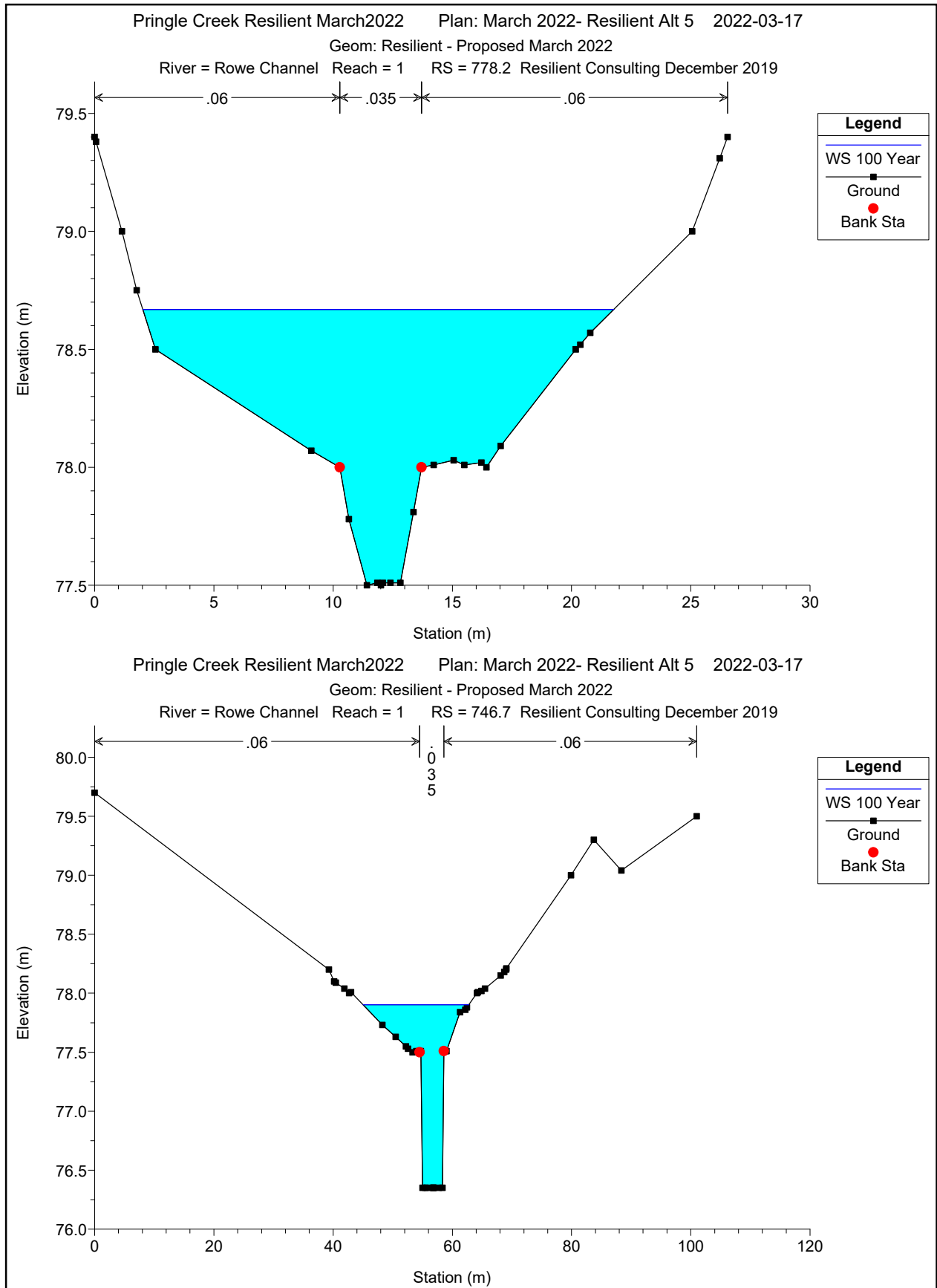
Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

River = Rowe Channel Reach = 1 RS = 818.6 Resilient Consulting December 2019



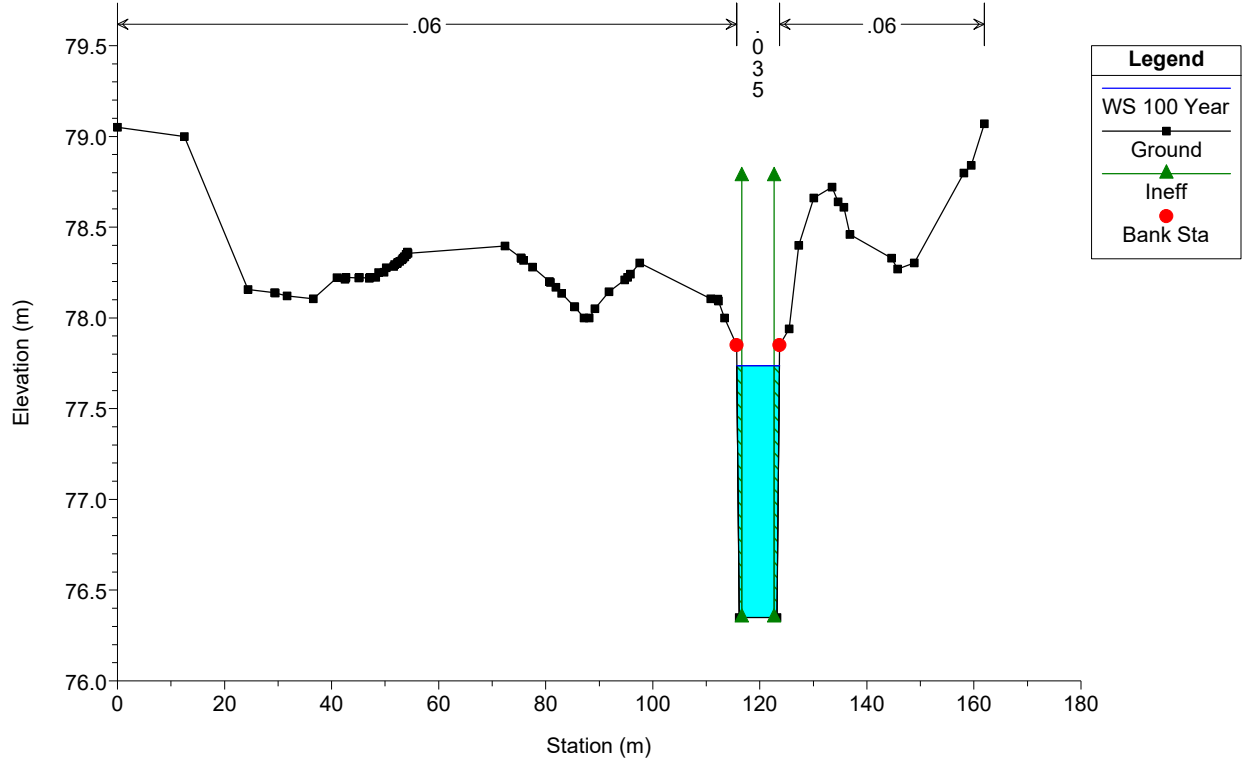




Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

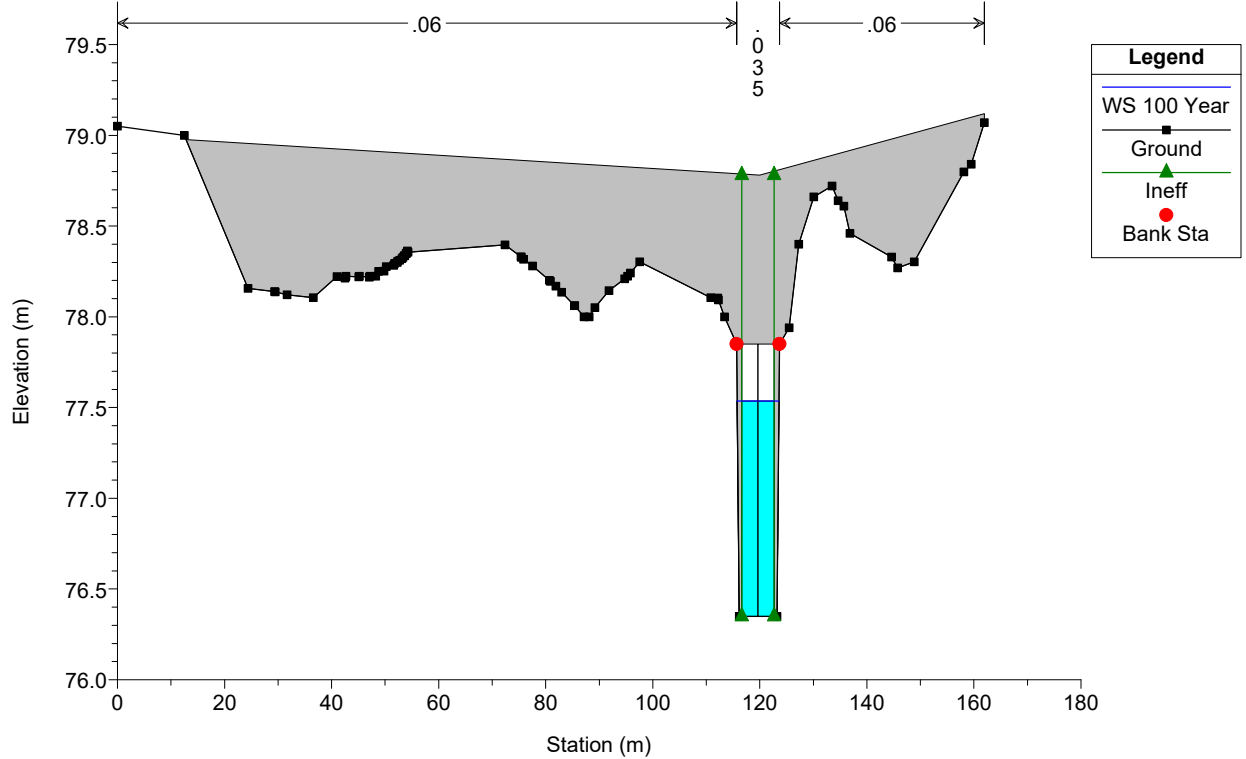
River = Rowe Channel Reach = 1 RS = 694.2 Victoria Street Culvert- US Section



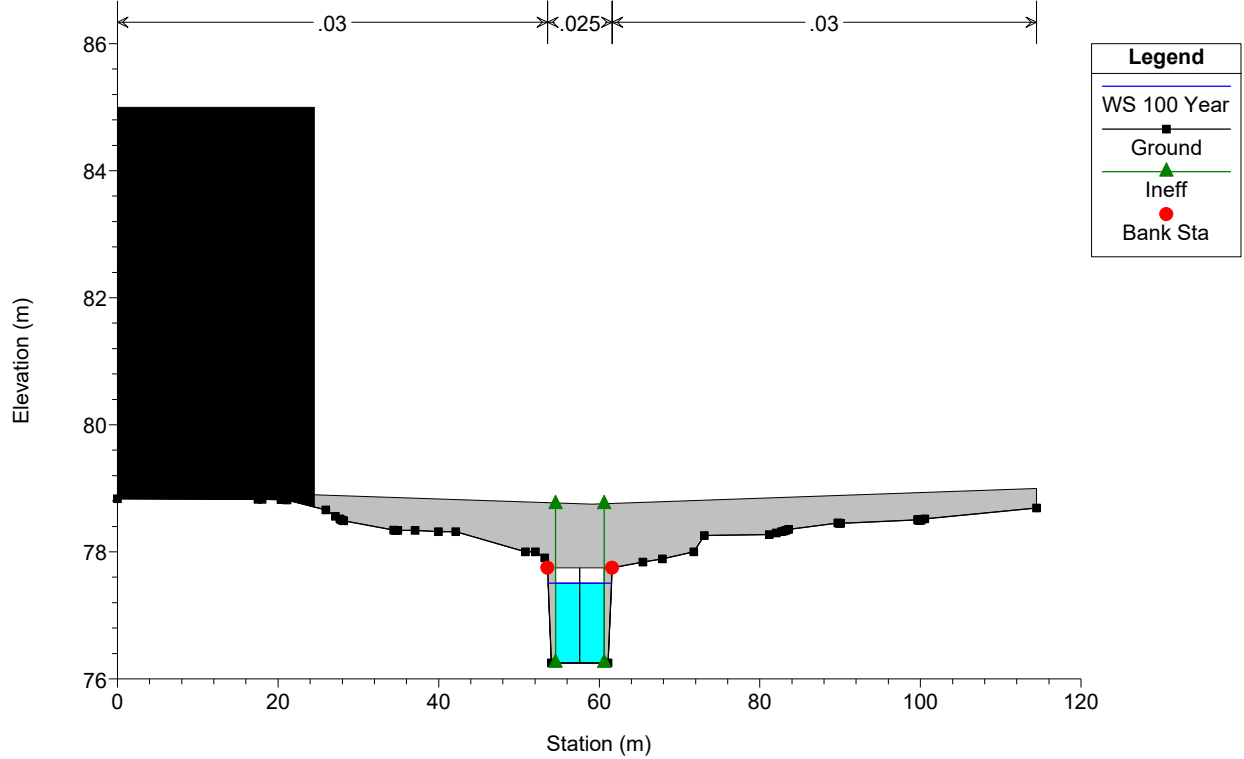
Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

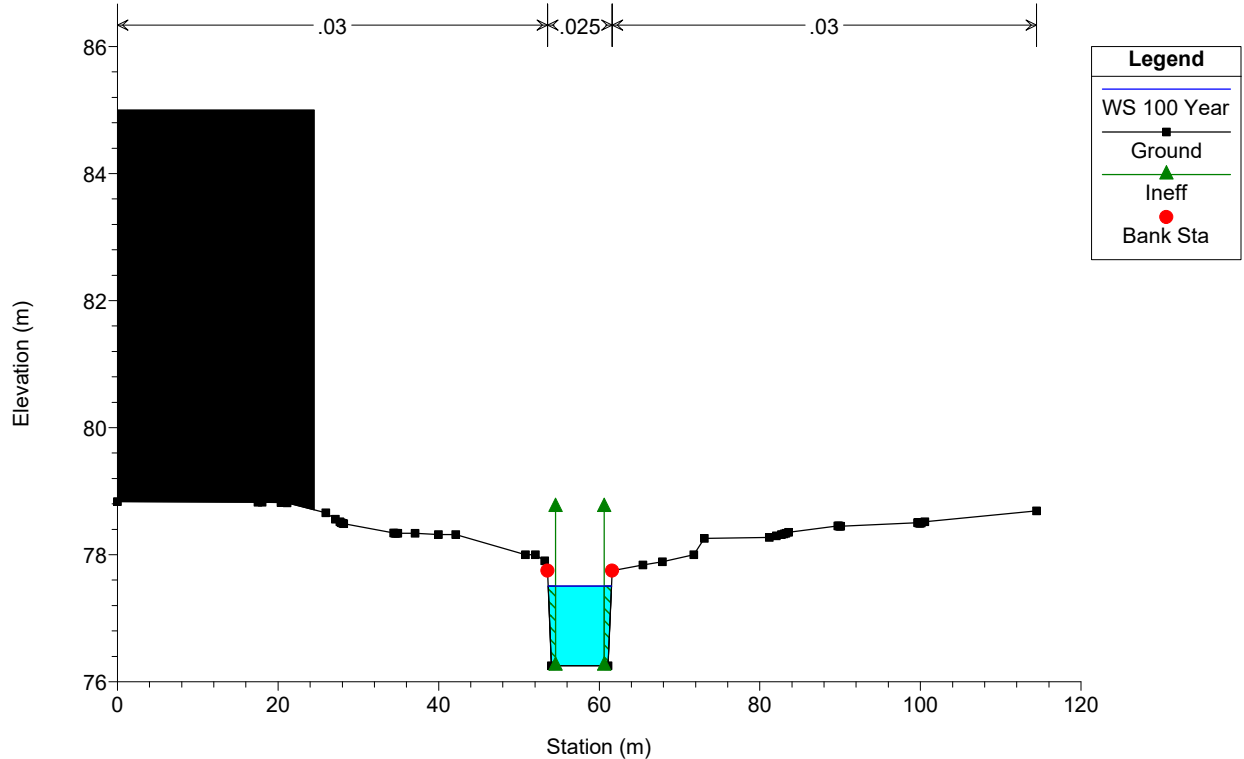
River = Rowe Channel Reach = 1 RS = 680 Culv #S32 (Victoria Street Culvert Crossing)



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17  
 Geom: Resilient - Proposed March 2022  
 River = Rowe Channel Reach = 1 RS = 680 Culv #S32 (Victoria Street Culvert Crossing)



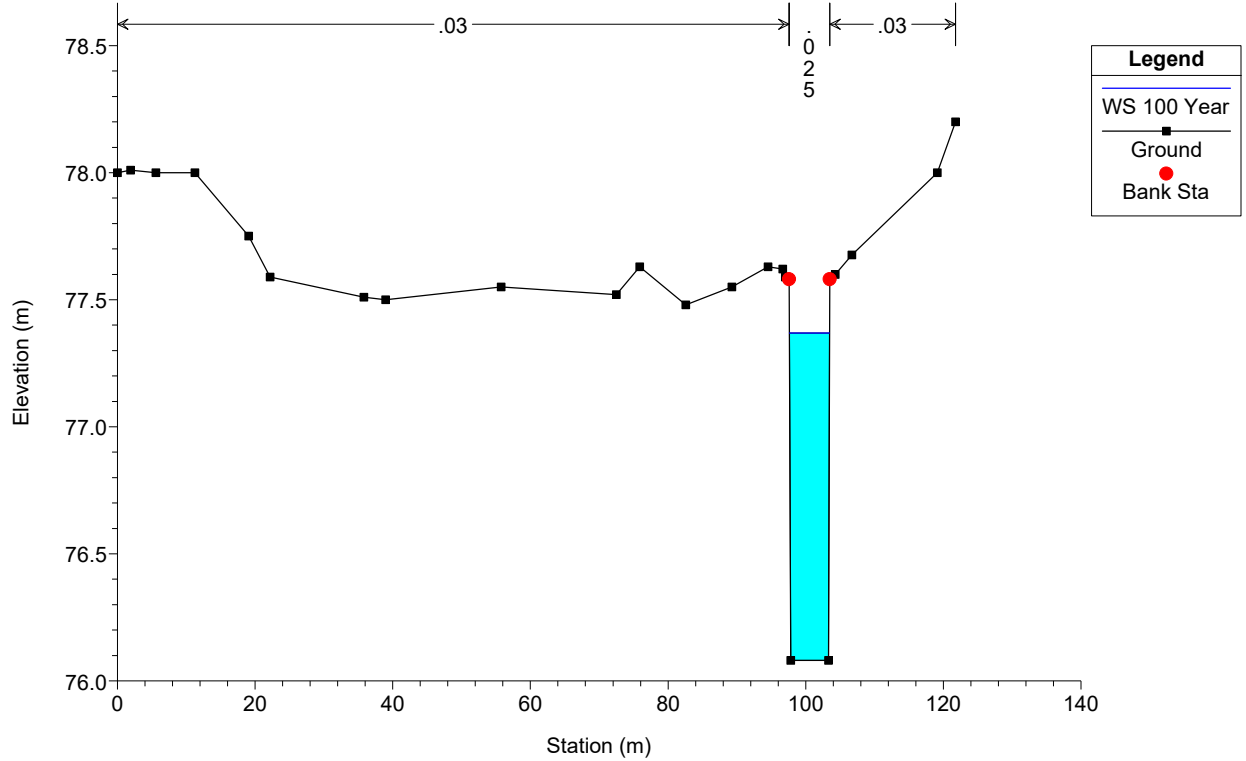
Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17  
 Geom: Resilient - Proposed March 2022  
 River = Rowe Channel Reach = 1 RS = 643.1 Victoria Street Culvert - DS Section



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

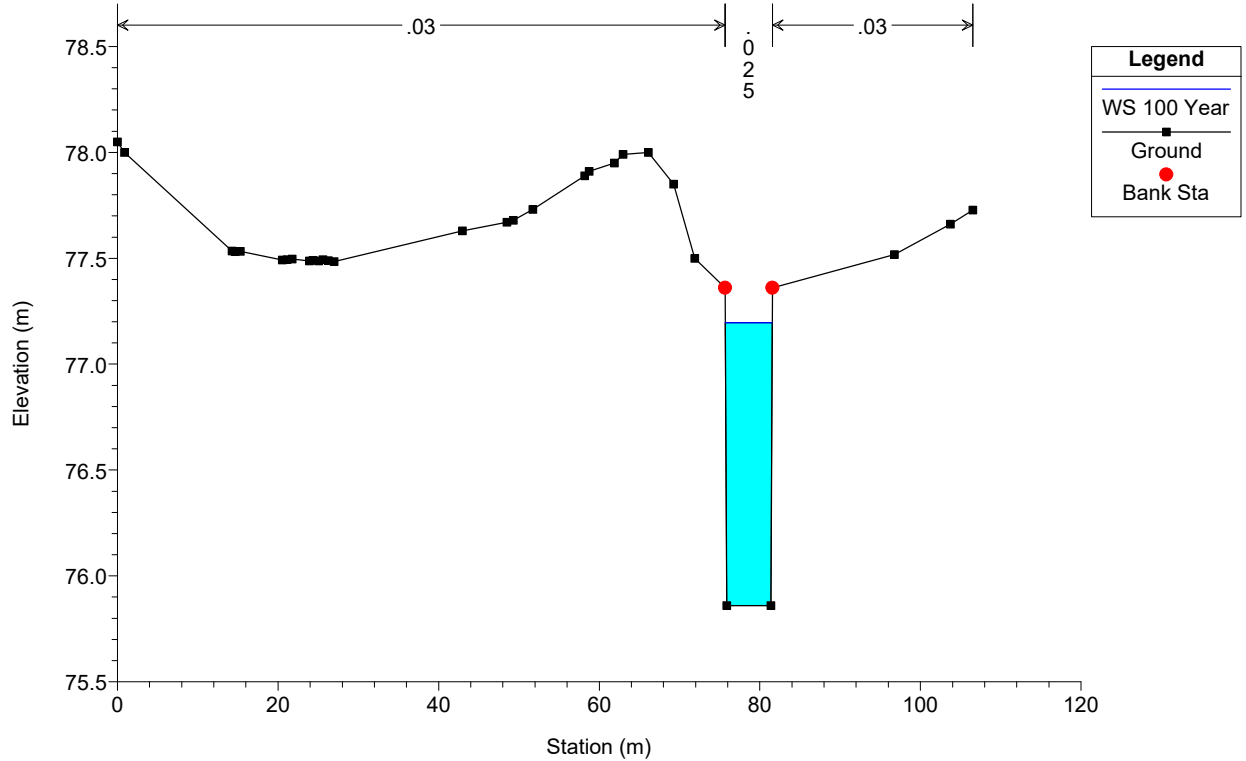
River = Rowe Channel Reach = 1 RS = 600.00 March 2022- Resilient Consulting



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

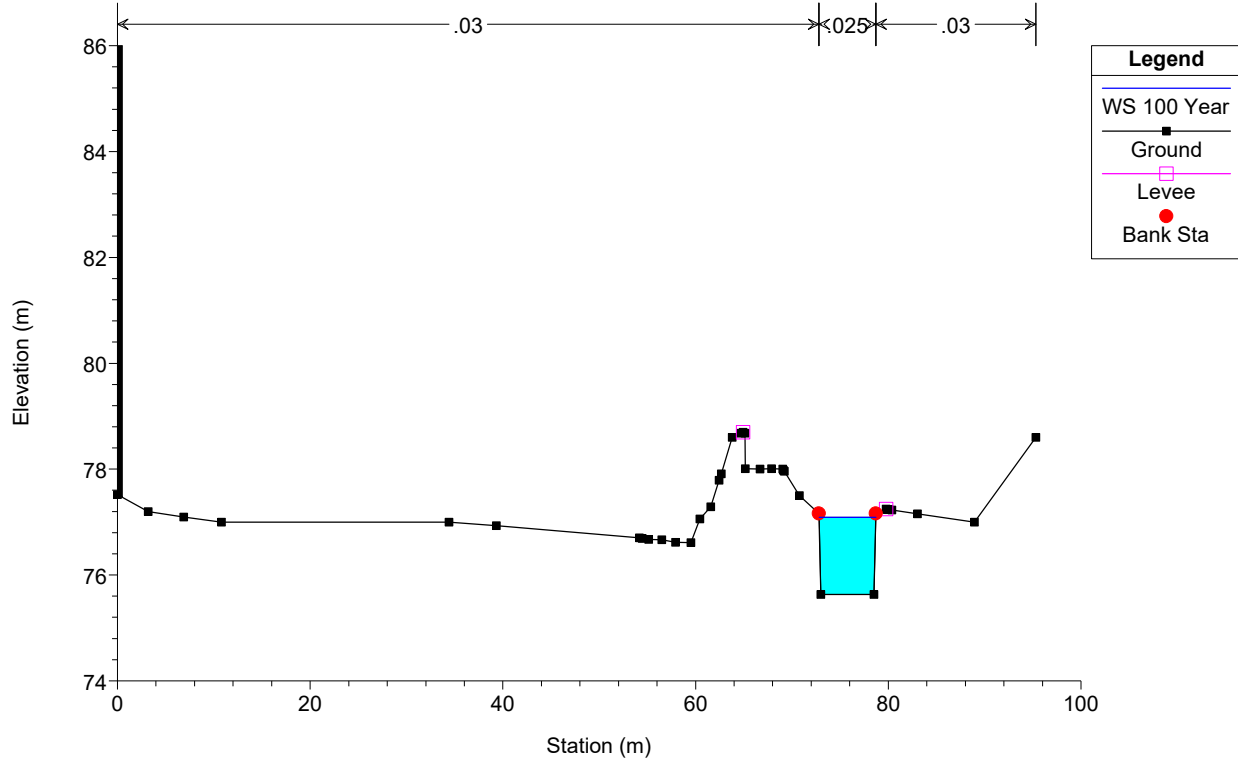
River = Rowe Channel Reach = 1 RS = 542.9 March 2022- Resilient Consulting



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

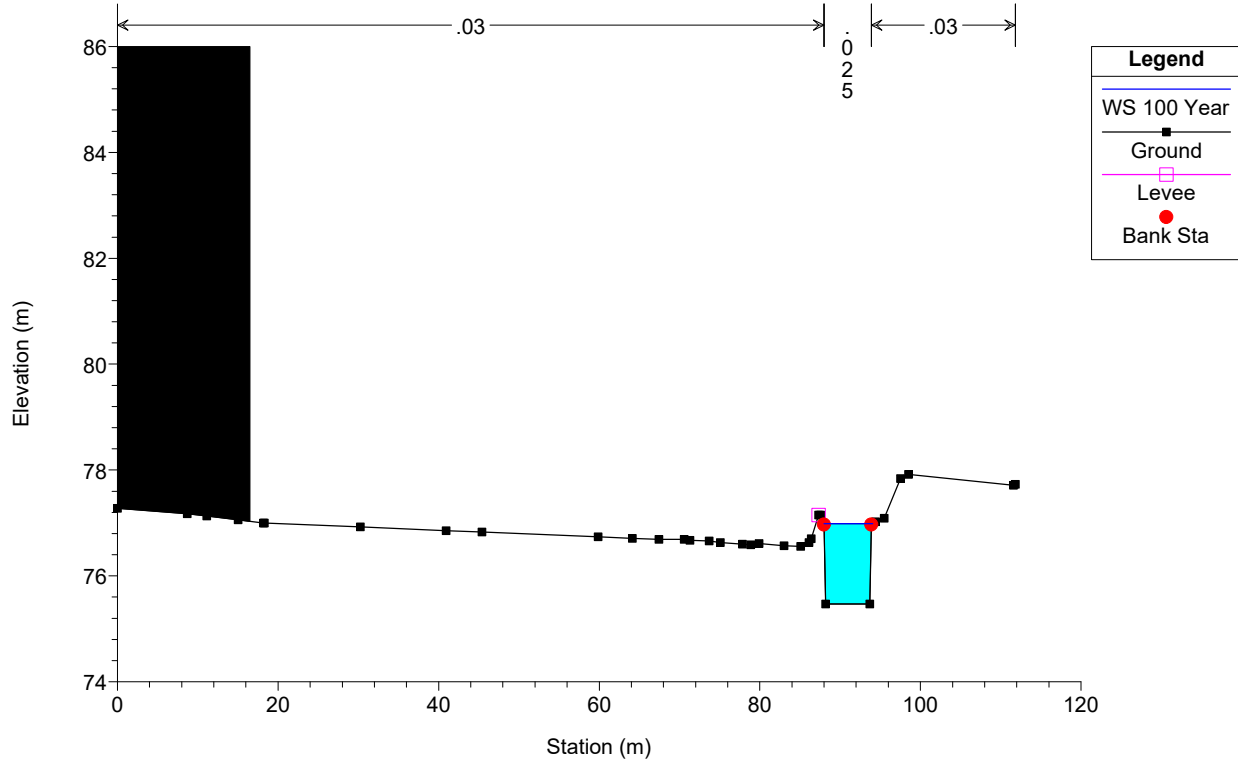
River = Rowe Channel Reach = 1 RS = 493.2 March 2022- Resilient Consulting

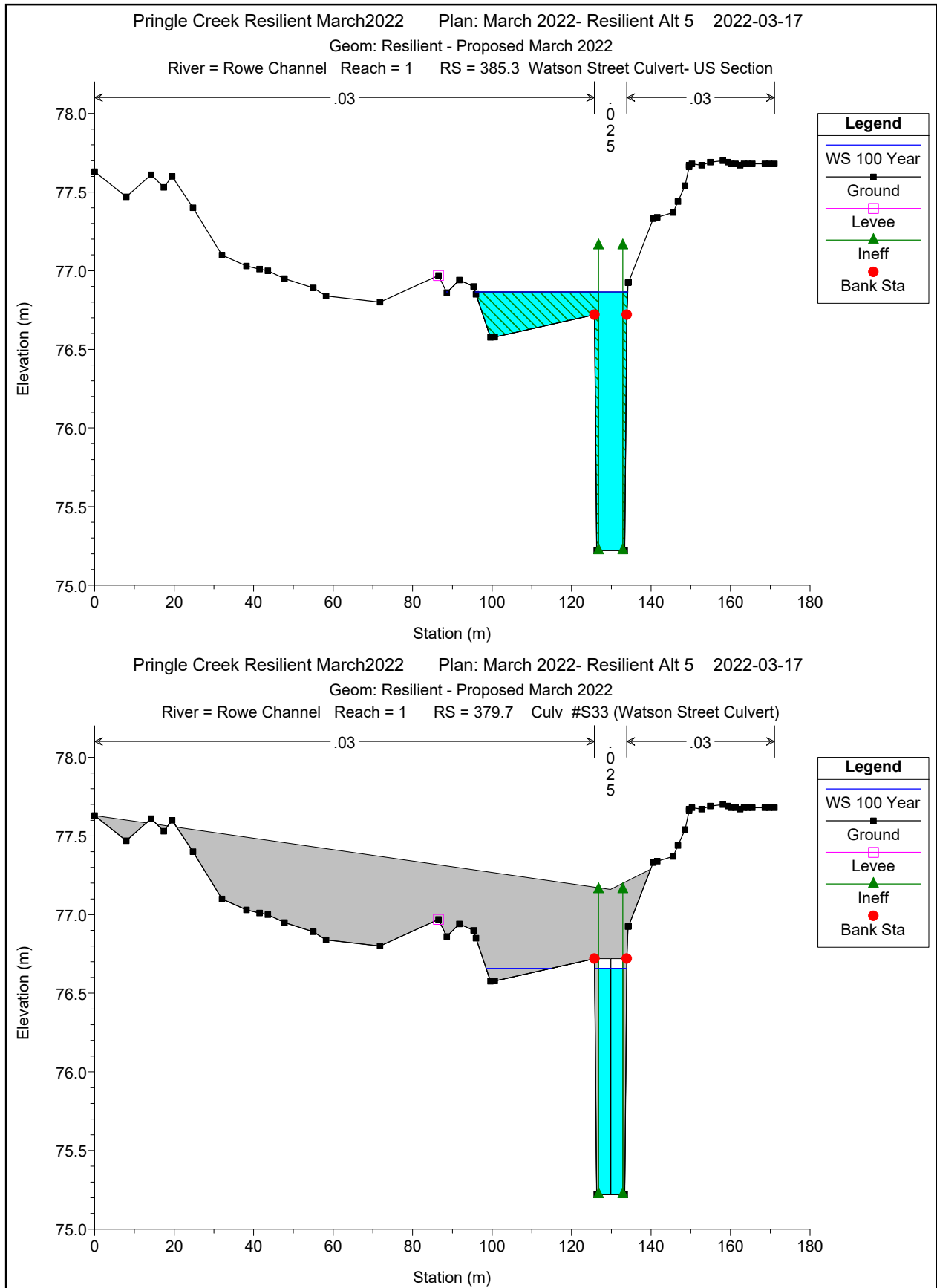


Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

River = Rowe Channel Reach = 1 RS = 442.8 March 2022- Resilient Consulting

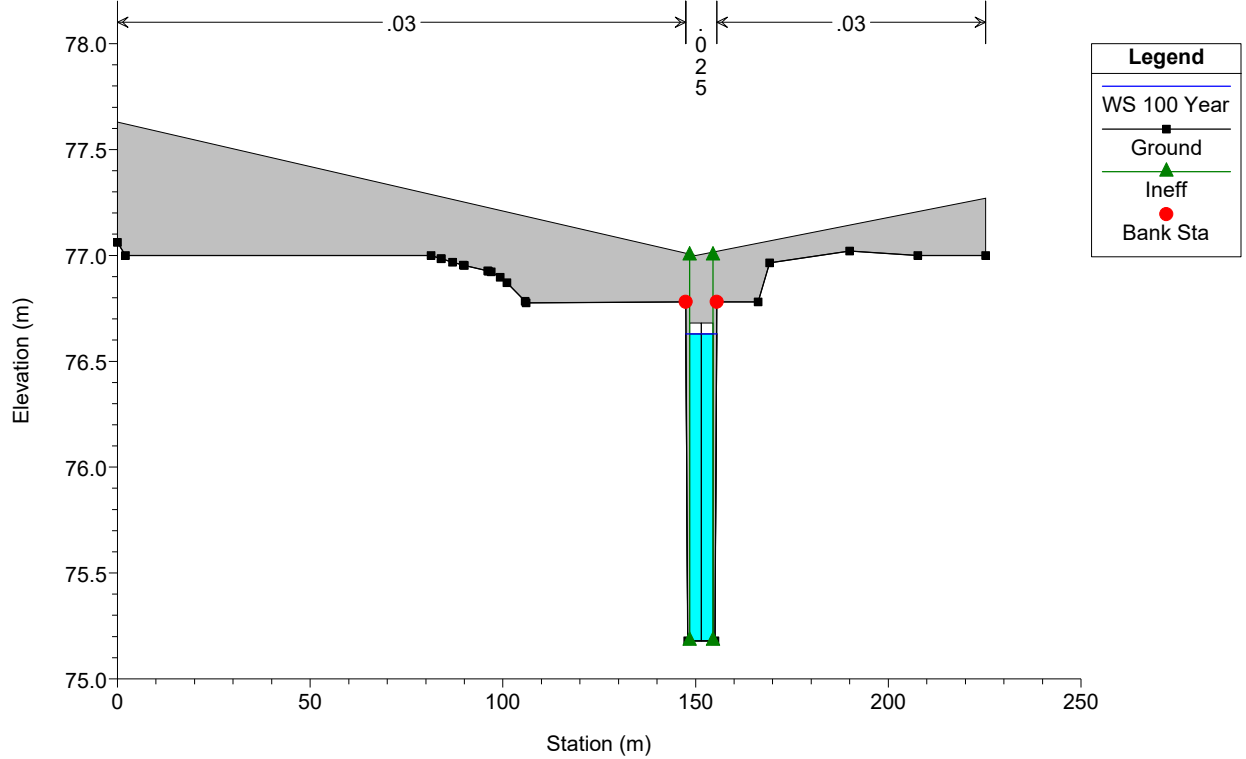




Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

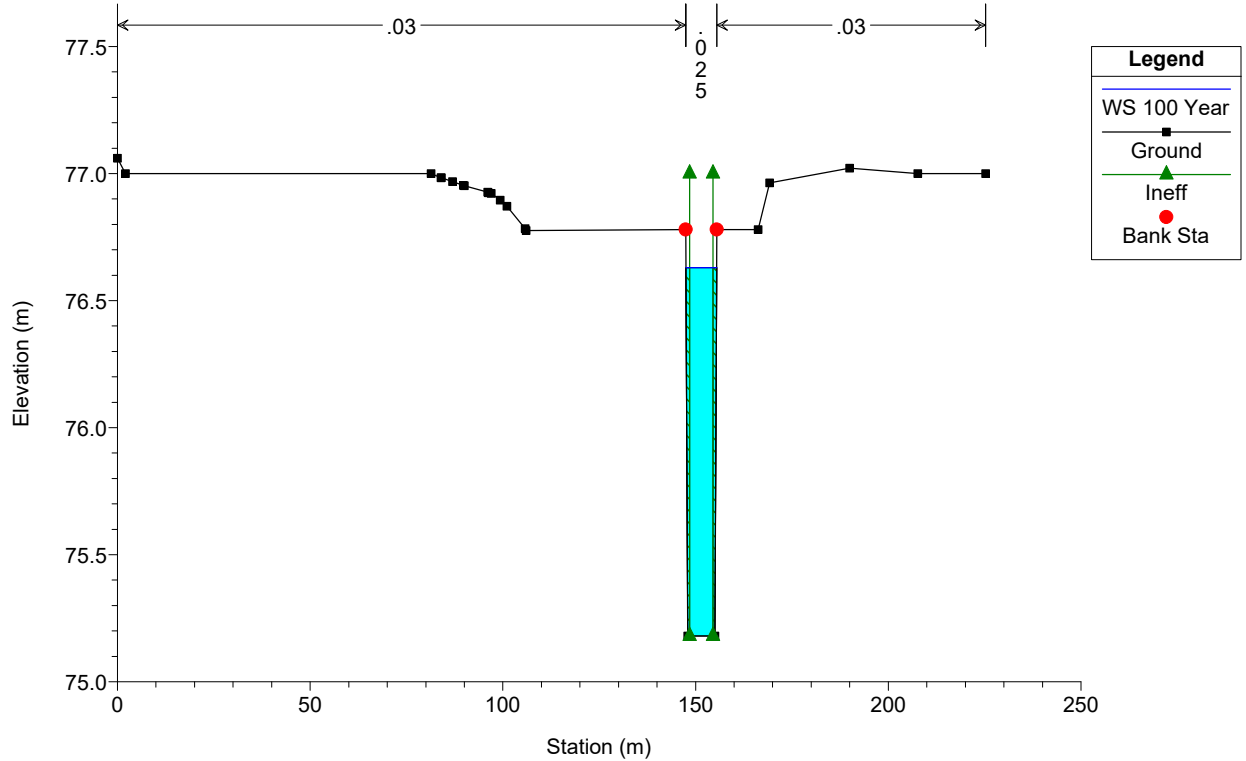
River = Rowe Channel Reach = 1 RS = 379.7 Culv #S33 (Watson Street Culvert)



