Addendum to the Front Street Wastewater Pumping Station Wastewater Diversion Schedule B Municipal Class Environmental Assessment

Addendum Report

Prepared for:
Region of Peel

Prepared by:
Stantec Consulting Ltd.

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Sign-off Sheet

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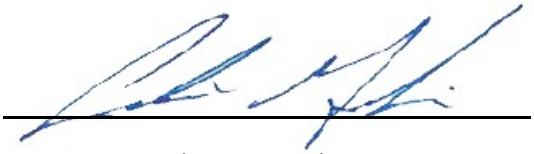
Reviewed by 

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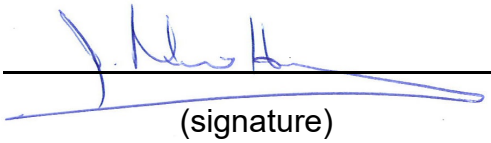
Approved by 

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ADDENDUM TO THE FRONT STREET WASTEWATER PUMPING STATION WASTEWATER DIVERSION SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction and Background

The Front Street Wastewater Pumping Station Wastewater Diversion Schedule B Municipal Class Environmental Assessment (Class EA) was completed by the Region of Peel (Region) in June of 2019. The Class EA study addressed the current wastewater flows from the Front Street Sewage Pumping Station (SPS) catchment area to align with the Region's long-term sustainable plan to provide wastewater services in accordance with the Region's Water and Wastewater Master Plan. The preferred solution identified within the 2019 Class EA, provided in **Appendix A**, included the following:

- Construction of a new gravity trunk sewer along Lakeshore Road (from Front Street to Richards Memorial Wastewater Pumping Station (WWPS) and from Richards Memorial WWPS to Jack Darling Memorial Park WWPS (JD1).
- Construction of a new gravity sewer along Pine Avenue South/Maple Avenue South from Lakeshore Road West to Ben Machree WWPS.
- Replacement and upgrade of the aging Richards Memorial SPS.
- Decommissioning of the current Front Street WWPS located in the Port Credit Lighthouse, decommissioning of the Ben Machree WWPS, and decommissioning of the existing Richards Memorial WWPS.

As a first step in advancing the design of the preferred solution identified in the 2019 Class EA, Stantec Consulting undertook a Feasibility Study to review sewer alignment options that will provide the Region with enhanced system flexibility (i.e., diverting flows away from G.E. Booth to Clarkson Wastewater Treatment Plant (WWTP) sewersheds). Stantec examined alternate design configurations that would maximize the value of the Region's investment, while providing added benefits and future options for east to west wastewater conveyance to the system needs and servicing objectives.

The Feasibility Study identified the opportunity to deepen the Lakeshore Road Sanitary Trunk Sewer allowing for a future crossing of the Credit River, along Lakeshore Road. While the preferred solution identified within the 2019 Class EA is still applicable, the recommendations of the Feasibility Study impact a number of project design components. For this reason, an Addendum to the 2019 Class EA is required to assess environmental impacts of the proposed changes.

The primary revisions to the preferred solution include:

- Deepening of the Lakeshore Trunk Sewer.
- Elimination of the proposed new WWPS identified at Richard's Memorial Park.
- Construction of a new WWPS at Jack Darling Memorial Park.

While the Feasibility Study identified the potential to extend the new sanitary sewer across the Credit River, the Region of Peel is undertaking a separate study to assess alternatives and recommend a preferred design for the scope on the east side of the Credit River.

It should be noted that the scope of this EA addendum study was changed after the Notice of EA Addendum was issued. The original EA Addendum study area limits extended to Stavebank Road South. The study area limits were later revised to end just west of the Credit River.

This Class EA Addendum Report has been prepared to assess and document the rationale for the proposed changes, and any changes in environmental benefits and impacts associated with the proposed changes.

As part of the project the Region is also undertaking the replacement of some existing local watermains as well as the construction of a sub-transmission main to bolster supply to Zone 1 along Lakeshore Road. Both these projects are considered as Schedule A+ EA works.

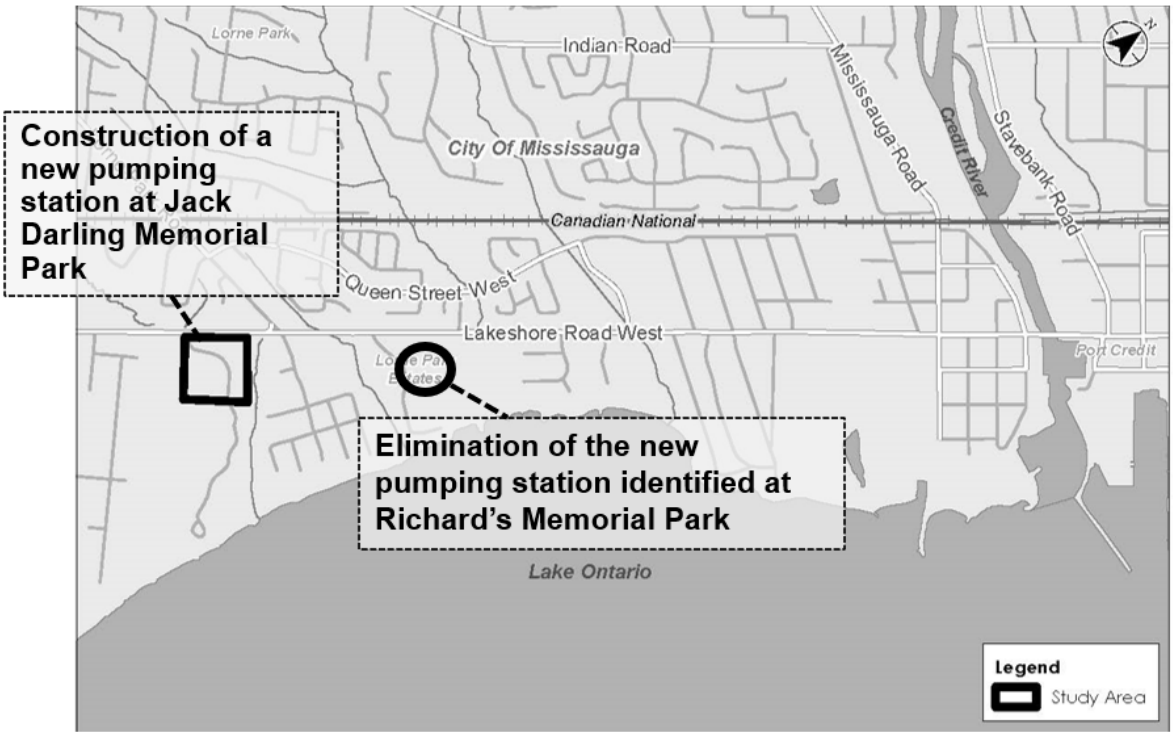
Section 2.2 of this report provides a summary of the development and assessment of three alternative site locations for the WWPS at Jack Darling Memorial Park.

A copy of the Feasibility Study is provided in **Appendix B**.

1.1 Addendum Study Area

The study area from the 2019 Class EA has been extended eastward to include the Lakeshore Road corridor from Front Street to just west of the Credit River. This Addendum has also focused on Jack Darling Memorial Park to address the changes in construction impacts associated with the proposed WWPS. See **Figure 1-1** for an overview of the study area.

Figure 1-1 Addendum Study Area



1.2 Municipal Class Environmental Assessment Process

All municipalities in Ontario are subject to the provisions of the Ontario *Environmental Assessment Act* (EA Act) and its requirements to prepare an Environmental Assessment (EA) for applicable public works projects. The Ontario Municipal Engineers Association (MEA) "Municipal Class Environmental Assessment" document (October 2000 as amended in 2007, 2011, and 2015) provides municipalities with a five-phase planning process approved under the EA Act to plan and undertake municipal infrastructure projects, including works associated with transportation, in a manner that protects the environment as defined in the Act.

Key components of the EA planning process include:

- Consultation with potentially interested parties early and throughout the process
- Consideration for a reasonable range of alternative solutions.
- Consideration of effects on the environment and ways to avoid/reduce impacts.
- Systematic evaluation of alternatives.

- Clear and transparent documentation.
- Traceable decision-making.

1.2.1 Addendum Process

Section A.4.3. of the MEA Class EA document identifies that an Addendum should be prepared to address significant modifications to the project, change in environmental conditions, or lapse of time.

The Addendum shall include a review of the planning and design process and the current environmental setting to ensure that the project and the mitigation measures are still valid given the current planning context. The review will be recorded in an Addendum Report and will be placed on public record for the required 30-day review period along with the 2019 Class EA.

It should be noted that upon issuance of the Notice of Filing Addendum and start of the 30-day public review period, only the items in the Addendum (i.e., the changes to the 2019 Class EA) are open for review or potential Section 16 Order requests (formerly Part II Orders).

It is noted that recent changes have been enacted to the Environmental Assessment Act through Bill 108 (More Homes More Choices) and Bill 197 (COVID-19 19 Economic Recovery Act) which pertain to the Section 16 Order process. Section 16 Order requests may be made, only on the grounds that the requested order may prevent, mitigate, or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered.

1.3 Consultation

Consultation and engagement with stakeholders represent an important element of the Class EA process. Consultation seeks both statutory consultation requirements as part of the Class EA process, but also to serve as an extension of community conversations surrounding the various developments within the community, by providing meaningful opportunities for the community to participate in the planning process. A stakeholder list was developed which includes all stakeholders consulted as part of the 2019 Class EA including appropriate Provincial ministries, local stakeholder groups, Indigenous communities, utility companies, and others who expressed their interest in the study. A copy of all consultation materials is available in **Appendix C**.

Major points of contact with stakeholders as part of the Class EA Addendum included:

- Notice of Class EA Addendum and Online Public Information Centre (PIC), to inform stakeholders of the Class EA Addendum and solicit any information on the study

area, and to present a summary of the changes to the 2019 Class EA recommendations and preferred solution.

- Notice of PIC Review Extended, to notify stakeholders of the presentation and allow for feedback for an extended period of time.
- Notice of Filing EA Addendum.

1.3.1 Notice of Class EA Addendum and Online Public Information Centre

The Notice of Class EA Addendum and Online PIC was distributed on December 13, 2021 to the study stakeholder list, and posted on the study website (www.peelregion.ca/public-works/environmental-assessments/mississauga/frontstreet-wastewater-pumping-station.asp). The Notice introduced the study and details regarding the Online PIC to present summary of the changes to the 2019 Class EA recommendations and preferred solution. The presentation boards were made available on the Region's website Front Street Wastewater Pumping Station and Wastewater Diversion - Region of Peel (peelregion.ca) for review from December 13, 2021 to January 10, 2022. Stakeholders were encouraged to provide comments and feedback on the study, though none were received. The Notice of Class EA Addendum and Online PIC materials are in **Appendix C**.

1.3.1.1 Online Public Information Centre Review Extended

The project team issued an Online Public Information Centre Review Extended Notice, to allow for additional timing for stakeholders to review and provide feedback on the Online PIC. The Online PIC review period was extended from the original PIC date to May 9 to May 27, 2022. The Notice was distributed to the stakeholder list on April 28, 2022, and Door Knockers were distributed to local residents on April 18/19, 2022. The project team posted the Notice of Online PIC Review Extended in the *Mississauga News* newspaper on May 19th, 2022. Comments and feedback were encouraged, though none was received. The Online PIC Review Extended materials are in **Appendix C**.

1.3.2 Notice of Class EA Addendum Study Completion

The Notice of Class EA Addendum Study Completion will be distributed to the study stakeholder list and posted on the study website. The Notice will introduce the 30-day review period for the public to review and comment on the EA Addendum report.

1.3.3 Agency Consultation

Agency meetings were held to updated interested stakeholders on the study's status and provide input to the study team. Meeting minutes are provided in **Appendix C**. The agency meetings are summarized below.

1.3.3.1 City of Mississauga

A meeting was held with the City of Mississauga on April 22, 2022, to discuss details surrounding the preferred solution identified in the EA Addendum.

1.3.3.2 Credit Valley Conservation

A meeting was held with Credit Valley Conservation (CVC) on January 21, 2022, to discuss the details surrounding the preferred solution identified in the EA Addendum. The project team shared details of the natural environment features identified within the study area, including the Tallgrass Prairie Community and floodplain mapping.

1.3.4 Indigenous Communities and First Nation Engagement

The Mississaugas of the Credit First Nation (MCFN), Six Nations of the Grand River (both the Six Nations Elected Council and the Haudenosaunee Confederacy Chiefs Council); and Huron-Wendat Nation were engaged initially as part of this study.

The Notice of Addendum, Notice of Online PIC, and Notice of Online PIC Review Extension were sent via email to the above communities. All interested parties were notified and invited to the PIC and given the opportunity to express concerns and provide feedback through an invitation to meet and via telephone calls soliciting discussion.

Comments were received from MCFN requesting an invitation to participate in the archaeological field work. The Region signed a participation agreement with MCFN for the required Stage 2 archaeological assessment, although no field liaison monitors came out to accompany fieldwork. A copy of the Stage 2 report was sent to MCFN as requested.

2.0 Problem and Opportunity Statement

Phase 1 of the Municipal Class EA process involves identification of the problems and/or opportunities which the Class EA is addressing. The Problem and Opportunity Statement developed for the 2019 Class EA is still applicable, and has been carried forward to guide the planning and decision-making process for the Addendum:

As Mississauga and Port Credit grow, Peel Region is faced with three challenges. The Region has a long-term master plan which recommends that wastewater be balanced between the G.E. Booth (located on the east side) and Clarkson (located on the west side) wastewater treatment plants as the entire Region grows over the coming decades. Since the equipment at the Front Street Wastewater Pumping Station is in need of replacement and the Richard's Memorial Wastewater Pumping Station has limited capacity and needs to be expanded options as how best to deal with these issues were explored.