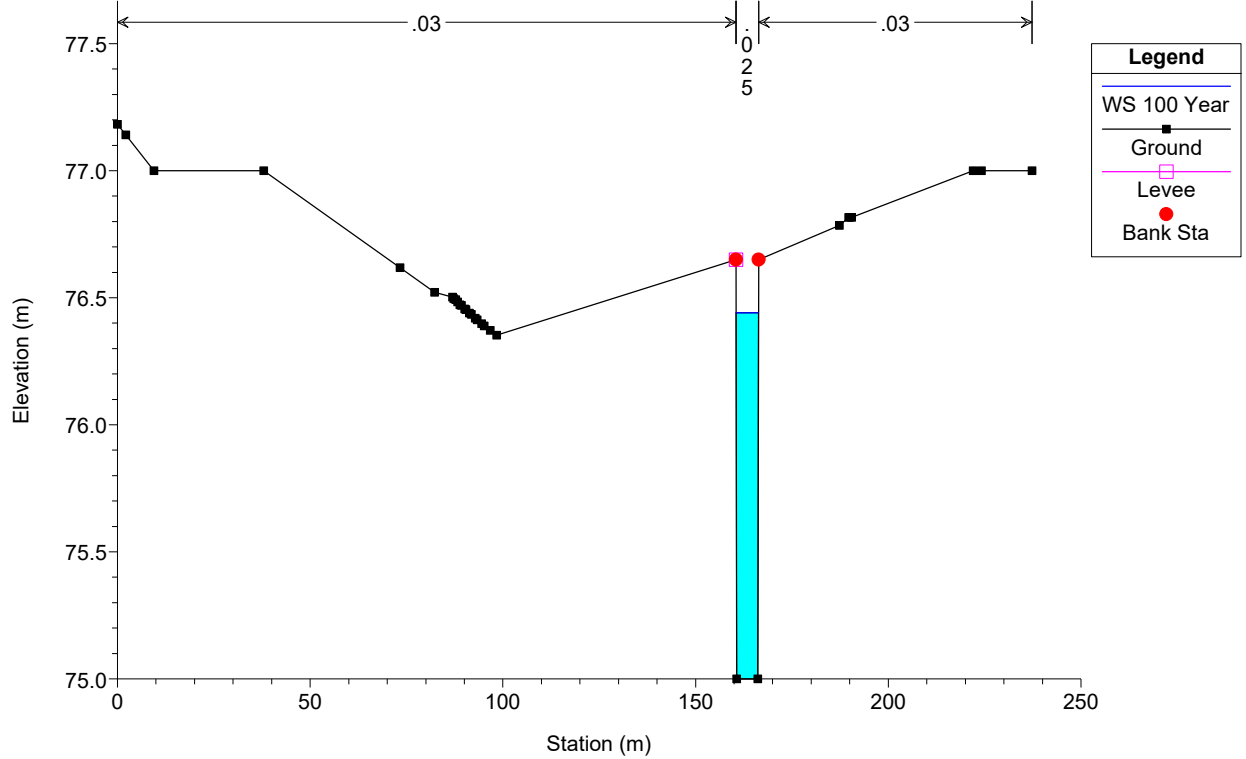
Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

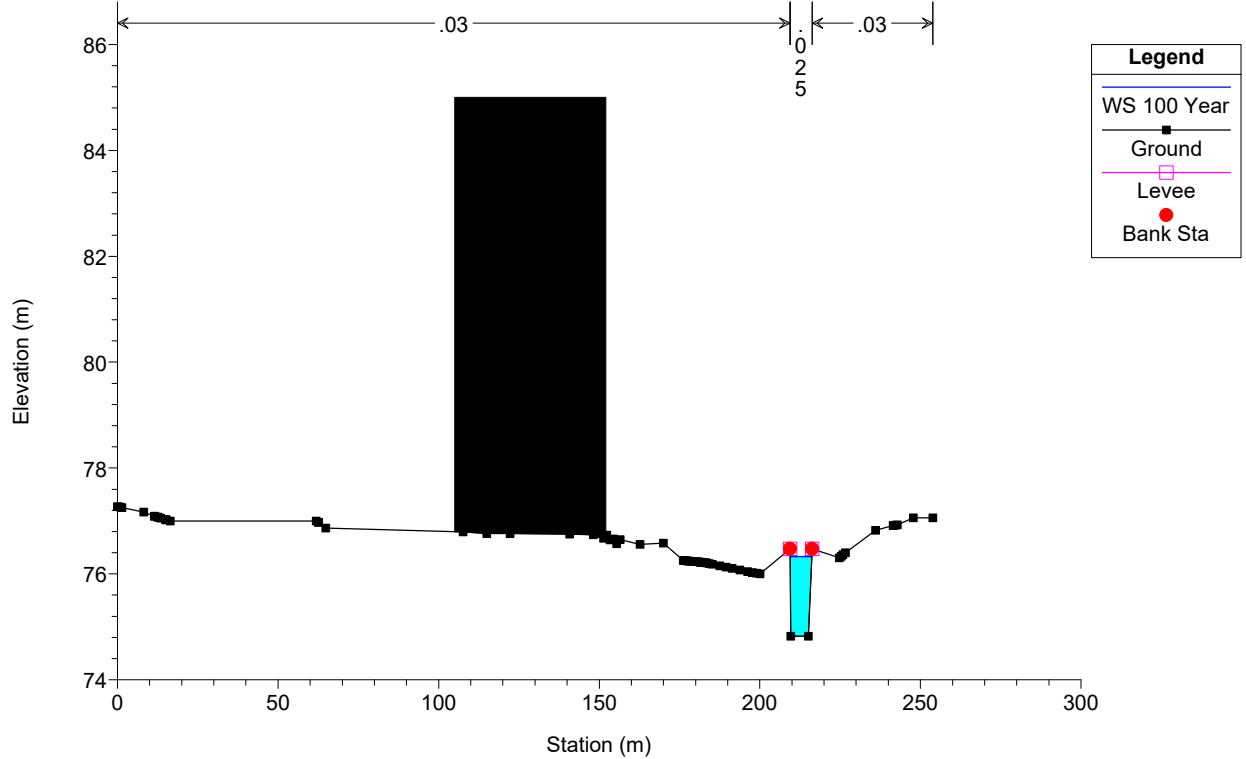
River = Rowe Channel Reach = 1 RS = 349.1 Watson Street Culvert- Downstream Section



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17  
 Geom: Resilient - Proposed March 2022  
 River = Rowe Channel Reach = 1 RS = 299.5 March 2022- Resilient Consulting



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17  
 Geom: Resilient - Proposed March 2022  
 River = Rowe Channel Reach = 1 RS = 249.8 Geometry Updates:

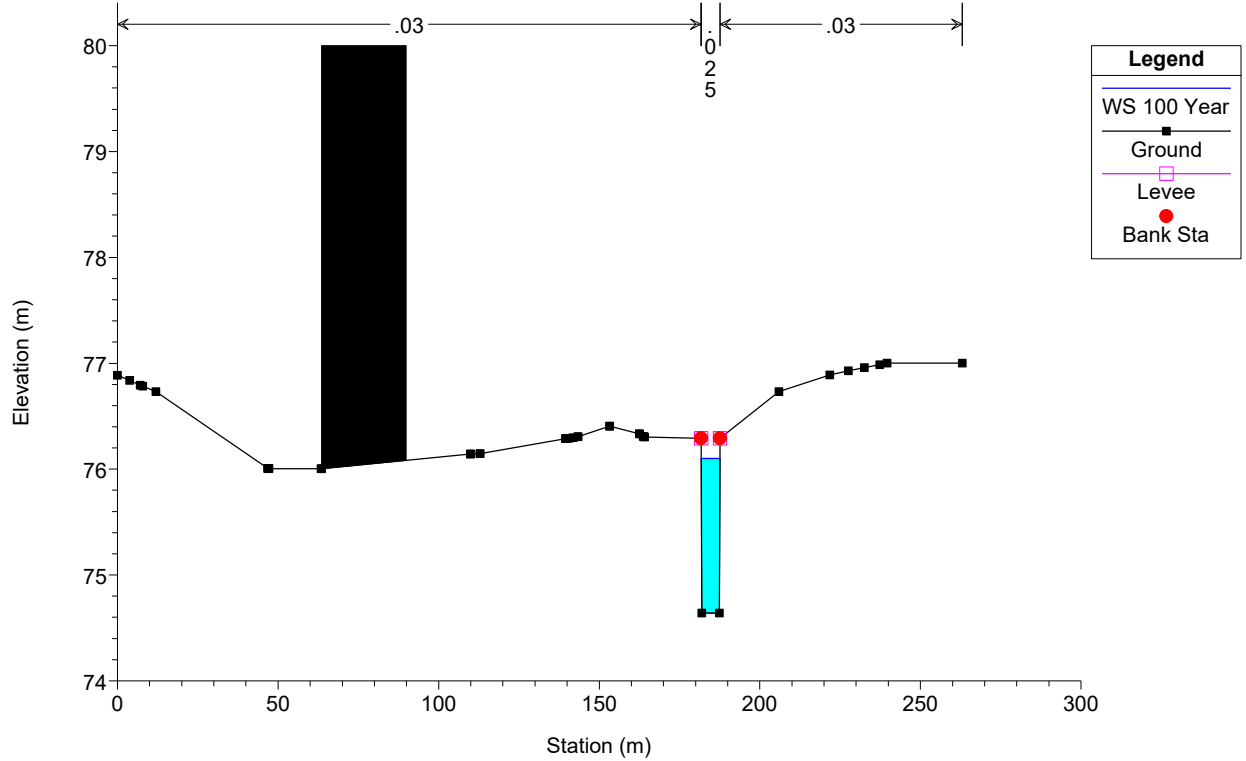




Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

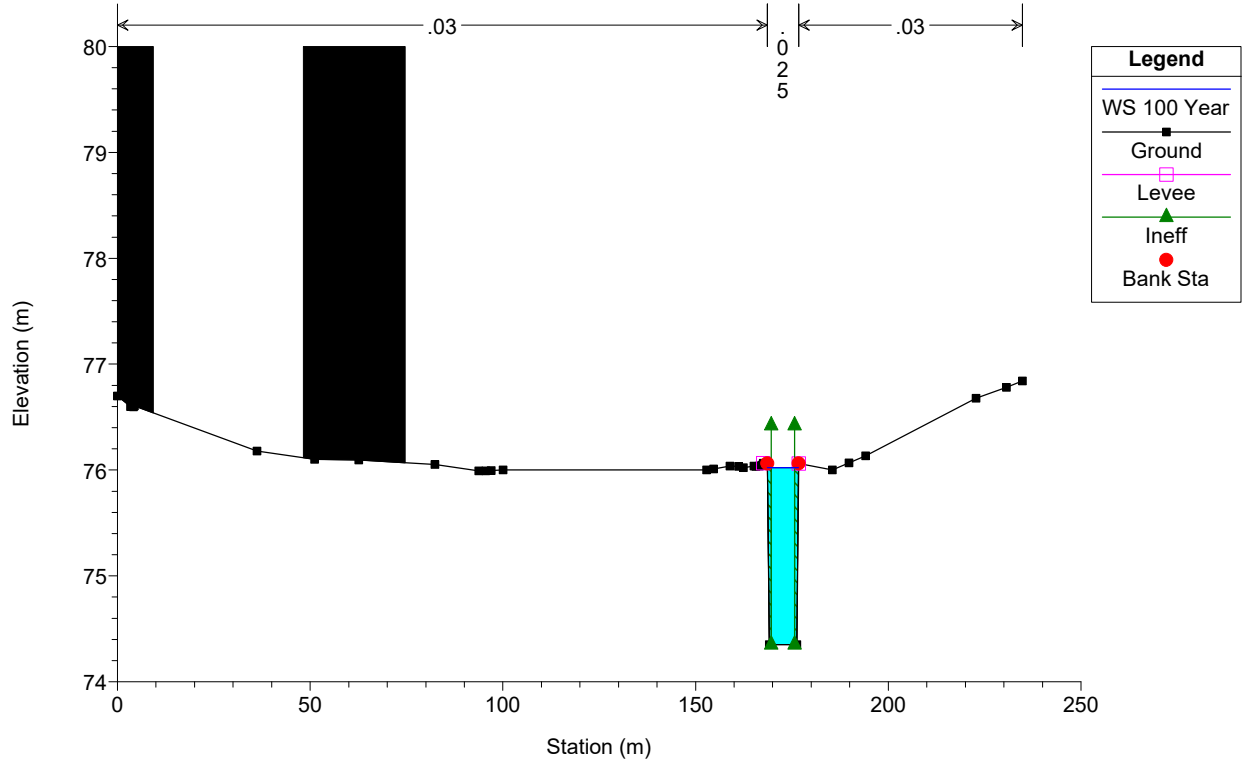
River = Rowe Channel Reach = 1 RS = 199.1 March 2022- Resilient Consulting



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

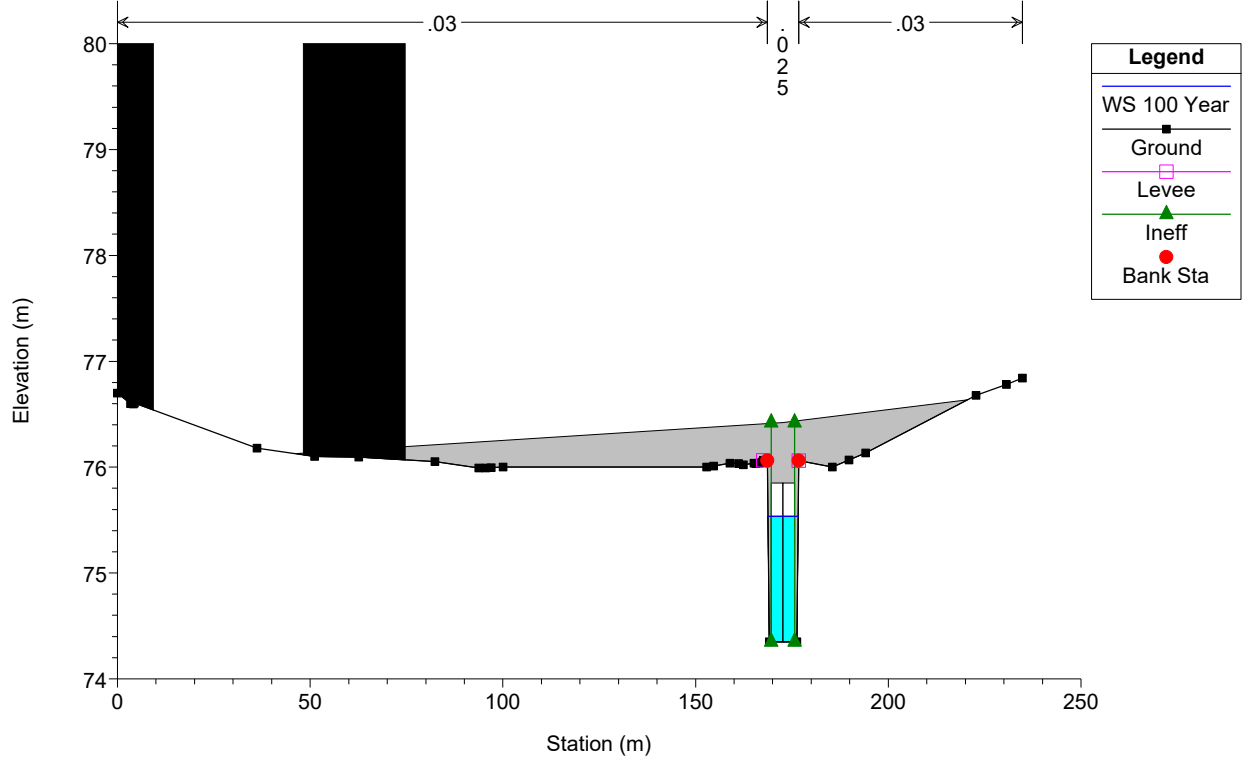
River = Rowe Channel Reach = 1 RS = 144.2 Front Street Culvert - Upstream Section



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

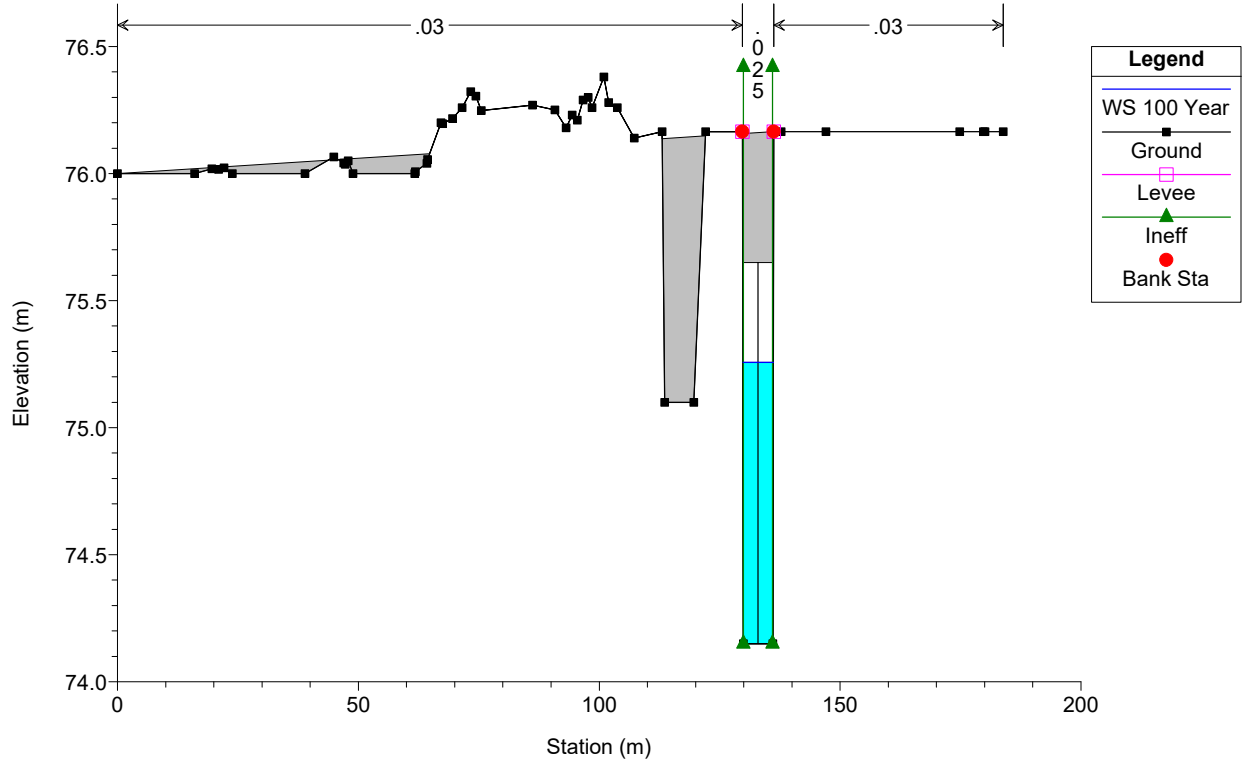
River = Rowe Channel Reach = 1 RS = 138.5 Culv #S34 (Front Street Culvert)



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

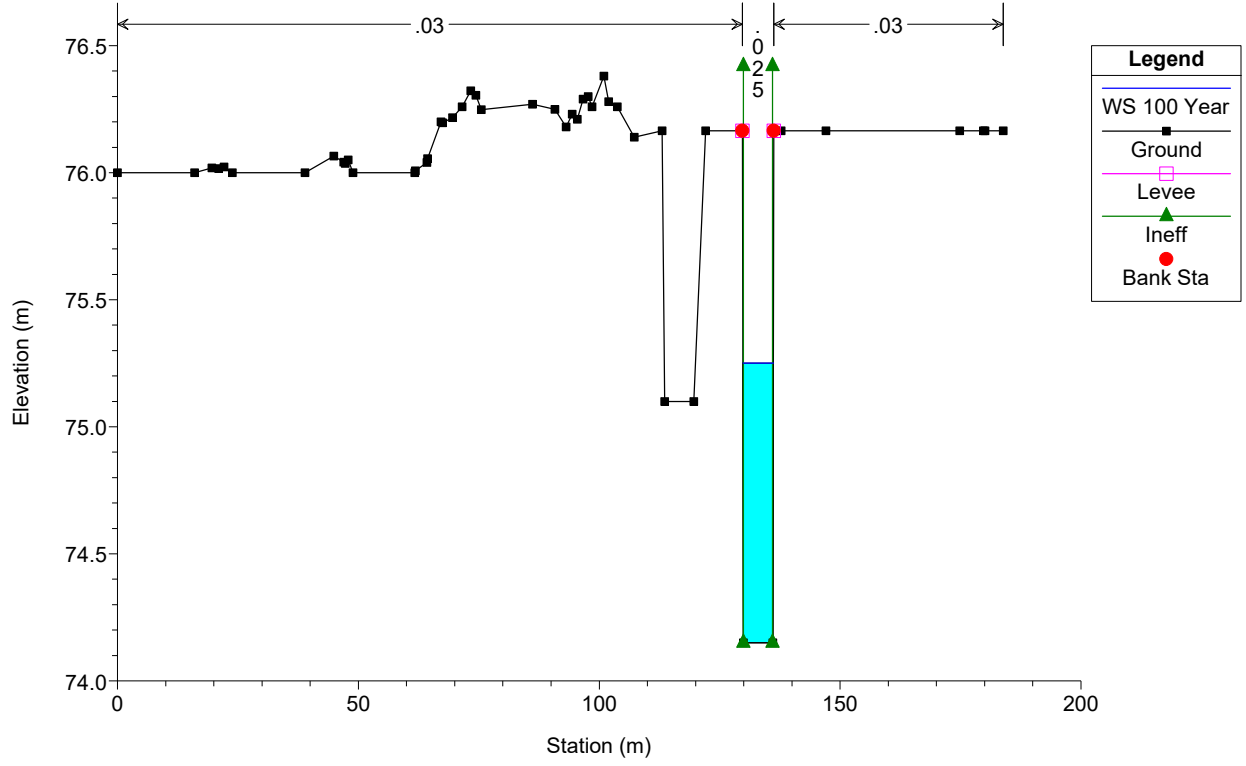
River = Rowe Channel Reach = 1 RS = 138.5 Culv #S34 (Front Street Culvert)



Pringle Creek Resilient March2022 Plan: March 2022- Resilient Alt 5 2022-03-17

Geom: Resilient - Proposed March 2022

River = Rowe Channel Reach = 1 RS = 64.2 Front Street Culvert- DS Section





**Alternative #6- Major- Minor Split  
100 Year Storm Sewer Design Sheet**

Project No. 2021-006  
 Date 04-Jan-22  
 Design By: S. Rayner, P.Eng.  
 Approved By: M. Bassingthwaite, P.Eng.

Location			Sewer Data												
Name	From	To	25-Yr Design Flow Q L/s	100-Yr Design Flow Q L/s	Manning's 'n'	Length m	Slope %	Number of Barrels	Span (m)	Rise (m)	Pipe Capacity L/s	Velocity m/s	Minor Conveyance in Pipe Network L/s	Major Conveyance Overland L/s	Overland Conveyance Route
Rowe Channel, Whitby	Upstream Victoria St. W	Downstream Victoria St. W	12563	16019	0.013	41.0	0.43%	2	2.40	1.20	15773	2.74	15773.2	245.8	Spill Over Roadway
Rowe Channel, Whitby	Downstream Victoria St. W	Upstream Watson St. W	15623	19940	0.013	271.0	0.53%	2	2.40	1.20	17512	3.04	17511.5	2428.5	Trapezoidal Channel
Rowe Channel, Whitby	Upstream Watson St. W	Downstream Watson St. W.	15623	19940	0.013	24.4	0.21%	2	2.40	1.20	11023	1.91	11022.9	8917.1	Spill Over Roadway
Rowe Channel, Whitby	Downstream Watson St. W	Upstream Front St W.	17145	21900	0.013	216.0	0.30%	2	3.00	1.20	17244	2.39	17243.8	4656.2	Trapezoidal Channel
Rowe Channel, Whitby	Upstream Front St. W	Outlet	17145	21900	0.013	72.0	0.31%	2	3.00	1.20	17529	2.43	17528.8	4371.2	Spill Over Roadway

## Alternative #6 - Spillway Between Victoria St W and Watson St W

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.027
Channel Slope	0.430 %
Left Side Slope	4.000 m/m (H:V)
Right Side Slope	4.000 m/m (H:V)
Bottom Width	8.00 m
Discharge	2,500.00 L/s
Results	
Normal Depth	0.28 m
Flow Area	2.6 m <sup>2</sup>
Wetted Perimeter	10.3 m
Hydraulic Radius	0.25 m
Top Width	10.27 m
Critical Depth	0.21 m
Critical Slope	1.253 %
Velocity	0.97 m/s
Velocity Head	0.05 m
Specific Energy	0.33 m
Froude Number	0.614
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 m
Length	0.0 m
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	0.00 m/s
Upstream Velocity	0.00 m/s
Normal Depth	0.28 m
Critical Depth	0.21 m
Channel Slope	0.430 %
Critical Slope	1.253 %

## Alternative #6 - Spillway Between Watson St W and Front St W

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.027
Channel Slope	0.290 %
Left Side Slope	4.000 m/m (H:V)
Right Side Slope	4.000 m/m (H:V)
Bottom Width	8.50 m
Discharge	4,650.00 L/s
Results	
Normal Depth	0.44 m
Flow Area	4.5 m <sup>2</sup>
Wetted Perimeter	12.1 m
Hydraulic Radius	0.37 m
Top Width	12.02 m
Critical Depth	0.30 m
Critical Slope	1.123 %
Velocity	1.03 m/s
Velocity Head	0.05 m
Specific Energy	0.49 m
Froude Number	0.538
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 m
Length	0.0 m
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	0.00 m/s
Upstream Velocity	0.00 m/s
Normal Depth	0.44 m
Critical Depth	0.30 m
Channel Slope	0.290 %
Critical Slope	1.123 %



**Alternative #7- Victoria Street Diversion  
100 Year Storm Sewer Design Sheet**

Project No. 2021-006  
Date 04-Jan-22  
Design By: S. Rayner, P.Eng.  
Approved By: M. Bassingthwaite, P.Eng.

LOCATION			100-Yr Design	SEWER DATA										
Name	From	To	Flow 'Q' L/s	Manning's 'n'	Length m	Slope %	Number of Culverts	Span (m)	Rise (m)	Pipe Capacity L/s	Velocity m/s	Time of flow Min.	Percent Full %	Check
Rowe Channel, Whitby	Downstream of Victoria St. W	Upstream of Watson St. W	3921.0	0.013	10.0	0.33%	1	2.40	1.20	6909.0	2.40	0.07	57	OKAY
Rowe Channel, Whitby	Upstream of Watson St. W	Upstream of Front St. W	5881.0	0.013	240.4	0.33%	1	2.40	1.20	6909.0	2.40	1.67	85	OKAY
Rowe Channel, Whitby	Upstream of Front St. W	Outlet in Lake Ontario	5881.0	0.013	72.0	0.33%	1	2.40	1.20	6909.0	2.40	0.50	85	OKAY

LOCATION			100-Yr Design								
Name	From	To	Flow Q L/s	Length m	Slope %	Diameter mm	Pipe Capacity L/s	Velocity m/s	Time of flow Min.	Percent Full %	Check
Diversion	Victoria St W.	New Whitby Harbour Outlet to Lake Ontario	16019.0	616.0	0.5	2400	17504.7	3.87	2.65	92	OKAY

**Intake Grate Capacity Check - Downstream of Victoria Street W**

100-Yr Design		Preliminary Grate Design									
Flow 'Q' L/s	Flow 'Q' cms	Intake Grate Length m	Intake Grate Width m	Number of Grates	Total Grate Area m <sup>2</sup>	Openess Ratio *	Max Ponding Depth m	Orifice Coeff.	Equivalent Orifice Area m <sup>2</sup>	0% Blockage Capacity cms	50% Blockage cms
16019.00	16.02	3	3	2	18	0.8	0.50	0.80	14.40	36.08	18.04

# APPENDIX E

## Communications and Consultation



Rowe Channel Upgrade Study  
Stakeholder Mailing List - Notice of Community Open House

Last Update: March 18, 2022

~~Removed from list (not sent)~~

Added to list

~~Councillor - not req'd as per Antony~~

Organization	Title	First_Name	Last_Name	Position	Address_Line1	City_Prov_PostCode	Email
<b>Proponent(s)</b>							
Town of Whitby	Mr.	Antony	Manoharan	Program Manager, Water Res	575 Rossland Rd. E.	Whitby, ON L1N 2M8	<a href="mailto:manoharana@whitby.ca">manoharana@whitby.ca</a>
Town of Whitby	Mr.	Keenan	Watters	Marina Supervisor	575 Rossland Rd. E.	Whitby, ON L1N 2M8	<a href="mailto:wattersk@whitby.ca">wattersk@whitby.ca</a>
<del>Town of Whitby</del>	<del>Mr.</del>	<del>Gautam</del>	<del>Singh</del>	<del>Water Resource Engineer</del>	<del>575 Rossland Rd. E.</del>	<del>Whitby, ON L1N 2M8</del>	<del><a href="mailto:singhe@whitby.ca">singhe@whitby.ca</a></del>
Town of Whitby	Mr.	Priyan	Tharumaratinam	Stormwater Management Tex	575 Rossland Rd. E.	Whitby, ON L1N 2M8	<a href="mailto:tharumaratinamp@whitby.ca">tharumaratinamp@whitby.ca</a>
Town of Whitby	Ms.	Fay	Ingram	Operations Technician	575 Rossland Rd. E.	Whitby, ON L1N 2M8	<a href="mailto:ingramf@whitby.ca">ingramf@whitby.ca</a>
Town of Whitby	Ms.	Deanna	Schlosser	Planner	575 Rossland Rd. E.	Whitby, ON L1N 2M8	<a href="mailto:schlosserd@whitby.ca">schlosserd@whitby.ca</a>
Town of Whitby							<a href="mailto:rcarleton@whitby.ca">rcarleton@whitby.ca</a>
Town of Whitby	Mr.	Graeme	Williamson				<a href="mailto:williamsong@whitby.ca">williamsong@whitby.ca</a>
Town of Whitby	Mr.	Peter	Angelo				<a href="mailto:angelop@whitby.ca">angelop@whitby.ca</a>
Town of Whitby	Ms.	Stacey	Kursikowski	Heritage Planner			<a href="mailto:kursikowskis@whitby.ca">kursikowskis@whitby.ca</a>
Town of Whitby	Ms.	Tara	Painchaud	Senior Manager, Transportation Services			<a href="mailto:painchaudt@whitby.ca">painchaudt@whitby.ca</a>
Central Lake Ontario Conservation Authority	Mr.	Louie	Jakupi	Water Resource Engineer	Administration Office, 100 Whitin Oshawa, ON	L1H 3T3	<a href="mailto:ljakupi@cloca.com">ljakupi@cloca.com</a>
Central Lake Ontario Conservation Authority	Mr.	Dan	Moore				<a href="mailto:dmoore@cloca.com">dmoore@cloca.com</a>
Central Lake Ontario Conservation Authority	Ms.	Lisa-Beth	Bulford				<a href="mailto:lbulford@cloca.com">lbulford@cloca.com</a>
<b>Federal/Provincial Agencies</b>							
Fisheries and Oceans Canada	Ms.	Heather	Ferguson	Manager, Office of Environme	867 Lakeshore Rd.	Burlington, ON L7S 1A1	<a href="mailto:heather.ferguson@dfo-mpo.gc.ca">heather.ferguson@dfo-mpo.gc.ca</a>
Fisheries and Oceans Canada	Ms.	Mark	Sandeman	Area Manager, Client Services	867 Lakeshore Rd.	Burlington, ON L7S 1A1	<a href="mailto:mark.sandeman@dfo-mpo.gc.ca">mark.sandeman@dfo-mpo.gc.ca</a>
Metrolinx/GO Transit	Mr.	Rajesh	Khetarpal	Director, Stakeholder Relatio	97 Front Street West	Toronto, ON M5J 1E6	<a href="mailto:Rajesh.Khetarpal@metrolinx.com">Rajesh.Khetarpal@metrolinx.com</a>
Metrolinx/GO Transit	Mr.	Adam	Snow	Third Party Projects Officer, Rail Corridor Management Office, Rail Corridors			<a href="mailto:adam.snow@gotransit.com">adam.snow@gotransit.com</a>
Metrolinx/GO Transit	Mr.	James	Hartley	Manager, Environmental Programs and Assessment			<a href="mailto:James.Hartley@metrolinx.com">James.Hartley@metrolinx.com</a>
Metrolinx/GO Transit	Mr.	Jason	Ryan	Manager, Environmental Programs, Capital Project Group			<a href="mailto:Jason.Ryan@gotransit.com">Jason.Ryan@gotransit.com</a>
<b>Crown-Indigenous Relations and Northern Affairs Canada</b>							<a href="mailto:indigenous.consultations.autochtones@canada.ca">indigenous.consultations.autochtones@canada.ca</a>
Ministry of the Environment, Conservation and Parks	Ms.	Erinn	Lee	Environmental Resource Coon	135 St. Clair Avenue W	Toronto, ON M4V 1P5	<a href="mailto:Erinn.Lee2@ontario.ca">Erinn.Lee2@ontario.ca</a>
Ministry of Natural Resources and Forestry	Mr.	Dan	Thompson	Acting District Manager	50 Bloomington Rd.	Aurora, ON L4G 0L8	<a href="mailto:dan.l.thompson@ontario.ca">dan.l.thompson@ontario.ca</a>
Ministry of Natural Resources and Forestry	Mr.	Jim	Boothby	A/Senior Planner - Southern Region			<a href="mailto:jim.boothby@ontario.ca">jim.boothby@ontario.ca</a>
Ministry of Municipal Affairs and Housing				EA Coordinator	College Park, 777 Bay Street, 17th	Toronto, ON M5G 2E5	<a href="mailto:mininfo.mah@ontario.ca">mininfo.mah@ontario.ca</a>
Ministry of Transportation	Mr.	Sylvester	Tuz	Planner			<a href="mailto:sylvester.tuz@ontario.ca">sylvester.tuz@ontario.ca</a>
Ministry of Transportation	Mr.	Jason	White	Manager, Engineering Office, Central Region			<a href="mailto:jason.white@ontario.ca">jason.white@ontario.ca</a>
Ministry of Transportation	Ms.	Linda	McAusland	Director, Provincial and Environmental Planning Office			<a href="mailto:linda.mcausland@ontario.ca">linda.mcausland@ontario.ca</a>
Infrastructure Ontario	Ms.	Lisa	Myslicki	Environmental Advisor	1 Dundas St. W., Suite 2000	Toronto, ON M5G 2L5	<a href="mailto:lisa.myslicki@infrastructureontario.ca">lisa.myslicki@infrastructureontario.ca</a>
Ministry of Public Infrastructure	Ms.	Tija	Dirks	Manager, Planning and Analy	777 Bay Street, 16th Floor	Toronto, ON M5G 2E5	<a href="mailto:tija.dirks@ontario.ca">tija.dirks@ontario.ca</a>
Ministry of Tourism, Culture and Sport	Ms.	Laura	Hatcher	Heritage Planner	401 Bay Street, Suite 1700	Toronto, ON M7A 0A7	<a href="mailto:laura.e.hatcher@ontario.ca">laura.e.hatcher@ontario.ca</a>
Ministry of Agriculture, Food and Rural Affairs	Ms.	Jocelyn	Beatty		Ontario Government Building, 3rd	Guelph, ON N1G 4Y2	<a href="mailto:jocelyn.beatty@ontario.ca">jocelyn.beatty@ontario.ca</a>
<b>Municipal/Local Agencies and Elected Officials</b>							
Region of Durham	Mr.	Ashley	Yearwood				<a href="mailto:ashley.yearwood@durham.ca">ashley.yearwood@durham.ca</a>
Region of Durham	Mr.	Josh	Hughey				<a href="mailto:josh.hughey@durham.ca">josh.hughey@durham.ca</a>
Whitby Chamber of Commerce	Ms.	Natalie	Prychitko	CEO			<a href="mailto:info@whitbychamber.org">info@whitbychamber.org</a>
Whitby Historical Society					900 Brock St.S.	Whitby, ON L1N 5L6	<a href="mailto:info@lyndehousemuseum.com">info@lyndehousemuseum.com</a>
Durham District School Board	Mr.	Carey	Trombino		400 Taunton Rd. E.	Whitby, ON L1R 2K6	<a href="mailto:carev.trombino@ddsb.ca">carev.trombino@ddsb.ca</a>
Durham Catholic District School Board							<a href="mailto:commentaires@csdccc.edu.on.ca">commentaires@csdccc.edu.on.ca</a>
French Catholic District School Board							<a href="mailto:reception@csviamonde.ca">reception@csviamonde.ca</a>
<b>Utilities/Service Providers</b>							
Bell Canada	Mr.	Chris	King	Implementation Manager - Acting			<a href="mailto:chris.king@bell.ca">chris.king@bell.ca</a>
Enbridge Gas							<a href="mailto:notifications@enbridge.com">notifications@enbridge.com</a>
TransCanada Pipelines	Mr.	Joe	Williment	Maple/Niagara Facilities Maintenance Manager - Eastern Region			<a href="mailto:joe_williment@transcanada.com">joe_williment@transcanada.com</a>
Rogers Communications	Ms.	Elizabeth	Kolodzik	Planning Support - Durham			<a href="mailto:elizabeth.kolodzik@rci.rogers.com">elizabeth.kolodzik@rci.rogers.com</a>
Hydro One							<a href="mailto:SecondaryLandUse@hydroone.com">SecondaryLandUse@hydroone.com</a>
Hydro One	Mr.	Jim	Oriotis		483 Bay St., North Tower, 15th Floor		<a href="mailto:jim.oriotis@hydroone.com">jim.oriotis@hydroone.com</a>
Hydro One	Ms.	Maria	Agnew	Real Estate Management			<a href="mailto:maria.agnew@hydroone.com">maria.agnew@hydroone.com</a>
Hydro One	Ms.	Melanie	Ducie	Senior Planning Technician, Zone 3A			<a href="mailto:melanie.ducie@hydroone.com">melanie.ducie@hydroone.com</a>
MTS Allstream	Mr.	Doug	Daniels	Project Supervisor, Network Engineering, Outside Plant			<a href="mailto:doug.daniels@allstream.com">doug.daniels@allstream.com</a>
Whitby Hydro	Mr.	Kevin	Whitehead				<a href="mailto:kwhitehead@whitbyhydro.on.ca">kwhitehead@whitbyhydro.on.ca</a>
Whitby Hydro	Ms.	Loren	Griffiths	Engineering Technician			<a href="mailto:lgriffiths@whitbyhydro.on.ca">lgriffiths@whitbyhydro.on.ca</a>
Veridian Connections	Mr.	Ken	Gallen	Engineering Supervisor			<a href="mailto:kgallen@veridian.on.ca">kgallen@veridian.on.ca</a>
Telus	Mr.	Paul	Totino	Manager			<a href="mailto:paul.totino@telus.com">paul.totino@telus.com</a>
Trans-Northern Pipelines Inc.	Ms.	Sandrine	Exibard-Edgar	Property Administrator			<a href="mailto:seedgar@tnpi.ca">seedgar@tnpi.ca</a>

**Indigenous Communities**

Alderville First Nation	Chief	Dave	Mowat	11696 Second Line Rd.	Alderville, ON K0K 2X0	<a href="mailto:dmowat@alderville.ca">dmowat@alderville.ca</a>
<del>Alderville First Nation</del>	<del>Ms.-</del>	<del>Sloye</del>	<del>Anderson</del>			<del><a href="mailto:sanderson@alderville.ca">sanderson@alderville.ca</a></del>
Mississaugas of Scugog Island First Nation	Chief	Kelly	LaRocca	Administration Building, 22521 Isl Port Perry, ON L9L 1B6		<a href="mailto:klarocca@scugogfirstnation.com">klarocca@scugogfirstnation.com</a>
Beausoleil First Nation	Chief	Guy	Monague	11 O'Gema Miiikaan	Christian Island, ON L9M 0J	<a href="mailto:council@chimissing.ca">council@chimissing.ca</a>
Chippewas of Georgina Island First Nation	Mr.	Brandon	Stiles	Environmental/By-Law Coordi	Georgina Island Administration O Sutton West, Ontario L0E 1J	<a href="mailto:brandon.stiles@georginaisland.com">brandon.stiles@georginaisland.com</a>
Chippewas of Rama First Nation	Ms.	Sharday	James	Community Consultation Wor	5884 Rama Rd., Suite 200 Rama, ON L3V 6H6	<a href="mailto:consultation@ramafirstnation.ca">consultation@ramafirstnation.ca</a>
Curve Lake First Nation	Mr.	Mile	Lazarevski	Community Engagement Offi	Government Services Building, 22 Curve Lake, ON K0L 1R0	<a href="mailto:communication@curvelake.ca">communication@curvelake.ca</a>
<del>Curve Lake First Nation</del>	<del>Chief</del>	<del>Phyllis</del>	<del>Williams</del>			<del><a href="mailto:chief@curvelakefn.ca">chief@curvelakefn.ca</a></del>
Curve Lake First Nation	Chief	Emily	Whetung			<a href="mailto:emilvw@curvelake.ca">emilvw@curvelake.ca</a>
<del>Curve Lake First Nation</del>	<del>Ms.-</del>	<del>Melissa</del>	<del>Dokis</del>	<del>Lands Resource Consultation Liason</del>		<del><a href="mailto:MelissaD@curvelake.ca">MelissaD@curvelake.ca</a></del>
Hiawatha First Nation	Chief	Laurie	Carr	Core Consultation Worker	123 Paudash Street Hiawatha, ON K9J 0E6	<a href="mailto:chiefcarr@hiawathafn.ca">chiefcarr@hiawathafn.ca</a>
Hiawatha First Nation	Mr.	Tom	Cowie	Metis Consultation Unit	500 Old St. Patrick St., Unit D Ottawa, ON K1N 9G4	<a href="mailto:tcowie@hiawathafn.ca">tcowie@hiawathafn.ca</a> <a href="mailto:mno@metisnation.org">mno@metisnation.org</a>
Metis Nation of Ontario Head Office						<a href="mailto:administration@cnhw.qc.ca">administration@cnhw.qc.ca</a>
<del>Huron-Wendat First Nation</del>	<del>Grand-Chief</del>	<del>Konrad</del>	<del>Sioui</del>			<del><a href="mailto:Maxime.picard@cnhw.qc.ca">Maxime.picard@cnhw.qc.ca</a></del>
<del>Huron-Wendat First Nation</del>	<del>Ms.-</del>	<del>Maxime</del>	<del>Picard</del>	<del>Coordonnateur de projets—Ontario</del>		<del><a href="mailto:Maxime.picard@cnhw.qc.ca">Maxime.picard@cnhw.qc.ca</a></del>
Metis Nation of Ontario	Mr.	Jesse	Fieldwebster	Climate Change and Regions 6, 8 & 9 Manager		<a href="mailto:JesseF@metisnation.org">JesseF@metisnation.org</a>
Huron Wendat Nation	Mr.	Mario	Gros-Louis			<a href="mailto:mario.gros-louis@wendake.ca">mario.gros-louis@wendake.ca</a>
Huron Wendat Nation	Ms.	Lori-Jeanne	Bolduc			<a href="mailto:lori-jeanne.bolduc@wendake.ca">lori-jeanne.bolduc@wendake.ca</a>
Huron Wendat Nation	Mr.	Dominic	Ste-Marie			<a href="mailto:dominic_ste-marie@wendake.ca">dominic_ste-marie@wendake.ca</a>
Huron Wendat Nation	Mr.	Louis	Lesage			<a href="mailto:louis.lesage@cnhw.qc.ca">louis.lesage@cnhw.qc.ca</a>
Huron Wendat Nation	Ms.	Mélanie	Vincent			<a href="mailto:melanievincent21@yahoo.ca">melanievincent21@yahoo.ca</a>
Six Nations of the Grand River	Chief	Mark	Hill			<a href="mailto:markhill@sixnations.ca">markhill@sixnations.ca</a>
Williams Treaty Coordinator	Ms.	Karry	Sandy-McKenzie	Barrister and Solicitor		<a href="mailto:k.a.sandy-mckenzie@rogers.com">k.a.sandy-mckenzie@rogers.com</a>
Kawartha Nishnawbe First Nation	Chief	Kris	Nahrgang	257 Big Cedar Lake Road	Big Cedar, ON K0L 2H0	<a href="mailto:info@spiritofthestone.ca">info@spiritofthestone.ca</a>

**Property Owners within Study Area**

[Redacted]

**Local Residents/Special Interest Groups (requested to be added to list)**

[Redacted] Ms. [Redacted] [Redacted] [Redacted] [Redacted]

# Appendix E-1

Public Communications and Consultation

# NOTICE OF STUDY COMMENCEMENT

## Rowe Channel Upgrade Study Municipal Class Environmental Assessment



The Town of Whitby, in partnership with Central Lake Ontario Conservation Authority (CLOCA) has initiated a Municipal Class Environmental Assessment (Class EA) study to assess possible improvement alternatives for upgrading Rowe Channel, located between the Whitby GO Station and the Front Street Culvert outfall into Lake Ontario (Refer to map). The existing channel requires work to address the failing gabion baskets that line the channel.

The study will assess the potential for reducing flooding

risk to properties along the channel, minimize maintenance costs, identify opportunities to make improvements to the channel aesthetics, and reduce the presence of invasive species. The study will develop and evaluate a range of design alternatives and recommend a preferred solution for the upgrade – the results of which will be outlined in the Municipal Class EA.

### The Process

The assessment is being carried out in accordance with the planning and design process for ‘Schedule B’ projects as outlined in the Municipal Engineers Association “Municipal Class Environmental Assessment” document (October 2000; amended 2007, 2011 and 2015), which is approved under the Ontario Environmental Assessment Act.

### Community Engagement

A Community Open House (COH) will be held in the Fall 2021 as part of the Class EA study to provide project details and obtain feedback from the public. The COH will be advertised in local newspapers and on the Town’s website. Depending on public health protocols at the time, the COH may be held virtually.

The recommended channel upgrade will be documented in a Project File Report, which will be made available for public review at the conclusion of the study. Community feedback is also encouraged now and over the course of the study. If you have comments, require further information, or would like to be added to the project mailing list, please contact [rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca) or one of the Project Team members listed below.

**Have Your Say!** For more information and to share your feedback on this project, visit [connectwhitby.ca/rowechannel](https://connectwhitby.ca/rowechannel)

### Antony Manoharan, P. Eng. | Program Manager, Water Resources Town of Whitby

575 Rossland Road East, Whitby, Ontario L1N 2M8  
T: 905.430.4925  
E: [manoharana@whitby.ca](mailto:manoharana@whitby.ca)

### Louie Jakupi, P. Eng. | Senior Water Resources Engineer Central Lake Ontario Conservation Authority

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### Mark Bassingthwaite, P. Eng. | Project Manager Resilient Consulting

PO Box 643, Whitby, ON L1N 5V3  
T: 289.943.4651  
E: [mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)

**Notice to All Correspondents:** The information gathered throughout the study is being collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments received become part of the public record and may be included in study documentation which will be available for public review. This Notice is first issued on March 25, 2021.

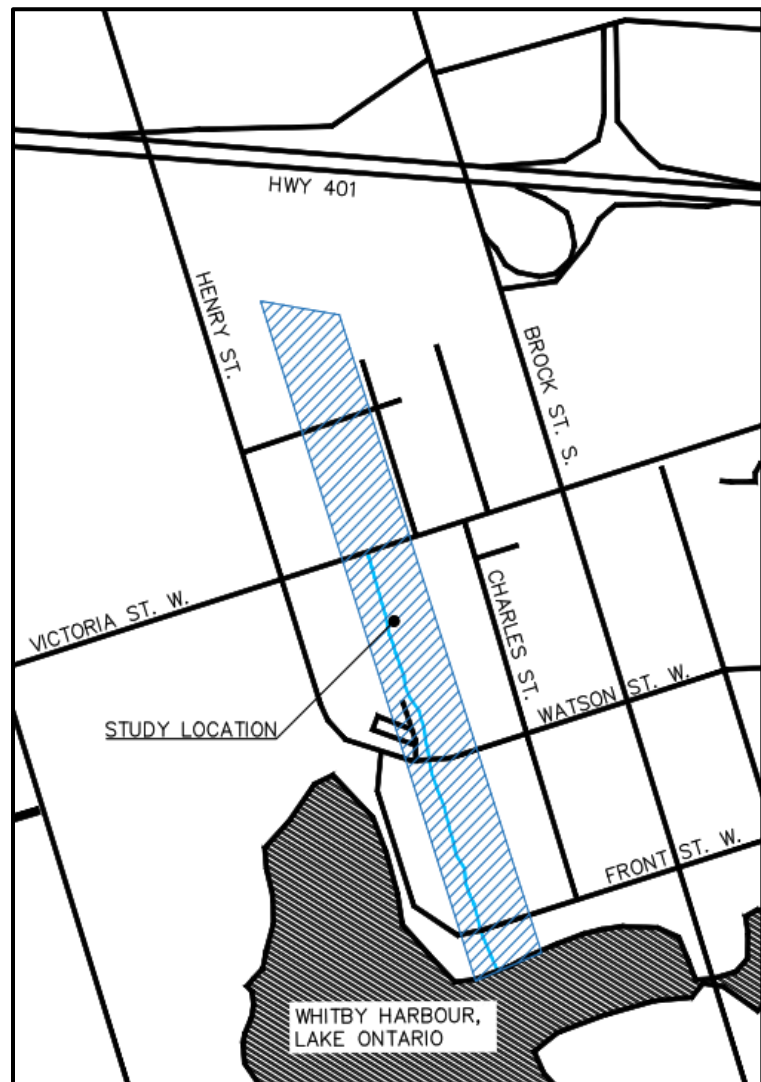
## Notice of Online Community Open House

### Rowe Channel Upgrade Study

### Municipal Class Environmental Assessment

The Town of Whitby, in partnership with Central Lake Ontario Conservation Authority (CLOCA) has initiated a Municipal Class Environmental Assessment (Class EA) study to assess possible improvement alternatives for upgrading the Rowe Channel. The channel is located between the Whitby GO Station and Lake Ontario (Refer to map). The existing channel requires improvements to address the failing gabion baskets that line the channel.

The project team has identified and evaluated a range of design options to reduce flooding risk to properties along the channel, minimize the Town's maintenance costs, improve channel aesthetics, and reduce the presence of invasive species. The options included full and partial channel replacement with pipes, an open channel with armour stone, a combination of piped flow and overland flow, and upstream flow diversion. Based on the results of the evaluation, the **preliminary preferred solution is replacement of the existing channel with an open channel lined with armour stone.**



## The Process

The study is being carried out in accordance with the planning process for 'Schedule B' projects as outlined in the Municipal Engineers Association "Municipal Class Environmental Assessment" document (October 2000; amended 2007, 2011 and 2015), which is approved under the Ontario *Environmental Assessment Act*. The Class EA process includes an evaluation of alternatives, assessment of potential environmental effects, identification of reasonable measures to mitigate any potential adverse impacts, and public and review agency consultation.

## Community Engagement

Community engagement is an important part of this study. Considering the ongoing COVID-19 pandemic, engagement for this project will be conducted online. Project details have been posted on Connect Whitby for public review and comment at [connectwhitby.ca](https://connectwhitby.ca)

Should you have any questions or comments, please complete a comment sheet (available on Connect Whitby) and submit online or email comments to [rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca) on or before **December 17<sup>th</sup>, 2021**.

## Next Steps

Comments received will be considered in confirming the preferred alternative and finalizing the preliminary design. A Project File Report will be prepared to document the Class EA planning process followed and consultation results. A similar notice will then be published to advise when and where the report will be made available for a 30-day public review period in early 2022.

Having trouble accessing the materials online? Need more information or wish to be added to the project emailing list? Contact one of the following project team members:

### **Antony Manoharan, P. Eng.**

Program Manager, Water Resources  
Town of Whitby  
575 Rossland Road East  
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### **Louie Jakupi, P. Eng.**

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Central Lake Ontario Conservation Authority  
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Telephone: 905.579.0411, x113  
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**Mark Bassingthwaite, P. Eng.**

Project Manager

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Telephone: 289.943.4651

Email: [mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)

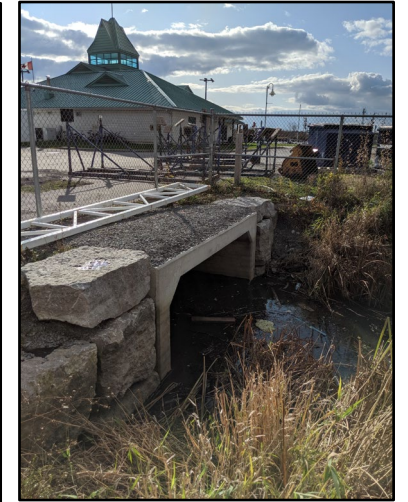
Please note the information gathered throughout the study is being collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments received become part of the public record and may be included in study documentation which will be available for public review.

This Notice is first issued on November 18<sup>th</sup>, 2021.



# Rowe Channel Upgrade Study

Online Community Open House  
Municipal Class Environmental Assessment  
Town of Whitby



Published: November 18, 2021



# Online Community Open House

The Town of Whitby is committed to protecting the health and well-being of our staff and community during the COVID-19 pandemic. To help prevent the spread of the virus, this Community Open House (COH) is relying on web-based communications rather than in-person presentations.

Should you have any questions or comments regarding the study, please complete the online survey (available on Connect Whitby) or email comments on or before **December 17th, 2021** to: [rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)

There is an opportunity at any time during the Class EA process to provide your input. Any comments received will be collected under the authority of the *Environmental Assessment Act* and, with the exception of personal information, will become part of the public record.

# Purpose of Community Open House

The Town of Whitby, in partnership with Central Lake Ontario Conservation Authority (CLOCA), has initiated a Municipal Class Environmental Assessment (EA) Study for upgrades to Rowe Channel. This Study will identify and evaluate a range of design options for upgrading the existing channel, ultimately resulting in the recommendation of a preferred design alternative.

The purpose of this COH is to:

- Present the alternatives for upgrading Rowe Channel
- Outline how each alternative was evaluated
- Provide a preferred design recommendation
- Provide a timeline of upcoming steps
- Provide the public an opportunity to submit comments



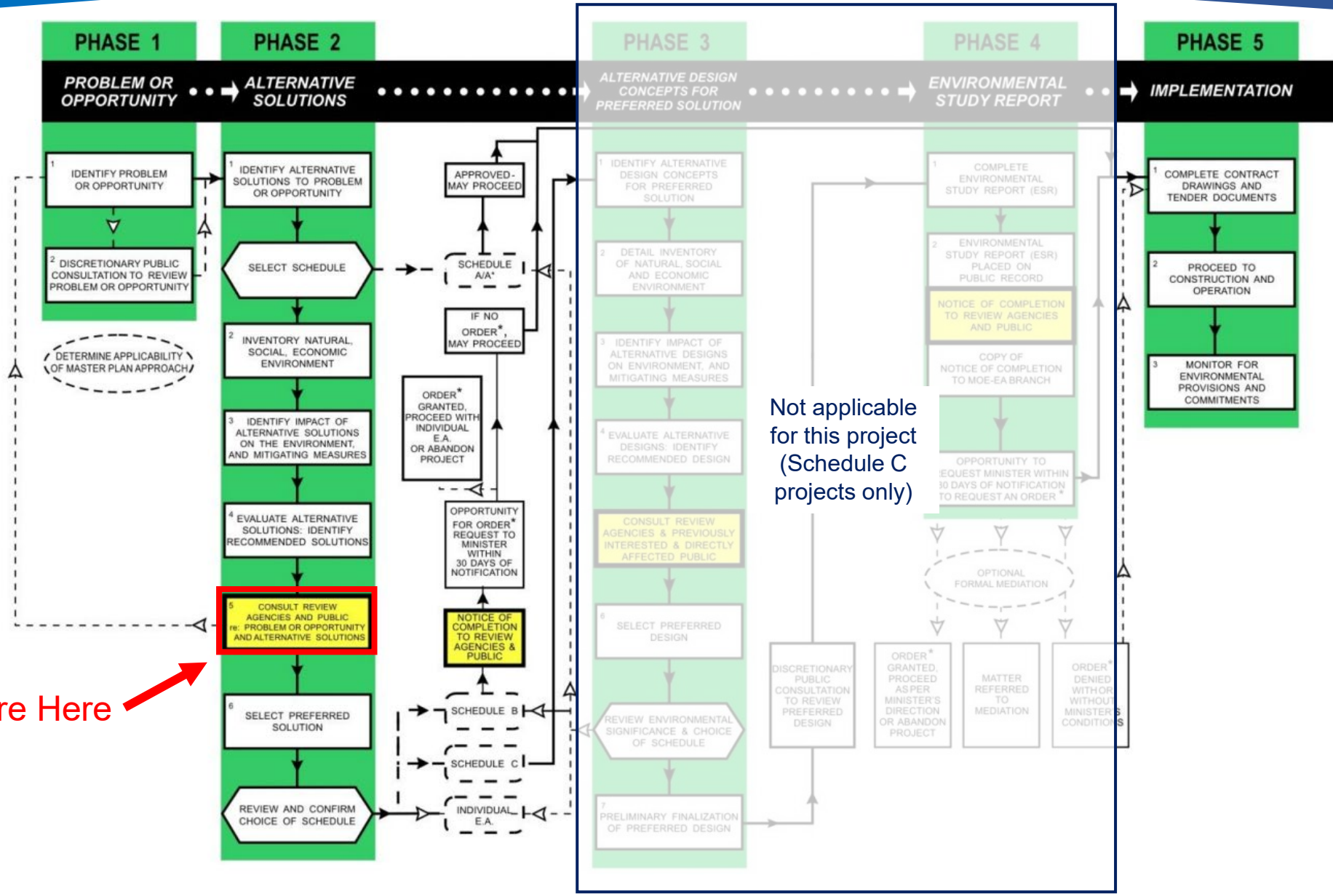
# Study Area

- Rowe Channel is located between Lake Ontario and the Whitby GO Station.
- The channel drains surface runoff from three main areas into Lake Ontario: a residential area north of Highway 401, the Whitby GO Station, and nearby areas south of Victoria Street W. The total contributing drainage area is 83.4 hectares.
- Rowe Channel crosses under three roadways: Victoria Street W, Watson Street W, and Front Street W.



# Municipal Class EA Overview

- The Municipal Class EA process is a decision-making and planning process that ensures that potential effects of a project are identified and managed prior to implementation.
- The Class EA process applies to routine public sector projects that have predictable and manageable environmental effects, such as municipal road, water and wastewater projects.
- The process requires the identification and evaluation of possible alternative solutions and design concepts, and recommends the best approach based on an evaluation.
- The Class EA study is undertaken in accordance with the requirements of the Ontario *Environmental Assessment Act*, as prescribed by the Municipal Engineers Association Municipal Class Environmental Assessment document (2000, as amended in 2007, 2011 and 2015)
- This study is being undertaken as a Schedule 'B' project.



Not applicable for this project (Schedule C projects only)

We Are Here



# Problem or Opportunity Statement

## Problem

Rowe Channel was constructed in 1989 as a part of the Port Whitby (Rowe) development to convey drainage to Lake Ontario. The channel is lined with concrete and Gabion baskets. The Gabion baskets are nearing the end of their design life and have begun to fail due to corrosion. If the Gabion baskets are allowed to fail and fall into the channel, the capacity of the channel would be reduced and flooding may occur. Sediment (soil) and invasive vegetation (phragmites or reed grass) have also accumulated within the channel, further reducing its ability to properly drain surface water to Lake Ontario.

## Opportunity

There is an opportunity to rehabilitate or replace the channel to mitigate risk. Potential benefits of the project include:

- Reduction in invasive species
- Improvements to the aesthetics of the channel
- Improvements in hydraulic capacity resulting in reduced flood risk
- Reduction in requirements for maintenance by the Town

# Existing Conditions

## Existing Infrastructure

Rowe Channel was constructed in 1989 to convey drainage to Lake Ontario. The banks of the existing channel are lined with Gabion baskets and mattresses, which are wire cages that contain rocks to prevent erosion. The existing Gabion baskets and mattresses are beginning to fail due to corrosion.



Example of Gabion Mattress

Images from <https://www.gabionmattress.org/index.html>

The channel includes three culvert crossings located at Victoria Street W, Watson Street W, and Front Street W. All three culvert crossings appear to be in good condition; however, sediment has begun to build up within these culverts.



Gabion Baskets within  
Rowe Channel



Front Street W Culvert

# Existing Natural Conditions

## Natural Environment

Rowe Channel is approximately 600 m long. Most of the vegetation within Rowe Channel is non-native or invasive plants, which reflects the long history of human disturbance in the area.

The channel is considered a warmwater watercourse that may provide limited fish habitat. Rowe Channel outlets into Whitby Harbour in Lake Ontario, which is considered ecologically significant as it provides habitat for a diversity of fish species, turtles and waterfowl.



Invasive Aquatic Plant Species within Rowe Channel





# Existing Social Conditions

## Social Environment

Rowe Channel is largely surrounded by high density residential areas and some commercial properties. The existing channel is located on land owned by the Town of Whitby.

Various existing and planned active transportation networks are identified within the study area, including Front Street W, Watson Street W, and along the channel corridor between Watson Street W and Victoria Street W. Active transportation routes encourage alternative transportation methods such as walking and cycling.

# Indigenous Community Notification

The Ontario Ministry of Environment, Conservation and Parks (MECP) has notified the Town that this proposed project *may* have the potential to affect Aboriginal or treaty rights protected under Canada's *Constitution Act* (1982). The following communities have been identified as potentially affected:

- Alderville First Nation
- Beausoleil First Nation
- Curve Lake First Nation
- Chippewas of Georgina Island
- Chippewas of Rama First Nation (Chippewas of Mnjikaning)
- Hiawatha First Nation
- Huron-Wendat Nation
- Kawartha Nishnawbe
- Mississaugas of Scugog Island First Nation

These communities have been notified of this project. To date, correspondence has been received from Curve Lake First Nation.

Recent amendments to Ontario's *Environmental Assessment Act* note that a Part II Order or "bump-up" request will only be considered by the MECP if the project impacts constitutionally protected Aboriginal or treaty rights. Requests on other grounds will not be considered.

# Alternatives Solutions

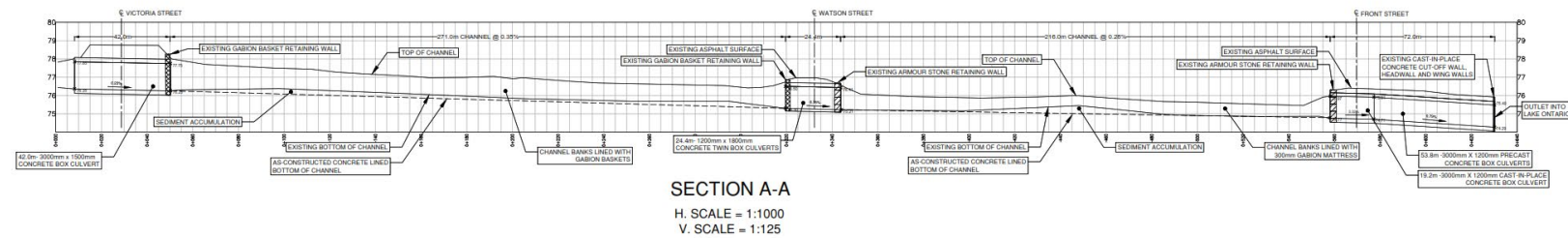
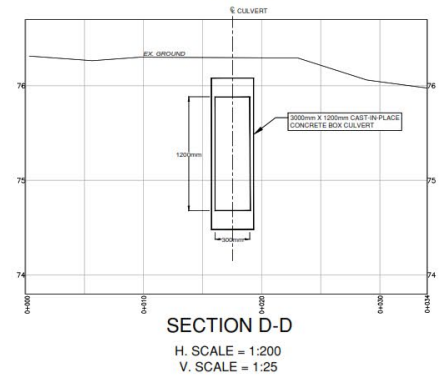
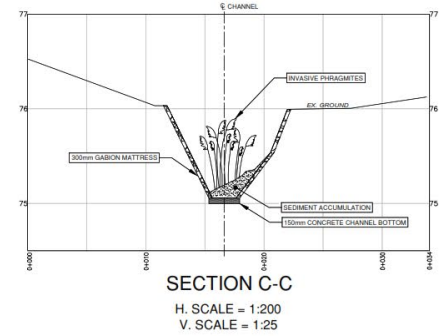
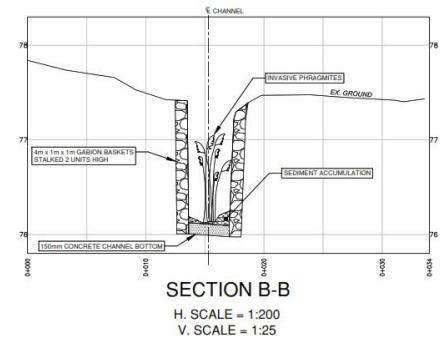
The following alternatives were developed and evaluated in accordance with Phase 2 of the Municipal Class EA process:

1. Do Nothing
2. Full Piped Channel Replacement
3. Partial Channel Replacement Excluding Victoria Street W
4. Partial Channel Replacement Excluding Front Street W
5. Open Channel Replacement with Armour Stone
6. Replacement with Combination of Piped and Overland Flow
7. Partial Diversion of Peak Flow Along Victoria Street W

# Alternative #1

## 'Do Nothing'

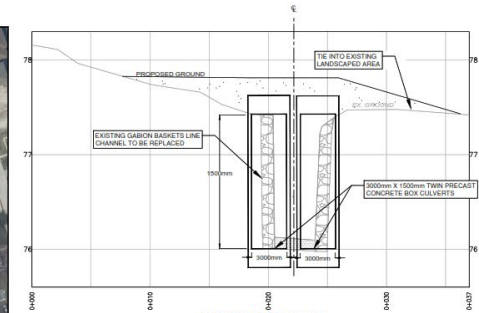
- No changes to the existing channel.
- This alternative is used for comparison purposes when evaluating the other alternatives.
- Required as per the Municipal Class EA process.



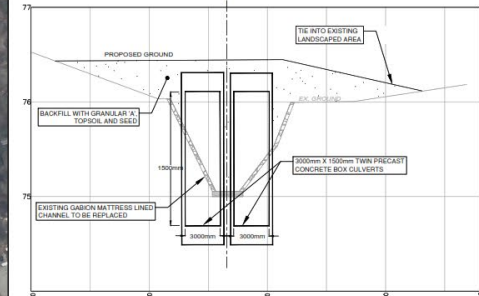
# Alternative #2

## Full Piped Channel Replacement

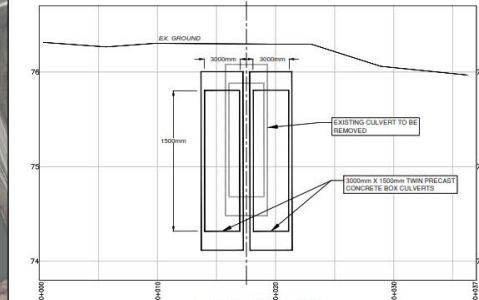
- The existing channel would be replaced with two parallel box pipes that are each 3m (10ft) wide and 1.5m (5ft) tall.
- The existing culvert crossings under Victoria Street W, Watson Street W, and Front Street W will also be replaced.



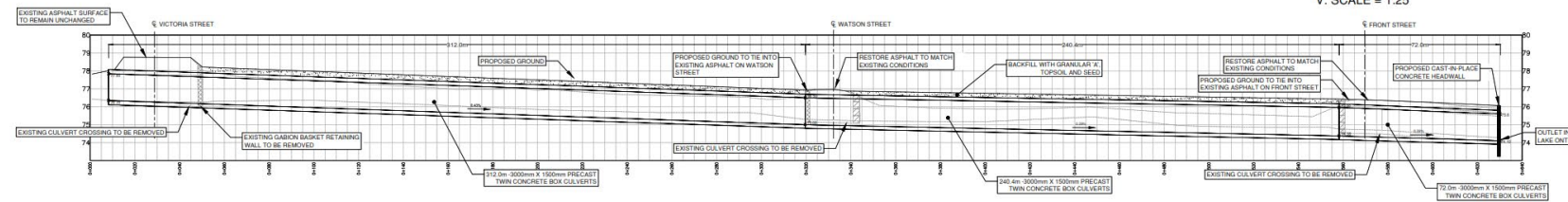
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V. SCALE = 1:25



SECTION C-C  
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V. SCALE = 1:25



SECTION D-D  
H. SCALE = 1:200  
V. SCALE = 1:25



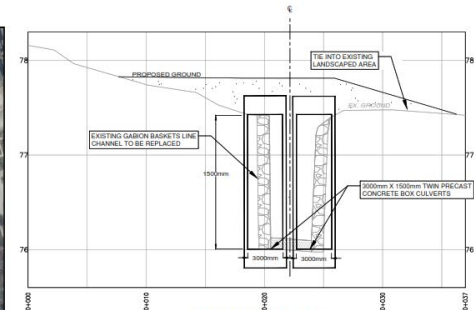
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H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.