3.0 Review of Alternative Solutions

The preferred solution identified within the 2019 Class EA, provided in **Appendix A**, included the following:

- Construction of a new gravity trunk sewer along Lakeshore Road (from Front Street to Richards Memorial Wastewater Pumping Station (WWPS) and from Richards Memorial WWPS to Jack Darling Memorial Park WWPS (JD1).
- Construction of a new gravity sewer along Pine Avenue South/Maple Avenue South from Lakeshore Road West to Ben Machree WWPS.
- The construction of a new wastewater pumping station in Richards Memorial Park and decommissioning of the existing station.
- Decommissioning of the current Front Street WWPS located in the Port Credit Lighthouse, and decommissioning of the Ben Machree WWPS.

The 2019 study identified Richard Memorial Park as the preferred location for the inlet to a new gravity trunk sewer to convey flows along Lakeshore Road W towards the existing Jack Darling WWPS. At the time, a cursory review of the areas between the Front Street WWPS and Richard's Memorial Park determined Richard's Memorial Park as the only vacant area where a wastewater pumping station could be constructed.

Following the completion of the 2019 Class EA, alternate design configurations were examined through a Feasibility Study to maximize the value of the Region's investment, while providing added benefits to the overall system needs and servicing objectives. A

number of challenges and opportunities in implementing the Preferred Solution from the 2019 EA were identified during the Feasibility Study, including:

- Limited opportunity for extension to the west or to the east in the future.
- Tunnel is too shallow to cross the Credit River, thus providing limited opportunity to divert additional tributary area from the east to the west if desired in the future.
- Socio-economic impacts resulting from the tunnel boring machine (TBM) launch or extraction shaft at Front Street Park.
- Significant impacts to Richard's Memorial Park relating to tree cutting and park access as a result of the new larger pumping station, wet well and access requirements.

The Feasibility Study thus developed and evaluated a number of alternative options that have the ability to enhance the value of the investment. The evaluation demonstrated that the baseline solution is limited in its ability to provide added benefits and operational flexibility beyond the specific objectives of the original 2019 Class EA.

A total of six (6) alternatives to the baseline 2019 Class EA solution, hereby described as alternative options, were developed, and evaluated. Each alternative was evaluated for their ability to add value relative to the core project objectives as well as relative to other criteria that included:

- Flexibility for Future Extension of the Tunnel Solution.
- Ability to Provide Added Operational Flexibility for the Region's WWTP's.
- Improve or Maintain Long Term Operational Sustainability of the overall collection system.
- Impacts on Project Approvals and Schedule.
- Mitigation of Constructability Risks.
- Mitigation of Socio-Economic Impacts.

The alternatives included:

- **Option 1:** Tunnel Entirely within Rock and Within Current Limits of Class EA.
- **Option 2:** Tunnel Extension West (from Front Street SPS to Clarkson WWTP).
- **Option 3:** Deep Tunnel Extension East (from JD1 to G.E. Booth WWTP).
- **Option 4:** Continuous Tunnel Extension between G.E. Booth and Clarkson WWTPs.

- **Option 5:** Two-Level Tunnel Extensions between Clarkson and G.E. Booth WWTPs.
- **Option 6:** Variation of Option 5 with Downstream Forcemain Extension (instead of higher-level tunnel).

3.1 Tunnel Solution Recommendations from Feasibility Study

Based on the assessment of options, the following was determined:

Jack Darling Memorial Park

The preferred location for an upgraded pumping station is Jack Darling Memorial Park rather than Richard's Memorial Park given that it will have a lesser impact on mature trees in the area, minimal disruption along Lakeshore Road and will be less disruptive to the general community and adjacent property owners. The construction of a pumping facility at Jack Darling Park provides the opportunity for integration of the required deep wet well station with an existing and recently upgraded facility at a common location, preventing additional construction within Richard Memorial Park. This will allow for one facility, with construction at one location, rather than having to operate two separate facilities at different locations. Furthermore, a continuous tunnel from the Credit River to JD1 provides for significantly more in-line storage and thus greater operational flexibility for managing peak flows and providing emergency storage and reducing impacts to the natural environment. The deep tunnel that would be constructed increases the likelihood that the tunneling can be performed entirely in rock, which reduces risks associated with tunneling in mixed face conditions.

The upgrades at Jack Darling Park would also allow for the eventual decommissioning of eight pumping stations (Jack Darling 2, Ben Machree, Indian Road, Front Street, Elmwood, and Hiawatha), including the SPS at Richard's Memorial Park. The decommissioning of these two additional pumping stations will reduce the long-term operational and maintenance costs to the Region.

Deepening Tunnel

There is significant value in making the tunnel deeper for both constructability and functional reasons. From a constructability perspective, deepening the tunnel reduces construction risks by avoiding or minimizing the extent of mixed face tunneling. From a functional perspective, deepening the tunnel provides the ability to make full use of the tunnel volume for in-line storage. If made deep enough to safely cross the Credit River, the tunnel provides the Region with the potential opportunity to divert additional flow from the east to the west.

Revised Preferred Solution

The primary revisions to the 2019 Class EA preferred solution include:

- Deepening of the Lakeshore Trunk Sewer.
- Elimination of the new WWPS identified at Richard's Memorial Park.
- Construction of a WWPS at Jack Darling Memorial Park.

The purpose of this EA Addendum is to focus on the elimination of the new WWPS identified at Richard's Memorial Park and the construction of a WWPS at Jack Darling Memorial Park. The extension of the proposed sanitary sewer east under the Credit River and beyond will be reviewed through a separate EA study.

3.2 Assessment of Alternative Sites for the Pumping Station

Three alternative location options for the WWPS site at Jack Darling Memorial Park were reviewed as part of this Class EA Addendum. The proposed site layout for each option is provided in **Appendix D**.

Option 1

Would have the drive shaft for the tunnel located in the grassed area in the north-east corner of the park. This area is open and would provide direct access to Lakeshore Road during construction. This area is not used by the public as it has been kept as a grassed area.

The drive shaft for the tunnel would be converted to a wet/dry well for the new sewage pumping station and valve chamber along with a permanent building housing electrical, odour and HVAC units.

This location would also see the need for forcemains to be constructed along the park access road to the maintenance hole in the parking lot next to JD1 so that flows would be conveyed to the station. The majority of the works would be underground, and any surface works would be designed to blend into the surrounding park.

Option 2

Would have the drive shaft for the tunnel located further into the park area, closer to the existing dog park, just south of the entrance road into the park itself. During construction, a portion of the dog park would have to be temporarily closed but not the entire area.

A portion of this location has been previously disturbed during the construction of the Lorne Park Water Treatment Plant expansion in 2008, however some trees would need to be removed. Part of this area is used by the public for off-leash dog walking.

The drive shaft for the tunnel would be converted to a wet/dry well for the new sewage pumping station and valve chamber along with a permanent building housing electrical, odour and HVAC units. This location would also see the need for forcemains to be constructed to the maintenance hole in the parking lot next to JD1 so that flows would be conveyed to the station. The length of the forcemains would be much shorter than those needed for Option 1. The majority of the works would be underground, and any surface works would be designed to blend into the surrounding park and water treatment plant.

Option 3

This option closely resembles the solution outlined in the 2019 EA already completed. This would see the main drive shaft for the tunnel located right next to Lakeshore Road at the northeast corner of the park. This shaft would allow tunneling to occur to the exit shaft located in the parking lot directly adjacent to JD1.

A portion of this location has been previously disturbed during the construction of the Lorne Park Water Treatment Plant expansion in 2008, however some trees would need to be removed. Parking would be temporarily impacted during the construction phase and depending on the final building site some parking may be lost in the long term.

The exit shaft for the tunnel, located next to JD1, would be converted to a wet/dry well for the new sewage pumping station and valve chamber along with a permanent building housing electrical, odour and HVAC units. This location would see very short forcemains discharging into a new manhole located within the existing JD1 parking area. The length of the forcemains would be much shorter than those needed for Option 2. The majority of the works would be underground, and any surface works would be designed to blend into the surrounding park and water treatment plant.

A detailed assessment of the alternative sites for the pumping station was completed and is provided below in Table 1. The diagrams within Table 1 are included in **Appendix D.** The site layouts provided are for illustration and evaluation purposes only. The exact layout and site configuration will be refined and confirmed during detailed design.

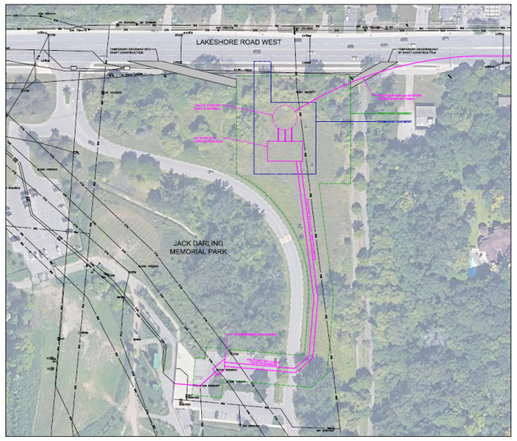
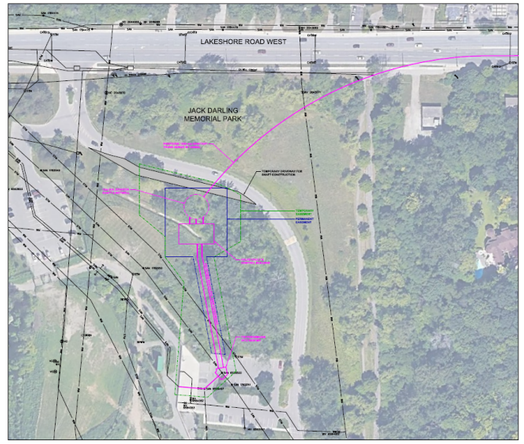
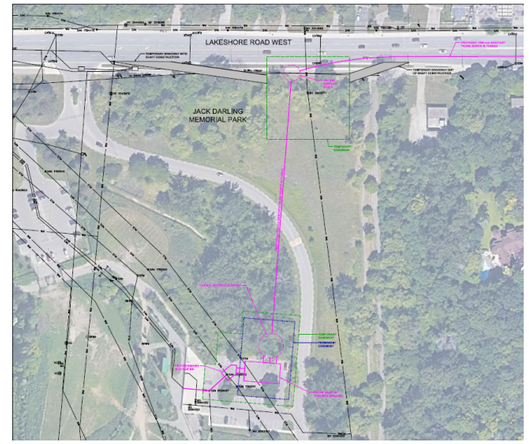
3.3 Preferred Alternative Site for the Pumping Station

Option 3 is the preferred alternative site for the sewage pumping station in Jack Darling Memorial Park for the following reasons:

- Shallowest lift station from surface to bottom of the wet well.

- Eliminates curves in the tunnel alignment going towards Front Street.
- Allows construction of lift station concurrently with tunnel construction which in turn accelerates the overall construction schedule and reduces impacts to the park and local community.
- Avoids a portion of the prairie tall grass area at the north-east corner of the park boundary.
- Reduces the length of time that portion of the parking lot is inaccessible to park users.
- Follows similar alignment to the preferred alignment from the 2019 EA and reduces the need for additional archaeological assessments, etc.
- Clusters the existing JD1 and the new station closer together providing for potential shared infrastructure as well as operational advantages.

Table 1: Jack Darling Memorial Park Alternative SPS Locations

	OPTION 1[1]	OPTION 2[1]	OPTION 3[1]
FACTORS			
TECHNICAL CONSIDERATIONS			
Constructability (Challenges or risks associated with undertaking construction)	• Requires deepest wet well of all options • Requires segment (+/- 100m) of tight radius curve (+/- 200m radius) at beginning of tunnel. • Requires construction of ~190m of twin forcemain from new SPS to existing sanitary manhole. • Medium risk associated with shorter bend to start tunnel.	• Mid-depth wet well of all options • Requires long segment (+/- 170m) of tight radius curve (+/- 200m radius) at beginning of tunnel. • Requires construction of ~75m of twin FM's from new SPS to existing sanitary manhole. • Highest risk associated with long tight bend on start tunnel.	• Shallowest wet well given lower site elevation • Requires construction of additional shaft next to Lakeshore Road and an additional 150m long section of deep tunnel from Lakeshore shaft to wet well. • Does not require tight radius curve on first portion of main tunnel. • Forcemain construction would be limited to two short segments (5-10m) to connect to existing sanitary manhole. • Lowest risk associated with short bend with smaller radius to start tunnel.
Impact on Existing Utilities	• Construction of wet well and control building may require the local relocation of existing watermain. Sanitary forcemains need to cross existing storm sewer to connect to existing sanitary manhole.	• Sanitary forcemains need to diagonally cross existing storm sewer to connect to existing sanitary manhole.	• Existing storm sewer may need to be locally relocated for construction of control building. This storm sewer is the extension of Lakeshore Road West culvert and any reduction in the capacity of the existing culvert may result in increase in risk of

[1] Site layout shown for each option is for illustration and evaluation purposes. Exact layout and site configuration to be refined and confirmed during detailed design.