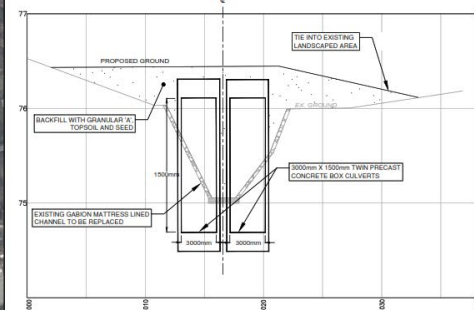
# Alternative #3

## Partial Channel Replacement Excluding Victoria Street W

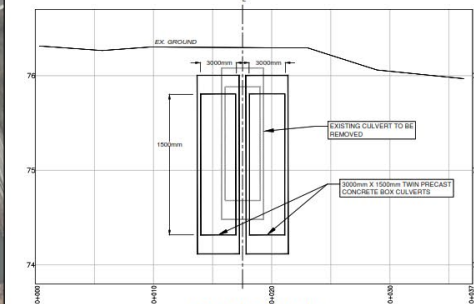
- The existing channel would be replaced with two parallel box pipes that are each 3m (10ft) wide and 1.5m (5ft) tall.
- The existing culvert crossing under Victoria Street W would not be replaced.
- The existing culvert crossings under Watson Street W and Front Street W would be replaced.



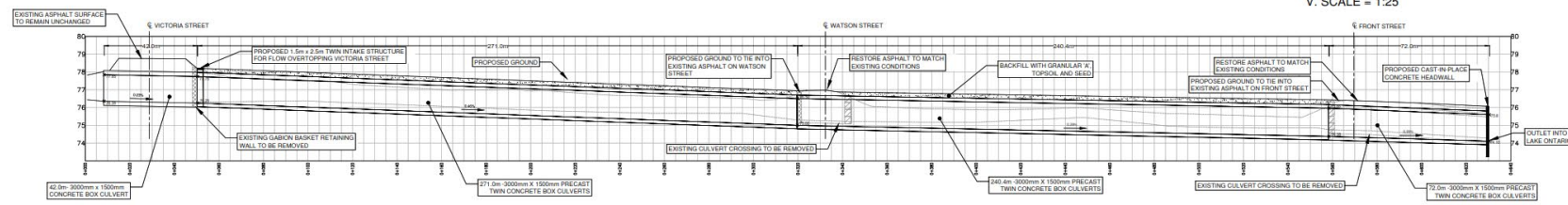
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SECTION C-C  
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V. SCALE = 1:25



SECTION D-D  
H. SCALE = 1:200  
V. SCALE = 1:25

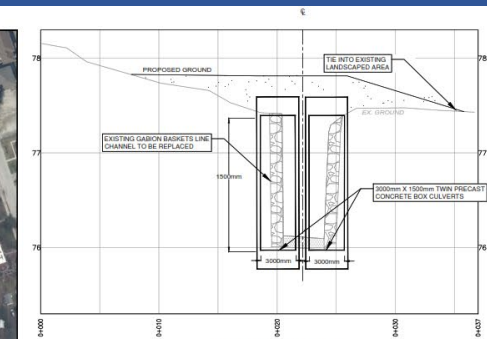


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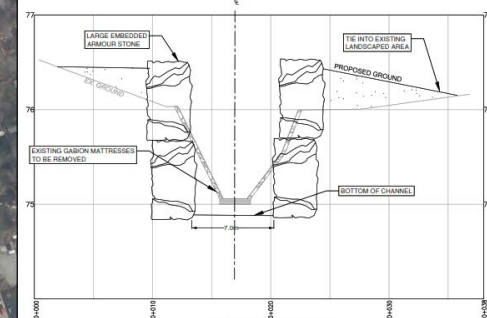
# Alternative #4

## Partial Channel Replacement Excluding Front Street W

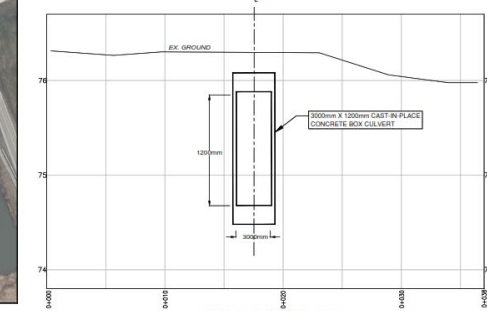
- The existing channel between Victoria Street W and Watson Street W would be replaced with two parallel box pipes that are each 3m (10ft) wide and 1.5m (5ft) tall.
- The existing culvert crossing under Victoria Street W and Watson Street W would be replaced, but the Front Street W culvert would remain the same.
- The existing channel between Watson Street W and Front Street W would remain as an open channel with armour stone used to stabilize the banks.



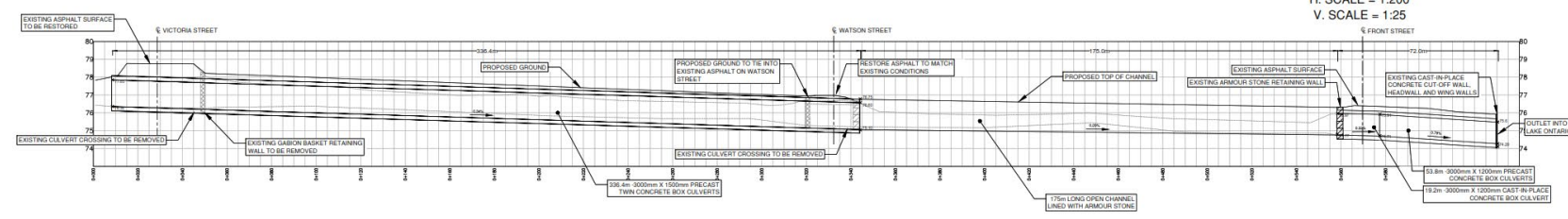
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SECTION C-C  
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V. SCALE = 1:25



SECTION D-D  
H. SCALE = 1:200  
V. SCALE = 1:25



SECTION A-A  
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V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.

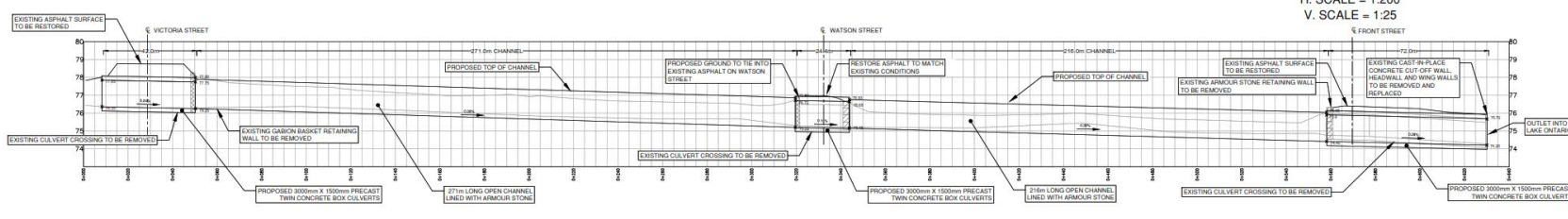
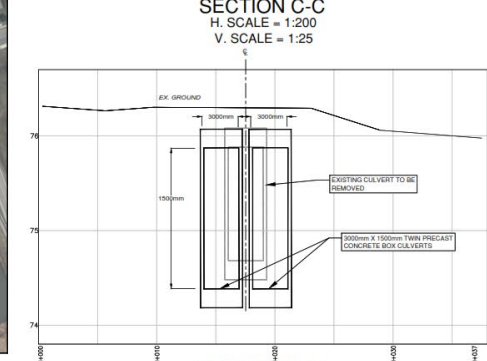
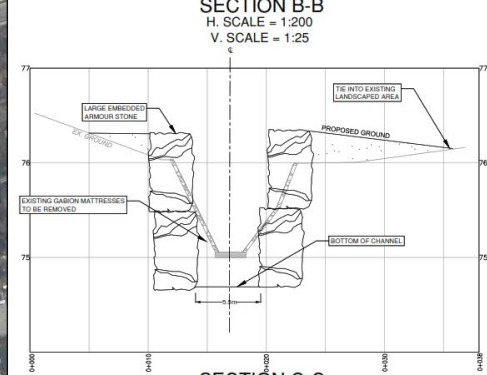
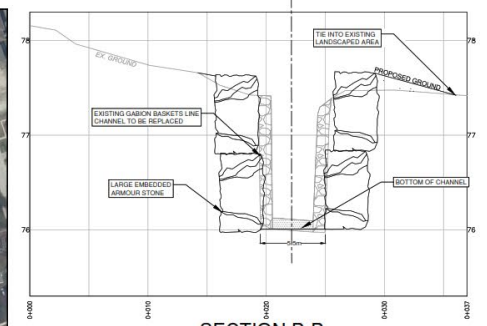
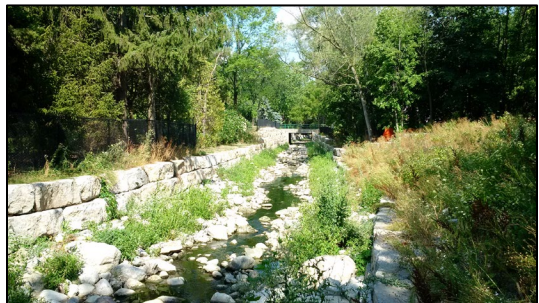


Example of armour stone used to line the banks of open portion of the channel

# Alternative #5

## Open Channel Replacement with Armour Stone

- The existing channel between Victoria Street W and Watson Street W, and between Watson Street W and Front Street W, would be widened and channel banks replaced using armour stone.
- The existing culvert crossing under Victoria Street W, Watson Street W, and Front Street W would also be replaced.



NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.

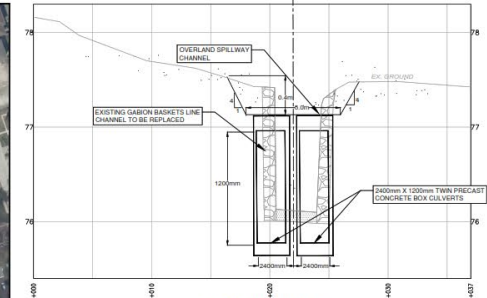
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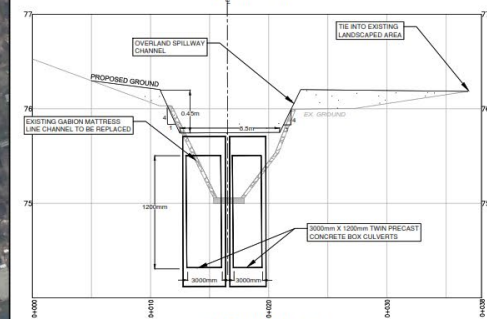
# Alternative #6

## Replacement with Combination of Piped and Overland Flow

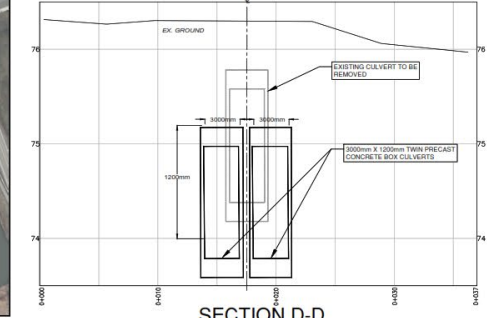
- The existing channel would be replaced with two parallel box pipes and a trapezoidal swale. During minor storm events, runoff would be conveyed underground within the box pipes. During a major storm, a portion of the runoff would be conveyed underground in the box pipes and the remainder would be conveyed within the swale above ground.
- The existing culvert crossing under Victoria Street W, Watson Street W, and Front Street W would also be replaced.



SECTION B-B  
H. SCALE = 1:200  
V. SCALE = 1:25



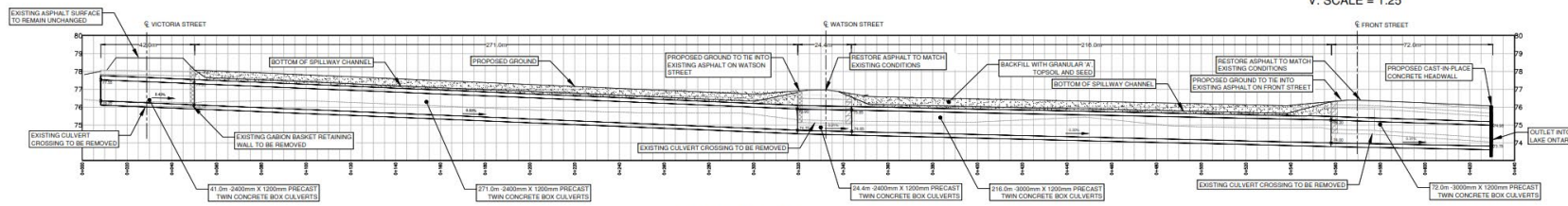
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V. SCALE = 1:25



SECTION D-D  
H. SCALE = 1:200  
V. SCALE = 1:25



Example of trapezoidal swale



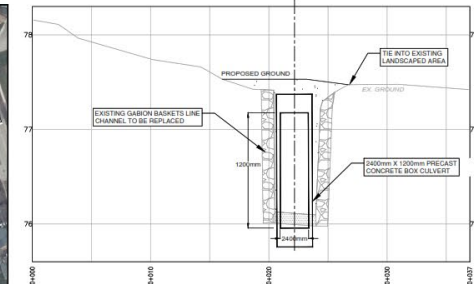
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NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW.

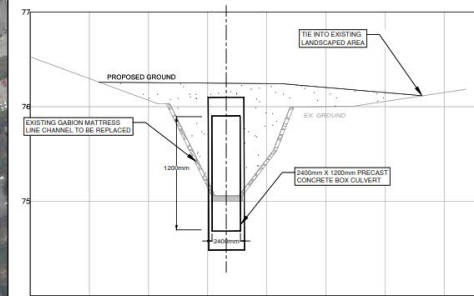
# Alternative #7

## Partial Diversion of Peak Flow Along Victoria Street W

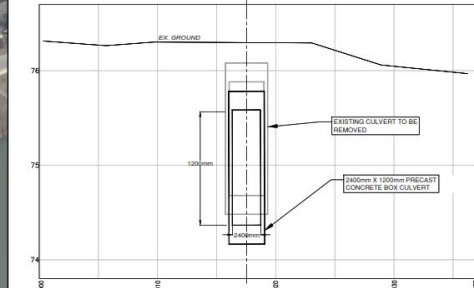
- Drainage directed to the existing channel from north of Victoria Street W would be diverted into a new storm sewer along Victoria Street W. The new storm sewer would be directed below Victoria Field and would outlet into Whitby Harbour.
- The existing channel would be replaced with one box pipe that is 2.4m (8ft) wide and 1.2m (4ft) tall.
- The existing culvert crossing under Watson Street W and Front Street W would also be replaced.
- The existing culvert crossing under Victoria Street W would be modified.



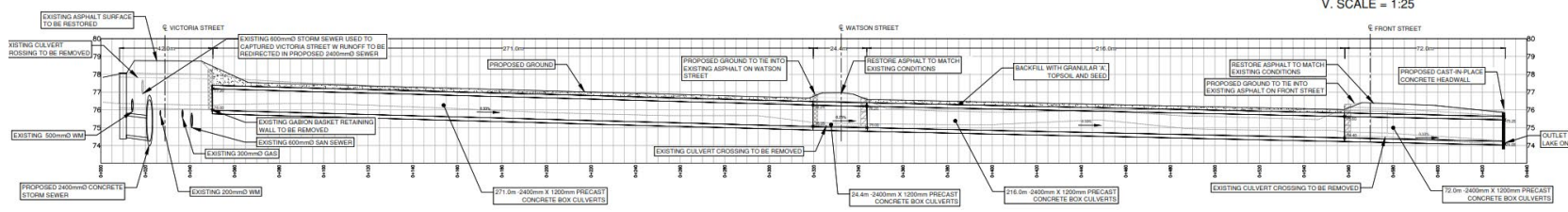
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SECTION C-C  
H. SCALE = 1:200  
V. SCALE = 1:25



SECTION D-D  
H. SCALE = 1:200  
V. SCALE = 1:25



SECTION A-A  
H. SCALE = 1:1000  
V. SCALE = 1:125

NOTE: CATCH BASINS WILL BE INSTALLED ALONG THE PIPE TO CAPTURE OVERLAND FLOW. THE LOCATION OF ALL EXISTING SEWERS AND UTILITIES ARE TO BE CONFIRMED DURING DETAILED DESIGN.

# Evaluation Criteria

## Functional

- Hydraulic Performance (Ability to Convey Water)
- Flood Mitigation
- Erosion Mitigation
- Constructability
- Site Access

## Natural Environment

- Aquatic Habitat Impact/ Opportunities
- Terrestrial Habitat Impact/ Opportunities
- Sensitive Species Impact/ Opportunities
- Water Quality

## Economic

- Capital Costs
- Operation and Maintenance Costs

## Social/ Cultural Environment

- Safety Impact/ Opportunities
- Recreational Amenity Impact/ Opportunities
- Archaeological and Cultural Heritage Resources Impact/ Opportunities
- Adjacent Property Impact/ Opportunities
- Indigenous Community Impact
- Noise, Traffic, Dust Impacts During Construction



More Preferred



Somewhat Preferred



Less Preferred

# Evaluation Matrix

## Functional Evaluation Criteria

Blue shading denotes Preferred Alternative

Evaluation Criteria	1. Do Nothing	2. Full Piped Channel Replacement	3. Partial Channel Replacement Excluding Victoria Street W	4. Partial Channel Replacement Excluding Front Street W	5. Open Channel Replacement with Armour Stone	6. Replacement with Combination of Piped and Overland Flow	7. Partial Diversion of Peak Flow Along Victoria Street W
<b>Functional</b>							
<b>Hydraulic Performance (Ability to convey water)</b>	Decline in performance due to failure of Gabion Baskets/ Mattresses and increase in sediment within channel. 	Increase in performance Pipe network has been sized adequately to fully convey runoff. 	Increase in performance downstream of Victoria St. W crossing. Victoria St. W crossing continues to be undersized 	Increase in performance except for Front St. W culvert to Lake Ontario. Pipe and open channel have been sized adequately to fully convey runoff; Front St. W culvert continues to be undersized. 	Increase in performance. Open channel replacement has been sized adequately to fully convey runoff. Proposed culvert crossings are sized to fully convey runoff. 	Increase in performance during minor storm events where pipes sized to fully convey minor storm. Major flow is contained within the proposed spillway Runoff continues to spill over three roadway crossings 	Increase in performance. Pipe network has been sized adequately to fully convey runoff 
<b>Flood Mitigation</b>	Flooding to continue during major storm events. 	Flows contained in pipe up to 100 year event. 	Flooding during major storm events at Victoria St. W crossing location. 	Flooding during major storm events at Front St. W crossing location. 	Flows contained in channel up to 100 year event. 	Flooding anticipated during major storm events at three roadway crossings. 	No flooding anticipated. 
<b>Erosion Mitigation</b>	Existing Gabion Baskets within the channel continue to deteriorate, resulting in erosion of channel banks. 	Removal of erosion risks. 	Removal of most erosion risk Potential for erosion near intake structure downstream of Victoria St. W. 	Removal of most erosion risks. Potential for erosion during spill of major flow over Front St. W. 	Reduction in erosion risks due to armour stone replacement of Gabion Baskets/ Mattresses. 	Potential for erosion within overland spillway. 	Removal of erosion risks. 
<b>Constructability</b>	No construction required. 	Temporary construction disturbances at roadway crossings. 	Minor temporary construction disturbance on Watson St. W and Front St. W. 	Temporary construction disturbances at three roadway crossings. Placement of armour stone difficult due to limited workspace. 	Temporary construction disturbances at roadway crossings. Placement of armour stone difficult due to limited workspace. 	Temporary construction disturbances at roadway crossings. 	Most complex and intrusive construction process. Requires extensive work along Victoria St. W which contains numerous utilities and services. Temporary construction disturbances at three roadway crossings. 
<b>Site Access</b>	No site access required. 	Site access required at three roadway crossings. Access may be required from private properties located along study limit. 	Site access required at three roadway crossings. Access may be required from private properties located along study limit. 	Site access required at three roadway crossings. Access may be required from private properties located along study limit. 	Site access required at three roadway crossings. Access may be required from private properties located along study limit. 	Site access required at three roadway crossings. Access may be required from private properties located along study limit. 	Site access required at three roadway crossings. Access may be required from private properties located along study limit. Access to Victoria Field also required. 

# Evaluation Matrix

## Natural Environment Evaluation Criteria

Blue shading denotes Preferred Alternative

Evaluation Criteria	1. Do Nothing	2. Full Piped Channel Replacement	3. Partial Channel Replacement Excluding Victoria Street W	4. Partial Channel Replacement Excluding Front Street W	5. Open Channel Replacement with Armour Stone	6. Replacement with Combination of Piped and Overland Flow	7. Partial Diversion of Peak Flow Along Victoria Street W
<b>Natural Environment</b>							
<b>Aquatic Habitat Impact/ Opportunities</b>	No disturbance to existing habitat. No opportunity to enhance existing habitat. Invasive species will remain. 	Removal of invasive aquatic plant species. Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement. 	Removal of invasive aquatic plant species. Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement. 	Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement. Opportunity for minor improvements to channel form through substrates and minor opportunities for riparian cover at open channel. 	Removal of existing sediment and invasive aquatic plants to promote fish passage and habitat. Opportunity for minor improvements to channel form through substrates and minor opportunities for riparian cover. 	Removal of invasive aquatic plant species. Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement. 	Removal of invasive aquatic plant species. Loss of potential fish habitat within pipe. Pipe length will be a barrier to fish movement. 
<b>Terrestrial Habitat Impact/ Opportunities</b>	No disturbance to existing habitat. No opportunity to enhance existing habitat. Invasive species will remain. 	Minimal disturbance to existing habitat, can be mitigated. Minor disturbance at outlet into Lake Ontario, considered nominal and unlikely to impact waterfowl. Opportunity to remove existing invasive plant species. 	Minimal disturbance to existing habitat, can be mitigated. Minor disturbance at outlet into Lake Ontario, considered nominal and unlikely to impact waterfowl. Opportunity to remove existing invasive plant species. 	Minimal disturbance to existing habitat. Opportunity to incorporate turtle nesting mounds into open channel design to provide net increase in suitable habitat. Opportunity to remove existing invasive plant species. 	Minimal disturbance to existing habitat. Opportunity to incorporate turtle nesting mounds into open channel design along the full reach to provide net increase in suitable habitat. Opportunity to remove existing invasive plant species. 	Minimal disturbance to existing habitat, can be mitigated. Minor disturbance at outlet into Lake Ontario, considered nominal and unlikely to impact waterfowl. Opportunity to remove existing invasive plant species. 	Minimal disturbance to existing habitat, can be mitigated. Minor disturbance at outlet into Lake Ontario, considered nominal and unlikely to impact waterfowl. Opportunity to remove existing invasive plant species. 
<b>Sensitive Species Impact/ Opportunities</b>	No impact to identified SAR and their associated habitat. 	No impact to identified SAR and their associated habitat. 	No impact to identified SAR and their associated habitat. 	No impact to identified SAR and their associated habitat. 	No impact to identified SAR and their associated habitat. 	No impact to identified SAR and their associated habitat. 	No impact to identified SAR and their associated habitat. 
<b>Water Quality</b>	No impact to water quality or opportunity to better existing water quality. 	Reduction in water quality during excavation of existing channel due to disturbance of sediments. Reduction in water quality within Whitby Harbour due to increased sediment transport through pipe network and increased dredging needs. 	Reduction in water quality during excavation of existing channel due to disturbance of sediments. Reduction in water quality within Whitby Harbour due to increased sediment transport through pipe network and increased dredging needs. 	Reduction in water quality during excavation of existing channel due to disturbance of sediments. Some opportunity within open channel to increase water quality through bank stabilization and creation of riparian buffers for filtering sediment and pollutants. 	Reduction in water quality during excavation of existing channel due to disturbance of sediments. Limited opportunity to increase water quality through bank stabilization and creation of riparian buffers for filtering sediment and pollutants. 	Reduction in water quality during excavation of existing channel due to disturbance of sediments. Reduction in water quality within Whitby Harbour due to increased sediment transport through pipe network and increased dredging needs. 	Reduction in water quality during excavation of existing channel due to disturbance of sediments. Reduction in water quality within Whitby Harbour due to increased sediment transport through pipe network and increased dredging needs. 

# Evaluation Matrix

## Social/ Cultural Evaluation Criteria















Blue shading denotes Preferred Alternative

Evaluation Criteria	1. Do Nothing	2. Full Piped Channel Replacement	3. Partial Channel Replacement Excluding Victoria Street W	4. Partial Channel Replacement Excluding Front Street W	5. Open Channel Replacement with Armour Stone	6. Replacement with Combination of Piped and Overland Flow	7. Partial Diversion of Peak Flow Along Victoria Street W
<b>Social/ Cultural</b>							
<b>Safety Impacts/ Opportunities</b>	Instability of existing channel banks and potential for failure a risk to public safety. Open water also potential safety concern. ❌	Public safety improved due to removal of open water and no spilling over roadway. +	Public safety improved due to removal of open water. Risk to public safety at spill location over Victoria St. W. ⚠️	Public safety improved due to removal of open water. Risk to public safety at spill location over Front St. W. ⚠️	Open water remains safety concern. Fencing along channel may be required to protect public. ⚠️	Public safety concern during major storm events when normally dry spillway conveys a large amount of flow. ⚠️	Public safety improved due to removal of open water and no spilling over roadway. +
<b>Recreational Amenity Impact/ Opportunities</b>	No impact to recreational amenities, but no opportunity for enhancements. ❌	Opportunity to increase public recreation space through trail development over top of pipe. +	Opportunity to increase public recreation space through trail development over top of pipe. +	Opportunity to increase public recreation space through trail development between Victoria St. W to Watson St. W. ⚠️	No impact to existing recreational amenities, but limited opportunity for enhancements. Potential loss of public access along channel due to required channel width. ❌	No impact to recreational amenities, but no opportunity for enhancements. ❌	Opportunity to increase public recreation space through trail development. Temporary closure of Victoria Field during construction of secondary pipe outlet. ⚠️
<b>Archaeological and Cultural Heritage Resources Impact/ Opportunities</b>	No potential impact to archaeological and cultural heritage resources, including James Rowe House. +	Low potential impact to archaeological and cultural heritage resources, including James Rowe House. ⚠️	Low potential impact to archaeological and cultural heritage resources, including James Rowe House. ⚠️	Low potential impact to archaeological and cultural heritage resources, including James Rowe House. ⚠️	Low potential impact to archaeological and cultural heritage resources, including James Rowe House. ⚠️	Low potential impact to archaeological and cultural heritage resources, including James Rowe House. ⚠️	Low potential impact to archaeological and cultural heritage resources, including James Rowe House. ⚠️
<b>Adjacent Property Impact/ Opportunities</b>	No impact to adjacent properties. +	Easement on neighbouring properties may be required to tie in grading above pipe network into existing ground surface. ⚠️	Easement on neighbouring properties may be required to tie in grading above pipe network into existing ground surface. ⚠️	Easement on neighboring properties may be required to tie in grading above pipe network, and top of armour stone, into existing ground surface. ⚠️	Easement on neighbouring properties may be required to tie in grading above pipe network into existing ground surface. ⚠️	Easement on neighbouring properties may be required to tie in emergency spillway grading into existing ground surface. ⚠️	Significant impact to adjacent properties. Easement will need to be granted to install secondary storm sewer pipe through Victoria Field. Pipe along existing channel to fit within existing property. ❌
<b>Indigenous Community Impact</b>	No potential impacts to Indigenous communities, rights and interests. +	Low potential for impacts to Indigenous communities, rights and interests. To be confirmed. ⚠️	Low potential for impacts to Indigenous communities, rights and interests. To be confirmed. ⚠️	Low potential for impacts to Indigenous communities, rights and interests. To be confirmed. ⚠️	Low potential for impacts to Indigenous communities, rights and interests. To be confirmed. ⚠️	Low potential for impacts to Indigenous communities, rights and interests. To be confirmed. ⚠️	Low potential for impacts to Indigenous communities, rights and interests. To be confirmed. ⚠️
<b>Noise, Traffic, Dust Impacts During Construction</b>	No impact on noise, traffic, and dust. +	Multiple sources of noise and dust during construction. Some traffic disturbance on three roadways. ⚠️	Multiple sources of noise and dust due to construction. Minor traffic impact to Watson St. W and Front St. W. ⚠️	Multiple sources of noise and dust during construction. Some traffic disturbance on three roadways. ⚠️	Multiple sources of noise and dust during construction. Some traffic disturbance on three roadways. ⚠️	Multiple sources of noise and dust during construction. Some traffic disturbance on three roadways. ⚠️	Multiple sources of noise and dust due to construction. Significant traffic disturbance on Victoria St. W. Minor traffic impact to Watson St. W and Front St. W. ❌

# Evaluation Matrix

## Economic Evaluation Criteria

Blue shading denotes Preferred Alternative

Evaluation Criteria	1. Do Nothing	2. Full Piped Channel Replacement	3. Partial Channel Replacement Excluding Victoria Street W	4. Partial Channel Replacement Excluding Front Street W	5. Open Channel Replacement with Armour Stone	6. Replacement with Combination of Piped and Overland Flow	7. Partial Diversion of Peak Flow Along Victoria Street W
<b>Economic</b>							
<b>Capital Costs</b>	No capital costs.  	High capital costs. Earthwork is significant as it will extend full length of existing channel. High material supply cost for concrete box culverts.  <b>Approx. \$ 8.7 Million</b> 	Moderate capital costs. Earthwork and material supply of concrete box culverts have a high cost; however, removal of work on Victoria Street W significantly decreases overall costs compared to other alternatives.  <b>Approx. \$ 7.9 Million</b> 	Moderate capital costs. Earthwork and material supply of concrete box culverts have a high cost, however removal of work on Front Street W will decrease overall costs compared to other alternatives.  <b>Approx. \$ 5.9 Million</b> 	Low capital costs. Earthworks significant to widen channel for installation of armour stone. High material supply cost for concrete box culverts under roadway and armour stone.  <b>Approx. \$ 4.6 Million</b> 	Moderate capital costs. High cost for earthworks, including grading of spillway. Reduced material supply cost for pipe network due to smaller pipe size.  <b>Approx. \$ 7.1 Million</b> 	High capital costs. Largest material supply cost and earthworks costs. Additional costs associated with major roadway restoration on Victoria Street W.  <b>Approx. \$ 8.4 Million</b> 
<b>Operation and Maintenance Costs</b>	High costs for continued annual maintenance and repair of failing Gabion baskets and removal of sediment accumulation in the channel.  	Moderate costs for maintenance. Maintenance will include enclosed space inspections of infrastructure, flushing of pipe network to remove sediment accumulation, and minor repairs to pipe where required.  	Moderate costs for maintenance. Maintenance will include enclosed space inspections of infrastructure, flushing of pipe network to remove sediment accumulation, and minor repairs to pipe where required.  	Moderate costs for the long-term maintenance of the open channel portion to remove debris buildup. Flushing of pipe network to remove sediment accumulation may also be required.  	Moderate costs for the long-term maintenance of the open channel portion to remove debris buildup.  	Moderate costs for the minor annual maintenance anticipated. Overland spillway to be maintained to ensure spillway achieves design conveyance capacity. Flushing of pipe network to remove sediment accumulation may also be required.  	Moderate costs for maintenance. Maintenance will include enclosed space inspections of infrastructure, flushing of pipe network to remove sediment accumulation, and minor repairs to pipe where required.  

# Preferred Alternative

Based on the results of the evaluation, **Alternative #5 – Open Channel Replacement with Armour Stone** best satisfies the Problem/ Opportunity Statement and provides the best long-term solution for the Town of Whitby.

Key features of this alternative include:

- Reduces risk of flooding, as the channel has been sized to fully convey all runoff during major storm events
- Reduces erosion risks
- Promotes removal of invasive species
- Improves fish habitat and passage through the channel
- Lower capital costs

Implementation of the project could be undertaken in phases to maximize the life cycle of existing infrastructure such as road crossings.



Channel with Armour Stone Example  
Note this site is larger than Rowe Channel



# Next Steps

Following this online COH, we will:

- Review and consider all comments received
- Confirm the preferred alternative and finalize the preliminary design
- Consider opportunities for phasing of the project to maximize existing infrastructure life cycles
- Complete the Project File Report, which documents the EA planning process followed and the consultation results
- Publish a Notice of Study Completion to advise where and when the Project File Report will be made available for a 30-day public review period

# Your Involvement

How can you remain involved in the Study?

- Request that your name/ email is added to the mailing list
- Complete and submit the comment sheet
- Contact the Town's representative or the Consultant at any time.

**Thank you for your participation in this online Community Open House.**

*All information is collected in accordance with the Freedom of Information and Protection of Privacy Act.*

# For more information please contact:

Antony Manoharan, P.Eng.  
Project Manager, Town of Whitby  
Email: [manoharana@whitby.ca](mailto:manoharana@whitby.ca)  
Phone: 905-430-4925

Mark Bassingthwaite, P.Eng.  
Project Manager, Resilient Consulting  
Email: [mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)  
Phone: 289-943-4651

Louie Jakupi, P. Eng.  
Senior Water Resources Engineer,  
Central Lake Ontario Conservation Authority  
Email: [ljakupi@cloca.com](mailto:ljakupi@cloca.com)  
Phone: 905-579-0411 x 113

## Online Community Open House

### Rowe Channel Upgrade Study

### Municipal Class Environmental Assessment

Thank you for your interest in this project. Your views are important to us. Please take a moment to complete this Comment Form and submit it via email or mail. Alternatively, you may email your comments directly to [rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca).

1. A Municipal Class Environmental Assessment has been initiated to assess possible alternatives for upgrading Rowe Channel. The existing channel requires improvements to address the failing Gabion baskets that line the channel. Do you have any questions, suggestions or concerns related to this study?


2. Do you have any comments or concerns regarding the information presented on existing conditions within the Study Area?


3. Do you have any comments or concerns about the selection of the open channel with armour stone as the preliminary preferred solution for upgrading Rowe Channel?


4. This study is being conducted as a Schedule 'B' Municipal Class Environmental Assessment. Do you have any questions about the Environmental Assessment process?


**5. How would you describe your interest in the study?**

- Member of general public
- Landowner/ homeowner
- Member of interest group
- Consultant
- Agency representative

**6. Are there any other ideas or suggestions you would like to share?**




# Rowe Channel Upgrade Study

Stakeholder Meeting – Whitby Yacht Club  
Municipal Class Environmental Assessment  
Town of Whitby



December 9, 2021

# Study Area

- Rowe Channel is located between Lake Ontario and the Whitby GO Station.
- The channel drains surface runoff from three main areas into Lake Ontario: a residential area north of Highway 401, the Whitby GO Station, and nearby areas south of Victoria Street W. The total contributing drainage area is 83.4 hectares.
- Rowe Channel crosses under three roadways: Victoria Street W, Watson Street W, and Front Street W.



# Problem or Opportunity Statement

## Problem

Rowe Channel was constructed in 1989 as a part of the Port Whitby (Rowe) development to convey drainage to Lake Ontario. The channel is lined with concrete and Gabion baskets. The Gabion baskets are nearing the end of their design life and have begun to fail due to corrosion. If the Gabion baskets are allowed to fail and fall into the channel, the capacity of the channel would be reduced and flooding may occur. Sediment (soil) and invasive vegetation (phragmites or reed grass) have also accumulated within the channel, further reducing its ability to properly drain surface water to Lake Ontario.