	OPTION 1[1]	OPTION 2[1]	OPTION 3[1]
			overtopping of Lakeshore Road West and a risk assessment will be prepared during detailed design based on a detailed hydraulic analysis to assess the offsite impact of culvert relocation.
Property Requirements (Including process and cost of acquiring necessary land to facilitate construction, including impacts to project timeline and associated complications)	• Temporary Easement in northeast corner of park for facility construction and along park road to existing JD1 for forcemain construction. • Permanent easement for new SPS facility and access from Lakeshore Road. • Temporary Easement - +/- 2.0 ac. • Permanent Easement - +/- 0.45 ac.	• Temporary easement between dog park area and park access road for construction of facility and forcemains. • Permanent easement for new SPS facility and access the park road. • Temporary Easement - +/- 1.25 ac. • Permanent Easement - +/- 0.60 ac.	• Two temporary easements are required: one for the construction of the shaft at Lakeshore Road and a second for the construction of the SPS and forcemains next to the existing JD1. • Permanent easement for new SPS facility. • Temporary Easement - +/- 1.30 ac. • Permanent Easement - +/- 0.40 ac.
Future Flexibility and Design Considerations	• Facility location separate from existing JD1. • Would allow for future design to eliminate existing JDSPS.	• Facility location separate from existing JD1. • Would allow for future design to eliminate existing JDSPS.	• New PS adjacent to existing JD1. • Would allow for future design to eliminate existing JDSPS.
Operations and Maintenance	• Furthest from Existing JD1. Most difficult for servicing both facilities.	• Better than option 1 and worse than Option 3.	• Closest to Existing JD1. Easier for servicing both facilities
TECHNICAL CONSIDERATIONS SUMMARY	**MODERATELY PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**
ENVIRONMENTAL CONSIDERATIONS			
Potential Effects on Water Features/Resources	• No immediate impact on water resources. Overflow route to be confirmed.	• No immediate impact on water resources. Overflow route to be confirmed.	• No immediate impact on water resources. Overflow route to be confirmed • Emergency overflow from existing JD1 will be redirected to spill into JD3 as the upstream tunnel provides significant storage in event of SPS shutdown. • A new emergency overflow for JD3 is required, however risk of an overflow occurring is low since the upstream tunnel provides over 8 hours of emergency storage for JD1, JD2, and JD3 in event of full SPS shutdown during a 25 yr rainfall event; this level of service exceeds the

	OPTION 1[1]	OPTION 2[1]	OPTION 3[1]
			MECP requirements outlined in the sewer design guidelines.
CVC Floodplain	• Not within CVC regulated area.	• Within CVC regulated area, but the site layout could be modified during detailed design to avoid or mitigate risks. The building will need to be floodproofed in accordance with the CVC Technical Guidelines, including providing flood free access to the building. A detailed hydraulic analysis and associated risk assessment will be required during detailed design to assess the offsite impact of the proposed building and flood free access to confirm the feasibility of dry floodproofing, where appropriate floodplain compensation/re-routing may be required.	• Within CVC regulated area, but the site layout could be modified during detailed design to avoid or mitigate risks. The building will need to be floodproofed in accordance with the CVC Technical Guidelines, including providing flood free access to the building. A detailed hydraulic analysis and associated risk assessment will be required during detailed design to assess the offsite impact of the proposed building and flood free access to confirm the feasibility of dry floodproofing, where appropriate floodplain compensation/re-routing may be required.
Potential Impacts to Trees	• Removal of relatively few trees at northern region of park along Lakeshore Road for site access, and construction of wet well and control building.	• Removal of large number of trees between park access road and dog park area for construction of wet well, control building and forcemains	• Removal of a limited number of trees next to the existing parking lot for Jack Darling SPS for construction of shaft and wet well.
Potential Impacts to Fish and Fish Habitat/ Aquatic Species at Risk	• Ground disturbance for open cut installation of 190m of twin forcemain. • Any disturbance associated with the construction of Option 1 is at least 50m from the tributary of Birchwood Creek. • The temporary easement encroaches on the CVC Regulated Area associated with the piped section of Birchwood Creek under Jack Darling Memorial Park. • Construction and operation of Option 1 will not result in any impacts to the unnamed tributary of Birchwood Creek, the piped section of Birchwood Creek. • Option 1 is not expected to result in any impacts to fish or fish habitat.	• Ground disturbance for open cut installation of 75m of twin forcemain. • The temporary and permanent easements for Option 2 are at least 100m from the unnamed tributary of Birchwood Creek. • The temporary and permanent easements for Option 2 are, for a large part, within the CVC Regulated Area associated with the piped section of Birchwood Creek under Jack Darling Memorial Park. • Construction and operation of Option 2 will not result in any impacts to the unnamed tributary of Birchwood Creek, the piped section of Birchwood Creek or any other fish habitat in the Study Area. • Option 2 is not expected to result in any impacts to fish or fish habitat.	• Minimum ground disturbance for open cut installation of 5-10m of forcemain. • The temporary and permanent easements for Option 3 are at least 50m from the unnamed tributary of Birchwood Creek. • The temporary easements for Option 3 are, for a large part, within the CVC Regulated Area associated with the piped section of Birchwood Creek under Jack Darling Memorial Park. • The permanent easement for this Option is almost entirely in the CVC Regulated Area. • Construction and operation of Option 3 will not result in any impacts to the unnamed tributary of Birchwood Creek, the piped section of Birchwood Creek or any other fish habitat in the Study Area. • Option 3 is not expected to result in any impacts to fish or fish habitat.

	OPTION 1[1]	OPTION 2[1]	OPTION 3[1]
GHG Emissions and Carbon Footprint (Consideration for Climate Change)	• Similar to Option 2	• Similar to Option 1	• Construction of additional shaft
ENVIRONMENTAL CONSIDERATIONS SUMMARY	**MODERATELY PREFERRED**	**LEAST PREFERRED**	**MODERATELY PREFERRED**
SOCIO-ECONOMIC ENVIRONMENT			
Short- and Long-Term Effects on Existing Land Uses **(Residences, businesses and/or community institutional and recreational facilities)**	• 5-6 residences on the north side of Lakeshore Road will have their view to the park permanently impacted. • Minimal impact on public use of park space.	• Possible impact to dog park users during construction. • Minimal impact on residences and businesses.	• Minimal short term and long-term impacts to residences, businesses, and park use.
Enjoyment of the Park/Community Assets, including Parking Availability	• Large site in open area with direct access from Lakeshore Road minimizes impact for Lorne Park users.	• Need to utilize main park entrance for construction access. • Greater impact to Lorne Park users as compared to Option 1.	• Temporary access impact to main park entrance for construction access. • Greater impact to Lorne Park users as compared to Option 1. • Permanent reduction of parking at JD11.
Visual Impacts on Streetscape/Park	• Streetscape along Lakeshore Road will be permanently impacted but can be mitigated. • Minimal visual impact to interior of park as compared to other options.	• Streetscape along Lakeshore Road will be maintained. • Will have permanent visual impacts to park interior from parking lot and dog park.	• Streetscape along Lakeshore Road will be temporarily impacted during construction and will have some permanent impact with the removal of mature trees for staging area. Impacts can be mitigated. • Will have some permanent visual impacts to park interior from parking lot and dog park.
SOCIO-ECONOMIC ENVIRONMENT SUMMARY	**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**
CULTURAL ENVIRONMENT			
Cultural Heritage Landscape (Lorne Park Prairie Grassland)	• Greatest impact to the Lorne Park Prairie Grassland as station will be built within this area.	• No impact to the Lorne Park Prairie Grassland as tunnel will be installed under grassland with no impact to surface.	• Temporary impact to grassland for staging of shaft construction.
Built Heritage Resources	• N/A	• N/A	• N/A
Archaeological Resources	• The Stage 1 Archaeological Assessment determined that a portion of the site retains potential for the identification and recovery of archaeological resources. A	• The Stage 1 Archaeological Assessment determined that a portion of the site retains potential for the identification and recovery of archaeological resources. A Stage 2	• The Stage 1 Archaeological Assessment determined that a portion of the site retains potential for the identification and recovery of archaeological resources. A Stage 2

	OPTION 1[1]	OPTION 2[1]	OPTION 3[1]
	Stage 2 archaeological assessment will be completed early in the detailed design process and well in advance of ground disturbance.	archaeological assessment will be completed early in the detailed design process and well in advance of ground disturbance.	archaeological assessment will be completed early in the detailed design process and well in advance of ground disturbance.
CULTURAL ENVIRONMENT SUMMARY			
FINANCIAL CONSIDERATIONS			
Initial Capital Costs	• Similar capital cost to Option 2, marginally lower than Option 3.	• Similar capital cost to Option 1, marginally lower than Option 3.	• Highest capital cost (by small margin) due to additional shaft and additional length of deep tunnel.
Operation and Maintenance Costs/Lifecycle Costs	• Additional length of forcemain versus deep tunnel. • New SPS and existing JDSPS would be at two separate locations requiring operators to go back and forth between the new facility on Lakeshore Road and the existing JDSPS within the park.	• Length of deep tunnel versus forcemain is in between Options 1 and 3. • New SPS and existing JDSPS would be at two separate locations requiring operators to go back and forth. • Closer to existing JDSPS as compared to Option 1 and both are located on the park access road.	• Additional length of deep tunnel versus shallow forcemain. • New SPS adjacent to existing JDSPS. Operations will likely prefer facilities closer together for ease of operations and maintenance.
FINANCIAL CONSIDERATIONS SUMMARY	**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**
OVERALL SUMMARY	**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**

Legend

	Most Preferred
	Somewhat Preferred
	Least Preferred

4.0 Existing Conditions in the Addendum Study Area

There have been no significant changes in the existing socio-economic, cultural, and environmental conditions within the study area since the completion of the 2019 Class EA.

The following provides a brief summary of existing conditions within the addendum study area, including a more detailed consideration of areas within Jack Darling Memorial Park.

4.1 Socio-Economic Environment

4.1.1 Provincial Policy Statement

The *Provincial Policy Statement* (PPS) (2020), issued under Section 3 of the *Planning Act* (2005), sets a policy foundation for regulating the development and use of land. It provides direction on matters of provincial interest and supports the enhancement of the quality of life for all citizens of Ontario, while still maintaining environmental integrity. In accordance with Section 3 of the *Planning Act*, decisions affecting planning matters shall have regard for the PPS. The PPS establishes a framework to build strong communities while ensuring development patterns are efficient and optimize the use of land, resources, and public investment in infrastructure.

Policies relevant to wastewater infrastructure include the requirement for infrastructure to be provided in a coordinated, efficient, and cost-effective manner that considers impacts from climate change while accommodating projected needs (Policy 1.6.1). these systems are meant to be sustainable, feasible, financially viable, in compliance with all regulatory requirements, and integrated with land use considerations across all stages of the planning process (Policy 1.6.6).

This Class EA Addendum supports the policies of the PPS through the identification of a coordinated, efficient, and cost-effective infrastructure system.

4.1.2 Growth Plan for the Greater Golden Horseshoe

The Growth Plan for the Greater Golden Horseshoe, 2020 (the “Growth Plan”) builds on the PPS and establishes a comprehensive growth management strategy for the Province of Ontario over the 2051 planning horizon. Section 3(5)(b) of the Planning Act requires that all decisions that affect a planning matter must conform with the Growth Plan. Through its update in 2020, the Growth Plan policies have been strengthened by

the province as they apply the integration of land use and infrastructure planning, and the importance of optimizing and improving efficiency within existing systems (s.3.2.6.2).

This Addendum supports the policies of the Growth Plan for the Greater Golden Horseshoe through the identification of a coordinated infrastructure system to support the land use planning policies and growth targets identified within the Plan.

4.1.3 Municipal Planning Policy

The Addendum will comply with local planning policies, such as the Regional of Peel Official Plan, City of Mississauga Official Plan, and the City of Mississauga Zoning By-law. These plans support the long-term Regional strategic policy frameworks for guiding growth and development.

4.1.4 Old Port Credit Village Heritage Conservation District Plan

The City of Mississauga enacted the Old Port Credit Village Heritage Conservation District Plan in 2004 to guide the physical changes to the area over time to ensure that modifications contribute to the area's character. The area under the plan is bound by Lakeshore Road W to the north, the Credit River to the east, Lake Ontario to the south, and Mississauga Road S to the west. The existing Front Street WWPS resides within the area defined in the plan.

Policies relevant to the Front Street WWPS Wastewater Diversion Class EA include the following:

- Undertakings such as road improvements and infrastructure upgrades should be assessed prior to the start of construction to determine if they will negatively affect the existing trees. It may not be possible to incorporate underground electrical services until such time that street trees are being replaced, due to the possibility of damage to trees and root systems (Policy 12.2.1.e).
- The feasibility of adding a grass boulevard and planting appropriate large-canopy trees, randomly spaced, should be investigated as part of future infrastructure and streetscape improvement initiatives (Policy 12.2.1.f).
- Alterations that may be carried out without obtaining a permit under Section 42 of the *Planning Act* include installation and/or of underground utilities or services, such as subsurface excavation for the installation and repair of utilities (water, sewage, gas, or communications) does not require a permit (Policy 17.5.b).

4.1.5 Land Use

Within the City of Mississauga, and in the study area, is the Jack Darling Memorial Park (the Park). This designated picnic park with a waterfront includes walking trails, an off-

leash park, sporting facilities, and parking for patrons. Also, within the park is a prairie wildflower demonstration garden, with over thirty native pollinator-friendly plant species. This designated natural area is managed as a tall grass prairie, located in a large area of the park, north of the recreational areas. Restoration and management of the prairie grassland at the park will enhance the Region's natural significance and help to provide a refuge for species now absent or in decline in the southern Peel Region.

4.2 Terrestrial Environment

The 2019 Class EA conducted by WSP outlines the natural environment features located within the study area. The information contained in this section describes the existing terrestrial environment features as a result of the changed scope and study area.

A terrestrial natural heritage assessment memo was prepared and summarizes the existing conditions, evaluation of relative sensitivities and significance, impact assessment, mitigation recommendations and regulatory requirements for a proposed tunnel construction staging area in the parking lot adjacent to the Port Credit Library, and three alternative pumping station locations in Jack Darling Memorial Park. The Study Area extended up to 120 m from the alternative pumping station locations and tunnel construction staging area. A copy of the memo with study area figures (Figures 1, 2a, 2b, and 2c) is provided in **Appendix E**.

A terrestrial habitat assessment was completed on October 6, 2020, by a Terrestrial Ecologist at each Study Area. The assessment included documentation of vegetation communities and potential wildlife habitat. Vegetation communities were identified using Ecological Land Classification (ELC) for southern Ontario (Lee et. al. 1998). The wildlife habitat assessment included identification of potentially suitable habitat for SAR and provincially rare species and candidate significant wildlife habitat (SWH) features. Candidate SWH was assessed in accordance with the SWH Criteria Schedules for EcoRegion 7E (MNRF 2015).

4.2.1 Pumping Station – Option 1

Vegetation Communities

The Permanent Easement for Option 1 consists primarily of a mixed tall grass prairie restoration area (MEMM1). Vegetation within the prairie community was dominated by planted native species including Indian grass, Virginia mountain mint and a variety of sunflowers. Other non-prairie meadow species included heath aster, Kentucky bluegrass and common milkweed. The Permanent Easement also overlaps with a naturalized deciduous hedgerow (FODM11) comprised of crack willow, white elm, hackberry, and scot's pine. The Temporary Easement overlaps with the FODM11

hedgerow, the MEMM1 meadow and a WODM5 woodland dominated by weeping willow, black walnut, and white elm.

Species at Risk

The MEMM1 meadow may provide habitat for some grassland breeding birds that are accustomed to disturbance and breeding in smaller habitat patches. However, the meadow is unlikely to support bird SAR such as Henslow's Sparrow, Bobolink, Eastern Meadowlark or Grasshopper Sparrow, because these species prefer larger, undisturbed areas of meadow. There was a crack willow (Bat Tree Roost 1) within the Temporary Easement in the MEMM1 meadow that has potential to support SAR bats.

The adjacent WODM5 woodland contained three large weeping willows (Bat Tree Roosts 2, 3 and 4) that have the potential to support SAR bats. One of these willows (Bat Tree Roost 3) overlapped with the Temporary Easement.

Significant Wildlife Habitat and Rare Species

The MEMM3 tallgrass prairie community is ranked as provincially rare (S1) by the NHIC (MNRF 2020c) and qualifies as SWH under the Rare Vegetation Communities category.

Due to the presence of abundant common milkweed (the larval host for Monarch) in the MEMM1 meadow in the Temporary Easement, this area is considered candidate SWH for Monarch breeding. This meadow may also provide foraging habitat for other migratory butterfly species.

Provincially rare cup plant (*Silphium perfoliatum*) was identified in MEMM1 prairie restoration area in the Temporary Easement. Other provincially rare prairie species may also be present (including Cleland's evening primrose, fall crabgrass and sundial lupine), but they could not be identified due to the late season botanical inventory.

4.2.2 Pumping Station – Option 2

Vegetation Communities

The Permanent Easement for Option 2 is located partially within a deciduous forest (FODM8-3) and partially within a regenerating meadow (MEMM3). There was also a small overlap with a deciduous woodland (WODM5), a parking lot and a maintained lawn associated with a large off-leash dog area.

The canopy of the deciduous forest was dominated by large diameter eastern cottonwood trees. The understory was comprised of a unique combination of common buckthorn, large-tooth aspen and planted redbud, and the ground layer was comprised of common buckthorn and Canada goldenrod. There were two sparse patches of highly invasive phragmites in the deciduous forest, including one patch directly adjacent to the proposed building footprint.

The area of regenerating meadow was small and dominated by typical cultural meadow species including Kentucky bluegrass, Canada goldenrod, lamb's quarters, burdock, and aster species. Regenerating trees included white pine (planted), white cedar and eastern cottonwood. This area has the potential to provide habitat for common wildlife species that are adapted to disturbed habitats. Provincially rare Cleland's evening primrose, fall crabgrass and sundial lupine were not identified in this area during the site visit, and there is a low potential for these species to occur based on the dominance of non-native, culturally influenced species.

Species at Risk

There was one dead standing tree (Bat Tree Roost 5) in the FODM8-3 community (north of the Pumping Station 2 Footprint) with a large amount of peeling bark that has potential to provide breeding habitat for endangered bats. There were no apparent cavities present on the large diameter eastern cottonwood trees.

Significant Wildlife Habitat

Although the FODM8-3 community has the potential to support woodland breeding birds, it is unlikely to support rare species such as Eastern Wood-Pewee and Wood Thrush, because these species prefer larger tracts of forest. The FODM8-3 community is too small to qualify as candidate SWH for woodland breeding birds.

4.2.3 Pumping Station – Option 3

Vegetation Communities

The Permanent Easement for Option 3 (**Figure 2c**) was located partially within the FODM8-3 deciduous forest (0.08 ha) and partially within a paved parking lot (0.07 ha). There was a large off-leash dog area adjacent to the Permanent Easement with trails, cultural meadow, and sections of maintained lawn. An area of Temporary Easement for Option 3 overlaps with the MEMM1 prairie (0.11 ha) and FODM11 hedgerow (0.08 ha) in the Study Area for Option 1.

Species at Risk

One dead standing tree (Bat Tree Roost 5) occurred in the FODM8-3 forest, north of the proposed building footprint with a large amount of peeling bark that may breeding habitat for endangered bats. There were no apparent cavities present on the large diameter eastern cottonwood trees.

The MEMM1 meadow may provide habitat for some grassland breeding birds that are accustomed to disturbance and breeding in smaller habitat patches. However, the meadow is unlikely to support bird SAR such as Henslow's Sparrow, Bobolink, Eastern Meadowlark or Grasshopper Sparrow, because these species prefer larger, undisturbed areas of meadow.

Significant Wildlife Habitat

Although the FODM8-3 community has the potential to support woodland breeding birds, it is unlikely to support rare species such as Eastern Wood-Pewee and Wood Thrush, because these species prefer larger tracts of forest. The FODM8-3 community is too small to qualify as candidate SWH for woodland breeding birds.

The MEMM3 tallgrass prairie community is ranked as provincially rare (S1) by the NHIC (MNRF 2020c) and qualifies as SWH under the Rare Vegetation Communities category. Provincially rare cup plant (*Silphium perfoliatum*) was present in the MEMM1 prairie restoration area adjacent to the Pumping Station 3 Temporary Easement. Other provincially rare prairie species may also be present (including Cleland's evening primrose, fall crabgrass and sundial lupine); however, they could not be identified due to the late season botanical inventory.

4.3 Aquatic Environment

The 2019 Class EA conducted by WSP outlines the natural environment features located within the study area. The information contained in this section describes the existing aquatic environment features as a result of the changed scope and study area.

An aquatic environment impact assessment was completed for this project. For the purpose of the aquatic environment impact, the Study Area is defined as all lands within 30 m of the three options for a pumping station in Jack Darling Park. A copy of the technical memo is provided in **Appendix F**.

4.3.1 Fish Habitat

The Study Area includes a reach of the Credit River in close proximity to its confluence with Lake Ontario. A tributary of Birchwood Creek is located in the eastern portion of the Study Area. This tributary crosses Lakeshore Road through a 350 mm diameter concrete pipe. During WSPs November 2017 field investigation, standing water, but no flow was observed in this tributary south of Lakeshore Road (WSP 2019). No fish were observed in this tributary at that time (WSP 2019).

The main channel of Birchwood Creek crosses Lakeshore Road west of the Study Area (MNRF 2020a). The channel is visible west of Lakeshore Road where it is located in Fudger’s Marsh. An approximately 450 m section of the Birchwood Creek is piped under Jack Darling Park. The pipe ends at a headwall structure east of Jack Darling Park Road. The confluence with the tributary of Birchwood Creek is approximately 5 m downstream of the headwall structure. The creek continues as an open straight constructed channel that is between 2.5 m and 3.0 m wide. The confluence of Birchwood Creek with Lake Ontario is located approximately 250 m downstream of the headwall structure.

The Credit Valley Conservation Authority's (CVC) Regulation Mapping (CVC 2020) shows the alignment of Birchwood Creek through the northeast corner of Jack Darling Park; however, this creek alignment was not observed during the site visit as it is piped under the park as discussed above.

4.3.2 Fish Community

Fish records are available for both the Credit River and Birchwood Creek (CVC 2018). Western Blacknose Dace and Creek Chub are the only fish species recorded in Birchwood Creek by CVC (2018). Both of these species are native, common, and widespread in southern Ontario and have a preference for a coolwater thermal regime.

As many as forty-eight species of fish have been recorded in the Credit River in recent years (CVC 2018; MNRF 2020a). Most fishes recorded in the Credit River are warmwater and coolwater species; however, Chinook Salmon, Rainbow Trout and Sea Lamprey, all coldwater species, were also captured.

4.3.3 Aquatic Species at Risk

There are records of the following aquatic species at risk in or near the Study Area:

- American Eel (*Anguilla rostrata*): American Eel may occur at the mouth of the Credit River (DFO 2020a; MNRF 2020b; CVC 2018) and the Credit River is a migratory corridor for the species (McGregor et al 2013). American Eel is listed as Endangered in the Species at Risk in Ontario (SARO) list and is protected by the *Endangered Species Act, 2007 (*ESA). American Eel is not protected by the federal *Species at Risk Act, 2002* (SARA).
- Shortnose Cisco (*Coregonus reighardi*): Shortnose Cisco may occur at the mouth of the Credit River (DFO 2012; DFO 2020a, MECP 2019). The Shortnose Cisco is found only in the Great Lakes of North America. It was last seen in Lake Ontario in 1964 (COSSARO 2017). Shortnose Cisco are a deep-water species; however, their life history and habitat requirements are not known. In Ontario, the Shortnose Cisco lives in the deep, cold water of the Great Lakes, usually at depths between 22 to 110 m (COSSARO 2017). Shortnose Cisco is listed as Endangered in the SARO list and is protected by the ESA. Shortnose Cisco is also listed as Endangered under the SARA and is protected by the SARA.

4.4 Drinking Water Source Protection

The study area falls within the Credit Valley Drinking Water Source Protection Area. Information provided by interactive mapping through the Drinking Water Source Protection website indicates that the study area is within an Intake Protection Zone 2, Significant Groundwater Recharge Area, and Highly Vulnerable Aquifer (HVA). There is no Well Head Protection Area within the study area or designated vulnerable area.

4.5 Cultural Heritage

4.5.1 Built Heritage Resources and Cultural Heritage Landscapes

As part of the 2019 EA, a Cultural Heritage Resource Assessment (CHRA) was prepared to identify cultural heritage resources within the study area, identify potential impacts resulting from the proposed alternatives of the EA, and recommend mitigation measures where impacts were anticipated. The CHRA study area consisted of Lakeshore Road between Jack Darling Memorial Park and Front Street, as well as Godfrey's: Line, Ben Machree Drive, Pine Ave, and Ben Machree Park. The CHRA identified seven Cultural Heritage Landscapes (CHL) and 16 Built Heritage Resources. Jack Darling Park was identified as a Cultural Heritage Landscape.

A copy of the Cultural Heritage Assessment is provided in **Appendix G**.

4.5.2 Archaeological Resources

A Stage 1 Archaeological Assessment was undertaken for the project. The Stage 1 Archaeological Assessment determined that a portion of the study area, in Jack Darling Memorial Park, retains potential for the identification and recovery of archaeological resources. A Stage 2 archaeological assessment was completed in areas which retain archaeological potential and will be impacted by the proposed improvements during detailed design. Consultation and engagement will continue with interested Indigenous communities during detailed design as it relates to the project and future archaeological assessment.

A copy of the Stage 1 and Stage 2 Archaeological Assessments are provided in **Appendix H**.

5.0 Potential Environmental Impacts and Proposed Mitigation Measures

This section outlines the updates of potential environmental impacts from those outlined in the 2019 Class EA, including the natural environment, socio-economic environment, built heritage resources and archaeological resources. Potential direct and indirect impacts are highlighted, including mitigation measures, as well as commitments to future work during the detailed design and construction phases.

5.1 Socio-Economic Environment

Many of the socio-economic impacts are short term in nature and related to construction activities and cannot be avoided or mitigated. These impacts include minimal impacts to

residences, businesses, and Jark Darling Memorial Park users, including a temporary access impact to the main park entrance for construction access. The streetscape along Lakeshore Road will be temporarily impacted during construction and will have some permanent impact with the removal of mature trees for staging area. A landscape plan will be developed as required during detailed design.

5.2 Terrestrial Environment

5.2.1 Potential Impacts

The full Terrestrial Environment Memo can be found in **Appendix E**. Potential terrestrial impacts associated with Option 3 include:

- An area of Temporary Easement for Option 3 overlaps with the MEMM1 prairie (0.11 ha) and FODM11 hedgerow (0.08 ha) resulting in short term habitat impacts for some grassland breeding birds, and potential impact to a Provincially rare cup plant (*Silphium perfoliatum*) within the prairie restoration area adjacent to the Temporary Easement. Other provincially rare prairie species may also be present (including Cleland's evening primrose, fall crabgrass and sundial lupine).

5.2.2 Proposed Mitigation Measures

The following standard mitigation measures/best practices are provided to reduce potential impacts to the adjacent natural heritage features during construction:

- Delineate the Project Footprint with tree protection fencing prior to construction to reduce impacts to adjacent natural features.
- Wash, refuel and/or service equipment a minimum of 30 m from watercourses to reduce the risk of deleterious substances from entering surface waters.
- Thoroughly clean construction machinery prior to entering the site to reduce the potential for establishment of highly invasive species such as Phragmites.
- To reduce the potential for spread of insect pests such as the Emerald Ash Borer, trees cut should be disposed of on site (either through spreading of wood chips or trees cut and sawed into logs).

5.2.2.1 Erosion and Sediment Control

- Silt fencing or sediment logs will be used if exposed soils are at risk of eroding.
- In addition to any specified requirements (i.e., documented with design drawings), additional silt fence and/or sediment logs should be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency.