## Opportunity

There is an opportunity to rehabilitate or replace the channel to mitigate risk. Potential benefits of the project include:

- Reduction in invasive species
- Improvements to the aesthetics of the channel
- Improvements in hydraulic capacity resulting in reduced flood risk
- Reduction in requirements for maintenance by the Town



# Existing Conditions

## Existing Infrastructure

Rowe Channel was constructed in 1989 to convey drainage to Lake Ontario. The banks of the existing channel are lined with Gabion baskets and mattresses, which are wire cages that contain rocks to prevent erosion. The existing Gabion baskets and mattresses are beginning to fail due to corrosion.



Example of Gabion Mattress  
Images from <https://www.gabionmattress.org/index.html>

The channel includes three culvert crossings located at Victoria Street W, Watson Street W, and Front Street W. All three culvert crossings appear to be in good condition; however, sediment has begun to build up within these culverts.



Gabion Baskets within  
Rowe Channel



Front Street W Culvert

# Existing Natural Conditions

## Natural Environment

Rowe Channel is approximately 600 m long. Most of the vegetation within Rowe Channel is non-native or invasive plants, which reflects the long history of human disturbance in the area.

The channel is considered a warmwater watercourse that may provide limited fish habitat. Rowe Channel outlets into Whitby Harbour in Lake Ontario, which is considered ecologically significant as it provides habitat for a diversity of fish species, turtles and waterfowl.



Invasive Aquatic Plant Species within Rowe Channel



# Existing Social Conditions

## **Social Environment**

Rowe Channel is largely surrounded by high density residential areas and some commercial properties. The existing channel is located on land owned by the Town of Whitby.

Various existing and planned active transportation networks are identified within the study area, including Front Street W, Watson Street W, and along the channel corridor between Watson Street W and Victoria Street W. Active transportation routes encourage alternative transportation methods such as walking and cycling.

# Indigenous Community Notification

The Ontario Ministry of Environment, Conservation and Parks (MECP) has notified the Town that this proposed project *may* have the potential to affect Aboriginal or treaty rights protected under Canada's *Constitution Act* (1982). The following communities have been identified as potentially affected:

- Alderville First Nation
- Beausoleil First Nation
- Curve Lake First Nation
- Chippewas of Georgina Island
- Chippewas of Rama First Nation (Chippewas of Mnjikaning)
- Hiawatha First Nation
- Huron-Wendat Nation
- Kawartha Nishnawbe
- Mississaugas of Scugog Island First Nation

These communities have been notified of this project. To date, correspondence has been received from Curve Lake First Nation.

Recent amendments to Ontario's *Environmental Assessment Act* note that a Part II Order or "bump-up" request will only be considered by the MECP if the project impacts constitutionally protected Aboriginal or treaty rights. Requests on other grounds will not be considered.

# Alternatives Solutions

The following alternatives were developed and evaluated in accordance with Phase 2 of the Municipal Class EA process:

1. Do Nothing
2. Full Piped Channel Replacement
3. Partial Channel Replacement Excluding Victoria Street W
4. Partial Channel Replacement Excluding Front Street W
5. Open Channel Replacement with Armour Stone
6. Replacement with Combination of Piped and Overland Flow
7. Partial Diversion of Peak Flow Along Victoria Street W

# Evaluation Criteria

## Functional

- Hydraulic Performance (Ability to Convey Water)
- Flood Mitigation
- Erosion Mitigation
- Constructability
- Site Access

## Natural Environment

- Aquatic Habitat Impact/ Opportunities
- Terrestrial Habitat Impact/ Opportunities
- Sensitive Species Impact/ Opportunities
- Water Quality

## Economic

- Capital Costs
- Operation and Maintenance Costs

## Social/ Cultural Environment

- Safety Impact/ Opportunities
- Recreational Amenity Impact/ Opportunities
- Archaeological and Cultural Heritage Resources Impact/ Opportunities
- Adjacent Property Impact/ Opportunities
- Indigenous Community Impact
- Noise, Traffic, Dust Impacts During Construction



More Preferred



Somewhat Preferred



Less Preferred

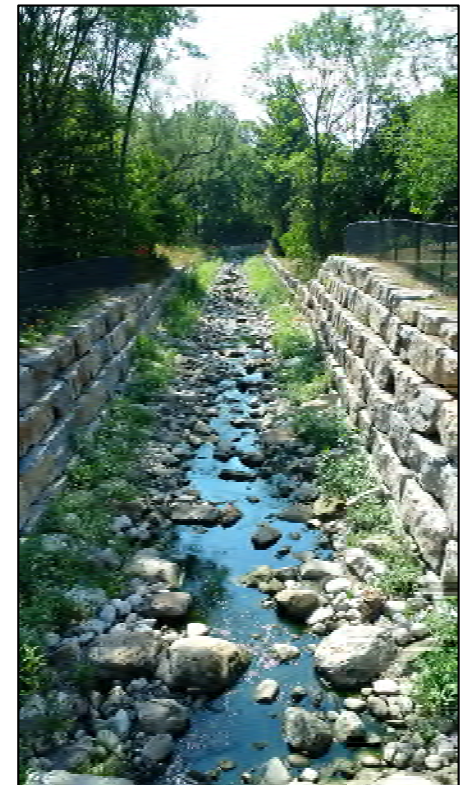
# Preferred Alternative

Based on the results of the evaluation, **Alternative #5 – Open Channel Replacement with Armour Stone** best satisfies the Problem/ Opportunity Statement and provides the best long-term solution for the Town of Whitby.

Key features of this alternative include:

- Reduces risk of flooding, as the channel has been sized to fully convey all runoff during major storm events
- Reduces erosion risks
- Promotes removal of invasive species
- Improves fish habitat and passage through the channel
- Lower capital costs

Implementation of the project could be undertaken in phases to maximize the life cycle of existing infrastructure such as road crossings.

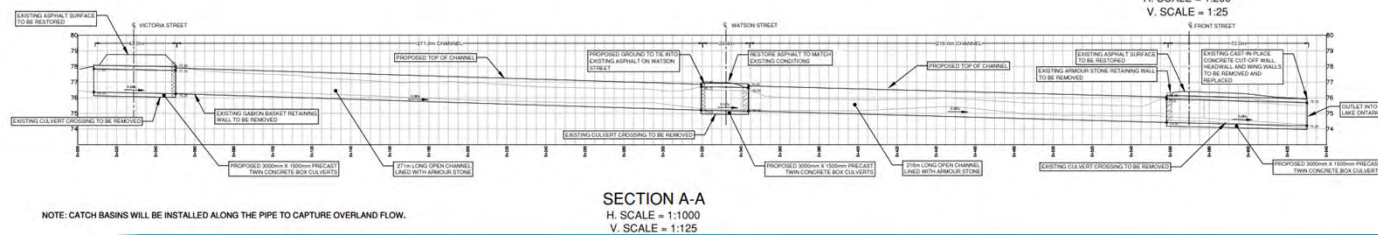
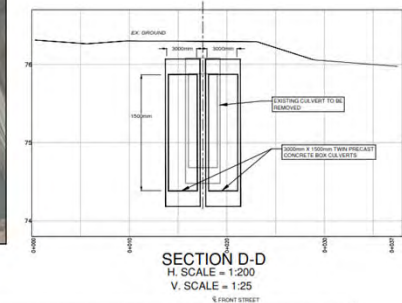
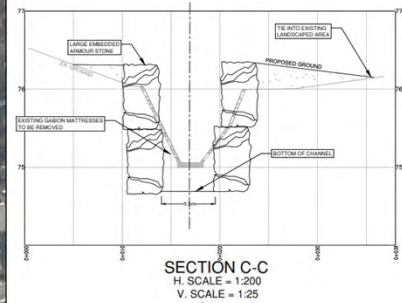
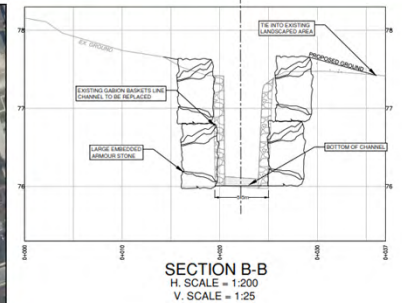


Channel with Armour Stone Example  
Note this site is larger than Rowe Channel

# Alternative #5

## Open Channel Replacement with Armour Stone

- The existing channel between Victoria Street W and Watson Street W, and between Watson Street W and Front Street W, would be widened and channel banks replaced using armour stone.
- The existing culvert crossing under Victoria Street W, Watson Street W, and Front Street W would also be replaced.





# Roseland Creek – Burlington



# Roseland Creek – Burlington



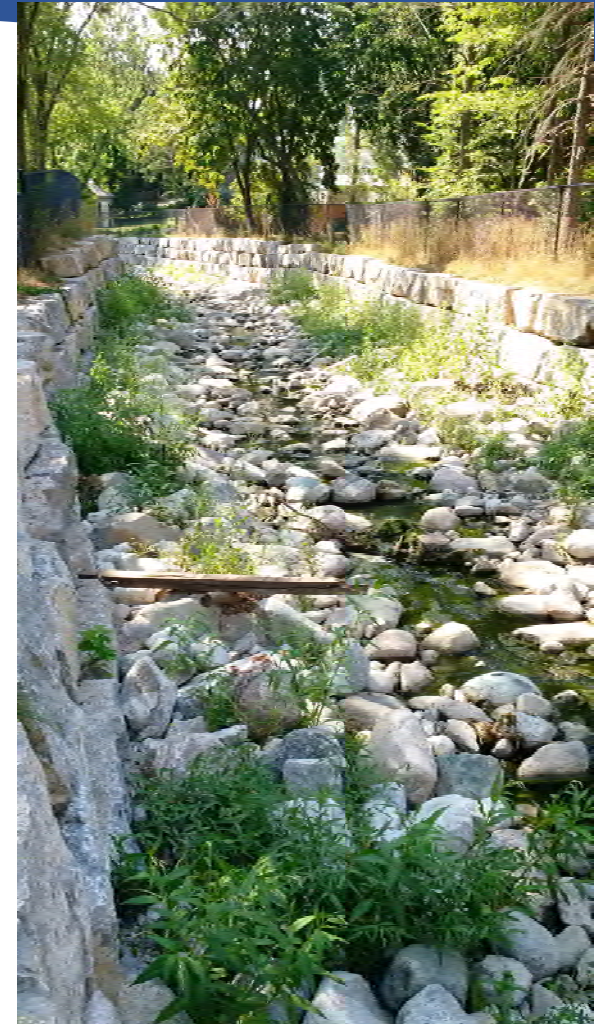
# Roseland Creek – Burlington



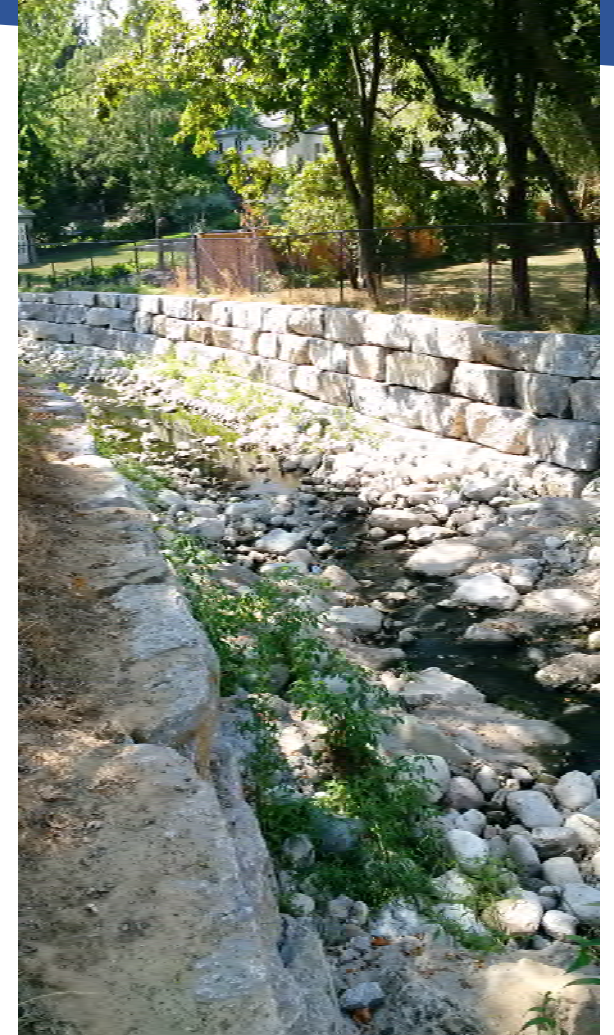
# Roseland Creek – Burlington



# Roseland Creek – Burlington



# Roseland Creek – Burlington



# Next Steps

After completion of the comment period, we will:

- Review and consider all comments received
- Confirm the preferred alternative and finalize the preliminary design
- Consider opportunities for phasing of the project to maximize existing infrastructure life cycles
- Complete the Project File Report, which documents the EA planning process followed and the consultation results
- Publish a Notice of Study Completion to advise where and when the Project File Report will be made available for a 30-day public review period

# Your Involvement

How can you remain involved in the Study?

- Request that your name/ email is added to the mailing list
- Complete and submit the comment sheet
- Contact the Town's representative or the Consultant at any time.

**Thank you for your participation in this online Community Open House.**

*All information is collected in accordance with the Freedom of Information and Protection of Privacy Act.*



# For more information please contact:

Antony Manoharan, P.Eng.  
Project Manager, Town of Whitby  
Email: [manoharana@whitby.ca](mailto:manoharana@whitby.ca)  
Phone: 905-430-4925

Mark Bassingthwaite, P.Eng.  
Project Manager, Resilient Consulting  
Email: [mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)  
Phone: 289-943-4651

Louie Jakupi, P. Eng.  
Senior Water Resources Engineer,  
Central Lake Ontario Conservation Authority  
Email: [ljakupi@cloca.com](mailto:ljakupi@cloca.com)  
Phone: 905-579-0411 x 113

**Whitby Yacht Club Meeting**  
**Meeting at 7:00 PM on December 9, 2021**

Attending:

- Mark B – Resilient
- Antony Manoharan, Town of Whitby
- Joanne Drumm, Centre Ward 3 Councillor, Mayor's Representative
- Numerous folks from the Yacht Club

Material Presented

- Mark provided an overview of the study area, problem statement, Class EA process
- Presented a scaled down version of the Community Open House slides (attached). Attendees could go to Connect Whitby to get the full version of the COH presentation.
- Whitby Yacht Club to provide comments to Mark and Antony after the meeting if they desire.

Questions and Answers

- The ground leader asked if the material removed from the channel would be available as the Whitby Yacht club may be looking at re-using material for shore protection. Mark advised that it would be good to re-use material locally instead of hauling it away. Could look at stockpiling on Yacht Club.
- A member asked if the objective of the project is strictly rehabilitation of the existing channel or if the objective is to reduce flooding or some other reason. Mark replied that the focus is on addressing the pending problem of failing gabions, which would result in erosion and flooding. However, capacity improvements may likely results as the intent is to safely convey the flow during 100 year rainfall event.

---

**From:** Manager Shared Facilities <manager@theinnerharbour.ca>  
**Sent:** March 24, 2021 2:04 PM  
**To:** Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca>  
**Subject:** requesting information

Good afternoon,

I would appreciate any and all information about the Rowe Channel study.

Thank you

Have a good day.

Kiera Niezen RCM., General Licence  
Condominium Manager

**Crossbridge Condominium Services Ltd.**

As Agents for and on behalf of DCC 123 and Shared Facilities

360 Watson Street West and The Inner Harbour

905-430-1214

[manager@dcc123.ca](mailto:manager@dcc123.ca) and [manager@thinnharbour.ca](mailto:manager@thinnharbour.ca)



Virus-free. [www.avast.com](http://www.avast.com)

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**Subject:** Re: Please add me to the project mailing list

**Date:** Friday, March 26, 2021 at 2:37:15 PM Central Standard Time

**From:** [REDACTED]

**To:** Rowe Channel Upgrade Class EA

Thank you

[REDACTED]

> On Mar 25, 2021, at 6:59 PM, Rowe Channel Upgrade Class EA <[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)> wrote:

>

> Hi [REDACTED],

>

> We have added you to the project mailing list. You must have already seen it, but also attached is the Notice of Study Commencement.

>

> A Community Open House is tentatively planned for Fall 2021 to provide project details and obtain feedback. You will receive similar notification of the Open House at that time. In the meantime, if you have any initial comments or require further information, please let us know by way of reply to this email or by contacting one of the Project Team members listed in the notice. Additional information is available at <https://connectwhitby.ca/rowechannel>.

>

> Thanks,

>

> Jennifer Whittard, BES, M.Plan, PMP

> Senior Environmental Planner

> Resilient Consulting

> PO Box 643

> Whitby, ON L1N 5V3

> [www.resilientconsulting.ca](http://www.resilientconsulting.ca)

> @resilientccorp

>

>

>

> On 2021-03-25, 9:50 AM, "[REDACTED]" > wrote:

>

> Please add me to the project mailing list for the Rowe Channel Upgrade Study

>

> Thank you!

>

> [REDACTED]

>

>

>

>

> <Notice of Study Commencement - Rowe Channel Upgrade (003)[1][17][2][1][3][23][1][1].pdf>

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**Subject:** Added to mailing list

**Date:** Wednesday, March 31, 2021 at 11:39:55 AM Central Standard Time

**From:** Rowe Channel Upgrade Class EA

**To:** [REDACTED]

**CC:** Manoharan, Antony

Done, thanks [REDACTED].

A Community Open House is tentatively planned for Fall 2021 to provide project details and obtain feedback. You will receive similar notification of the Open House at that time. In the meantime, if you have any initial comments or require further information, please let us know. Additional information is available at <https://connectwhitby.ca/rowechannel>.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP

Senior Environmental Planner

Resilient Consulting

PO Box 643

Whitby, ON L1N 5V3

[www.resilientconsulting.ca](http://www.resilientconsulting.ca)

@resilientcorp

---

**From:** [REDACTED]

**Date:** Friday, March 26, 2021 at 3:41 PM

**To:** Rowe Channel Upgrade Class EA <[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)>

**Subject:** <no subject>

I would like to be put on the mailing list.

[REDACTED]

Sent from [Mail](#) for Windows 10



Virus-free. [www.avg.com](http://www.avg.com)

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**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement  
**Date:** Thursday, March 25, 2021 at 3:41:37 PM Central Standard Time  
**From:** Painchaud, Tara  
**To:** Jennifer Whittard  
**CC:** Manoharan, Antony

Hello Jennifer,

Please add me to the Interested Parties List for this project. As the staff liaison for the Active Transportation and Safe Roads Advisory Committee, as well as currently finalizing the Town's Active Transportation Plan, this project is of interest and I'd like to remain aware of the project.

Thank you.

Tara

**Tara Painchaud, B.Sc., P.Eng.**  
**Senior Manager**  
**Transportation Services**  
**Town of Whitby**  
T 905.430.4307 x4937

---

**From:** Jennifer Whittard <jwhittard@resilientconsulting.ca>  
**Sent:** Thursday, March 25, 2021 5:04 PM  
**To:** Painchaud, Tara <painchaudt@whitby.ca>  
**Subject:** FW: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

**[EXTERNAL EMAIL]**

Hi Tara,

I was asked to forward this to you.

Thanks,  
Jen

---

**From:** Jennifer Whittard <[jwhittard@resilientconsulting.ca](mailto:jwhittard@resilientconsulting.ca)> on behalf of Rowe Channel Upgrade Class EA <[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)>  
**Date:** Thursday, March 25, 2021 at 2:19 PM  
**To:** "[mulcahyr@whitby.ca](mailto:mulcahyr@whitby.ca)" <[mulcahyr@whitby.ca](mailto:mulcahyr@whitby.ca)>  
**Cc:** "Manoharan, Antony" <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>  
**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

Dear Councillor Mulcahy,

On behalf of the Town of Whitby, please find attached the Notice of Study Commencement for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the study commencement and invite your preliminary input, as applicable. As the Mayor's Designate for the Active Transportation and Safe Roads Advisory Committee, please also feel free to forward this notice to other committee members if applicable.

The channel is located within Centre Ward (3), south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study will identify and evaluate a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. The study will also identify opportunities to improve the look of the channel and reduce the presence of invasive species. The options being considered include, but may not be limited to, full or partial channel replacement with pipes, open channel with armor stone, a combination of piped flow and overland flow, and upstream flow diversion.

A Community Open House is tentatively planned for Fall 2021 to provide project details and obtain feedback. You will receive similar notification of the Open House at that time. In the meantime, if you have any initial comments or require further information, please let us know by way of reply to this email or by contacting one of the Project Team members listed in the notice. Additional information is available at <https://connectwhitby.ca/rowechannel>.

We look forward to hearing from you.

Thanks,  
Jennifer Whittard, BES, M. Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

Confidentiality Warning: This e-mail contains information that is confidential and is intended only for the use of the named recipient(s). If you are not the intended recipient, you are hereby notified that any review, copying or distribution of this transmission is strictly prohibited. Please contact the Town of Whitby immediately if you have received this transmission in error and delete this message.

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**Subject:** Re: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

**Date:** Thursday, March 25, 2021 at 2:53:40 PM Central Standard Time

**From:** Drumm, JoAnne

**To:** Rowe Channel Upgrade Class EA

Good afternoon Jennifer,

Thank you very much for bringing this forward.  
I look forward to going over the information you have provided.

Sincerely,

JoAnne Drumm  
Councillor, Centre Ward 3  
Tel: 905.430.4300 ext 2203  
Cell: 905.706.0379  
drummjoanne@whitby.ca

On Mar 25, 2021, at 4:18 PM, Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca> wrote:

[EXTERNAL EMAIL]

Dear Councillor Drumm,

On behalf of the Town of Whitby, please find attached the Notice of Study Commencement for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the study commencement and invite your preliminary input, as applicable. As the Mayor's Designate for the Whitby in Bloom Committee, please also feel free to forward this notice to other committee members if applicable.

The channel is located within Centre Ward (3), south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study will identify and evaluate a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. The study will also identify opportunities to improve the look of the channel and reduce the presence of invasive species. The options being considered include, but may not be limited to, full or partial channel replacement with pipes, open channel with armor stone, a combination of piped flow and overland flow, and upstream flow diversion.

A Community Open House is tentatively planned for Fall 2021 to provide project details and obtain feedback. You will receive similar notification of the Open House at that time. In the meantime, if you have any initial comments or require further information, please let us know by way of reply to this email or by contacting one of the Project Team members listed in the notice. Additional information is available at <https://connectwhitby.ca/rowechannel>.

We look forward to hearing from you.

Thanks,



Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

<Notice of Study Commencement - Rowe Channel Upgrade (003)[1][17][2][1][3][38].pdf>

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**Subject:** Re: Rowe channel project

**Date:** Monday, April 19, 2021 at 3:31:16 PM Central Daylight Time

**From:** Rowe Channel Upgrade Class EA

**To:** [REDACTED]

**CC:** Manoharan, Antony, Mark Bassingthwaite

Hi [REDACTED],

On behalf of the Town of Whitby, thank you for your email. We will consider your request if the study determines that the preferred solution requires construction works on Victoria Street. In the meantime, we have forwarded your email to the Region of Durham because Victoria Street is the Region's responsibility because it's a Regional road.

We've also added your email address to our project mailing list. A Community Open House is tentatively planned for Fall 2021 to provide further project details and obtain feedback. You will receive email notification of the Open House at that time.

Thanks,  
Jen

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
www.resilientconsulting.ca  
@resilientccorp

On 2021-04-13, 9:13 AM, '[REDACTED]' wrote:

I am a resident of 360 Watson St for many years. My condo faces Victoria St.

As Whitby allowed the truck depot to be built on Victoria St west of us, we are forced to listen to the big trucks race by us in both directions, starting about 4 am as they exit at Brock St to/from the 401.

When trucks are proceeding west from Brock exit, I am forced to listen to a big

"Boom" sound which rattles my windows. This sounds like a sonic boom when inside our homes. I have watched for years and it happens as they pass over the Rowe channel as they travel Victoria St. It is not a desirable noise to have to put up with numerous times a day.

Could you please consider fixing the dip in the road at the same time that the channel project is being done? It would be very much appreciated.

Thank you  
[REDACTED]

Sent from my iPad

---

**From:** Connect Whitby <notifications@engagementhq.com>  
**Sent:** November 18, 2021 10:33 AM  
**To:** Manoharan, Antony <manoharana@whitby.ca>  
**Subject:** A new comment has been added to Comments

**[EXTERNAL EMAIL]**

Hi there,

Just a quick heads up to let you know that a new question has been asked at Rowe Channel Upgrade Study Environmental Assessment by [REDACTED] .

The question that was asked is:

I do not see a separator structure to assure contaminants do not enter Lake Ontario. Existing vegetation acts like a filter capturing garbage etc. , it also is a habitat for birds, amphibian's and Coyote, Fox and Raccoon trails. Lack of maintenance and control of Phragm has led to the over growth of this invasive species but does act like a filter. Complete box culvert covered with pedestrian walkway and landscaping with a separation system prior to outfall to the bay/lake.

Please DO NOT reply to this email. If you want to provide an answer to this comment, sign into your site and respond to the question from within the Q & A tool.

Regards

[REDACTED]

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**From:** Connect Whitby <notifications@engagementhq.com>  
**Sent:** November 18, 2021 11:10 AM  
**To:** Manoharan, Antony <manoharana@whitby.ca>  
**Subject:** A new comment has been added to Comments

**[EXTERNAL EMAIL]**

Hi there,

Just a quick heads up to let you know that a new question has been asked at Rowe Channel Upgrade Study Environmental Assessment by [REDACTED].

The question that was asked is:

My preference is the Open Channel with armour stone. This supports both the directing of run off and the environmental advantages of the open channel for native reeds and grasses to sink carbon a provide habitat for the birds and fish species that inhabit the current channel. A cost effective and sustainable key to climate change mitigation is preservation and protection of natural habitat to sink carbon and promote ecological diversity using natural infrastructure.

Please DO NOT reply to this email. If you want to provide an answer to this comment, sign into your site and respond to the question from within the Q & A tool.

Regards

[REDACTED]

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**Subject:** FW: Rowe Channel Upgrade Study  
**Date:** Tuesday, December 7, 2021 at 9:05:16 AM Central Standard Time  
**From:** Rowe Channel Upgrade Class EA  
**To:** Manoharan, Antony  
**CC:** Samantha Rayner, Jennifer Whittard  
**Attachments:** Rowe Channel Study.pdf

Hi Antony,

Please see below and attached.

Mark

---

**From:** [REDACTED]  
**Sent:** December 6, 2021 1:42 PM  
**To:** Drumm, JoAnne <drummjoanne@whitby.ca>  
**Cc:** Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca>; Leahy, Chris <leahyc@whitby.ca>; Newman, Deidre <newmand@whitby.ca>  
**Subject:** Re: Rowe Channel Upgrade Study

Hi JoAnne

The attachment below (Rowe Channel pdf) contains the list of names supporting the replacement of at least the portion of the channel south of Victoria and north of Watson with pipes completely closing off that part of the channel. I also added the contents of the attachment to the Comments Section within the Rowe Channel Study in the Connect Whitby website.

Thanks,

[REDACTED]

On Friday, December 3, 2021, 12:47:29 p.m. EST, Drumm, JoAnne <[drummjoanne@whitby.ca](mailto:drummjoanne@whitby.ca)> wrote:

Good afternoon [REDACTED],

I would like to thank you for reaching out to us regarding your thoughts on the Rowe Channel Upgrade and Municipal Class Environmental Assessment.

I'm not sure if you have provided your suggestions / comments online yet but there is still time to do so. You may still submit on or before December 17, 2021  
[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)

I'm also happy to pass along your feedback to the Town Program Manager, Water Resources. If you would like to provide your list of names I can also do that and I would love to have a copy myself. All ideas and feedback are most welcome.

Most Sincerely,

JoAnne

JoAnne Drumm  
Councillor, Centre Ward 3  
Tel: 905.430.4300 ext 2203  
Cell: 905.706.0379  
[drummjoanne@whitby.ca](mailto:drummjoanne@whitby.ca)

On Dec 3, 2021, at 12:27 PM, [REDACTED] wrote:

**[EXTERNAL EMAIL]**

I am sending this email in response to the "Rowe Channel Upgrade Study" Public Notice. A number of residents in the 3 condo buildings located just south of Victoria St West and close to the open channel believe the best solution would be to replace at least the portion of the channel south of Victoria and north of Watson with pipes completely closing off that part of the channel. As stated in your Public Notice this solution would reduce flooding risk and most importantly reduce the presence of invasive species that are attracted to the area due to the swamp like conditions.

If it would be helpful I could provide a list of the names of the residents who support the above solution.

Thanks,

[REDACTED]

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---

[REDACTED]

6th December 2021

**JoAnne Drumm**

Councillor Centre Ward, Whitby  
drummjoanne@whitby.ca

**Chris Leahy**

Regional Councillor, Whitby  
leahyc@whitby.ca

**Deidre Newman**

Councillor West Ward, Whitby  
newmand@whitby.ca

**Resilient Consulting**

[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)

[REDACTED]

Joanne Drumm,

This memo is in response to the "Rowe Channel Upgrade Study" Public Notice. A number of residents in the 3 condo buildings located just south of Victoria St West and close to the open channel believe the best solution would be to replace at least the portion of the channel south of Victoria and north of Watson with pipes completely closing off that part of the channel. As stated in your Public Notice this solution would reduce flooding risk and most importantly reduce the presence of invasive species that are attracted to the area due to the swamp like conditions. Other problems resulting from the open channel are: 1) a large spider infestation is damaging the paint of cars parked both on level 1 and level 2 and our superintendent spends time cleaning it up; 2) the tall vegetation in the channel obstructs drivers view when exiting the garage onto Watson.

The following are names of the residents in the 3 condo buildings that have been approached and support the solution to enclose the portion of the channel between Victoria and Watson. More than 90% of the residents that have been approached support the enclosure solution and no doubt at least a 75% support level would be maintained if all residents were approached.

---

**360 Watson St West, Sailwinds**

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

**340 Watson St West, Yacht Club**

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]			

**1600 Charles St, The Rowe**

[REDACTED]	[REDACTED]
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---

**Subject:** FW: Letter sent from residents in 3 condos  
**Date:** Friday, December 10, 2021 at 10:53:50 AM Central Standard Time  
**From:** Rowe Channel Upgrade Class EA  
**To:** Manoharan, Antony  
**CC:** Jennifer Whittard, Samantha Rayner

Hi Antony,

Please see below emails from [REDACTED].

Thanks  
Mark

-----Original Message-----

From: Drumm, JoAnne <drummjoanne@whitby.ca>

Sent: December 9, 2021 5:37 PM

To: [REDACTED]

Cc: Leahy, Chris <leahyc@whitby.ca>; Newman, Deidre <newmand@whitby.ca>; Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca>

Subject: Re: Letter sent from residents in 3 condos

Good afternoon [REDACTED].

I know you are very active on the Board and as always, I / we value any comments and feedback. Thank you for providing further clarification which is much appreciated.

Kindest regards,  
JoAnne

JoAnne Drumm  
Councillor, Centre Ward 3  
Tel: 905.430.4300 ext 2203  
Cell: 905.706.0379  
drummjoanne@whitby.ca

> On Dec 9, 2021, at 10:29 AM, [REDACTED] wrote:

> [EXTERNAL EMAIL]

>

>

> Dear Councillors and Consultant -

>

> I am in receipt of a letter from [REDACTED], addressed to the four of you and myself, which lists a number of residents who support a piped option for the Rowe Channel Upgrade Study. With this email I would like to provide some clarifications.

>

> 1) I am listed as a recipient in my capacity as President of the Sailwinds condominium Board of Directors. Personally, I support the preferred option (#5) as the most effective way to address possible future flooding

events, at the least cost. I have personally responded to the survey, supporting option #5.

>

> 2) The Board of Directors of the Sailwinds has chosen not to make a corporate submission, on behalf of its condominium owners, in this consultation. Please do not interpret the appearance of my name and position as an indication that the letter represents the views of the Board of Directors.

>

> 3) The letter you have received speculates about the level of support from condominium residents for a piped option. This is just speculation. The letter also mentions a 'spider infestation' problem. I am active on our Board and am unaware of such a problem. I would point out that, even if such a problem exists, there is no evidence that it is caused by the Rowe channel. The letter further says that the tall vegetation obstructs driver's views. While I personally disagree with that this is the case, I'd note that all options, other than "do nothing", will address the vegetation issue.

>

> Thank you for your consideration of these clarifications.

>

> 

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**Subject:** RE: Rowe Channel Upgrade Study  
**Date:** Thursday, December 16, 2021 at 9:07:08 AM Central Standard Time  
**From:** Manoharan, Antony  
**To:** 'Louie Jakupi', [REDACTED]  
**CC:** Mark Bassingthwaite, Jennifer Whittard  
**Attachments:** image001.png, image005.png, image006.png, image007.png, image008.png, image009.png, image010.jpg

Thanks [REDACTED] for your call.

Jen, please add [REDACTED] to the mailing list.

Thanks,  
Antony



**Antony Manoharan, P.Eng.,**  
**Program Manager, Water Resources**  
**Engineering & Infrastructure Services**

**Public Works**

**Town of Whitby**  
T 905430.4925  
Town of Whitby

[whitby.ca](http://whitby.ca)



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**From:** Louie Jakupi <ljakupi@CLOCA.com>  
**Sent:** December 16, 2021 9:39 AM  
**To:** [REDACTED]  
**Cc:** Manoharan, Antony <manoharana@whitby.ca>; mbassingthwaite@resilientconsulting.ca  
**Subject:** RE: Rowe Channel Upgrade Study

[EXTERNAL EMAIL]

Hi [REDACTED],

It was nice talking to you today. As discussed, please refer to the Rowe Channel Upgrade Study Online Community Open House materials found on the Town's website, link found here:

<https://connectwhitby.ca/rowechannel>

This is also where you can also find resources for providing your comments/feedback for this study.

Mark/Antony, please confirm that [REDACTED] has been added to the project mailing list.

Thanks

**Louie Jakupi, P.Eng.** | Senior Water Resources Engineer



**Admin Office** 100 Whiting Avenue, Oshawa ON L1H 3T3  
**Phone** 905 579 0411 ext 113 | **Fax** 905 579 0994  
**Email** [ljakupi@cloca.com](mailto:ljakupi@cloca.com) | **Website** [cloca.com](http://cloca.com)

Healthy watersheds for today and tomorrow.

---

**From:** [REDACTED]

**Sent:** December 15, 2021 4:19 PM

**To:** Louie Jakupi <[ljakupi@CLOCA.com](mailto:ljakupi@CLOCA.com)>

**Cc:** [manoharana@whitby.ca](mailto:manoharana@whitby.ca); [mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)

**Subject:** Rowe Channel Upgrade Study

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Hi Louie,

I just called and left a VM re the Rowe Channel Upgrade Study.

██████████ is the owner of 1606, 1610, & 1614 Charles Street, which borders the Rowe Channel, and we are in the middle of securing building permits for a five building project. When you are free can you please call me to discuss your project, and can I please be added to the project emailing list?

Thanks,

██████████

██████████  
██████████

██████████

██████████  
██████████  
██████████

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**Subject:** RE: Rowe Channel EA - [REDACTED]  
**Date:** Thursday, January 20, 2022 at 7:53:10 AM Central Standard Time  
**From:** Mark Bassingthwaite  
**To:** [REDACTED]  
**CC:** [REDACTED], Manoharan, Antony, Jennifer Whittard, Samantha Archibald  
**Attachments:** image001.png, image002.png, image003.png, image004.png, image005.png, image006.png, image007.png

Hi [REDACTED],

Further to your phone call the other day, I can provide the following information at this time:

- The notice of completion is scheduled to be filed in the next month or two, and the project file will be made available for review by the public at that time. The project file contains more detail than what was provided through the online PIC material.
- Hydrologic modelling was completed and is summarized in the Project File. Our understanding is that the 100 year storm is the regulatory event for the Rowe Channel. Our analysis looking at return period (2 to 100 year) flows only and we did not analyze the Hurricane Hazel event.
- Basic hydraulic and floodplain analysis of existing conditions was completed but is not intended for analysis of development limits.
- It should be noted that the recommended alternative will be implemented in phases to maximize the lifespan of existing infrastructure, specifically existing culverts. Therefore the culvert at Watson may not be replaced for some time.
- Any additional questions related to model requests, development potential or development applications should be directed to the Town (our client) and CLOCA (reviewer for development limits related to flooding).