- Erosion and sediment controls should be monitored and maintained, as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected until cover is re-established.
- Materials requiring stockpiling (fill, topsoil, etc.) will be stabilized and kept a safe distance (> 30 m) from watercourses.

5.2.2.2 Wildlife Protection

- Schedule vegetation clearing to occur between September 1 and March 31 to avoid the primary breeding (nesting) period for birds in accordance with the MBCA. If vegetation removal will occur during the primary breeding period (April 1 to August 31), areas to be cleared should be marked and a qualified biologist should conduct nest surveys approximately seven (7) days, or less, in advance of the planned clearing. If nests are found, clearing of the area would cease until the young have naturally fledged.
- Schedule removal of potential suitable bat maternity roost trees outside of the bat roosting period from April 1 to September 30 to avoid direct harm to bats, and to reduce the risk to bat species protected under the ESA.
- Conduct a visual search of the construction area (including machinery) each day to locate and avoid reptiles, amphibians, and other wildlife. If wildlife is encountered, they will be given reasonable time to flee the area on their own. If a wildlife species must be moved, a person knowledgeable in handling techniques may relocate it to a location that is both safe and suitable. Handling of a SAR is not permitted without authorization under the ESA.

5.2.2.3 Site Rehabilitation

A plan to rehabilitate temporary easement areas upon completion of the work shall be prepared to re-naturalize the area and retain the ecological function of the natural heritage features. The plan will be prepared in consultation with Credit Valley Conservation (CVC) and should include a program to monitor the success of the restoration plantings and the presence of invasive species.

Specifically, CVC requested the following additional mitigation measures be included in the Detailed Design and implementation phase of the project:

1. Transplant rare plants from within the MEMM1 community prior to disturbing the area for staging and construction.
2. Lay down landscape fabric, wood chips and horizontal hoarding over the component of the staging area that extends into the MEMM1 community in order to minimize soil compaction.

3. Prepare a comprehensive dewatering plan (as appropriate) at detailed design showing the location of proposed groundwater discharge locations, dissipation technologies, and calculations showing discharge within the erosion thresholds.
4. Prepare an arborist report and vegetation protection plan for proposed vegetation removals.
5. Prepare a comprehensive restoration plan for all impacted ELC communities, including decompaction and soil amendments (e.g., the additions of 300mm of organic topsoil) as appropriate.
6. It is recommended that CVC Offsetting Guideline and offsetting tables (for DBH and/or basal area as appropriate) be used to ensure no net loss of ecosystem services as a result of this project through additional plantings to replace lost area and function of FOD communities. Opportunities should also be sought to replace lost MEMM1 area and function.
7. Prepare an invasive species management plan for the removal and management of phragmites from the FODM8-3 ELC community.

5.2.2.4 Endangered Species Act Authorizations

With the implementation of mitigation, including timing windows, impacts to SAR or SAR habitat are not anticipated and therefore authorizations under the ESA are not needed.

5.3 Aquatic Environment

5.3.1 Potential Impacts

The temporary and permanent easements for Option 3 are at least 50 m from the unnamed tributary of Birchwood Creek. The temporary easements for Option 3 are for a large part within the CVC Regulated Area associated with the piped section of Birchwood Creek under Jack Darling Park. The permanent easement for Option 3 is almost entirely in the CVC Regulated Area and it crosses the piped portion of Birchwood Creek.

Mitigation measures have been developed specific for the construction of a pumping station in Jack Darling Memorial Park. We have also described contingency measures, as outlined below.

5.3.2 General Construction Mitigation Measures

The following general mitigation measures apply to the construction of the tunnel construction staging area and the pumping stations:

- Prior to construction, the limits of vegetation clearing should be staked in the field so that disturbance does not occur outside of a pre-determined area required for construction of the pumping station.
- Design and implement an Erosion and Sediment Control (ESC) plan that identifies erosion control measures that should be installed, monitored, and maintained throughout all phases of the Project until the site has been stabilized.
- Designated areas for equipment refueling should be located a minimum 30 m from watercourses, waterbodies, or regulated areas.
- Construction dewatering, associated with excavation (if applicable), should be pumped through a filter system (i.e., filter bags and/or sediment filter tank) before being discharged to a watercourse.
- Machinery shall arrive on site in a clean condition and maintained free of fluid leaks, invasive species, and noxious weeds.
- Develop and implement a containment and spill management plan (or equivalent) that reduces the risk of accidental spills or releases (including construction materials) from entering a watercourse.
- Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to reduce the risk of the entry of deleterious substances to surface water features.
- Remove all construction materials from site upon project completion.
- If dewatering associated with excavation will be discharged to any watercourse, design and implement measures for managing water should be established such that sediment is filtered out prior to the water entering the river or other surface water features (i.e., use of filter bags and/or sediment filter tank).
- If construction of the pumping station requires disturbance to the piped portion of Birchwood Creek, construction shall be phased such that downstream flow to Birchwood Creek is maintained during construction.

5.3.3 Contingency Plan

A contingency plan should be prepared and kept on-site. Spills containment and clean-up procedures shall be implemented immediately in the unlikely event of a spill. The proponent shall immediately contact the Ministry of Environment and Conservation and Parks (MECP) Spills Action Centre. The MECP Spills Action Centre is the first point of contact for spills at the provincial and federal level. In addition, the following agencies will be contacted:

- Fisheries and Oceans Canada (Toll-free: 1-855-852-8320).
- Ministry of Northern Development, Mines and Natural Resources (Toll-free:1-866-517-0571).
- Credit Valley Conservation (Call: 1-905-670-1615 extension 0).

A contingency plan will be in place to effectively address inadvertent releases of sediment laden water or other deleterious substances from the project site. The contingency plan shall outline the steps that the contractor is to take in the event of a sediment release or other type of spill.

5.3.4 Permitting Requirements

The federal *Fisheries Act* prohibits causing harmful alteration disruption and destruction (HADD) of fish habitat unless authorized by the DFO. It protects all fish and fish habitat and prohibits causing the death of fish by means other than fishing.

The pumping station at Jack Darling Park (all three options) do not directly affect fish or fish habitat; therefore, this component of the project is not expected to result in impacts to fish or fish habitat.

5.4 Built Heritage Resources

5.4.1 Potential Impacts

The proposed pumping station will not result in destruction of Jack Darling Park but will result in the alteration of the park from its existing condition. The proposed pumping station is a single-story structure that is not anticipated to produce shadows that would affect the heritage attributes of the park, isolate the park from its surroundings, or result in the obstruction of views. The proposed pumping station will not result in a change in land use of the park as a whole. There are no other heritage structures within the park within 50 m of the preferred alternative for the pumping station that would experience vibrations resulting from land disturbance.

5.4.2 Proposed Mitigation Measures

To mitigate the construction of a new structure within Jack Darling Park, the following design guidelines are recommended for consideration in detailed design of the pumping station:

- Use natural cladding materials to reflect the natural character of the park and the existing water treatment plant, including stone as a primary material, with accents of wood, metal, or glass.

- Maintain a low-profile, single-story design to avoid overwhelming the character of the park and nearby trees.
- Where possible, include design elements such as windows (frosted glass if privacy is a concern) or faux windows to give the building a more traditional façade appearance rather than a purely utilitarian structure.

Mature trees were identified as a heritage attributes of the park. It is recommended that an inventory of mature trees to be removed for the construction of the pumping station be conducted. Replacement species of the same type, or similar appropriate species, in consultation with the City's urban forestry department, should be planted in a nearby area following completion of construction.

5.5 Archaeological Resources

The Stage 1 Archaeological Assessment determined that a portion of the study area, in Jack Darling Memorial Park, retains potential for the identification and recovery of archaeological resources. A Stage 2 archaeological assessment was completed in areas which retain archaeological potential and will be impacted by the proposed improvements during detailed design. Consultation and engagement was completed with interested Indigenous communities regarding the Stage 2 archaeological assessment.

If previously undocumented archaeological resources be discovered during construction, all activities impacting archaeological resources will cease immediately, and a licensed archaeologist will be engaged to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the Standards and Guidelines for Consultant Archaeologists. If human remains are encountered, all activities will cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services (416-326-8800) must be contacted. In situations where human remains are associated with archaeological resources, MTCS will also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

5.5.1 Stage 2 Archaeological Assessment

The Stage 2 archaeological assessment was completed following the identification of archaeological potential within the study area. No archaeological resources were identified during the Stage 2 archaeological assessment of the study area. As a result, no further archaeological assessment of the study area is recommended.

A copy of the Stage 2 Archaeological Assessment is provided in **Appendix H**.

5.6 Mitigation Measures for New Sewer along Lakeshore Road West

The 2019 EA Report includes a review of existing conditions and potential impacts and mitigation measures to be carried forward into detailed design and construction for the proposed sewer along Lakeshore Road West and Pine Avenue South. These recommendations as presented in Section 7, Table 7-2 (page 70, 2019 EA Report) of the 2019 report are still relevant.

6.0 Implementation and Detailed Design Commitments

The 2019 EA Report provides a summary of the necessary permits and approvals required from various agencies during detailed design and prior to construction. Although the permits and approvals required for the new pumping station are noted to be obtained for the “New Richard’s Memorial Wastewater Pumping Station”, these are still relevant for the newly recommended site at Jack Darling Memorial Park. The information presented in Section 9 of the 2019 EA Report are still relevant. The detailed design phase will conduct additional technical studies (i.e., dewatering discharge plans, environmental protection considerations, etc.) to evaluate the existing conditions and proposed plans for the construction implementation of the improvements.

Many of the environmental concerns related to this project have been mitigated through the process by which the preferred design was selected, as described in this EA Addendum. The anticipated impacts and proposed mitigation measures have been described in **Section 4.0**.

Table 2 provides a list of specific commitments to be carried forward to Phase 5 of the Municipal Class EA process, Implementation (detailed design and construction) for the preferred alternative. The Region will work with CVC, City of Mississauga, MECP and additional stakeholders as required during the detailed design and implementation phases to ensure that the proposed works are acceptable, and to obtain required permits.

Table 2: Detailed Design Commitments

ID#	Detailed Design Commitments
1.	**Socio-Economic Environment**
	• Impacts to residences, businesses, and Jark Darling Memorial Park users, including a temporary access impact to the main park entrance for construction access. Signage will be provided to provide advance notice of construction timing and closures. • The streetscape along Lakeshore Road will be temporarily impacted during construction and will have some permanent impact with the removal of mature trees for staging area. A landscape plan will be developed as required during detailed design.
2.	**Cultural Heritage**
	The proposed pumping station will not result in destruction of Jack Darling Park but will result in the alteration of the park from its existing condition. To mitigate the construction of a new structure within Jack Darling Park, the following design guidelines are recommended for consideration in detailed design of the pumping station: • Use natural cladding materials to reflect the natural character of the park and the existing water treatment plant, including stone as a primary material, with accents of wood, metal, or glass • Maintain a low-profile, single-story design to avoid overwhelming the character of the park and nearby trees • Where possible, include design elements such as windows (frosted glass if privacy is a concern) or faux windows to give the building a more traditional façade appearance rather than a purely utilitarian structure • Mature trees were identified as a heritage attributes of the park. It is recommended that an inventory of mature trees to be removed for the construction of Jack Darling Park be conducted. Replacement species of the same type, or similar appropriate species, in consultation with the City's urban forestry department, should be planted in a nearby area following completion of construction.

ADDENDUM TO THE FRONT STREET WASTEWATER PUMPING STATION WASTEWATER DIVERSION SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

ID#	Detailed Design Commitments
3.	**Wildlife Protection**
	• Schedule vegetation clearing to occur between September 1 and March 31 to avoid the primary breeding (nesting) period for birds in accordance with the MBCA. If vegetation removal will occur during the primary breeding period (April 1 to August 31), areas to be cleared should be marked and a qualified biologist should conduct nest surveys approximately seven (7) days, or less, in advance of the planned clearing. If nests are found, clearing of the area would cease until the young have naturally fledged. • Schedule removal of potential suitable bat maternity roost trees outside of the bat roosting period from April 1 to September 30 to avoid direct harm to bats, and to reduce the risk to bat species protected under the ESA. • Conduct a visual search of the construction area (including machinery) each day to locate and avoid reptiles, amphibians, and other wildlife. If wildlife is encountered, they will be given reasonable time to flee the area on their own. If a wildlife species must be moved, a person knowledgeable in handling techniques may relocate it to a location that is both safe and suitable. Handling of a SAR is not permitted without authorization under the ESA.
4.	**Sediment and Erosion Control**
	• A Sediment and Erosion Control Plan will be developed during detailed design to address site-specific requirements for protection and landscape considerations such as topography, slope, and drainage patterns. Specific sediment and erosion control measures will be identified and depicted on plans associated with grading and construction. – Silt fencing or sediment logs will be used if exposed soils are at risk of eroding. – In addition to any specified requirements (i.e., documented with design drawings), additional silt fence and/or sediment logs should be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency.

ID#	Detailed Design Commitments
	– Erosion and sediment controls should be monitored and maintained, as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected until cover is re-established. – Materials requiring stockpiling (fill, topsoil, etc.) will be stabilized and kept a safe distance (> 30 m) from watercourses.
5.	**Terrestrial Habitat Impacts**
	• An area of Temporary Easement results in short term terrestrial habitat impacts for some grassland breeding birds, and potential impact to a Provincially rare cup plant (*Silphium perfoliatum*) within the prairie restoration area adjacent to the Temporary Easement. • A plan to rehabilitate temporary easement areas upon completion of the work shall be prepared to re-naturalize the area and retain the ecological function of the natural heritage features in consultation with Credit Valley Conservation (CVC), and will include the following mitigation measures: – Transplant rare plants from within the MEMM1 community prior to disturbing the area for staging and construction. – Lay down landscape fabric, wood chips and horizontal hoarding over the component of the staging area that extends into the MEMM1 community in order to minimize soil compaction. – Prepare a comprehensive dewatering plan (as appropriate) at detailed design showing the location of proposed groundwater discharge locations, dissipation technologies, and calculations showing discharge within the erosion thresholds. – Prepare an arborist report and vegetation protection plan for proposed vegetation removals. – Prepare a comprehensive restoration plan for all impacted ELC communities, including decompaction and soil amendments (e.g., the additions of 300mm of organic topsoil) as appropriate.

ID#	Detailed Design Commitments
	– It is recommended that CVC Offsetting Guideline and offsetting tables (for DBH and/or basal area as appropriate) be used to ensure no net loss of ecosystem services as a result of this project through additional plantings to replace lost area and function of FOD communities. Opportunities should also be sought to replace lost MEMM1 area and function. – Prepare an invasive species management plan for the removal and management of phragmites from the FODM8-3 ELC community.
6.	**Fish and Fish Habitat**
	The temporary and permanent easements for Option 3 are at least 50 m from the unnamed tributary of Birchwood Creek. The temporary easements for Option 3 are for a large part within the CVC Regulated Area associated with the piped section of Birchwood Creek under Jack Darling Park. The permanent easement for Option 3 is almost entirely in the CVC Regulated Area and it crosses the piped portion of Birchwood Creek. • Prior to construction, the limits of vegetation clearing should be staked in the field so that disturbance does not occur outside of a pre-determined area required for construction of the pumping station. • Design and implement an Erosion and Sediment Control (ESC) plan that identifies erosion control measures that should be installed, monitored, and maintained throughout all phases of the Project until the site has been stabilized. • Designated areas for equipment refueling should be located a minimum 30 m from watercourses, waterbodies, or regulated areas. • Construction dewatering, associated with excavation (if applicable), should be pumped through a filter system (i.e., filter bags and/or sediment filter tank) before being discharged to a watercourse. • Machinery shall arrive on site in a clean condition and maintained free of fluid leaks, invasive species, and noxious weeds. • Develop and implement a containment and spill management plan (or equivalent) that reduces the risk of accidental spills or releases (including construction materials) from entering a watercourse.

ID#	Detailed Design Commitments
	• Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to reduce the risk of the entry of deleterious substances to surface water features. • Remove all construction materials from site upon project completion. • If dewatering associated with excavation will be discharged to any watercourse, design and implement measures for managing water should be established such that sediment is filtered out prior to the water entering the river or other surface water features (i.e., use of filter bags and/or sediment filter tank). • If construction of the pumping station requires disturbance to the piped portion of Birchwood Creek, construction shall be phased such that downstream flow to Birchwood Creek is maintained during construction. A contingency plan should be prepared and kept on-site. Spills containment and clean-up procedures shall be implemented immediately in the unlikely event of a spill. The proponent shall immediately contact the Ministry of Environment and Conservation and Parks (MECP) Spills Action Centre. The MECP Spills Action Centre is the first point of contact for spills at the provincial and federal level. In addition, the following agencies will be contacted: • Fisheries and Oceans Canada (Toll-free: 1-855-852-8320). • Ministry of Northern Development, Mines and Natural Resources (Toll-free:1-866-517-0571). • Credit Valley Conservation (Call: 1-905-670-1615 extension 0). A contingency plan will be in place to effectively address inadvertent releases of sediment laden water or other deleterious substances from the project site. The contingency plan shall outline the steps that the contractor is to take in the event of a sediment release or other type of spill.

ADDENDUM TO THE FRONT STREET WASTEWATER PUMPING STATION WASTEWATER DIVERSION SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

ID#	Detailed Design Commitments
7.	**Air Quality**
	• During construction, vehicles/machinery and equipment will be good in repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements. • A minimal number of machines operating in one area shall be considered during construction activities. • Water and non-chloride dust suppressants will be applied during construction to protect air quality associated with dust.
8.	**Archaeology**
	• N/A – Stage 1 and Stage 2 assessments completed previously cleared. • If previously undocumented archaeological resources be discovered during construction, all activities impacting archaeological resources will cease immediately, and a licensed archaeologist will be engaged to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the Standards and Guidelines for Consultant Archaeologists. If human remains are encountered, all activities will cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services (416-326-8800) must be contacted. In situations where human remains are associated with archaeological resources, MTCS will also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.
9.	**Disposal of Excess Material**
	• Surplus excavated material shall be removed to locations arranged by the Contractor. Prior to the disposal of any surplus material, the Contractor shall provide the Engineer with a sketch of dumping site(s), including site access points. A written statement from the property owner(s) agreeing to allow the disposal of fill on the property must be approved by a Contract Administrator (CA). Furthermore, the placement of fill within any area associated with valleys, wetlands, shorelines, and other hazardous lands that are regulated by Ontario Regulation 162/06 requires the written permission of CVC.

ID#	Detailed Design Commitments
	• All approvals and permits will have to be obtained. Relevant MECP policy framework and best management practices should be referenced and applied where applicable. • Upon completion of the disposing, levelling, and grading of surplus excavated material on any property, a written statement shall be obtained from the property owner(s) releasing the Contractor and Region from any claims and accepting the condition of the property as satisfactory.
	Proper Tree Removal and Preservation of Residual Plant Communities
	• A Tree Protection Plan will be developed during the detailed design stage in order to provide guidelines for protecting and removing trees. • Recommendations will be included outlining how to best manage trees, as well as guidelines for removed timber resource use and minimizing soil compaction. • The plan should also include hazard tree monitoring, pruning, insect and disease control, aerating, watering, and mulching guidelines for maintenance both during and post-construction.
10.	**Mud and Dust Control**
	• All necessary measures should be taken during construction to prevent dust accumulation as a result of construction operations. • The Contractor shall be responsible for all dirt and mud that it tracked onto the roadways from vehicles entering or leaving the job site. • Upon request from the CA, the contractor shall immediately clean-up any mud or dirt resulting from construction activities. If the contractor is unable to sufficiently proceed with clean-up activities, the CA will perform the necessary clean-up. • Erosion and sediment control measures outlined in earlier sections will aid in controlling mud and dust levels by keeping exposed soil at a minimum.

ADDENDUM TO THE FRONT STREET WASTEWATER PUMPING STATION WASTEWATER DIVERSION SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

ID#	Detailed Design Commitments
11.	**CVC Floodplain**
	• The proposed improvements are located within the CVC regulated area - site layout to be reviewed and modified during detailed design as appropriate to avoid or mitigate risks. • The building will need to be floodproofed in accordance with the CVC Technical Guidelines, including providing flood free access to the building. • A detailed hydraulic analysis and associated risk assessment to be completed during detailed design to assess the offsite impact of the proposed building and flood free access to confirm the feasibility of dry floodproofing, where appropriate floodplain compensation/re-routing may be required.
12.	**Impact to Existing Utilities**
	• The existing 1650mm diameter storm sewer which runs northwest to southeast across the existing Jack Darling SPS parking lot may need to be locally relocated for construction of control building. This storm sewer is the extension of Lakeshore Road West culvert and any reduction in the capacity of the existing culvert may result in increase in risk of overtopping of Lakeshore Road West and a risk assessment will be prepared during detailed design based on a detailed hydraulic analysis to assess the offsite impact of culvert relocation.
13.	**Potential Effects on Water Features/Resources**
	The risk of spills will be reviewed in detailed design: • Emergency overflow from existing JD1 will be redirected to spill into JD3 as the upstream tunnel provides significant storage in event of SPS shutdown. • A new emergency overflow for JD3 is required, however risk of an overflow occurring is low since the upstream tunnel provides over 8 hours of emergency storage for JD1, JD2, and JD3 in event of full SPS shutdown during a 25-year rainfall event; this level of service exceeds the MECP requirements outlined in the sewer design guidelines.

Appendix A
2019 Schedule B Class EA

REGION OF PEEL

FRONT STREET WASTEWATER PUMPING STATION WASTEWATER DIVERSION

SCHEDULE 'B' CLASS ENVIRONMENTAL ASSESSMENT

JUNE 05, 2019

FRONT STREET WASTEWATER PUMPING STATION WASTEWATER DIVERSION

SCHEDULE 'B' CLASS ENVIRONMENTAL ASSESSMENT

REGION OF PEEL

PROJECT NO.: 161-13700-00
DATE: JUNE 05, 2019

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REGION OF PEEL
10 Peel Centre Drive, Suite A
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Attention: Kolsoom Motamedi, M.Eng., P.Eng., PMP., Project Manager

Dear Ms:

Subject: Project File

WSP Canada Inc. is pleased to provide you with the Project File v1.1 report for the Front Street Wastewater Pumping Station Wastewater Diversion, Schedule 'B' Class Environmental Assessment. Enclosed, in addition to the report, are attached supporting documentation in the form of technical memorandums, reports, and investigations conducted specifically for this project scope.

Thank you for the opportunity to complete this assignment. Please contact the undersigned with any questions or comments.

Yours sincerely,

Michelle Albert, P.Eng.

MB/ma
Encl.
cc:
WSP ref.: 161-13700-00

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REVISION HISTORY

FIRST ISSUE

June 5, 2019	Project File v 1.1: Front Street Wastewater Pumping Station Wastewater Diversion, Schedule 'B' Class Environmental Assessment	
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Martina Betkova, P.Eng	Michelle Albert, P.Eng	Michelle Albert, P.Eng
REVISION 1		
Prepared by	Reviewed by	Approved By

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PREPARED BY

June 5, 2019

Martina Betkova, P.Eng
Project Engineer

Date

June 5, 2019

Michelle Albert, P. Eng
Senior Director

Date

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SUBCONSULTANTS

Geotechnical and Hydrogeological	Golder Associates Ltd.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 EXECUTIVE SUMMARY

The Region of Peel's Water and Wastewater Master Plan provides a planning framework for the development of water and wastewater servicing infrastructure growth to 2031 planning horizon. The Master Plan was last updated in 2013 and was carried out in accordance with the Master Plan process of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (EA) document (October 2000, as amended in 2007, 2011, and 2015). The Master Plan identifies a number of strategically phased water and wastewater projects based on the Region's 2031 growth target of 1.64 million people. The Master Plan also considers the impact of potential intensification and greenfield growth post 2031.

Through the 2013 Water and Wastewater Master Plan, the Region has identified a need to divert wastewater from the G.E. Booth Wastewater Treatment Plant (WWTP). The G.E. Booth WWTP has limited capacity to support the planned growth of its current catchment area. The 2013 Master Plan identified a need to divert wastewater away from G.E. Booth WWTP to the Clarkson WWTP, as the Clarkson WWTP has available capacity.

The project is being carried out as a Schedule 'B' Municipal Class Environmental Assessment to address the following problem statement.

> As Mississauga and Port Credit grow, Peel Region is faced with three challenges. The Region has a long-term master plan which recommends that wastewater be balanced between the G.E. Booth (located on the east side) and Clarkson (located on the west side) wastewater treatment plants as the Region grows over the coming decades. The equipment at the Front Street Wastewater Pumping Station is in need of replacement. The Richard's Memorial Wastewater Pumping Station has limited capacity and needs to be expanded.

This Project File has been prepared to document the findings of the evaluation and selection of the preferred solution. Agency and public community involvement have been engaged through the project including issuance of project commencement notices, consultation with Indigenous and agency groups, publication and administration of three separate Public Information Centres (PICs).

A long list of four alternative solutions were identified and short list of alternative solution created. The short list of alternative solutions was then evaluated based on technical feasibility, natural environmental impacts, social and cultural impacts as well as economic/financial impacts all supported by on site investigations and reports. The final preferred solution identified includes constructing a new gravity sewer along Lakeshore Road W (from Front St WWPS to Richard's Memorial WWPS, and from Richard's Memorial WWPS to Jack Darling WWPS) and Pine Avenue S (from Lakeshore Road W to Ben Machree WWPS) and also constructing a new wastewater pumping station in Richard's Memorial Park, decommissioning of the current Front Street WWPS located in the Port Credit Lighthouse and decommissioning of Ben Machree WWPS. Decommissioning of the pumping station assets includes decommissioning of the forcemains at each location however, hydraulic relief points are to remain in operation.

In support of the preferred solution conceptual drawings have been completed, implementation considerations were identified, and mitigation measures developed.

The following Project File provides detailed information on the Municipal EA process followed as well as the substantiating reports commissioned in support of the project.

2 INTRODUCTION

2.1 STUDY PURPOSE AND OBJECTIVES

The purpose of this Municipal Class EA study is to provide a comprehensive and environmentally sound planning process, which is open to public participation, to select the preferred solution to address the current Front Street WWPS catchment area wastewater flows taking into consideration the condition of the Front Street WWPS, the site constraints for expansion of the station to accommodate future growth and the environmental risks. Study objectives include:

- Protection of the environment, as defined in the *Environmental Assessment Act (EAA)*, through the wise management of resources;
- Extensive consultation with all affected and interested parties, including participation of a broad range of stakeholders to allow for the sharing of ideas, education, testing of creative solutions and developing alternatives;
- Facilitation dialogue between those with different or contrasting interests;
- Documentation of the study process in compliance with required phases of the Municipal Class EA planning process;
- Selection of an optimal solution which is both technically viable and cost effective; and
- Documentation of mitigation and monitoring requirements which will ensure minimal disruption during construction to resident, businesses and the natural environment and fulfillment of commitments, as required.

By completing the Class EA planning process, the preferred solution should address environmental, social and technical concerns and be acceptable to the majority of residents, stakeholders and review agencies.