Regards  
Mark

Mark Bassingthwaite, P.Eng.  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)  
P: 289-943-4651  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

---

**From:** [REDACTED]  
**Sent:** January 14, 2022 3:18 PM  
**To:** Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>  
**Cc:** [REDACTED]  
**Subject:** Rowe Channel EA - [REDACTED]

Hi Mark,

[REDACTED] is completing a due diligence exercise in association with the purchase of the property at [REDACTED] in the Town of Whitby.

We understand the site is abutting the Rowe Channel and also within the floodplain. We have reviewed the Rowe Channel EA and have a few questions regarding the alternatives for improving the current channel conditions:

- Through correspondence with CLOCA, we understand the regulatory floodplain elevation is 77.39m. According to the Pringle Creek Master Drainage Study, the flood standard used within the Pringle Creek watershed should be from the 100-year storm event. Having said that, was this elevation or a different elevation used as a factor when conducting your analysis/modelling for the alternatives? Did you also take into account any regional storm events?
- With each option, particularly the favoured Alternative #5, if they are implemented, what would the new floodplain elevation be and would it be contained within the upgraded channel?
- Was there any modelling done in association with his study? Is there any modelling done for alternative #5 specifically? Would you be able to provide us with this?

Please feel free to give me a call to discuss.

Regards,

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

# Appendix E-2

Review Agency  
Communications and Consultation



December 6<sup>th</sup>, 2021

Louie Jakupi, P.Eng.  
Central Lake Ontario Conservation Authority  
100 Whiting Avenue  
Oshawa L1H 3T3

**Re: Response to Central Lake Ontario Conservation Authority (CLOCA) Comments  
Rowe Channel EA  
CLOCA File PSSE72**

Further to the comments received on November 3<sup>rd</sup>, 2021, Resilient Consulting Corporation (Resilient) is pleased to provide the following information on the above-mentioned project. Resilient as re-iterated the CLOCA's comments below, with the responses following in *italics*.

**Planning:**

1. Has a comparison been completed on the impact of each option on the extent of the regulatory floodplain in this area or what storms can be conveyed within the channel of each option? Should the EA consider a reduction in flooding impacts on adjacent lands as a positive outcome within their evaluation criteria?

*All proposed alternatives for upgrading Rowe Channel have been sized accordingly to fully convey the 100-year storm event within the proposed infrastructure. The exception to this is Alternative #3, #4, and #6, where some of the existing undersized infrastructure is to remain unchanged, resulting in flooding during major storm events in isolated areas. Flood mitigation has been included in the evaluation criteria under functional (technical) evaluation category.*

**Aquatics/Natural Environment:**

2. Despite the vegetation in the Rowe channel being primarily non-native, it is still serving a function from a habitat and water quality perspective. Given its seed bank is feeding the downstream Provincially Significant Wetland (PSW), it is still recommended for removal but could result in a change in sediment transport that puts more management onus on the marina for dredging near the outflow.

*Alternative #5, consisting of an open channel with armour stone, has been identified as the preferred alternative. The proposed open channel alternative provides opportunity of new vegetation growth that would assist in mitigating against sediment transport through the channel. In addition, erosion and sediment controls will be required during the construction process to prohibit suspended sediment from travelling downstream.*

3. From a natural heritage perspective, the greatest impact would be the removal of the open channel to a closed culvert.

*Noted. The evaluation rankings of all natural heritage criteria have been revised to demonstrate the impact of enclosing the channel.*

4. Have amphibian surveys been completed here?

*Amphibian surveys have not been completed within the study limit.*

5. Is there any evidence of Northern Pike spawning in the open vegetated portions? This may only be obvious on high lake water level years, if at all.

*As per sampling completed by CLOCA in Whitby Harbour, Northern Pike have been identified in the vicinity of the channel. At this time, fish sampling has not been completed by the Project Team within Rowe Channel.*

6. Regardless of the options chosen, any consideration for water quality enhancements to the receiving PSW would be beneficial and could help reduce sedimentation in the marina area, depending on the type of treatment.

*Noted. Water quality has been added as an evaluation criterion under the Natural Environment category. Opportunities to enhance water quality will be reviewed future during the detailed design of the channel.*

7. DFO may deem this to be fish habitat, and in that case, an authorization may be required to compensate for this loss in habitat if a closed culvert is chosen. DFO will obviously make the decision on this. If it does go this way, it may be beneficial to coordinate with the DFO during their contaminated soils dredging project. From what I understand, they will be completing compensation projects to offset their impacts through the dredging process, and there may be an opportunity to add on to their compensation work.

*Alternative #5, consisting of an open channel with armour stone, has been identified as the preferred alternative. Contact with DFO will be made during the detailed design process.*

8. Why do all of the alternatives score the same for sensitive species impact/opportunities?

*Based on SAR screening completed by North-South Environmental, Barn Swallows, Chimney Swift, American Eel and Eastern Pondmussels may be present within the study area. Habitat for these species have been identified within or around Whitby Harbour, and not directly within Rowe Channel. Channel upgrade works are not expected to affect habitat function within the harbour, therefore all alternatives have been scored equally.*

### **Engineering:**

9. Please explain the "somewhat preferred" rating for the full piped option under aquatic habitat opportunities. This option may remove invasive plant species, but it also eliminates any fish habitat that may exist. The potential need for fish habitat compensation should be examined for this option. Removal of invasive species could be provided for all options.

*The aquatic habitat evaluation criteria for all fully piped options have been revised to less preferred.*

10. The downstream vegetated channel provides filtering of stormwater from the contributing drainage area. Has the water quality benefit been considered?

*Water quality has been added as an evaluation criterion under the Natural Environment category.*

11. Please explain how the piped option scores "somewhat preferred" with a cost greater than the "less preferred" partial diversion. It seems like the open channel option should get some preference under capital cost.

*Evaluation of the design alternatives for capital costs have been revised to demonstrate the most expensive options (Alternative #2 and Alternative #7) as less preferred. As Alternative #5 – Open Channel Replacement with Armour Stone, requires the lowest capital costs with the exception of the 'Do Nothing' alternative, it has been revised to more preferred.*

12. Please describe stormwater drainage for lands adjacent to the channel under the piped option, and provide consideration for developing lands.

*Runoff from lands adjacent to the channel are to be capture within a series of catch basins located along the length of the pipe. Revised grading above the proposed pipe network will be complete to promote runoff to enter these catch basins though establishing low capture points.*

13. Have the hydraulic effects of elevated Lake Ontario water levels (as experienced in recent years) been considered?

*As a component of the feasibility study, a sensitivity analysis was completed using low, average and highwater levels to assess the potential impacts of the variation in water levels on the proposed alternatives. This sensitivity analysis was updated to correspond with the revised hydrology and design of each alternative.*

14. Alternative 2 Cross section B-B shows the proposed ground above the channel filled in. How will work with existing sheet drainage from the adjacent lands? It appears that these areas are drained via overland flow. Please consider the interim drainage function in the scenario that the channel is upgraded but the adjacent lands have not been developed.

a. Similar with Section C-C. Please review interim drainage conditions.

*Runoff from lands adjacent to the channel are to be capture within a series of catch basins located along the length of the pipe. Revised grading above the proposed pipe network will be complete to promote runoff to enter these catch basins though establishing low capture points.*

15. For Alternative 4, Section A-A looks like its adding capacity and B-B looks like its reducing capacity. What is the overall hydraulic impact on the channel and please show the resulting flooding impact to the adjacent lands on the east side.

a. Please comment on the overall impacts to the regulatory floodlines for all options.

*The proposed twin 3000mm by 1500mm concrete culverts located between Victoria Street W and Watson Street W, and the open channel between Watson Street W and*

*Front Street W, have been sized to fully contain the regulatory floodline within the proposed infrastructure, therefore reducing the risk of flooding on adjacent lands. Flooding is anticipated to continue around the Front Street W crossings, as the undersize culvert is not to be replaced. As per Section C-C, revised grading is required along the eastern boundary of the channel in order to tie the armour stone into the neighbouring property. The dimensions of the channel will be optimized during detailed design to reduce this required regrading, if feasible, to promote continued overland sheet flow into the channel. If required, catch basins with outlets into the channel are proposed along the eastern boundary of the channel to capture and convey runoff into the channel.*

*As noted in the response in Question #1, all design alternatives have been sized to fully convey the 100-year event therefore reducing the risk of flooding of adjacent properties. The exception to this is Alternative #3, #4, and #6, where some of the existing undersized infrastructure is to remain unchanged, resulting in flooding during major storm events in isolated areas.*

16. Alternative 6 requires that the overland channel will require berming in order to create the trapezoidal channel. Please reference the MNR technical manual (River and Stream Flood Hazard Technical Guide) on guidance related to Berms and flood walls. New development would be required to be floodproofed to the flood standard.
  - a. As per Section B-B and C-C it does not appear that any sheet drainage from the adjacent lands between Victoria & Front St. would be able to be captured by this overland flow channel. How will the adjacent lands drain? Will there be a hydraulic connection?

*The design of the overland spillway has been revised to remove the need to berm the banks on the channel. Runoff from adjacent lands can continue to sheet flow overland into the spillway. Catch basins within the spillway are proposed to capture and convey runoff from minor storm events into the underground pipe network.*

17. As mentioned above, it looks like there are some inconsistencies with the evaluation criteria (ie. Option 2 is more expensive than Option 7 but more preferred for capital cost, and there is a big difference between Options 2 and 5 but they are scored the same). Please review.

*The evaluation of various alternatives has been revised to ensure consistency.*

We trust that the above will provide sufficient detail as to how the provided comments have been addressed. Please do not hesitate to contact the undersigned should you require further clarification.

Sincerely,



**Samantha Rayner, P.Eng.**  
Project Engineer  
Resilient Consulting

May 3<sup>rd</sup>, 2022

Louie Jakupi, P.Eng.  
Central Lake Ontario Conservation Authority  
100 Whiting Avenue  
Oshawa L1H 3T3

**Re: Response to Central Lake Ontario Conservation Authority (CLOCA) Comments  
Rowe Channel EA Draft Project File  
CLOCA File PSSE72**

Further to the comments received on April 28<sup>th</sup>, 2022, Resilient Consulting Corporation (Resilient) is pleased to provide the following information on the above-mentioned project. Resilient as reiterated the CLOCA's comments below, with the responses following in *italics*.

**General/ Report:**

1. Figure 6 within the draft EA document has a label pointing to the Rowe Channel between Watson and Front Streets indicating a 24.4 m – 3000 mmx1500 mm concrete twin culvert at 0.16 % is proposed. There is also a separate label indicating the replacement of the Watson Street culvert. It is unclear if this is a duplication of information or if another culvert is proposed. The labels on this Figure need to be reviewed and updated to clarify this matter.

*Noted. Figure 6 within the Draft Project File has been updated accordingly to clarify the location of the proposed culvert replacement.*

2. There are references throughout the document related to the potential reuse of the old gabion basket materials as shoreline protection for the Whitby Yacht Club. It should be noted in the Future Commitments section that prior to any placement of materials for shoreline protection within the Whitby Harbour, that CLOCA must be contacted regarding any required permitting through Ontario Regulation 42/06 of the Conservation Authorities Act for these activities.

*Reference to permitting requirements under Ontario Regulation 42/06 for the reuse of gabion basket materials by the Whitby Yacht Club has been added to Section 11 – Next Steps and Future Commitments of the Project File.*

3. Section 8.4 outlines the expectations related to the creation of fish habitat and passage during detailed design. It should be noted in this section that the design of fish habitat (eg. Any materials to be placed in the channel or recommendations to embed culverts when they are replaced) should be coordinated with the hydraulic analysis to ensure one does not impact the other negatively. (ie. Floodplain storm events remain within the designed channel if the culvert is embedded to create a low flow channel.)

*Additional wording has been added to Section 8.4 – Fish and Fish Habitat Restoration, stating that the design of all proposed fish habitat will be incorporated into the hydraulic analysis during detailed design to ensure the proposed features do not impact hydraulic function.*

4. A statement should be added to the Future Commitments section that states that hydraulic modelling and floodplain mapping will be required at each stage of implementation of detailed design for the proposed armoured channel and roadway culvert improvements. It should also state that the ultimate design and hydraulic modelling for the channel must demonstrate containment of the 100-year (regulatory) flood within the channel and easement, and each channel improvement must demonstrate no negative impact to surrounding landowners.

*Additional wording has been added to Section 11 – Next Steps and Future Commitments, stating that hydraulic modelling and floodplain mapping will be required at each stage of implementation of detail design, and the ultimate design must demonstrate the containment of the 100-year flood within the channel and easement.*

5. Given there are currently active development projects taking place adjacent to the Rowe Channel, the Town may want to approach these landowners now, to determine the best timing for channel improvements adjacent to their lands. Coordination of activities taking place within and adjacent to the channel may make the process more efficient, cost effective and minimize the number of times the adjacent lands need to be disturbed. Any approved future stormwater management connections to the Rowe Channel will also need to be considered as part of detailed design.

*Noted.*

We trust that the above will provide sufficient detail as to how the provided comments have been addressed. Please do not hesitate to contact the undersigned should you require further clarification.

Sincerely,



**Samantha Archibald**

Project Engineer  
Resilient Consulting

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**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement  
**Date:** Wednesday, April 7, 2021 at 12:25:55 PM Central Daylight Time  
**From:** ONT Environment / Environnement ONT  
**To:** Rowe Channel Upgrade Class EA  
**Attachments:** Notice of Study Commencement - Rowe Channel Upgrade (003)[1][17][2][1][2....pdf

Greetings,

Thank you for your correspondence.

Please note Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents self-assess if their project:

1. Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at [www.tbs-sct.gc.ca/dfrp-rbif/](http://www.tbs-sct.gc.ca/dfrp-rbif/); **and**
2. Will require approval and/or authorization under any Acts administered by Transport Canada\* available at <http://www.tc.gc.ca/eng/acts-regulations/menu.htm>.

Projects that will occur on federal property prior to exercising a power, performing a function or duty in relation to that project, will be subject to a determination of the likelihood of significant adverse environmental effects, per Section 82 of the *Impact Assessment Act, 2019*.

If the aforementioned does not apply, the Environmental Assessment program should not be included in any further correspondence and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded *electronically* to: [EnviroOnt@tc.gc.ca](mailto:EnviroOnt@tc.gc.ca) with a **brief description of Transport Canada's expected role**.

\*Below is a summary of the most common Acts that have applied to projects in an Environmental Assessment context:

- **Canadian Navigable Waters Act (CNWA)** – the Act applies primarily to works constructed or placed in, on, over, under, through, or across navigable waters set out under the Act. The Navigation Protection Program administers the CNWA through the review and authorization of works affecting navigable waters. Information about the Program, CNWA and approval process is available at: <http://www.tc.gc.ca/eng/programs-621.html>. Enquiries can be directed to [NPPONT-PPNONT@tc.gc.ca](mailto:NPPONT-PPNONT@tc.gc.ca) or by calling (519) 383-1863.
- **Railway Safety Act (RSA)** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing safe railway operations. Additional information about the Program is available at: <https://www.tc.gc.ca/eng/railsafety/menu.htm>. Enquiries can be directed to [RailSafety@tc.gc.ca](mailto:RailSafety@tc.gc.ca) or by calling (613) 998-2985.
- **Transportation of Dangerous Goods Act (TDGA)** – the transportation of dangerous goods by air, marine, rail and road is regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: <https://www.tc.gc.ca/eng/tdg/safety-menu.htm>. Enquiries can be directed to [TDG-](mailto:TDG-)

[TMDOntario@tc.gc.ca](mailto:TMDOntario@tc.gc.ca) or by calling (416) 973-1868.

- **Aeronautics Act** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: <https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm>. Enquires can be directed to [tc.aviationservicesont-servicesaviationont.tc@tc.gc.ca](mailto:tc.aviationservicesont-servicesaviationont.tc@tc.gc.ca) or by calling 1 (800) 305-2059 / (416) 952-0230.

Please advise if additional information is needed.

Thank you,

**Environmental Assessment Program, Ontario Region**

Transport Canada / Government of Canada / 4900 Yonge St., Toronto, ON M2N 6A5  
[EnviroOnt@tc.gc.ca](mailto:EnviroOnt@tc.gc.ca) / Facsimile : (416) 952-0514 / TTY: 1-888-675-6863

**Programme d'évaluation environnementale, Région de l'Ontario**

Transports Canada / Gouvernement du Canada / 4900, rue Yonge, Toronto, ON, M2N 6A5  
[EnviroOnt@tc.gc.ca](mailto:EnviroOnt@tc.gc.ca) / télécopieur: (416) 952-0514

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**From:** Rowe Channel Upgrade Class EA [<mailto:rowechannel@resilientconsulting.ca>]

**Sent:** Thursday, March 25, 2021 6:11 PM

**To:** Westaway, Paula <[paula.westaway@tc.gc.ca](mailto:paula.westaway@tc.gc.ca)>

**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

On behalf of the Town of Whitby, please find attached the Notice of Study Commencement for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the study commencement and invite your preliminary input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study will identify and evaluate a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. The study will also identify opportunities to improve the look of the channel and reduce the presence of invasive species. The options being considered include, but may not be limited to, full or partial channel replacement with pipes, open channel with armor stone, a combination of piped flow and overland flow, and upstream flow diversion.

A Community Open House is tentatively planned for Fall 2021 to provide project details and obtain feedback. You will receive similar notification of the Open House at that time. In the meantime, if you have any initial comments or require further information, please let us know by way of reply to this email or by contacting one of the Project Team members listed in the notice. Additional information is available at <https://connectwhitby.ca/rowechannel>.



We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

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**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House  
**Date:** Monday, November 22, 2021 at 9:07:51 AM Central Standard Time  
**From:** Indigenous Consultations Autochtones  
**To:** Rowe Channel Upgrade Class EA

Hello,

Thank you for your email. Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) has developed a useful tool, the Aboriginal and Treaty Rights Information System (ATRIS). ATRIS is a web-based, geographic information system intended to help users identify the location of Indigenous groups and providing users with information pertaining to each group's established or asserted rights. ATRIS provides access to narrative records, documents and maps that can be used to assist governments, industry and other interested parties in determining their consultation obligations and in carrying out their consultation research. I invite you to visit the ATRIS web page at: <https://www.rcaanc-cirnac.gc.ca/eng/1100100014686/1609421785838>.

As per web pages above, Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) regularly holds free webinars to provide an overview of ATRIS and its key functions.

If you require additional information about ATRIS or if you require more specific consultation information related to your project, please contact the Consultation and Accommodation Unit at [indigenous.consultations.autochtones@rcaanc-cirnac.gc.ca](mailto:indigenous.consultations.autochtones@rcaanc-cirnac.gc.ca).

Vienna Watt *she/they - elle/ielle*

**Single Window – Consultation and Accommodation Unit**

**Guichet unique – L'Unité de la consultation et de l'accommodement**

For more information on federal coordination, processes and tools for consultation and accommodation with Indigenous peoples :

Pour de plus amples renseignements sur la coordination, les processus et les outils du gouvernement fédéral pour la consultation et l'accommodement des peuples autochtones :

[Indigenous.consultations.autochtones@rcaanc-cirnac.gc.ca](mailto:Indigenous.consultations.autochtones@rcaanc-cirnac.gc.ca)

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**From:** Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca>

**Sent:** Thursday, November 18, 2021 7:29 AM

**Cc:** Manoharan, Antony <manoharana@whitby.ca>; Louie Jakupi <ljakupi@CLOCA.com>; Mark Bassingthwaite <mbassingthwaite@resilientconsulting.ca>

**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House

On behalf of the Town of Whitby, please find attached the Notice of Online Community House for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the preliminary preferred solution and invite your input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study has identified and evaluated a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. As a result of the evaluation, the preliminary preferred solution has been identified as **replacement of the existing channel with an open channel lined with armour stone**. The Open House materials provide further details and are now available for review and comment at: <https://connectwhitby.ca/rowechannel>.

Pending comments received from the public, First Nation communities, and various review agencies,

completion of the Project File (EA report) is tentatively planned for early 2022. You will then receive similar notification that the Project File is available for review. In the meantime, please submit any comments or questions you may have by completing our online survey or by way of reply to this email. We would appreciate your response by December 17, 2021. If you require further information, please also feel free to contact one of the Project Team members listed in the notice.

We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP

Senior Environmental Planner

Resilient Consulting

PO Box 643

Whitby, ON L1N 5V3

[www.resilientconsulting.ca](http://www.resilientconsulting.ca)

@resilientccorp

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**Subject:** RE: MECP Comments on the Notice of Commencement for the Rowe Channel Upgrade Study  
**Date:** Thursday, June 3, 2021 at 1:00:35 PM Central Daylight Time  
**From:** Lee, Erinn (MECP)  
**To:** Jennifer Whittard  
**CC:** Mark Bassingthwaite  
**Attachments:** image004.png, image005.png, image006.png

Hi Jen,

A quantitative Air Quality Impact Assessment is not required for this project. MECP recommends that you consider dust mitigation measures and/or best management dust practices to minimize off-site impacts at nearby sensitive receptors in your qualitative assessment.

If you have any questions or require additional clarification, please let me know.

Thanks,

### Erinn Lee

Environmental Resource Planner/EA Coordinator | Ministry of the Environment, Conservation and Parks  
Project Review Unit, Environmental Assessment Branch  
135 St. Clair Ave W, Toronto, ON M4V 1P5  
P : 1 (416) 357-1511 E: [Erinn.Lee2@ontario.ca](mailto:Erinn.Lee2@ontario.ca)

---

**From:** Jennifer Whittard <jwhittard@resilientconsulting.ca>  
**Sent:** June 1, 2021 4:28 PM  
**To:** Lee, Erinn (MECP) <Erinn.Lee2@ontario.ca>  
**Cc:** Mark Bassingthwaite <mbassingthwaite@resilientconsulting.ca>  
**Subject:** Re: MECP Comments on the Notice of Commencement for the Rowe Channel Upgrade Study

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

Hi Erinn,

Further to your letter (attached for reference) and the email trail below, could you please confirm that a quantitative Air Quality Impact Assessment is not required? Page 3 of the "Areas of Interest" attachment suggests that we should contact you about the level of assessment required if we've not already been advised.

We will include a qualitative assessment as you've suggested, but we do not believe a quantitative assessment is required because:

- All alternatives involve construction using typical excavation equipment. Duration/types of equipment would be very similar for each alternative; and
- No alternatives include long-term changes to traffic or any other activities/sources that may impact air quality.

Appreciate your input.

Thanks,

Jen

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

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**From:** "Lee, Erinn (MECP)" <[Erinn.Lee2@ontario.ca](mailto:Erinn.Lee2@ontario.ca)>  
**Date:** Wednesday, May 26, 2021 at 10:43 AM  
**To:** "Manoharan, Antony" <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>  
**Cc:** Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>, Jennifer Whittard <[jwhittard@resilientconsulting.ca](mailto:jwhittard@resilientconsulting.ca)>  
**Subject:** RE: MECP Comments on the Notice of Commencement for the Rowe Channel Upgrade Study

Hi Antony,

Thank you for confirming receipt.

I missed one of the Indigenous communities in my initial email. I have attached a revised version of MECP comments on the Notice of Commencement, with the addition provided below:

- Huron-Wendat Nation (if there are potential archaeological impacts)

Please be aware that the Huron-Wendat Nation is to be consulted if there are potential archaeological impacts, but not to the exclusion of the other communities. The other communities are also interested in archaeology.

Thank you and apologies for any confusion.

### Erinn Lee

Environmental Resource Planner/EA Coordinator | Ministry of the Environment, Conservation and Parks  
Project Review Unit, Environmental Assessment Branch  
135 St. Clair Ave W, Toronto, ON M4V 1P5  
P : 1 (416) 357-1511 E: [Erinn.Lee2@ontario.ca](mailto:Erinn.Lee2@ontario.ca)

---

**From:** Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>  
**Sent:** May 25, 2021 5:17 PM  
**To:** Lee, Erinn (MECP) <[Erinn.Lee2@ontario.ca](mailto:Erinn.Lee2@ontario.ca)>  
**Cc:** 'Mark Bassingthwaite' <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>; Jennifer Whittard <[jwhittard@resilientconsulting.ca](mailto:jwhittard@resilientconsulting.ca)>  
**Subject:** RE: MECP Comments on the Notice of Commencement for the Rowe Channel Upgrade Study

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

Hi Erinn,

This is to confirm that we have received this email. Thanks for your comments on the notice of study commencement. We are looking forward to work with you on this study.

Antony



**Antony Manoharan, P.Eng.,**  
**Program Manager, Water Resources**  
**Development Engineering and Environmental Services**

**Public Works**

**Town of Whitby**  
T 905430.4925  
Town of Whitby

[whitby.ca](http://whitby.ca)



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**From:** Lee, Erinn (MECP) <[Erinn.Lee2@ontario.ca](mailto:Erinn.Lee2@ontario.ca)>

**Sent:** May 25, 2021 5:04 PM

**To:** Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>; [ljakupi@cloca.com](mailto:ljakupi@cloca.com)

**Cc:** [mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca); Dugas, Celeste (MECP) <[Celeste.Dugas@ontario.ca](mailto:Celeste.Dugas@ontario.ca)>; Potter, Katy (MECP) <[Katy.Potter@ontario.ca](mailto:Katy.Potter@ontario.ca)>

**Subject:** MECP Comments on the Notice of Commencement for the Rowe Channel Upgrade Study

[EXTERNAL EMAIL]

Good afternoon,

Please find attached MECP's comments on the Notice of Commencement for the Rowe Channel Upgrade Study.

A draft copy of the report should be sent directly to me prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments.

Please also confirm receipt of this email.

Thank you,

**Erinn Lee**

Environmental Resource Planner/EA Coordinator | Ministry of the Environment, Conservation and Parks  
Project Review Unit, Environmental Assessment Branch  
135 St. Clair Ave W, Toronto, ON M4V 1P5  
P : 1 (416) 357-1511 E: [Erinn.Lee2@ontario.ca](mailto:Erinn.Lee2@ontario.ca)

**Confidentiality Warning:** This e-mail contains information that is confidential and is intended only for the use of the named recipient(s). If you are not the intended recipient, you are hereby notified that any review, copying or distribution of this transmission is strictly prohibited.

Please contact the Town of Whitby immediately if you have received this transmission in error and delete this message.

Ministry of the Environment,  
Conservation and Parks

*Environmental Assessment Branch*

1<sup>st</sup> Floor  
135 St. Clair Avenue W  
Toronto [ON M4V 1P5](#)  
Tel.: 416 314-8001  
Fax.: 416 314-8452

Ministère de l'Environnement, de la  
Protection de la nature et des Parcs

*Direction des évaluations  
environnementales*

Rez-de-chaussée  
135, avenue St. Clair Ouest  
Toronto [ON M4V 1P5](#)  
Tél. : 416 314-8001  
Télééc. : 416 314-8452



May 26, 2021

Antony Manoharan, Town of Whitby  
[manoharana@whitby.ca](mailto:manoharana@whitby.ca)

Louie Jakupi, Central Lake Ontario Conservation Authority  
[ljakupi@cloca.com](mailto:ljakupi@cloca.com)

Re: **Rowe Channel Upgrade Study  
Town of Whitby, in partnership with Central Lake Ontario Conservation Authority  
Municipal Class EA  
Response to Notice of Commencement**

Dear Antony Manoharan & Louie Jakupi,

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 Town of Whitby, in partnership with the Central Lake Ontario Conservation Authority, has indicated that the study is following the approved environmental planning process for a Schedule B project under the Municipal Class Environmental Assessment (Class EA).

The **updated (February 2021)** attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.**

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.

The 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 the proposed project, **the MECP is delegating the procedural aspects of rights-based consultation to the proponent 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 provided to date and the Crown`s preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed project:

- Kawartha Nishnawbe
- The following Williams Treaties Communities (with a copy to the Williams Treaties Coordinator Karry Sandy-McKenzie):
  - Hiawatha First Nation
  - Curve Lake First Nation
  - Alderville First Nation
  - Mississaugas of Scugog Island First Nation
  - Chippewas of Georgina Island
  - Chippewas of Rama First Nation (Chippewas of Mnjikaning)
  - Beausoleil First Nation
- Huron-Wendat Nation (if there are potential archaeological impacts)

Please be aware that the Huron-Wendat Nation is to be consulted if there are potential archaeological impacts, but not to the exclusion of the other communities. The other communities are also interested in archaeology.

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "[Code of Practice for Consultation in Ontario's Environmental Assessment Process](#)". Additional information related to Ontario's Environmental Assessment Act is available online at: [www.ontario.ca/environmentalassessments](http://www.ontario.ca/environmentalassessments).

**Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.**

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) 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 with Indigenous communities or other stakeholders has reached an impasse
- A Part II Order request is expected on the basis of impacts to Aboriginal or treaty rights

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 should additional steps and activities be required.

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**A draft copy of the report should be sent directly to me prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments.**

**Please also ensure a copy of the final notice is sent to the ministry's Central Region EA notification email account ([eanotification.cregion@ontario.ca](mailto:eanotification.cregion@ontario.ca)) after the draft report is reviewed and finalized.**

Should you or any members of your project team have any questions regarding the material above, please contact me at [Erinn.Lee2@ontario.ca](mailto:Erinn.Lee2@ontario.ca).

Yours truly,



Erinn Lee  
Regional Environmental Assessment Coordinator – Central Region

cc Katy Potter, Supervisor, Project Review Unit, Environmental Assessment Branch, MECP  
Celeste Dugas, Manager, York Durham District Office, MECP  
Mark Bassingthwaite, Resilient Consulting

Attach: Areas of Interest (below)

A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with  
Aboriginal Communities (below)

Client Guide to Preliminary Screening for SAR – May 2019 (attached)

## AREAS OF INTEREST (v. February 2021)

*It is suggested that you check off each section after you have considered / addressed it.*

### Planning and Policy

- Projects located in MECP Central Region are subject to [A Place to Grow: Growth Plan for the Greater Golden Horseshoe \(2020\)](#). Parts of the study area may also be subject to the [Oak Ridges Moraine Conservation Plan \(2017\)](#), [Niagara Escarpment Plan \(2017\)](#), [Greenbelt Plan \(2017\)](#) or [Lake Simcoe Protection Plan \(2014\)](#). Applicable plans and the applicable policies should be identified in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.
- Additionally, if the project is located within the boundaries of the Lake Simcoe Protection Plan, we also strongly recommend that the project team review the information and resources available on the province's website related to protecting Lake Simcoe found here: <https://www.ontario.ca/page/protecting-lake-simcoe>, including the Lake Simcoe phosphorus reduction strategy.
- The [Provincial Policy Statement \(2020\)](#) contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.
- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

### Source Water Protection

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

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e. systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- In October 2015, the MEA Parent Class EA document was amended to include reference to the Clean Water Act (Section A.2.10.6) and indicates that proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring within a vulnerable area. **Given this requirement, please include a section in the report on source water protection.**

- The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.
- If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.
- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs, it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and, within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.
- In order to determine if this project is occurring within a vulnerable area, proponents can use this mapping tool: <http://www.applications.ene.gov.on.ca/swp/en/index.php>. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the “Map Legend” bar on the left. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.
- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. Please document the results of that consultation within the report and include all communication documents/correspondence.**

#### More Information

For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to [Conservation Ontario's website](#) where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in [section 1.1 of Ontario Regulation 287/07](#) made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional “local” threat activities, as approved by the MECP.

#### **Climate Change**

The document "[Considering Climate Change in the Environmental Assessment Process](#)" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

#### • **The MECP expects proponents of Class EA projects to:**

1. Consider during the assessment of alternative solutions and alternative designs, the following:
  - a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and

- b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "[Community Emissions Reduction Planning: A Guide for Municipalities](#)" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

#### **Air Quality, Dust and Noise**

- If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.**
- If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:
  - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
  - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
  - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
  - A discussion of potential mitigation measures.
- As a common practice, "air quality" should be used an evaluation criterion for all road projects.
- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.
- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to [Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities](#) report prepared for Environment Canada. March 2005.
- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

#### **Ecosystem Protection and Restoration**

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.

- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
  - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
  - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
  - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, you may consider the provisions of the Rouge Park Management Plan if applicable.

#### □ **Species at Risk**

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario's Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at <https://www.ontario.ca/page/species-risk>.
- The Client's Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.
- For any questions related to subsequent permit requirements, please contact [SAROntario@ontario.ca](mailto:SAROntario@ontario.ca).

#### □ **Surface Water**

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.
- Additionally, stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's [Stormwater Management Planning and Design Manual \(2003\)](#) should be referenced in the report and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:
  - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
  - Watershed information, drainage conditions, and other relevant background information
  - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
  - Information on maintenance and monitoring commitments

- Ontario Regulation 60/08 under the *Ontario Water Resources Act* (OWRA) applies to the Lake Simcoe Basin, which encompasses Lake Simcoe and the lands from which surface water drains into Lake Simcoe. If the proposed sewage treatment plant is listed in Table 1 of the regulation, the report should describe how the proposed project and its mitigation measures are consistent with the requirements of this regulation and the OWRA.
- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the [Water Taking User Guide for EASR](#) for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

#### □ **Groundwater**

- The status of, and potential impacts to, any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.
- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.
- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.
- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the [Water Taking User Guide for EASR](#) for more information.
- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.

#### □ **Excess Materials Management**

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled "[On-Site and Excess Soil Management](#)" (*O. Reg. 406/19*) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don't go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over

time, with the first phase in effect on January 1, 2021. For more information, please visit <https://www.ontario.ca/page/handling-excess-soil>.

- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP's current guidance document titled "[Management of Excess Soil – A Guide for Best Management Practices](#)" (2014).
- All waste generated during construction must be disposed of in accordance with ministry requirements

#### **Contaminated Sites**

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the [MECP's D-4 guideline](#) for land use considerations near landfills and dumps.
  - Resources available may include regional/local municipal official plans and data; provincial data on [large landfill sites](#) and [small landfill sites](#); Environmental Compliance Approval information for waste disposal sites on [Access Environment](#).
- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada's [website](#)).
- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.
- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

#### **Servicing, Utilities and Facilities**

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.
- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the project.
- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP's Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.
- We recommend referring to the ministry's [environmental land use planning guides](#) to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.



## □ **Mitigation and Monitoring**

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.
- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.
- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section A.2.5 and A.4.1 of the MEA Class EA parent document.

## □ **Consultation**

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The report should also include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments (as directed by the Class EA to include full documentation).
- Please include the full stakeholder distribution/consultation list in the documentation.

## □ **Class EA Process**

- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.
- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.
- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.
- Ministry guidelines and other information related to the issues above are available at <http://www.ontario.ca/environment-and-energy/environment-and-energy>. We encourage you to review all the available guides and to reference any relevant information in the report.

## **Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020**

Once the EA Report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address (for projects in MECP Central Region, the email is [eanotification.cregion@ontario.ca](mailto:eanotification.cregion@ontario.ca)).