2.2 DESCRIPTION OF STUDY AREA

The project Study Area is located at the south end of the Region of Peel on the shore of Lake Ontario. It is within the City of Mississauga and bound by Dundas Street W to the north, the shore to the south, Dixie Road to the east and Winston Churchill Boulevard to the west. The Study Area includes the Infrastructure Planning Area. The infrastructure area is bound by Indian Road to the north, the shore to the south, the Credit River to the east and Lorne Park Road to the west. The Study Area and Infrastructure Planning Area are shown in Figure 2-1 Study and Infrastructure Planning Area.

The eastern portion of the Infrastructure Planning Area includes the Port Credit West Village Heritage Conservation District (HCD). This area is urbanized and will be fully developed with a mix of commercial, medium density residential, and parkland. The Port Credit river confines the eastern boundary of the Infrastructure Planning Area. A recreational trail runs along the waterfront in the south-eastern portion of the Infrastructure Planning Area. The western portion of the Infrastructure Planning Area contains mostly low-density residential housing. Two parks, Richard's Memorial Park and Jack Darling Park, are located in the south-western portion of the Infrastructure Planning Area. A Regional right-of-way, being Lakeshore Road W and Lakeshore Road E, traverses the Study Area in an east-west alignment.

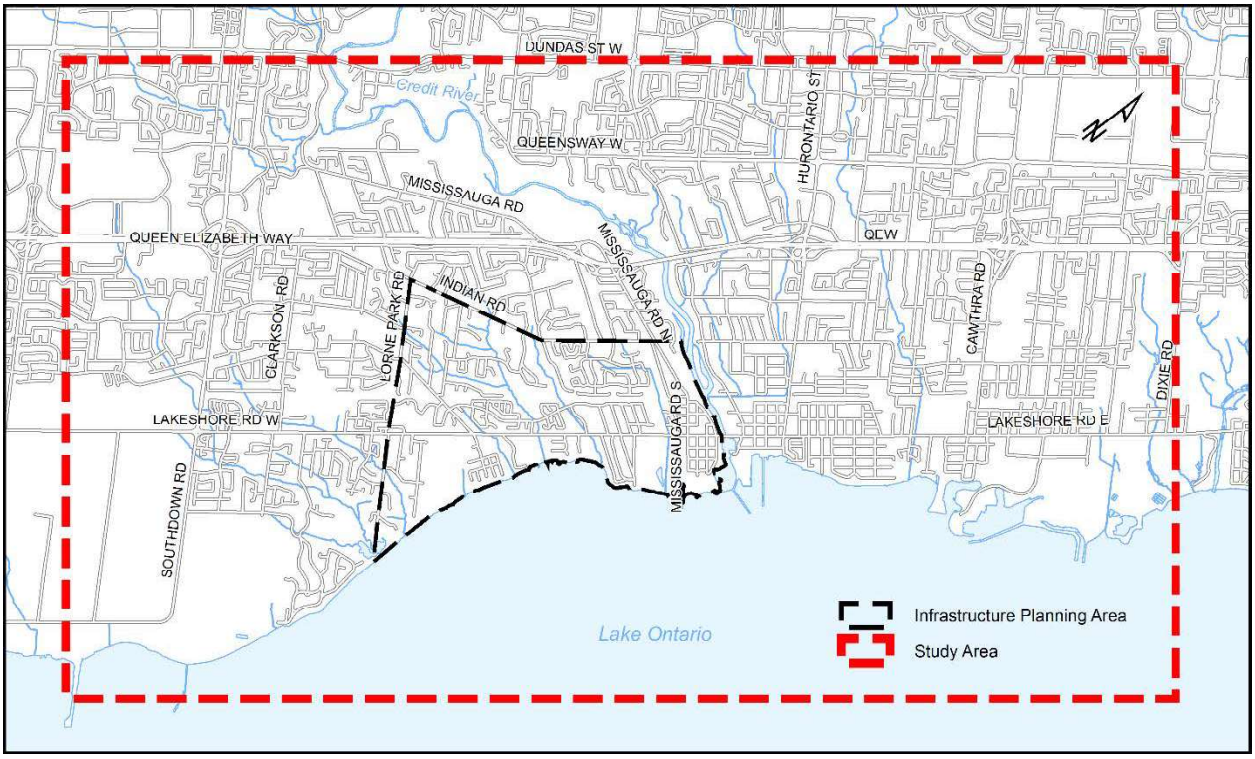


Figure 2-1 Study and Infrastructure Planning Area

2.3 BACKGROUND

The Region of Peel's Water and Wastewater Master Plan provides a planning framework for the development of water and wastewater servicing infrastructure growth to 2031 planning horizon. The Master Plan was last updated in 2013 and was carried out in accordance with the Master Plan process of the MEA Municipal Class EA document (October 2000, as amended in 2007, 2011, and 2015). The 2013 Master Plan brings the previous 2007 Master Plan in to conformity with the residential and employment growth targets established by the Province and area municipalities.

The Master Plan identifies a number of strategically phased water and wastewater projects based on the Region's 2031 growth target of 1.64 million people. The Master Plan also considers the impact of potential intensification and greenfield growth post 2031. The Region of Peel's lake-based wastewater collection system services the City of Mississauga, much of the City of Brampton and parts of the Town of Caledon.

The system consists of two largely separate gravity trunk sewer systems – the east trunk and west trunk – that terminate near Lake Ontario at the G. E. Booth WWTP and the Clarkson WWTP. The divide between the east and west trunk systems is approximated by the watershed boundary between the Etobicoke Creek and the Credit River.

The two trunk systems are currently connected through the West-East Sanitary Trunk Sewer, which diverts some wastewater flows by gravity from the west to the east trunk system near Highway 407. The system consists of 33 active municipal sanitary pumping stations. Many of these sewage pumping stations service small tributary areas and pump flows to the sanitary trunk sewers.

Through the 2013 Water and Wastewater Master Plan, the Region has identified a need to divert wastewater from the G.E. Booth WWTP. The G.E. Booth WWTP has limited capacity to support the planned growth of its current catchment area. This includes the area subject to this Schedule B Municipal Class Environmental Assessment as described in Section 2.2. The 2013 Master Plan identified a need to divert wastewater away from G.E. Booth WWTP to the Clarkson WWTP, as the Clarkson facility has available capacity.

The following additional existing constraints inform the study and problem statement:

- Limited capacity at the G.E. Booth WWTP;
- Available capacity at the Clarkson WWTP;
- Long-term sustainable Master Plan strategy to divert flows from G.E. Booth WWTP to Clarkson WWTP;
- Future growth in the Front Street WWPS and Richard's Memorial WWPS catchment areas;
- Limited space available for expansion of Front Street WWPS on Lakeshore Road near the Credit River;
- Constructability issues with the Front Street WWPS forcemain crossing the Credit River;
- Upgrades required at Richard's Memorial WWPS and opportunity to redirect flows from Front Street WWPS to Richard's Memorial WWPS;
- Opportunity to decommission the Front Street WWPS; and,
- Opportunity to decommission the Ben Machree WWPS.

2.4 PROBLEM STATEMENT

The problem statement for the Front Street Wastewater Pumping Station Wastewater Diversion Class EA is as follows:

As Mississauga and Port Credit grow, Peel Region is faced with three challenges. The Region has a long-term master plan which recommends that wastewater be balanced between the G.E. Booth (located on the east side) and Clarkson (located on the west side) wastewater treatment plants as the Region grows over the coming decades. The equipment at the Front Street Wastewater Pumping Station is in need of replacement. The Richard's Memorial Wastewater Pumping Station has limited capacity and needs to be expanded.

To address the Problem/Opportunity Statement, the Region has initiated this Municipal Class EA planning process which evaluates alternative solutions to solve the problem identified above. This Project File has been prepared to document the findings of the evaluation and the selection of the preferred solution.

2.5 ORGANIZATION

This report was prepared to meet the requirements of the Ontario Municipal Engineers Association (MEA) Municipal Class EA planning process. The report combines all phases of the planning process under one cover and incorporates steps considered essential for compliance with the requirements of the *Environmental Assessment Act (EAA)* in the following sections.

- **Section 1** provides an overview of the whole project from conception to review process, consultation and conclusion;
- **Section 2** describes the study purpose, provides a description of the Study Area, provides background information, establishes the problem statement, confirms public review procedures and next steps;
- **Section 3** provides an overview of the Municipal Class EA planning process, including confirmation of the Class EA schedule, as well as the communication and consultation program activities undertaken as part of this Municipal Class EA study;
- **Section 4** describes the Study Area and its features, including the existing wastewater distribution system and existing and future land uses and infrastructure projects. This section also summarizes the socio-economic, physical and natural environments and social/cultural features, as well as other servicing and planning considerations;

- **Section 5** identifies and describes the problems/opportunities addressed by this Class EA study. It also presents the alternative solutions to the problems/opportunities, including how the alternative solutions were identified, provides a comparative evaluation of the alternative solutions, the alternative design concepts that were considered for each solution and rationale for the preferred solution;
- **Section 6** presents an overview of the preferred design, implementation considerations and construction methodology. This section also discusses co-ordination with other approved projects and construction costs and funding;
- **Section 7** describes the mitigative measures recommended to ensure that any disturbances are managed by the best available methods, including traffic management and co-ordination with other approved projects;
- **Section 8** summarizes the input received from agencies and the public from the communication and consultation program activities undertaken as part of this Municipal Class EA study;
- **Section 9** outlines future review agency approvals and permits required during detailed design and as the project proceeds through construction and post-construction, including an overview of the property requirements; and,
- **Section 10** presents the final study conclusions and recommendations.

2.6 PUBLIC REVIEW AND NEXT STEPS

This Project File meets the requirements of a Schedule 'B' Municipal Class EA study. Filing of this Project File initiates the 30-day public review period starting June 13, 2019 and ending July 12, 2019. To facilitate public review of this document, hard copies of the Project File are available at the following locations:

Region of Peel	**Port Credit Library**	**City of Mississauga**
5th Floor, Suite A	**20 Lakeshore Road E**	**300 City Centre Drive**
10 Peel Centre Drive	**Mississauga, ON**	**Mississauga, ON**
Brampton ON	**Phone: 905-615-4835**	**Phone: 905-615-3200**
Phone: 905-791-7800		

A copy of this document is also available online at http://www.peelregion.ca/pw/water/ and click on Environmental Assessments, Mississauga.

If you have any questions or concerns about the report, please take the following steps:

1. Contact the Region's Project Manager to discuss your questions or concerns:

   Kolsoom Motamedi, M.Eng., P.Eng., PMP
   Project Manager, Region of Peel
   10 Peel Centre Drive, Suite A 4th Floor
   Brampton, ON L6T 4B9
   Phone: 905-791-7800 ext. 4196
   Fax: 905-791-0728
   Email: kolsoom.motamedi@peelregion.ca

2. Arrange a meeting with the Region's Project Manager.
3. If you have significant concerns, the Region will attempt to negotiate a resolution of the issue(s). A mutually acceptable time period for this negotiation will be set. If the issue remains unresolved, you may request the Minister of the Environment and Climate Change to require the Region to comply with Part II of the *Environmental Assessment Act (EAA)* before proceeding with the project. This is called a Part II Order or "bump up request". After reviewing the Part II Order request and the project documents in detail, the Minister may make one of the following decisions:

a. Deny the request, with or without conditions;

b. Refer the matter to mediation; or,

c. Require that the Region comply with Part II of the *EAA* by undertaking one of the following:

   i. Set out directions with respect to the Terms of Reference and preparing an Individual EA for the undertaking;

   ii. Declare that the Region has satisfied requirements for the preparation of the Class EA Study, as are specified in the order; or,

   iii. Impose additional conditions, in addition to those set out in the Class EA Study.

Requests must be submitted in writing to the Minister of the Environment, Conservation and Parks within the 30-day review period. As of July 1, 2018, a Part II Order Request Form must be used to request a Part II Order. The Part II Order Request Form is available online on the Forms Repository website (http://www.forms.ssb.gov.on.ca/) by searching "Part II Order" or "012-2206E" (the form ID number). A copy of the form should also be submitted to the Director of Environmental Assessment and Permission Branch:

Minister
Ministry of the Environment, Conservation and Parks
11th Floor
77 Wellesley Street West
Toronto, ON M7A 2T5
minister.mecp@ontario.ca

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

A copy of the request must also be forwarded to the attention of the Region's Project Manager at the address provided above.

If no Part II Order requests are received, the Region will proceed with detailed design and construction of the proposed works as presented in this Project File.

With the exception of personal information, all received comments collected will become part of the public record of the study, in accordance with the *Municipal Freedom of Information and Protection of Privacy Act.*

3 MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PLANNING PROCESS

3.1 ENVIRONMENTAL ASSESSMENT ACT (1990)

Ontario's *Environmental Assessment Act,* R.S.O. 1990 (henceforth referred to as "the Act") was passed in 1975 and proclaimed in 1976. Class Environmental Assessments were approved by the Minister of the Environment in 1987 for municipal projects having predictable and preventable impacts. The Class EA approach streamlines the planning and approvals process for municipal projects which have the following characteristics:

- Recurring
- Similar in nature
- Usually limited in scale
- Predictable range of environmental impacts
- Environmental impacts are responsive to mitigation

The Municipal Class Environmental Assessment document, prepared by the Municipal Engineers Association (MEA) (October 2000, as amended in 2007, 2011, and 2015), outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater and road projects (MEA, 2015). The process includes five phases:

- Phase 1: Problem Definition
- Phase 2: Identification and Evaluation of Alternative Solutions to Determine a Preferred Solution
- Phase 3: Examination of Alternative Methods of Implementation of the Preferred Solution
- Phase 4: Documentation of the Planning, Design and Consultation Process
- Phase 5: Implementation and Monitoring.