The public has the ability to request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Part II Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Part II Order requests on those matters should be addressed in writing to:

Minister Jeff Yurek  
Ministry of Environment, Conservation and Parks  
777 Bay Street, 5th Floor  
Toronto ON M7A 2J3  
[minister.mecp@ontario.ca](mailto: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](mailto:EABDirector@ontario.ca)

## A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

### DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

**Aboriginal communities** – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

**Consultation** – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

**Crown** – the Ontario Crown, acting through a particular ministry or ministries.

**Procedural aspects of consultation** – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

**Proponent** – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

### I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

### II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

### **III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS**

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

### **IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS**

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

**a) What might a proponent be required to do in carrying out the procedural aspects of consultation?**

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;
- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

**b) What documentation and reporting does the Crown need from the proponent?**

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;
- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

### **c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?**

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

## **V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES IN THE CONSULTATION PROCESS?**

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;
- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigate any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

## **VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?**

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

Ministry of the Environment,  
Conservation and Parks

Ministère de l'Environnement, de la  
Protection de la nature et des Parcs

*Environmental Assessment Branch*

*Direction des évaluations  
environnementales*

1<sup>st</sup> Floor  
135 St. Clair Avenue W  
Toronto ON M4V 1P5  
Tel.: 416 314-8001  
Fax.: 416 314-8452

Rez-de-chaussée  
135, avenue St. Clair Ouest  
Toronto ON M4V 1P5  
Tél. : 416 314-8001  
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May 11, 2022

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Resilient Consulting  
[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)

Jennifer Whittard, Senior Environmental Planner (BY EMAIL ONLY)  
Resilient Consulting  
[Jwhittard@resilientconsulting.ca](mailto:Jwhittard@resilientconsulting.ca)

**Re: Rowe Channel Upgrade Study  
Town of Whitby  
Municipal Class Environmental Assessment – Schedule B  
Draft Project File Report  
MECP Project Review Unit Comments**

Dear Project Team,

This letter is in response to the draft Project File Report for the Rowe Channel Upgrade Study, which is being completed as a Schedule B project under the Municipal Class Environmental Assessment process. The Ministry of the Environment, Conservation and Parks (MECP) provides the following comments for your consideration.

#### **Section 4.2.4: Species at Risk**

1. It is the responsibility of the proponent to ensure that Species at Risk are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the proposed activities to be carried out on the site. Please contact [SAROntario@ontario.ca](mailto:SAROntario@ontario.ca) for any questions and concerns related to Species at Risk and authorizations under the *Endangered Species Act*.



## **Section 8.5: Wildlife, Wildlife Habitat and Vegetation Restoration**

2. Please note that if a species is encountered that is determined to be threatened or endangered, you must inform the Natural Heritage Information Centre within three months of the sighting or encounter. For more information, please refer to “Report a species sighting” at this [webpage](#).

## **Section 8.12: Proposed Monitoring and Maintenance**

3. MECP recommends that additional information be provided regarding the proposed construction and post-construction monitoring. Section A.3.2.1 of the MCEA document provides suggestions for monitoring content for ESRs, including:
  - key impacts to be monitored
  - monitoring requirements during construction
  - the period during which monitoring will be necessary
  - frequency and timing of surveys, the location of monitoring sites and the methods of data collection, analysis and evaluation
  - the content, manner and form in which records of monitoring data are to be prepared and retained
  - where and for how long monitoring records and documentation will be on file
  - specific requirements for monitoring appropriate to the particular circumstances and conditions under which the project will be implemented

If providing general information at this stage, then the Project File Report should include a commitment to develop construction and post-construction monitoring plans during detailed design as part of the other plans being developed (e.g. erosion and sediment control plan, restoration plans).

## **Section 9.2.7: Ministry of Heritage, Sport, Tourism and Culture Industries**

4. Was MHSTCI involved in the confirmation that a Cultural Heritage Evaluation Report was not required as part of this Class EA, in coordination with the Town of Whitby Policy and Heritage Planning staff? If not, MHSTCI should be consulted as well. Please provide a copy of the Notice of Completion and Project File Report to MHSCTI during the public comment period.

## **Section 9.3: Indigenous Communities Communication and Consultation**

5. MECP recommends that the project team follow-up with any Indigenous communities that have not provided a response to any of the notices using an alternative method of contact (e.g. telephone, alternative email) to confirm receipt of the Notice of Completion and awareness of the project.

## **General Administrative Comments**

6. Please note that the Minister of the Environment, Conservation and Parks may make a Section 16 Order on their own initiative within 30 days from the end of the comment period set out in the Notice of Completion. As such, proponents cannot proceed with projects until at least 30 days after the end of the public comment period.

Thank you for the opportunity to comment on this draft Project File Report. Should you or any members of your project team have any questions regarding the material above, please contact me at [Erinn.Lee2@ontario.ca](mailto:Erinn.Lee2@ontario.ca).

Sincerely,

A handwritten signature in black ink that reads "Erinn Lee". The signature is written in a cursive, flowing style.

Erinn Lee  
Regional Environmental Planner  
Project Review Unit, Environmental Assessment Branch  
Ontario Ministry of the Environment, Conservation and Parks

cc Katy Potter, Supervisor, Project Review Unit, MECP  
Celeste Dugas, Manager, York-Durham District Office, MECP  
Samantha Archibald, Project Engineer, Resilient Consulting

**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement  
**Date:** Tuesday, May 4, 2021 at 6:52:29 AM Central Daylight Time  
**From:** Kelly, Kevin (MTO)  
**To:** Mark Bassingthwaite, Van Voorst, John (MTO), Tuz, Sylvester (MTO)  
**CC:** Samantha Rayner, Jennifer Whittard, Manoharan, Antony

Hi Mark,

I no longer work in Durham Region. Sylvester Tuz is the MTO Planner for that area now. Please forward all future inquiries to Sylvester. Thanks.

---

**From:** Mark Bassingthwaite <mbassingthwaite@resilientconsulting.ca>  
**Sent:** May 3, 2021 7:34 PM  
**To:** Kelly, Kevin (MTO) <Kevin.Kelly@ontario.ca>; Van Voorst, John (MTO) <John.VanVoorst@ontario.ca>  
**Cc:** Samantha Rayner <srayner@resilientconsulting.ca>; Jennifer Whittard <jwhittard@resilientconsulting.ca>; Manoharan, Antony <manoharana@whitby.ca>  
**Subject:** FW: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

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

Hi Kevin and John,

Further to Jennifer's email below, we are in the process of analyzing alternatives for the Rowe Channel in Whitby. A key component of the study is to confirm drainage areas and hydrology for the site.

The Town of Whitby has provided us with the information they have on hand regarding the drainage area, however we do not have any information regarding the Highway 401 drainage system. We would like to confirm if the only crossing of 401 in this area is a 900 x 1200 mm box culvert from the south end of Centre St S (see attached figure) and also, we would like to know if Highway 401 contributes drainage to the subject channel.

Could you please provide us with the drainage and hydrology report for the most Highway 401 widening through Whitby in this area? I believe this would be the easiest way for us to get the information we are looking for. Please let me know if there is anyone else we should be contacting to get this information.

Thank you,  
Mark

Mark Bassingthwaite, P.Eng.  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)  
P: 289-943-4651  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientcorp

**From:** Jennifer Whittard <[jwhittard@resilientconsulting.ca](mailto:jwhittard@resilientconsulting.ca)> **On Behalf Of** Rowe Channel Upgrade Class EA  
**Sent:** March 25, 2021 4:00 PM  
**To:** [linda.mcausland@ontario.ca](mailto:linda.mcausland@ontario.ca)  
**Cc:** [jason.white@ontario.ca](mailto:jason.white@ontario.ca); [kevin.kelly@ontario.ca](mailto:kevin.kelly@ontario.ca); Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>  
**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

On behalf of the Town of Whitby, please find attached the Notice of Study Commencement for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the study commencement and invite your preliminary input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study will identify and evaluate a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. The study will also identify opportunities to improve the look of the channel and reduce the presence of invasive species. The options being considered include, but may not be limited to, full or partial channel replacement with pipes, open channel with armor stone, a combination of piped flow and overland flow, and upstream flow diversion.

A Community Open House is tentatively planned for Fall 2021 to provide project details and obtain feedback. You will receive similar notification of the Open House at that time. In the meantime, if you have any initial comments or require further information, please let us know by way of reply to this email or by contacting one of the Project Team members listed in the notice. Additional information is available at <https://connectwhitby.ca/rowechannel>.

We look forward to hearing from you.

Thanks,  
Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

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**Subject:** RE: Whitby - MHSTCI comments  
**Date:** Monday, November 22, 2021 at 10:25:53 AM Central Standard Time  
**From:** Manoharan, Antony  
**To:** Tesolin, Lori, Rowe Channel Upgrade Class EA  
**CC:** Belsey, Edward, Henley, Peter  
**Attachments:** image001.png, image003.png, image005.png, image006.jpg, image004.png

Thanks Lori.

Antony

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**From:** Tesolin, Lori <tesolinl@whitby.ca>  
**Sent:** November 22, 2021 11:16 AM  
**To:** Manoharan, Antony <manoharana@whitby.ca>  
**Cc:** Belsey, Edward <BelseyE@whitby.ca>; Henley, Peter <HenleyP@whitby.ca>  
**Subject:** RE: Whitby - MHSTCI comments

Hi Antony,

Thanks for clarifying between the two projects.

I think our only comment at this time for the Rowe Channel Upgrade COH, is that Policy and Heritage Planning staff request a heritage permit for the work. Again, it is not a very complicated process. It just involves filling out the heritage permit application form, and explaining that the work would not impact the James Rowe House building. Please also indicate if it would impact any mature trees. We would request a drawing of the work to go along with the permit application. Once we have all of that information from your team, Peter can process the permit.

I greatly appreciate you forwarding this comment to the consulting team. Peter and I are happy to chat if there are questions about the heritage permit process.  
Thank you.  
Lori

**Lori Tesolin, MCIP, RPP**  
**Principal Planner**  
**Planning and Development**

T 905.444.2858

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**From:** Manoharan, Antony <manoharana@whitby.ca>  
**Sent:** November 22, 2021 10:42 AM  
**To:** Tesolin, Lori <tesolinl@whitby.ca>  
**Cc:** Belsey, Edward <BelseyE@whitby.ca>; Henley, Peter <HenleyP@whitby.ca>  
**Subject:** RE: Whitby - MHSTCI comments

Good Morning Lori,

Row Channel Upgrade study is a separate project and not related to the shoreline study which has been completed and filed in April. You can find the final report at the link below. The report was revised to address MECP and MHSTCI comments..

[https://www.whitby.ca/en/resources/PW-Whitby\\_Coastal\\_Flood\\_Hazard\\_Risk\\_Assessment-Final-report-040721.pdf](https://www.whitby.ca/en/resources/PW-Whitby_Coastal_Flood_Hazard_Risk_Assessment-Final-report-040721.pdf)

I hope your email is related to the last week COH notification on Rowe Channel. If you are not providing separate comments to Rowe Channel study, I can forward this email to Resilient Consulting who is working on this study (<https://connectwhitby.ca/rowechannel>).

Let me know.

Thanks  
Antony

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**From:** Tesolin, Lori <[tesolinl@whitby.ca](mailto:tesolinl@whitby.ca)>  
**Sent:** November 22, 2021 9:51 AM  
**To:** Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>  
**Cc:** Belsey, Edward <[BelseyE@whitby.ca](mailto:BelseyE@whitby.ca)>; Henley, Peter <[HenleyP@whitby.ca](mailto:HenleyP@whitby.ca)>  
**Subject:** RE: Whitby - MHSTCI comments

Hi Antony,

I hope you are doing well. I have a question about the Rowe Channel Upgrade - Is this related to the Whitby Shoreline Flood Hazard Risk Assessment report, for which we provided comments (see below) to the Ministry regarding heritage properties?

My understanding is that the work for the upgrade would take place just west of the James Rowe House, is that correct? It doesn't seem like the house would be impacted, but given that the work will take place on a Part IV designated heritage property under the Ontario Heritage Act, we probably want to have a heritage permit on file, just for our records. We are requesting heritage permits more often now with any improvements on Town designated heritage properties (e.g. improvements related to parks, street lighting, electric car charging stations, etc.) just to have it on record, and to show that the Town is leading by example with following the required heritage process. If there is no impact to the building, staff can issue the heritage permit very quickly.

There heritage permit application is very minimal. See attached.  
Please let me know.  
Lori

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**From:** Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>  
**Sent:** June 18, 2021 11:46 AM  
**To:** Tesolin, Lori <[tesolinl@whitby.ca](mailto:tesolinl@whitby.ca)>  
**Cc:** Belsey, Edward <[BelseyE@whitby.ca](mailto:BelseyE@whitby.ca)>  
**Subject:** RE: Whitby - MHSTCI comments

Thanks Lori for your response. Really appreciated.

Have a great weekend.  
Antony

---

**From:** Tesolin, Lori <[tesolinl@whitby.ca](mailto:tesolinl@whitby.ca)>  
**Sent:** June 18, 2021 11:43 AM  
**To:** Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>  
**Cc:** Belsey, Edward <[BelseyE@whitby.ca](mailto:BelseyE@whitby.ca)>  
**Subject:** RE: Whitby - MHSTCI comments

Hi Antony,

Thank you again for our meeting this morning, and for clarifying what may be any future proposed shoreline work in the areas of the James Rowe House property, and the Ontario Shores property. In response to the Ministry's questions:

James Rowe House – 299 Front Street West

- While the designation by-law does include some minor description of the landscape features close to the frontage of the property near Charles St., the main focus of the designation by-law is on the attributes of the house, and the history of James Rowe.
- There does not appear to be any potential impact of the proposed shoreline improvements, on the heritage attributes described in the designation by-law.
- Based on the current proposed shoreline improvements in this area, a Cultural Heritage Impact Assessment (CHIA) is not required. Should the proposed work change in scope and/or location, then we will re-examine if a CHIA is required at that time.

Please don't hesitate to contact us if you have any further questions. Please also let us know if the scope and location of any of the proposed shoreline improvements for these area should change in the future.

Kind regards,  
Lori

**Lori Tesolin, MCIP, RPP**  
**Supervisor, Policy and Heritage Planning, Principal Planner**  
**Planning and Development Department**

**Town of Whitby**  
(Currently working remotely) 905-706-2545  
575 Rossland Road East, Whitby, ON L1N 2M8

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**From:** Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>



Hydro One Networks Inc  
483 Bay St  
Toronto, ON

November 19, 2021

Re: Rowe Channel Upgrade Study Municipal Class EA

Attention:

Antony Manoharan, P. Eng.  
Program Manager, Water Resources  
Town of Whitby

Thank you for sending us notification regarding (Rowe Channel Upgrade Study Municipal Class EA). In our preliminary assessment, we confirm there are no existing Hydro One Transmission assets in the subject area. Please be advised that this is only a preliminary assessment based on current information.

If plans for the undertaking change or the study area expands beyond that shown, please contact Hydro One to assess impacts of existing or future planned electricity infrastructure.

Any future communications are sent to [Secondarylanduse@hydroone.com](mailto:Secondarylanduse@hydroone.com).

Be advised that any changes to lot grading and/or drainage within proximity to Hydro One transmission corridor lands must be controlled and directed away from the transmission corridor.

Sent on behalf of,

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



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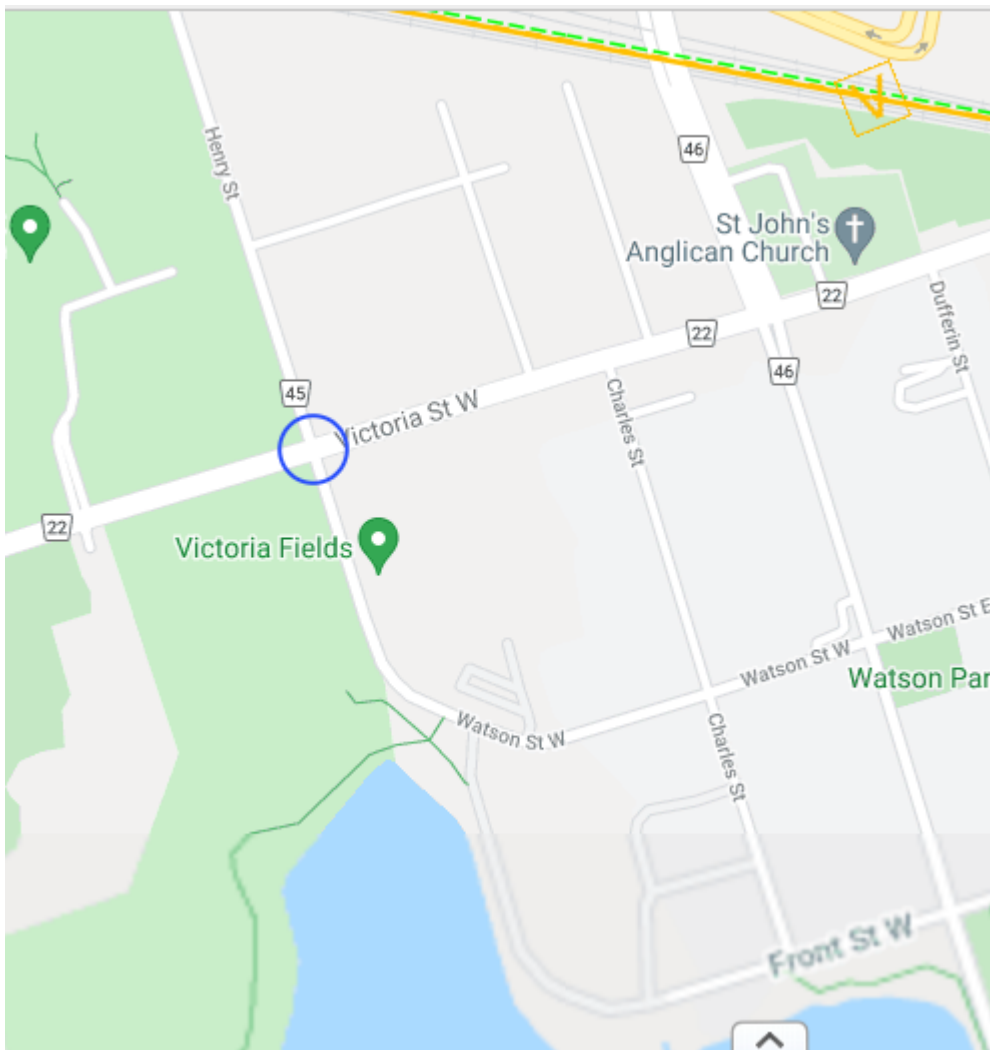
**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House  
**Date:** Monday, November 22, 2021 at 7:20:02 AM Central Standard Time  
**From:** Marcel Vien  
**To:** Rowe Channel Upgrade Class EA  
**CC:** Paul Totino, manoharana@whitby.ca, ljakupi@CLOCA.com, Mark Bassingthwaite, Marcel Vien  
**Priority:** High  
**Attachments:** image002.png, Notice of Online COH - Rowe Channel Upgrade.pdf

Good morning,

After reviewing the attached PDF, TELUS does not have any infrastructure within your study zone.

TELUS does have fibre cable on the rail ROW. If your scope of work extends to the rail ROW then TELUS will need to be notified.

Thank you.



**From:** Paul Totino <Paul.Totino@TELUS.Com>

**Sent:** November 18, 2021 7:53 PM

**To:** Marcel Vien <Marcel.Vien@telus.com>

**Subject:** FW: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House

Hi Marcel,

Can you please assist.

Thanks,

Paul Totino

TELUS

Manager - Access Engineering/Design & Build

416-883-6632

----- Original message -----

From: Rowe Channel Upgrade Class EA <[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)>

Date: 2021-11-18 10:29 a.m. (GMT-05:00)

To:

Cc: "Manoharan, Antony" <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>, Louie Jakupi <[ljakupi@CLOCA.com](mailto:ljakupi@CLOCA.com)>, Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>

Subject: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House

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On behalf of the Town of Whitby, please find attached the Notice of Online Community House for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the preliminary preferred solution and invite your input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study has identified and evaluated a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. As a result of the evaluation, the preliminary preferred solution has been identified as **replacement of the existing channel with an open channel lined with armour stone**. The Open House materials provide further details and are now available for review and comment at: <https://connectwhitby.ca/rowechannel>.

Pending comments received from the public, First Nation communities, and various review agencies, completion of the Project File (EA report) is tentatively planned for early 2022. You will then receive similar

notification that the Project File is available for review. In the meantime, please submit any comments or questions you may have by completing our online survey or by way of reply to this email. We would appreciate your response by December 17, 2021. If you require further information, please also feel free to contact one of the Project Team members listed in the notice.

We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

# Town of Whitby Staff Report

[whitby.civicweb.net](http://whitby.civicweb.net)



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**Report Title:** Rowe Channel Upgrade Study – Class EA Project File

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**Report to:** Committee of the Whole

**Date of meeting:** June 13, 2022

**Report Number:** PDE 06-22

**Department(s) Responsible:**

Planning and Development Department  
(Engineering Services)

**Submitted by:**

Roger Saunders, Commissioner,  
Planning and Development

**Acknowledged by M. Gaskell, Chief  
Administrative Officer**

**For additional information, contact:**

Peter Angelo, Director, Engineering  
Services x4918

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## 1. Recommendation:

1. That Rowe Channel Upgrade Study Report PDE 06-22 be received as information;
2. That the Final Environmental Study Report be filed in accordance with the Municipal Class EA process and be made available for agency and stakeholder review;
3. That staff advise Council if there are any significant comments or concerns following the public consultation; and,
4. That based on the recommendations of the Rowe Channel Upgrade Study, staff continue to develop the implementation plan for the recommended channel upgrade works, including the update of asset management plans and capital budgets.

## 2. Highlights:

- In partnership with Central Lake Ontario Conservation Authority (CLOCA), the Town has retained Resilient Consulting to complete a Schedule B Municipal Class Environmental Assessment (EA) for the upgrade of the Rowe Channel.
- The Rowe Channel, located between Lake Ontario and the Whitby GO Station, is used to convey surface runoff to Lake Ontario from the surrounding area. The existing open portions of the channel are lined with gabion baskets and mattresses that will require some remediation to address future erosion and stability issues.
- Seven (7) alternative solutions were identified and evaluated for upgrading the channel as a part of the Class EA. Following the comparative evaluation of alternatives, **Alternative 5 – Open Channel Replacement with Armour Stone**, was identified as the preferred solution. This preferred alternative will replace the existing channel, with a long-lasting solution that will mitigate long term erosion concerns. In addition, this alternative provides an opportunity to reduce flood risks, promote the removal of invasive species and improve fish habitat and passage through the channel.
- Stakeholders including various Indigenous communities, the public, and regulatory review agencies were consulted throughout the preparation of the Class EA, and their comments and concerns have been addressed where possible.
- Following completion of the 30-day public review period and Class EA clearance, staff will evaluate the existing culvert's condition and will determine the best timing for the preferred solution implementation.
- Implementation is recommended to be completed through a staged plan, with open channel works to be completed first, and culvert replacements to be completed towards the end of each culvert's service life.

## 3. Background:

The Rowe Channel is located south of the Whitby GO Station and approximately 290 metres (m) west of Brock Street. The primary function of the Rowe Channel is to convey drainage to Lake Ontario from upstream residential and commercial areas, including runoff from the Whitby GO Station and a residential area located to the north of Highway 401.

The channel was originally designed by G.M. Sernas and Associates and constructed in 1989 as part of the Port Whitby (Rowe) Development. Though not considered part of the Pringle Creek watershed, the Rowe Channel discharges into Whitby Harbour near the mouth of Pringle Creek.

The geometry of Rowe Channel consists of a rectangular open channel between Victoria Street West and Watson Street West a trapezoidal channel between Watson Street West and Front Street West, and three existing culvert crossings located at Victoria Street West, Watson Street West, and Front Street West.

The existing open channels are lined with gabion baskets and mattresses, with some gabion baskets in need of repair/replacement. Failure of these gabion baskets may result in reduced conveyance capacity in the channel and flooding. Sediment and invasive vegetation have also accumulated within the channel reducing its ability to drain surface water to Lake Ontario. There is an opportunity to rehabilitate or replace the channel to mitigate risk, in addition to providing additional benefits such as reduction of invasive species, aesthetic improvement, reduced flooding risks and reduced maintenance requirements.

## 4. Discussion:

In partnership with Central Lake Ontario Conservation Authority (CLOCA), the Town has retained Resilient Consulting to complete a Schedule B Municipal Class Environmental Assessment (EA) for the upgrade of the Rowe Channel. A copy of the Draft Project File has been included in Attachment 1.

### 4.1 Proposed Alternatives and Evaluation Process

The following seven (7) alternatives were identified and evaluated for upgrading the Rowe Channel:

- Do Nothing;
- Full Piped Channel Replacement;
- Partial Piped Channel Replacement, excluding Victoria Street West;
- Partial Piped Channel Replacement, excluding Front Street West;
- Open Channel Replacement with Armour Stone;
- Replacement with Combination of Piped and Overland Flow; and,
- Partial Diversion of Peak Flow along Victoria Street West.

These alternatives were comparatively evaluated using the following primary categories of evaluation criteria: technical; natural; social/cultural; and, economic. Each alternative was ranked as, 'more', 'somewhat', or 'less' preferred, depending on the relative advantages and disadvantages of each alternative, and whether or not they could be mitigated.

**Alternative 5 - Open Channel with Armour Stone Protection** was identified as the most preferred alternative. This alternative involves removal of the existing gabion baskets and mattresses that line Rowe Channel, and replacement of the channel banks using armour stone retaining walls. The existing crossings at Victoria Street West, Watson Street West, and Front Street West would each be replaced using twin 3.0 metre by 1.5 metre concrete box culverts in order to fully convey large storm events within the channel.

### 4.2 Proposed Implementation Plan

Following completion of the 30-day public review period and Class EA clearance, staff will evaluate the existing culvert's condition and will determine the best timing for the preferred solution implementation.

Supplemental investigations, including a geotechnical assessment and refined hydraulic assessment will need to be completed during the detailed design phase. Detailed design drawings, including removals, erosion and sediment control, grading and restoration plans will also be developed during this stage.

The proposed channel upgrades are located in a regulated area and will require authorization and permits from CLOCA, Fisheries and Oceans Canada (DFO), Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), and the Region of Durham. The project will also need to be registered under the Excess Soil Registry, as required by Ontario Regulation 406/19, to track the disposal of excess fill during construction.

The timing for the Rowe Channel upgrade works will be determined based on the replacement needs and the end of service life for the existing culvert crossings (Victoria Street West, Watson Street West, and Front Street West). Construction works will be completed through a staged implementation plan, over several years, starting with the replacement of the gabion baskets and mattresses, within the open channel part (Stage 1 and 2). The existing culvert crossings will be replaced in Stages 3 to 5. The existing culverts are currently in acceptable working condition at this time however, they will continue to overtop during large storm events.

## **5. Financial Considerations:**

Economic impacts, including capital costs and operation and maintenance costs, were taken into consideration during the evaluation of the proposed channel upgrade alternatives. Initial capital cost estimates ranged from \$0 (Alternative 1- Do Nothing) to approximately \$8.7 million (Alternative 2- Fully Piped). The preferred alternative (Alternative 5- Open Channel) was noted as the second lowest capital cost of \$4.75 million.

A high-level cost breakdown for the preferred alternative was prepared, with an estimated total cost of approximately \$4.75 million. This cost estimate is to be further refined during detailed design. To reduce the upfront financial implications on the Town and to achieve erosion and flood plain mitigation goals, construction was broken down in five (5) stages. Open channel works (Stage 1 and 2) and culvert replacements (Stages 3 - 5) are to be constructed within a span of several years, with the culverts being replaced close to the end of their service life.

The Town will be responsible for all construction and operations/maintenance costs of the Rowe Channel, with the exception of the Victoria Street culvert, which is a Durham Region asset. Construction has been identified in the Town's capital budget. Short-term maintenance activities will include removal of sediment from the channel, particularly at crossing locations and/or gabion basket repairs.

The Town's long-term capital forecast for this project is currently \$5.05 million (\$0.05 million in 2023 and \$5 million in 2025) and will be refined as the detailed design is finalized. Provincial and federal funding grants, such as the Government of Canada Disaster Mitigation and Adaptation Fund, will be explored further during the development of detail design to reduce the financial contribution requirements of the Town.



## **6. Communication and Public Engagement:**

A Notice of Study Commencement was distributed to those on the project mailing list via email on March 25th, 2021, and mailed to property owners along the Rowe Channel the week of March 22nd, 2021. The notice was also published in two (2) editions of *Whitby This Week*, on March 25th and April 1st, 2021, and was made available on the Town's project website.

Due to the ongoing COVID-19 pandemic and public health and safety concerns, the Community "Open House" was held via an online format. The Online Community Open House (COH) was formally held from November 18th to December 17th, 2021. Project information materials were posted on the project website, and an online survey was made available to the public during this time. In addition to online survey responses, additional comments were received directly from the public via email, online comment boxes and verbally.

The Project File report will be filed for public review and comment for a period of 30-calendar days, starting in late June/July 2022. A Notice of Study Completion will be prepared and circulated to those on the project mailing list, property owners along the Rowe Channel, and published in the local newspaper and on the project website.

## **7. Input from Departments/Sources:**

The Rowe Channel Upgrade Study was completed as a partnership between the Town and CLOCA, allowing CLOCA staff to be involved in most aspects of the study. In addition to attending various project meetings, CLOCA staff reviewed and provided comment on the initial proposed alternatives and draft Project File.

Due to the channel's proximity to the James Rowe House historical building, Town heritage staff have indicated that a Heritage Permit from the Town will be required to complete construction within the channel.

Region of Durham staff participated in the project kick-off meeting, and were provided a copy of the draft Project File for comment. Any comments received from Region of Durham staff will be addressed prior to filing of the final Project File.

A copy of the draft Project File has been submitted to the Ministry of the Environment, Conservation and Parks (MECP) for review prior to filing. Any comments received from MECP will be addressed and incorporated into the final Project File.

## **8. Strategic Priorities:**

The Rowe Channel Upgrade Study project is consistent with the Council goals to continue the tradition of responsible financial management and to remain the community of choice for families. It also aligns with the Strategic Priority to

provide a consistent and optimal customer experience by ensuring that infrastructure continues to be provided and maintained to support current and future residents.

**9. Attachments:**

**[Attachment 1: Rowe Channel Upgrade Study, Draft Municipal Class EA Schedule 'B' Report File, March 2022](#)**

# Appendix E-3

## Indigenous Communities Communications and Consultation

June 2, 2021

Kawartha Nishnawbe First Nation  
c/o Chief Kris Nahrgang  
257 Big Cedar Lake Rd.  
Big Cedar, ON K0L 2H0

**Re: Rowe Channel Upgrade Study Municipal Class Environmental Assessment  
Notice of Study Commencement**

Dear Chief Nahrgang,

On behalf of the Town of Whitby, please find enclosed the Notice of Study Commencement for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the study commencement and invite your preliminary input, as applicable.

We are sending this to you because we were recently informed of Kawartha Nishnawbe First Nation's potential interest in this project by the Ministry of Environment, Conservation and Parks (MECP).

**Background**

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in enclosed notice). The study will identify and evaluate a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. The study will also identify opportunities to improve the look of the channel and reduce the presence of invasive species. The options being considered include, but may not be limited to, full or partial channel replacement with pipes, open channel with armor stone, a combination of piped flow and overland flow, and upstream flow diversion.

**Next Steps**

A Community Open House is tentatively planned for Fall 2021 to provide project details and obtain feedback. You will receive similar notification of the Open House at that time. In the meantime, if you have any initial comments or require further information, please let us know by contacting one of the Project Team members listed in the notice. Additional information is available at <https://connectwhitby.ca/rowechannel>.

We look forward to hearing from you.

Sincerely,



Mark Bassingthwaite, P.Eng.  
President, Resilient Consulting Corporation

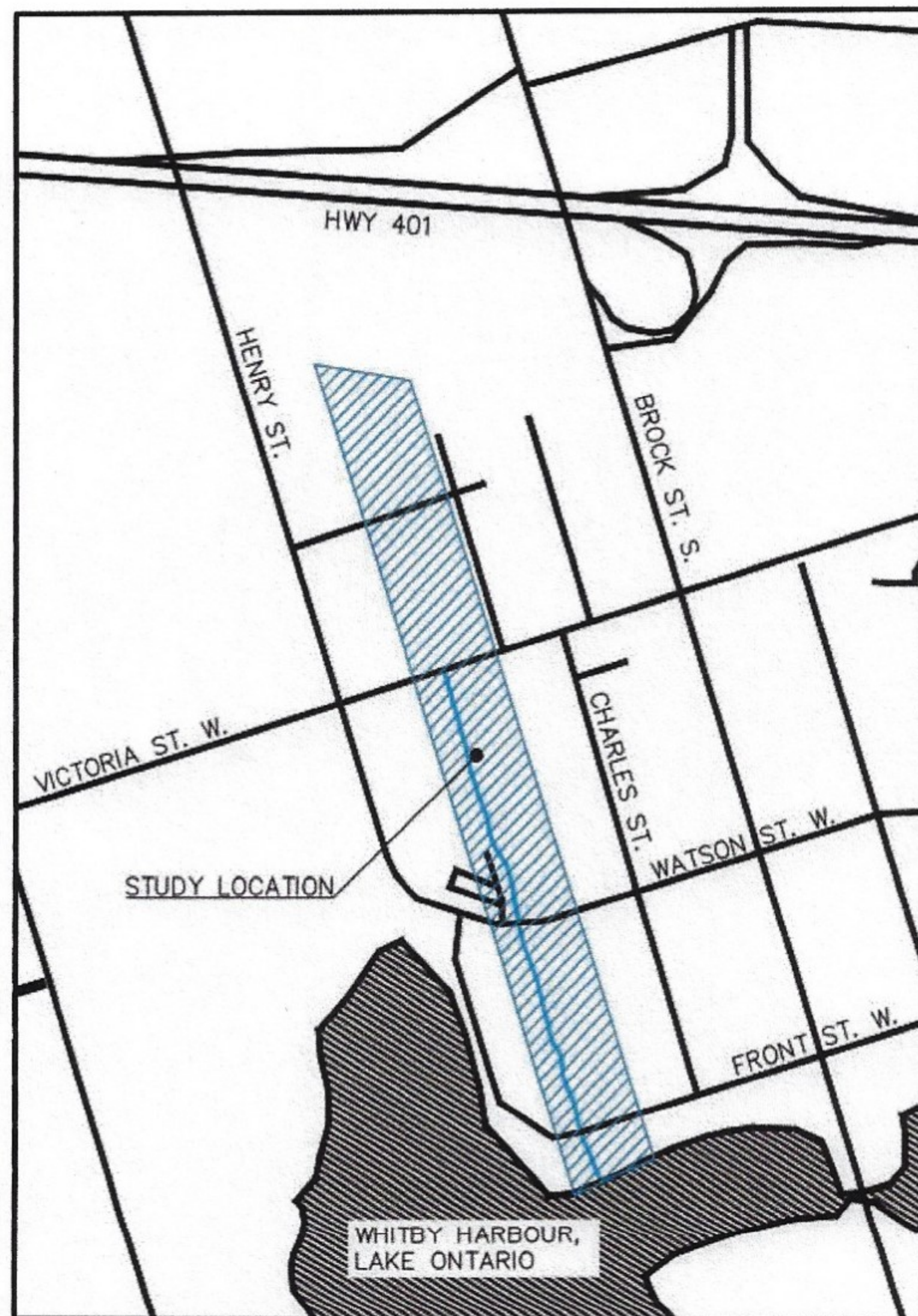
Encl: Notice of Study Commencement

## Notice of Study Commencement

### Rowe Channel Upgrade Study Municipal Class Environmental Assessment

The Town of Whitby, in partnership with Central Lake Ontario Conservation Authority (CLOCA) has initiated a Municipal Class Environmental Assessment (Class EA) study to assess possible improvement alternatives for upgrading Rowe Channel, located between the Whitby GO Station and the Front Street Culvert outfall into Lake Ontario (Refer to map). The existing channel requires work to address the failing gabion baskets that line the channel.

The study will assess the potential for reducing flooding risk to properties along the channel, minimize maintenance costs, identify opportunities to make improvements to the channel aesthetics, and reduce the presence of invasive species. The study will develop and evaluate a range of design alternatives and recommend a preferred solution for the upgrade – the results of which will be outlined in the Municipal Class EA.



### The Process

The assessment is being carried out in accordance with the planning and design process for 'Schedule B' projects as outlined in the Municipal Engineers Association "Municipal Class Environmental Assessment" document (October 2000; amended 2007, 2011 and 2015), which is approved under the Ontario Environmental Assessment Act.

## Community Engagement

A Community Open House (COH) will be held in the fall 2021 as part of the Class EA study to provide project details and obtain feedback from the public. The COH will be advertised in local newspapers and on the Town's website. Depending on public health protocols at the time, the COH may be held virtually.

The recommended channel upgrade will be documented in a Project File Report, which will be made available for public review at the conclusion of the study. Community feedback is also encouraged now and over the course of the study. If you have comments, require further information, or would like to be added to the project mailing list, please contact [rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca) or one of the following Project Team members directly. Visit the Connect Whitby platform for further project information and opportunities to have your opinion heard on this project at [connectwhitby.ca](http://connectwhitby.ca)

### **Antony Manoharan, P. Eng.**

Program Manager, Water Resources  
Town of Whitby  
575 Rossland Road East  
Whitby, Ontario L1N 2M8  
Telephone: 905.430.4925  
Email: [manoharana@whitby.ca](mailto:manoharana@whitby.ca)

### **Louie Jakupi, P. Eng.**

Senior Water Resources Engineer  
Central Lake Ontario Conservation Authority  
100 Whiting Avenue  
Oshawa, Ontario L1H 3T3  
Telephone: 905.579.0411, x113  
Email: [ljakupi@cloca.com](mailto:ljakupi@cloca.com)

### **Mark Bassingthwaite, P. Eng.**

Project Manager  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
Telephone: 289.943.4651  
Email: [mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)

Please note the information gathered throughout the study is being collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments received become part of the public record and may be included in study documentation which will be available for public review.

This Notice is first issued on March 25, 2021.

---

**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House  
**Date:** Tuesday, February 22, 2022 at 12:27:28 PM Central Standard Time  
**From:** Jordon MacArthur  
**To:** Mark Bassingthwaite, Rowe Channel Upgrade Class EA  
**CC:** Julie Kapyrka, manoharana@whitby.ca, Kaitlin Hill, Samantha Archibald, Jennifer Whittard  
**Attachments:** image001.jpg, image002.jpg, image003.jpg

Good afternoon Mark,

Thank you for making that change. Yes this is acceptable to us.

Have a great day,



**Jordon MacArthur**  
Archaeological Program Administrator  
Curve Lake First Nation Government Services Building  
22 Winookeeda Road, Curve Lake, ON K0L 1R0  
P: 705.657.8045 ext. 237 C: 705.957.9549 F: 705.657.8708  
W: [www.curvelakefirstnation.ca](http://www.curvelakefirstnation.ca)  
E: [JordonM@curvelake.ca](mailto:JordonM@curvelake.ca)

---

**From:** Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>  
**Sent:** February 22, 2022 11:49 AM  
**To:** Jordon MacArthur <[JordonM@curvelake.ca](mailto:JordonM@curvelake.ca)>; Rowe Channel Upgrade Class EA <[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)>  
**Cc:** Julie Kapyrka <[JulieK@curvelake.ca](mailto:JulieK@curvelake.ca)>; manoharana@whitby.ca; Kaitlin Hill <[KaitlinH@curvelake.ca](mailto:KaitlinH@curvelake.ca)>; Samantha Archibald <[sarchibald@resilientconsulting.ca](mailto:sarchibald@resilientconsulting.ca)>; Jennifer Whittard <[jwhittard@resilientconsulting.ca](mailto:jwhittard@resilientconsulting.ca)>  
**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House

Hi Jordon,

Thank you for your review. As requested below, ASI has updated the Stage 1 report to include the Oral History (please refer to Page 9).

Could you please review and confirm that the Stage 1 is acceptable to be submitted to the Ministry?

Thanks  
Mark

Mark Bassingthwaite, P.Eng.  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)



P: 289-943-4651  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

---

**From:** Jordon MacArthur <[JordonM@curvelake.ca](mailto:JordonM@curvelake.ca)>  
**Sent:** February 22, 2022 10:00 AM  
**To:** Rowe Channel Upgrade Class EA <[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)>  
**Cc:** Julie Kapyrka <[JulieK@curvelake.ca](mailto:JulieK@curvelake.ca)>; [manoharana@whitby.ca](mailto:manoharana@whitby.ca); Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>; Kaitlin Hill <[KaitlinH@curvelake.ca](mailto:KaitlinH@curvelake.ca)>  
**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House

Good morning Jen,

Apologies for the delay in replying. I have had a chance to review the report. We are in agreement with the conclusion, that the area has been extensively and previously disturbed so there is no further archaeological potential.

I do have to ask for our Oral History to be included in the report. For any and all projects occurring within our Treaty Territory we ask for the oral history to be included in the main body of the report. It can be added in as a section after the Treaty section. Please have this added and sent to us to confirm so that the report can be submitted this week.

Thank you,



**Jordon MacArthur**  
Archaeological Program Administrator  
Curve Lake First Nation Government Services Building  
22 Winookeeda Road, Curve Lake, ON K0L 1R0  
P: 705.657.8045 ext. 237 C: 705.957.9549 F: 705.657.8708  
W: [www.curvelakefirstnation.ca](http://www.curvelakefirstnation.ca)  
E: [JordonM@curvelake.ca](mailto:JordonM@curvelake.ca)

---

**From:** Rowe Channel Upgrade Class EA <[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)>  
**Sent:** February 18, 2022 3:43 PM  
**To:** Kaitlin Hill <[KaitlinH@curvelake.ca](mailto:KaitlinH@curvelake.ca)>  
**Cc:** Julie Kapyrka <[JulieK@curvelake.ca](mailto:JulieK@curvelake.ca)>; Jordon MacArthur <[JordonM@curvelake.ca](mailto:JordonM@curvelake.ca)>; [manoharana@whitby.ca](mailto:manoharana@whitby.ca); Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>  
**Subject:** Re: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House  
**Importance:** High

Hi Kaitlin, Julie and Jordon,

Please see the attached Stage 1 Archaeological Assessment and my email below. We have not yet submitted the attached report to the MHSTCI because we were waiting to see if you had any comments. Do you think you will have any comments?

I would appreciate if you could please get back to me no later than EOB next Friday, February 25<sup>th</sup>. If we don't hear back by then, we intend to proceed with submitting the report to the Ministry.

Have a great weekend.

Thanks,  
Jen

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

---

**From:** Rowe Channel Upgrade Class EA <[rowechannel@resilientconsulting.ca](mailto:rowechannel@resilientconsulting.ca)>

**Date:** Thursday, November 18, 2021 at 1:00 PM

**To:** Kaitlin Hill <[KaitlinH@curvelake.ca](mailto:KaitlinH@curvelake.ca)>

**Cc:** Julie Kapyrka <[JulieK@curvelake.ca](mailto:JulieK@curvelake.ca)>, Jordon MacArthur <[JordonM@curvelake.ca](mailto:JordonM@curvelake.ca)>, Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>, Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>, Samantha Rayner <[srayner@resilientconsulting.ca](mailto:srayner@resilientconsulting.ca)>

**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House

Hi Kaitlin,

On behalf of the Town of Whitby and further to our previous correspondence (attached for reference), please find attached the Notice of Online Community House for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the preliminary preferred solution and invite your input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study has identified and evaluated a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. As a result of the evaluation, the preliminary preferred solution has been identified as **replacement of the existing channel with an open channel lined with armour stone**. The Open House materials provide further details and are now available for review and comment at: <https://connectwhitby.ca/rowechannel>.

Please note that the Stage 1 Archaeological Assessment determined that the **Study Area does not retain archaeological potential** and may be considered clear of further archaeological concern. Please let us know if you have any comments or concerns regarding this draft report (issued August 12, 2021). Also note that the Evaluation Matrix provided on slide 23 states that there is "Low potential for impacts to Indigenous communities, rights and interests. To be confirmed." Although we believe there is low potential for impacts given the urban nature of the Study Area and the Stage 1 study results, we have included this statement because we have not yet heard from Curve Lake First Nation in this regard. As such, **we would appreciate any comments you may have** so that we may make revisions as necessary.

Pending comments received from the public, Indigenous communities, and various review agencies, completion of the Project File is tentatively planned for early 2022. You will then receive similar notification that the Project File is available for review. In the meantime, please submit any comments or questions you

may have by completing our online survey or by way of reply to this email. We would appreciate your response by December 17, 2021. Alternatively, we would be happy to set up a meeting to discuss the project as you've suggested.

We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientcorp

---

**Subject:** RE: CLFN - Rowe Channel Upgrade Study- Whitby  
**Date:** Tuesday, August 17, 2021 at 4:05:20 PM Central Daylight Time  
**From:** Mark Bassingthwaite  
**To:** Kaitlin Hill  
**CC:** Julie Kapyrka, Manoharan, Antony, Jennifer Whittard, Samantha Rayner, Eliza Brandy, Jordon MacArthur  
**Attachments:** Rowe Channel Upgrade - Curve Lake FN.pdf, image001.jpg, image002.jpg, image003.jpg

Hi Kaitlin,

Thank you for getting back to us.

Jennifer Whittard had previously sent a summary letter to your attention. It is attached for your convenience. As noted in the letter, environmental field investigations are ongoing, and are scheduled to be completed in the fall.

Can you please confirm if you require any additional information not contained in the letter?

Thank you!  
Mark

Mark Bassingthwaite, P.Eng.  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)  
P: 289-943-4651  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

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**From:** Kaitlin Hill <KaitlinH@curvelake.ca>  
**Sent:** August 17, 2021 12:51 PM  
**To:** Mark Bassingthwaite <mbassingthwaite@resilientconsulting.ca>  
**Cc:** Julie Kapyrka <JulieK@curvelake.ca>; Manoharan, Antony <manoharana@whitby.ca>; Jennifer Whittard <jwhittard@resilientconsulting.ca>; Samantha Rayner <srayner@resilientconsulting.ca>; Eliza Brandy <ebrandy@asiheritage.ca>; Jordon MacArthur <JordonM@curvelake.ca>  
**Subject:** RE: CLFN - Rowe Channel Upgrade Study- Whitby

Aaniin Mark,

Miigwech for sending the stage 1 Archaeological Assessment. I have added my co-worker Jordon MacArthur to this discussion as she is the Archaeological Program Administrator for Curve Lake First Nation.

In regard to this project our community also has environmental concerns relating the proposal. Can you please send a summary statement as outlined in the original letter? Once we have reviewed this we will likely

be setting up a meeting to discuss the project and any concerns or questions we may have.

Miigwech,  
Kaitlin H.

---

**From:** Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>

**Sent:** Thursday, August 12, 2021 10:02 AM

**To:** Kaitlin Hill <[KaitlinH@curvelake.ca](mailto:KaitlinH@curvelake.ca)>

**Cc:** Julie Kapyrka <[JulieK@curvelake.ca](mailto:JulieK@curvelake.ca)>; Manoharan, Antony <[manoharana@whitby.ca](mailto:manoharana@whitby.ca)>; Jennifer Whittard <[jwhittard@resilientconsulting.ca](mailto:jwhittard@resilientconsulting.ca)>; Samantha Rayner <[srayner@resilientconsulting.ca](mailto:srayner@resilientconsulting.ca)>; Eliza Brandy <[ebrandy@asiheritage.ca](mailto:ebrandy@asiheritage.ca)>

**Subject:** RE: CLFN - Rowe Channel Upgrade Study- Whitby

Hi Kaitlin,

Further the below, I understand that the Town of Whitby has directly sent the requested File Fee to Curve Lake First Nation. According to my records, a cover letter and cheque was sent to Chief Whetung's attention on June 20, 2021. If you could confirm receipt, it would be appreciated.

Our project team has engaged Archaeological Services Inc. (ASI) to provide a Stage 1 Archaeological Assessment. As per your letter of June 20, 2021, Curve Lake First Nation expects engagement at Stage of an archaeological assessment, so that Indigenous Knowledge of the land can be included. ASI has provided a preliminary Stage 1 report, which is attached to this email for your comment and input. If you could kindly provide any comments, we will then submit the report to the Ministry of Heritage, Sport, Tourism and Culture Industries.

Please feel free to contact Jennifer Whittard (our Environmental planner), Eliza Brandy of ASI, or myself if you have any questions on the report.

Thank you!

Mark

Mark Bassingthwaite, P.Eng.  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)  
P: 289-943-4651  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
[@resilientccorp](#)

---

**From:** Mark Bassingthwaite

**Sent:** April 21, 2021 2:48 PM

**To:** Kaitlin Hill <[KaitlinH@curvelake.ca](mailto:KaitlinH@curvelake.ca)>

**Cc:** Julie Kapyrka <[JulieK@curvelake.ca](mailto:JulieK@curvelake.ca)>

**Subject:** RE: CLFN - Rowe Channel Upgrade Study- Whitby

Hi Kaitlin,

Thank you for the letter. I will circulate it to the rest of the Project Team, including the Town of Whitby.

Thanks

Mark

Mark Bassingthwaite, P.Eng.  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)  
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[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

---

**From:** Kaitlin Hill <[KaitlinH@curvelake.ca](mailto:KaitlinH@curvelake.ca)>  
**Sent:** April 21, 2021 2:44 PM  
**To:** Mark Bassingthwaite <[mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)>  
**Cc:** Julie Kapyrka <[JulieK@curvelake.ca](mailto:JulieK@curvelake.ca)>  
**Subject:** CLFN - Rowe Channel Upgrade Study- Whitby

Aaniin Mark,

Please find attached a letter from Curve Lake First Nation in regard to the proposed Rowe Channel Upgrade Study project.

We look forward to hearing from you.

Miigwech,  
Kaitlin H.



**Kaitlin Hill**  
Lands and Resources Consultation Liaison  
Curve Lake First Nation  
Government Services Building  
22 Winookeeda Street, Curve Lake, ON K0L 1R0  
P: 705.657.8045 ext 222 F: 705.657.8708  
W: [www.curvelakefirstnation.ca](http://www.curvelakefirstnation.ca)  
E: [KaitlinH@curvelake.ca](mailto:KaitlinH@curvelake.ca)



**Town of Whitby  
Public Works Department**

575 Rossland Road East, Whitby, ON L1N 2M8  
www.whitby.ca

June 20, 2021

Chief Emily Whetung  
Curve Lake First Nation  
22 Winookeeda Street  
Curve Lake, Ontario K0L 1R0

**Re: Rowe Channel Upgrade Study  
Town of Whitby Municipal  
Class Environmental Assessment**

Dear Chief Whetung,

Enclosed, please find payment for the \$250.00 fee in response to your letter dated April 20, 2021, for the review of the aforementioned project's Municipal Class Environmental (EA) study. We've attached the following documents for your review and approval

- a) A copy of the letter received from Curve Lake
- b) \$ 250 cheque
- c) Response to your letter dated April 27, 2021

Please let us know if you need further information.

Sincerely,

Antony Manoharan P. Eng.  
Water Resources Engineer, Project Manager  
Town of Whitby  
575 Rossland Road East  
Whitby, ON L1N 2M8  
905.430.4925

manoharana@whitby

Government Services Building  
22 Winookeedaa Road  
Curve Lake, Ontario K0L1R0



Phone: 705.657.8045  
Fax: 705.657.8708  
[www.curvelakefirstnation.ca](http://www.curvelakefirstnation.ca)

April 20<sup>th</sup>, 2021  
VIA E-MAIL

Mark Bassingthwaite, P. Eng.  
Project Manager  
Resilient Consulting  
PO Box 643 Whitby, ON L1N 5V3  
Telephone: 289.943.4651  
Email: [mbassingthwaite@resilientconsulting.ca](mailto:mbassingthwaite@resilientconsulting.ca)

**RE: Rowe Channel Upgrade Study- Whitby**

Dear Mark,

I would like to acknowledge receipt of correspondence, which was received on April 4<sup>th</sup>, 2021 regarding the above noted project. As you may be aware, the area in which your project is proposed is situated within the Traditional Territory of Curve Lake First Nation. Our First Nation's Territory is incorporated within the Williams Treaties Territory and was the subject of a claim under Canada's Specific Claims Policy, which has now been settled. All 7 First Nations within the Williams Treaties have had their harvesting rights legally re-affirmed and recognized through this settlement.

Curve Lake First Nation is requiring a File Fee for this project in the amount of \$250.00 as outlined in our *Consultation and Accommodation Standards*. This Fee includes project updates as well as review of standard material and project overviews. Depending on the amount of documents to be reviewed by the Consultation Department, additional fees may apply. **Please make this payment to Curve Lake First Nation Consultation Department and please indicate the project name or number on the cheque.**

If you do not have a copy of *Curve Lake First Nation's Consultation and Accommodation Standards* they are available at <https://www.curvelakefirstnation.ca/services-departments/lands-rights-resources/consultation/>. Hard copies are available upon request.

Based on the information that you have provided us with respect to the Rowe Channel Upgrade Study, Curve Lake First Nation may require a Special Consultation Framework for this project. Information on this Framework can be found on page 9 of our *Consultation and Accommodation Standards* document.

In order to assist us in providing you with timely input, it would be appreciated if you could provide a summary statement indicating how the project will address the following areas that are of concern to our First Nation within our Traditional and Treaty Territory: possible environmental impact to our drinking water; endangerment to fish and wild game; impact on Aboriginal heritage and cultural values; and to endangered species; lands; savannas etc.



Government Services Building  
22 Winookeedaa Road  
Curve Lake, Ontario K0L1R0



Phone: 705.657.8045  
Fax: 705.657.8708  
[www.curvelakefirstnation.ca](http://www.curvelakefirstnation.ca)

After the information is reviewed it is expected that you or a representative will be in contact to make arrangements to discuss this matter in more detail and possibly set up a date and time to meet with Curve Lake First Nation in person (or virtually).


Although we have not conducted exhaustive research nor have we the resources to do so, there may be the presence of burial or archaeological sites in your proposed project area. Please note, that we have particular concern for the remains of our ancestors. Should excavation unearth bones, remains, or other such evidence of a native burial site or any other archaeological findings, we must be notified without delay. In the case of a burial site, Council reminds you of your obligations under the *Cemeteries Act* to notify the nearest First Nation Government or other community of Aboriginal people which is willing to act as a representative and whose members have a close cultural affinity to the interred person. As I am sure you are aware, the regulations further state that the representative is needed before the remains and associated artifacts can be removed. Should such a find occur, we request that you contact our First Nation immediately.

Furthermore, Curve Lake First Nation also has available, trained Cultural Heritage Liaisons who are able to actively participate in the archaeological assessment process as a member of a field crew, the cost of which will be borne by the proponent. **Curve Lake First Nation expects engagement at Stage 1 of an archaeological assessment** so that we may include Indigenous Knowledge of the land in the process. We insist that at least one of our Cultural Heritage Liaisons be involved in any Stage 2-4 assessments, including test pitting, and/or pedestrian surveys to full excavation.

Although we may not always have representation at all stakeholder meetings, as rights holders', it is our wish to be kept apprised throughout all phases of this project. Please note that this letter does not constitute consultation, but it does represent the initial engagement process.

Should you have further questions or if you wish to hire a Liaison for a project, please contact Julie Kapyrka or Kaitlin Hill, Lands and Resources Consultation Liaisons, at 705-657-8045 or via email at [JulieK@Curvelake.ca](mailto:JulieK@Curvelake.ca) and [KaitlinH@Curvelake.ca](mailto:KaitlinH@Curvelake.ca).

Yours sincerely,



Chief Emily Whetung  
Curve Lake First Nation



Resilient Consulting  
214 Centre St N  
Whitby, ON L1N 4T1

April 27, 2021

**SENT VIA E-MAIL (KaitlinH@curvelake.ca)**

Kaitlin Hill  
Lands and Resources Consultation Liaison  
Curve Lake First Nation  
Government Services Building  
22 Winookeeda Street, Curve Lake, ON K0L 1R0

**Re: Rowe Channel Upgrade Study Municipal Class Environmental Assessment  
Response to Request for File Fee and Summary Statement**

Dear Ms. Hill,

Further to Chief Whetung's letter dated April 20th, 2021, please find enclosed a cheque for the requested File Fee of \$250.00 for the Town of Whitby's Rowe Channel Upgrade Study. We have reviewed *Curve Lake First Nation's Consultation and Accommodation Standards* and understand that this service fee corresponds to a Level 2 or 3 Project, meaning "potential or definite impacts to First Nation and Treaty Rights as deemed by Curve Lake First Nation". Further information is provided below to assist you in making this determination.

### **Background**

The Rowe Channel was constructed in 1989 to convey surface drainage from neighbouring built-up residential and commercial areas (see **Figure 1** below). The channel is lined with concrete and gabion baskets, and ranges in depth from approximately 0.4 metres (m) to 1.6 m. It includes three concrete box culvert crossings at Victoria Street West, Watson Street West, and Front Street West, and discharges through the Front Street West culvert directly into Whitby Harbour/Lake Ontario.



*Figure 1: Location of the Rowe Channel (dashed red line) in the Town of Whitby. Inset shows the concrete and gabion-basket lined channel north of Watson Street W. All site disturbance/alteration will be limited to the Rowe Channel itself.*

The existing channel requires upgrades to address the failing gabions (steel wire baskets filled with stone) that line the channel. Design options being considered to decrease both the risk of flooding and the Town's costs to maintain the channel include, but may not be limited to, full or partial channel replacement with pipes, open channel with armor stone, a combination of piped flow and overland flow, and upstream flow diversion. The stormwater management pond located north of Victoria Street West will not be affected. Pending results of the Municipal Class Environmental Assessment (EA) study, construction is tentatively planned for late 2022.

### **Potential Environmental Impacts to Drinking Water**

No potential impacts to drinking water are anticipated. Although the evaluation of alternatives has yet to be completed, it is anticipated that any excavations required would be a maximum of approximately 0.5 to 2 m below ground, typically above local groundwater levels corresponding to Lake Ontario levels. Minor dewatering may be required during construction but significant groundwater taking will not be needed, and mitigation measures to prevent spills and natural environment contamination will be identified as part of the Class EA.

In addition, the study area is located within the Central Lake Ontario Source Protection Area. As such, the CTC Source Protection Plan (Amended March 2019) applies, which identifies Whitby Harbour as a surface water Intake Protection Zone (IPZ)-2. This designation means that the Harbour is located upstream of a municipal drinking water intake pipe located further out into Lake Ontario. However, none of the 22 prescribed drinking water threats listed in Ontario Regulation (O. Reg.) 287/07 under the *Clean Water Act* (2006) will be undertaken as part of this project.

### **Potential Impacts to Fish, Wild Game, Endangered Species and Wildlife Habitat**

Given the urban nature of the study area and the channel itself, impacts to fish, wild game, endangered species, and wildlife habitat are not anticipated. However, a Natural Heritage Evaluation is being completed as part of the Class EA. Background review will include existing information regarding fisheries and aquatic habitat, aquatic Species at Risk (SAR), and terrestrial features. Field investigations will include a stream assessment, breeding bird surveys, summer and fall vegetation inventories, and Ecological Land Classification (ELC). Mitigation measures such as appropriate construction timing windows and adherence to Erosion and Sediment Control (ESC) Plans will also be identified. Results of the evaluation and the proposed mitigation measures will initially be presented at a Community Open House, tentatively scheduled for Fall 2021, and again as part of the Project File Report. This information can also be shared with Curve Lake First Nation in advance of or following the open house upon request.

### **Potential Impacts on Aboriginal Heritage and Cultural Values**

A Stage 1 Archaeological Assessment will be completed as part of the Class EA and shared with Curve Lake First Nation in advance of public filing. We have provided your letter and contact information to our sub-consultant, ASI, so that they may include your Indigenous Knowledge as part of their assessment, as requested. If additional Stage 2, 3 or 4 assessments are required, we also confirm that your Cultural Heritage Liaison will be contacted to arrange a mutually acceptable date for field investigations.

The Class EA report and subsequent detailed design documents will obligate the Town of Whitby and their contractors to immediately notify First Nations and the appropriate authorities should any buried remains or archaeological findings be unearthed during construction.

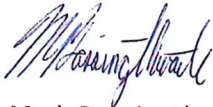
Kaitlin Hill

April 27, 2021

**Next Steps**

We would appreciate your confirmation of receipt and feedback regarding how you may wish to be consulted throughout the course of this study or any initial comments you may have. In the meantime, ASI will be in touch with you regarding your request to be engaged as part of the Stage 1 Archaeological Assessment. Please also let us know if you require further information. We look forward to working with you.

Sincerely,



Mark Bassingthwaite, P.Eng.  
Project Manager  
Resilient Consulting Corporation

Encl: \$250 cheque payable to Curve Lake First Nation Consultation Department

cc: Antony Manoharan, Town of Whitby  
Samantha Rayner/Jennifer Whittard, Resilient Consulting Corporation

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**Subject:** Re: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement  
**Date:** Wednesday, March 31, 2021 at 11:25:28 AM Central Standard Time  
**From:** Rowe Channel Upgrade Class EA  
**To:** Mile Lazarevski  
**Attachments:** image001.jpg, image002.jpg, image003.jpg

Thanks Mile, we've updated our mailing list.

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**From:** Mile Lazarevski <Communication@curvelake.ca>  
**Date:** Tuesday, March 30, 2021 at 7:33 AM  
**To:** Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca>  
**Subject:** Re: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

Thank you.

For future reference, Melissa Dokis no longer works for Curve Lake First Nation. Also, Chief Emily Whetung's email address is [emilyw@curvelake.ca](mailto:emilyw@curvelake.ca).

Best regards,

Mile



**Mile Lazarevski**  
**Communications /Community Engagement Officer**  
**Curve Lake First Nation Government Services Building**  
**22 Winookeedaa Road, Curve Lake, ON K0L 1R0**  
**P: 705.657.8045 ext. 209 F: 705.657.8708**  
**W: [www.curvelakefirstnation.ca](http://www.curvelakefirstnation.ca)**  
**E: [Communication@curvelake.ca](mailto:Communication@curvelake.ca)**

**From:** Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca>

**Date:** Thursday, March 25, 2021 at 4:02 PM

**To:** Mile Lazarevski <Communication@curvelake.ca>, "chief@curvelakefn.ca" <chief@curvelakefn.ca>, Melissa Dokis <MelissaD@curvelake.ca>

**Cc:** "Manoharan, Antony" <manoharana@whitby.ca>

**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

On behalf of the Town of Whitby, please find attached the Notice of Study Commencement for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the study commencement and invite your preliminary input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study will identify and evaluate a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. The study will also identify opportunities to improve the look of the channel and reduce the presence of invasive species. The options being considered include, but may not be limited to, full or partial channel replacement with pipes, open channel with armor stone, a combination of piped flow and overland flow, and upstream flow diversion.

A Community Open House is tentatively planned for Fall 2021 to provide project details and obtain feedback. You will receive similar notification of the Open House at that time. In the meantime, if you have any initial comments or require further information, please let us know by way of reply to this email or by contacting one of the Project Team members listed in the notice. Additional information is available at <https://connectwhitby.ca/rowechannel>.

We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP

Senior Environmental Planner

Resilient Consulting

PO Box 643

Whitby, ON L1N 5V3

[www.resilientconsulting.ca](http://www.resilientconsulting.ca)

@resilientccorp

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**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House  
**Date:** Thursday, November 18, 2021 at 12:31:14 PM Central Standard Time  
**From:** Rowe Channel Upgrade Class EA  
**To:** mario.gros-louis@wendake.ca  
**CC:** louis.lesage@cnhw.qc.ca, melanievincent21@yahoo.ca, lori-jeanne.bolduc@wendake.ca, dominic.ste-marie@wendake.ca, Manoharan, Antony, Mark Bassingthwaite  
**Attachments:** Notice of Online COH - Rowe Channel Upgrade.pdf

Dear Mr. Gros-Louis,

On behalf of the Town of Whitby and further to the Notice of Study Commencement sent March 25, 2021, please find attached the Notice of Online Community House for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the preliminary preferred solution and invite your input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study has identified and evaluated a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. As a result of the evaluation, the preliminary preferred solution has been identified as **replacement of the existing channel with an open channel lined with armour stone**. The Open House materials provide further details and are now available for review and comment at: <https://connectwhitby.ca/rowechannel>.

Please note that the Stage 1 Archaeological Assessment determined that the **Study Area does not retain archaeological potential** and may be considered clear of further archaeological concern. **Please let us know if you would like to review this draft report** prior to its finalization and issuance as part of the Project File (EA report). Also note that the Evaluation Matrix provided on slide 23 states that there is "Low potential for impacts to Indigenous communities, rights and interests. To be confirmed." Although we believe there is low potential for impacts given the urban nature of the Study Area and the Stage 1 study results, we have included this statement because we have not yet heard from the Huron Wendat Nation. As such, **we would appreciate any comments you may have** so that we may make revisions as necessary.

Pending comments received from the public, Indigenous communities, and various review agencies, completion of the Project File is tentatively planned for early 2022. You will then receive similar notification that the Project File is available for review. In the meantime, please submit any comments or questions you may have by completing our online survey or by way of reply to this email. We would appreciate your response by December 17, 2021. If you require further information, please also feel free to contact one of the Project Team members listed in the notice.

We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp



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**Subject:** Re: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement  
**Date:** Wednesday, March 31, 2021 at 11:36:08 AM Central Standard Time  
**From:** Rowe Channel Upgrade Class EA  
**To:** Mélanie Vincent  
**CC:** Manoharan, Antony

Thank you Mélanie, we've updated our mailing list as requested.

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**From:** Mélanie Vincent <melanievincent21@yahoo.ca>  
**Reply-To:** Mélanie Vincent <melanievincent21@yahoo.ca>  
**Date:** Sunday, March 28, 2021 at 12:42 PM  
**To:** Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca>  
**Cc:** Louis Lesage <louis.lesage@cnhw.qc.ca>, "mario.groslouis@cnhw.qc.ca" <mario.groslouis@cnhw.qc.ca>, "manoharana@whitby.ca" <manoharana@whitby.ca>  
**Subject:** Re: Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

Good Day Jennifer, the Huron-Wendat Nation acknowledges reception of the Notice. We would like to be kept informed of any development in this Study.

Please note that since Maxime Picard has landed a new position at the Council, any future correspondance to the Huron-Wendat Nation needs to be addressed and forwarded to Mario Gros-Louis (cc'd), Louis Lesage (cc'd) and I. We will also coordinate any follow-up to this Study.

Thank you!

**Mélanie Vincent, M.Sc.AJS**  
**Cell / SMS: (418) 580-4442**  
[melanievincent21@yahoo.ca](mailto:melanievincent21@yahoo.ca)  
*Gestion MV Management*  
*Gestion de projets / Project Management*

**De:** Rowe Channel Upgrade Class EA <rowechannel@resilientconsulting.ca>  
**Date:** 25 mars 2021 à 16:03:13 HAE  
**À:** administration@cnhw.qc.ca, maxime.picard@cnhw.qc.ca  
**Cc:** "Manoharan, Antony" <manoharana@whitby.ca>  
**Objet:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Study Commencement

On behalf of the Town of Whitby, please find attached the Notice of Study Commencement for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the study commencement and invite your preliminary input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study will identify and evaluate a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. The study will also identify opportunities to improve the look of the channel and reduce the presence of invasive species. The options being considered include, but may not be limited to, full or partial channel replacement with pipes, open channel with armor stone, a combination of piped flow and overland flow, and upstream flow diversion.

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We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP

Senior Environmental Planner

Resilient Consulting

PO Box 643

Whitby, ON L1N 5V3

[www.resilientconsulting.ca](http://www.resilientconsulting.ca)

@resilientccorp

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**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House  
**Date:** Thursday, November 18, 2021 at 12:31:38 PM Central Standard Time  
**From:** Rowe Channel Upgrade Class EA  
**To:** JesseF@metisnation.org  
**CC:** mno@metisnation.org, Manoharan, Antony, Mark Bassingthwaite  
**Attachments:** Notice of Online COH - Rowe Channel Upgrade.pdf

Dear Mr. Fieldwebster,

On behalf of the Town of Whitby and further to the Notice of Study Commencement sent March 25, 2021 to the Consultation Unit (copied), please find attached the Notice of Online Community House for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the preliminary preferred solution and invite your input, as applicable.

The channel is located south of Victoria Street West, between Henry Street and Charles Street near Lake Ontario (see map in attached notice). The study has identified and evaluated a range of design options to decrease both the risk of flooding and the Town's costs to maintain the channel. As a result of the evaluation, the preliminary preferred solution has been identified as **replacement of the existing channel with an open channel lined with armour stone**. The Open House materials provide further details and are now available for review and comment at: <https://connectwhitby.ca/rowechannel>.

Please note that the Stage 1 Archaeological Assessment determined that the **Study Area does not retain archaeological potential** and may be considered clear of further archaeological concern. **Please let us know if you would like to review this draft report** prior to its finalization and issuance as part of the Project File (EA report). Also note that the Evaluation Matrix provided on slide 23 states that there is "Low potential for impacts to Indigenous communities, rights and interests. To be confirmed." Although we believe there is low potential for impacts given the urban nature of the Study Area and the Stage 1 study results, we have included this statement because we have not yet heard from the Metis Nation of Ontario. As such, **we would appreciate any comments you may have** so that we may make revisions as necessary.

Pending comments received from the public, Indigenous communities, and various review agencies, completion of the Project File is tentatively planned for early 2022. You will then receive similar notification that the Project File is available for review. In the meantime, please submit any comments or questions you may have by completing our online survey or by way of reply to this email. We would appreciate your response by December 17, 2021. If you require further information, please also feel free to contact one of the Project Team members listed in the notice.

We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
@resilientccorp

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**Subject:** RE: Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House  
**Date:** Monday, November 22, 2021 at 12:51:10 PM Central Standard Time  
**From:** Jesse Fieldwebster  
**To:** Rowe Channel Upgrade Class EA

Hello Jennifer,

Thank you for reaching out. Quick point of correction the consultations email is [consultations@metisnation.org](mailto:consultations@metisnation.org). I have sent your project there. If there is any concern we should get back to you in 15 business days though I will say from an initial assessment the project does not look to be one that would be of any concern and I believe the design solution recommended (open channel) makes sense.

Cheers,

**Jesse Fieldwebster** (he/his)  
Manager  
Lands, Resources, and Consultations (LRC) Branch  
Métis Nation of Ontario  
Midland, ON, Canada  
P: 705-529-6000 | [jessef@metisnation.org](mailto:jessef@metisnation.org)  
[www.metisnation.org](http://www.metisnation.org)

*Please note that MNO employees in client-facing programs will resume in-person client services starting August 9, 2021. Client services may be by appointment, or drop-in. Please consult your local MNO office for a list of offered services. Please visit [COVID-19 Support Programs - Métis Nation of Ontario \(metisnation.org\)](https://www.metisnation.org/COVID-19-Support-Programs) for available supports and programs. If you have COVID-19 related concerns or need help accessing support, please contact us by phone at 1-800-263-4889 or by email at [covidhelp@metisnation.org](mailto:covidhelp@metisnation.org).*

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**From:** Rowe Channel Upgrade Class EA [mailto:rowechannel@resilientconsulting.ca]  
**Sent:** Thursday, November 18, 2021 1:32 PM  
**To:** Jesse Fieldwebster <JesseF@metisnation.org>  
**Cc:** General Address <mno@metisnation.org>; Manoharan, Antony <manoharana@whitby.ca>; Mark Bassingthwaite <mbassingthwaite@resilientconsulting.ca>  
**Subject:** Rowe Channel Upgrade Study Municipal Class EA - Notice of Online Community Open House

Dear Mr. Fieldwebster,

On behalf of the Town of Whitby and further to the Notice of Study Commencement sent March 25, 2021 to the Consultation Unit (copied), please find attached the Notice of Online Community House for the Rowe Channel Upgrade Study Municipal Class Environmental Assessment (EA). The purpose of this notice is to inform you of the preliminary preferred solution and invite your input, as applicable.

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We look forward to hearing from you.

Thanks,

Jennifer Whittard, BES, M.Plan, PMP  
Senior Environmental Planner  
Resilient Consulting  
PO Box 643  
Whitby, ON L1N 5V3  
[www.resilientconsulting.ca](http://www.resilientconsulting.ca)  
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