Since projects undertaken by municipalities can vary in their complexity and potential environmental impacts, projects are classified in "Schedules" as shown in Table 3-1 (MEA, 2015):

Table 3-1 Municipal Class Environmental Assessment Schedules

MCEA SCHEDULE	DESCRIPTION
Schedule A	Generally, includes normal or emergency operational and maintenance activities. The environmental effects of these activities are usually minimal and, therefore, these projects are pre-approved. (i.e. no public consultation is required)
Schedule A+	In 2007, MEA introduced Schedule 'A+.' These projects are pre-approved. However, the public is to be advised prior to project implementation.
Schedule B	Generally includes improvements and minor expansions to existing facilities/infrastructure. There is the potential for some adverse environmental impacts and, therefore, the Proponent is required to proceed through a screening process including consultation with those who may be affected. Typical projects that follow a Schedule 'B' process will include projects requiring watercourse crossings, construction of watermains and sewers outside of existing road allowances, construction of pumping stations and reservoirs.

Schedule C	Generally includes the construction of new facilities and major expansions to existing facilities. Typical projects that follow the Schedule 'C' process include the expansion of existing, or construction of new Water and Sewage Treatment Facilities.

Public and agency consultation are integral to the Class EA planning process. It is important to note that the Schedule assigned to a particular project is proponent-driven. For example, if a project has been designated as Schedule 'A', the proponent can decide to comply with the requirements of a Schedule 'B' or 'C' of the MEA process based on the magnitude of anticipated impacts or the special public and agency consultation requirements specific to that particular project (MEA, 2015).

The Class EA process also provides an appeal mechanism to change the project status. Under the provisions of Subsection 16 of the amended EA Act, there is an opportunity under the Class EA planning process for the Minister to review the status of a project. Members of the public, interest groups and review agencies may request the Minister to require a Proponent to comply with Part II of the EA Act before proceeding with a proposed undertaking.

For Schedule 'B' and 'C' projects the public has the opportunity to request additional investigation by filing a Part II Order Request to the Ministry of the Environment, Conservation and Parks. The Minister determines whether or not this is necessary, with the Minister's decision being final. The procedure for dealing with concerns, which may result in the Minister, by order, requiring the Proponent to comply with Part II of the Act is outlined in the MEA document (MEA, 2015).

3.2 PRINCIPLES OF ENVIRONMENTAL PLANNING

The Act sets a framework for a systematic, rational and replicable environmental planning process that is based on five key principles, as follows:

- **Consultation with affected parties -** Consultation with the public and government review agencies is an integral part of the planning process. Consultation allows the proponent to identify and address concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.
- **Consideration of a reasonable range of alternatives –** Alternatives should include functionally different solutions to the proposed undertaking and alternative methods of implementing the preferred solution. The "do nothing" alternative must also be considered.
- **Identification and consideration of the effects of each alternative on all aspects of the environment -** This includes the natural, social, cultural, technical, and economic environments.
- **Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects -** The evaluation shall increase in the level of detail as the study moves from the evaluation of alternatives to the proposed undertaking to the evaluation of alternative methods.
- **Provision of clean and complete documentation of the planning process followed –** This will allow traceability of decision-making with respect to the project. The planning process must be documented in such a way that it may be repeated with similar results.

3.3 CONFIRMATION OF MCEA SCHEDULE

The Front Street Station Wastewater Diversion project is proceeding in accordance with the Class EA process in the MEA document (MEA, 2015). This Class EA is being completed as a Schedule 'B' project. This project generally fits the description listed under Item 1 for Schedule 'B' Wastewater Projects in Appendix 1 of the MEA Class EA document:

1. Construct new pumping station or increase pumping station capacity by adding or replacing equipment and appurtenances, where new equipment is located in a new building or structure.

Schedule 'B' projects require the completion of Phases 1 and 2 followed by Phase 5 (problem or project implementation).

As required for Schedule 'B' projects, this report documents requirements of Phases 1 and 2 of the Municipal Class EA Planning and Design Process Public Consultation.

Public consultation is an important component of the Class EA process and includes informing members of the community and stakeholders to provide balanced and objective information. It also includes the consultation of the stakeholder to obtain feedback on the study process, alternatives, and preliminary preferred solution. The Region of Peel continues to coordinate with the City of Mississauga and Credit Valley Conservation regarding coordination of various EA and road widening projects within the Study Area.

The primary goals and objectives of the public consultation process are to:

- Present clear and concise information at key stages of the study process;
- Solicit community, regulatory and Regional staff input;
- Identify concerns that might arise from the undertaking;
- Undertake First Nations and Metis consultation to complete the Duty to Consult with Aboriginal people in Ontario;
- Consider stakeholder comments when developing the preferred solution; and,
- Meet Municipal Class EA consultation requirements.

3.3.1 COMMUNICATION AND COMMUNITY ENGAGEMENT PLAN

A Communications and Community Engagement Plan was developed upon commencement of the study. The purpose of the Communications and Engagement Plan was to provide a comprehensive approach and guidebook to the manner in which Region staff, agencies, stakeholders, and members of the community are engaged during the Class EA study. It also identified the format, methods, and tools to be used to engage stakeholders and the community in a manner that is interactive, visually appealing, and meaningful.

The Plan identified several methods for community engagement including:

- Three public open houses;
- A community event booth;
- Project website with online survey;
- Notices in the local newspaper and the Region's website;
- A descriptive video vignette; and,
- Social media updates and links.

Details of the materials and the results of the above listed community engagement activities can be found in Section 3.3.2.

The Plan identified specific agencies that were directly impacted by the project. These agencies (Credit Valley Conservation and City of Mississauga Parks and Recreation and Planning Departments) were contacted directly for formal meetings. Minutes of these meetings can be found in Appendix A-1.

3.3.2 COMMUNICATION AND CONSULTATION SUMMARY

The following public and agency consultation activities were undertaken as part of the various stages of this Class EA process, including study commencement, three Public Information Centres, and Notice of Study Completion.

3.3.2.1 CONTACT LIST

A Study Contact List was compiled of relevant and interested parties, including review agencies, local area municipalities and interested members of the community. This list was developed at the outset of the study and was updated as comments were received. The list was used for mail and e-mail correspondence, as applicable. Agency stakeholders included:

- Indigenous Communities
- Conservation Authorities
- Emergency and Health Services
- Federal Agencies
- Municipal Representatives
- Provincial Agencies
- Rail / Transit
- Residents Associations
- School Boards
- Utilities

A full Study Contact List is provided in Appendix A-2.

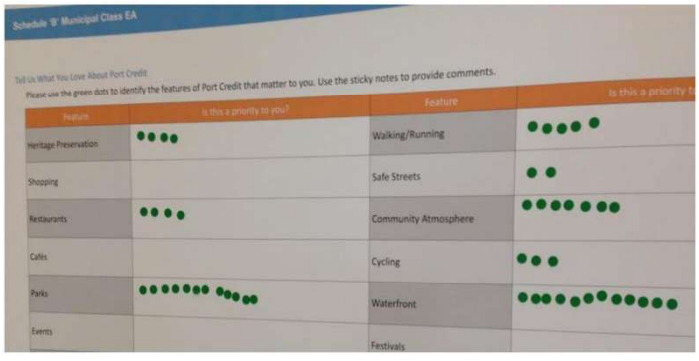
3.3.2.2 STUDY COMMENCEMENT

The formal Notice of Commencement was distributed to stakeholders included in the Study Contact List on January 19, 2017 and advertised in the Mississauga News on January 20, 2017. The Notice of Commencement was also posted on the Region of Peel's project website.

A copy of the Notice of Commencement can be found in Appendix A-3.

3.3.2.3 PUBLIC INFORMATION CENTRE NO. 1

The first Public Information Centre (PIC) was held within the Infrastructure Study Area at the Port Credit Arena (40 Stavebank Road) on March 28, 2017, from 4:00 p.m. to 7:00 p.m. The format of the PIC was drop-in style, open house format. Public and agency stakeholders were informed of PIC No. 1 by newspaper advertisements, mail, and the Region's project website. The Notice of PIC No. 1 was published March 17, 2017.



Representatives from the Region of Peel and its Consultant, WSP, were present at the PIC to provide information and answer questions. A total of 20 people signed-in including a Councillor and staff from the City of Mississauga.

PIC No. 1 presented a total of 10 panels that introduced the study, described the Class EA process, identified problems and opportunities, and outlined the study process. In addition to the general process, the list of servicing approaches, strategies, and long list of possible site locations and linear infrastructure routes were presented. Two additional panels were used to facilitate two exercises for attendees to

participate in: “What I Love about Port Credit” and “Place Based Comments”. The “What I Love about Port Credit” panel listed several features that the attendees could mark as important to them with one of five green dots provided to them upon entering the PIC. Comment sheets were also provided to attendees to allow them to submit comments regarding the project and materials presented at PIC No. 1.

Copies of the Notice of PIC No. 1, display panels, sign-in sheets, and a summary of the event and comments received can be found in Appendix A-4.

3.3.2.4 *ONLINE SURVEY AND PROJECT VIDEO*

An online survey was developed similar to the “What I Love about Port Credit” exercise board presented in PIC No. 1. The online survey was used as an additional medium for stakeholders to voice which elements of Port Credit are important to the public. The survey became available to the public on June 5, 2017. In addition to the survey being available through the Region’s project webpage, an e-mail was sent to all stakeholders on the stakeholder list with a valid e-mail address. The community pop-up event was also used to raise awareness of the online survey. A total of 33 responses were received via the online survey. Responses were compiled, reviewed, and presented in PIC No. 2.

A project video was also developed to visually describe the project and the strategies being considered. The project video was shown at PIC No. 1, PIC No. 2, PIC No. 3, posted on YouTube, and shown at the end of the online survey. The project video can be found here: https://www.youtube.com/watch?v=oWtDN2f82Wk.

3.3.2.5 *COMMUNITY POP-UP EVENT BOOTH*

A community pop-up event booth was made available during Art Fest in Port Credit on May 26, 2017. Information about the project was made available, as was a post card that contained a link to the online survey and video. The interactive activity that was used during PIC No. 1 was also made available, and staff asked passersby what they love about Port Credit and to provide their place-based comments. The input provided by participants during Art Fest was aggregated with that received during PIC No. 1 and the online survey. The results are provided in Appendix A-5.

3.3.2.6 *PUBLIC INFORMATION CENTRE NO. 2*

The second PIC was held within the Infrastructure Study Area at the Port Credit Arena (40 Stavebank Road) on March 1, 2018, from 5:00 p.m. to 8:00 p.m. The format of the PIC was drop-in style, open house format. Public and agency stakeholders were informed of PIC No. 2 by newspaper advertisements, mail, and the Region’s project website. The Notice of PIC No. 2 was published February 15, 2018.

Representatives from the Region of Peel and its Consultant, WSP, were present at the PIC to provide information and answer questions. A total of 12 people signed-in, including representatives from the Credit Valley Conservation and the City of Mississauga.

PIC No. 2 presented a total of 21 panels that re-introduced the information presented at PIC No. 1 including the Class EA process, the list of servicing approaches, strategies, and long list of possible site locations and linear infrastructure routes. In addition to the previously presented information, the results of the completed technical investigations, responses from PIC No. 1, the Online Survey, and the Community Pop-Up Event Booth, the alternative evaluation table, the preferred alternatives, and the preliminary construction alternatives were presented.

Copies of the Notice of PIC No. 2, display panels, sign-in sheets, and a summary of the event and comments received can be found in Appendix A-6.

3.3.2.7 *PUBLIC INFORMATION CENTRE NO. 3*

The third PIC was held within the Infrastructure Study Area at the Port Credit Arena (40 Stavebank Road) on November 29, 2019, from 5:30 p.m. to 8:00 p.m. The format of the PIC was drop-in style, open house format. Public and agency stakeholders were informed of PIC No. 3 by newspaper advertisements, mail, and the Region’s project website. The Notice of PIC No. 3 was published November 15, 2018 and November 22, 2018.

Representatives from the Region of Peel and its Consultant, WSP, were present at the PIC to provide information and answer questions. A total of 26 people signed-in, including representatives from the City of Mississauga and the City Councillor for Mississauga Ward 1.

PIC No. 3 presented a total of 17 panels that re-introduced the information presented at PIC No. 1 and 2 including the Class EA process, strategies, and alternative evaluation and preferred alternatives. In addition to the previously presented information, the Ben Machree Wastewater Pumping Station alternative evaluation table, the preferred alternatives and the preliminary construction alternatives were presented. Copies of the Notice of PIC No. 3, display panels, sign-in sheets, and a summary of the event and comments received can be found in Appendix A-7.

3.3.2.8 *STUDY COMPLETION*

The Notice of Study Completion was published and distributed on June 13, 2019. The notices were made public by mail-out of letters to stakeholders included on the stakeholder contact list, advertised in the Mississauga News, and posted on the Region of Peel's project website. Refer to Appendix A-8 for a copy.

3.4 INDIGENOUS CONSULTATION

Indigenous communities for EA consultation were identified using the Government of Canada's web-based, geographic information system called the Aboriginal and Treaty Rights Information System (ATRIS). ATRIS was launched to the public in September 2013 and is a key tool that provides access to narrative records and maps to assist interested parties in determining and fulfilling their consultation obligations.

The ATRIS search identified the following 26 Indigenous communities:

1. Haudenosaunee Confederacy
2. Zhiibaahaasing First Nation
3. Kawartha Nishnawbe First Nation
4. Beausoleil
5. Mississaugas of the New Credit First Nation
6. Aundeck-Omni-Kaning
7. Six Nations of the Grand River
8. Mohawks of Akwesasne
9. Nation Huronne-Wendat
10. Curve Lake
11. Credit River Metis Council
12. Hiawatha First Nation
13. Anishinabek Nation (Union of Ontario Indians)
14. Aamjiwnaang
15. Sheguiandah
16. Mohawks of the Bay of Quinte
17. Bkejwanong Walpole Island First Nation
18. Chippewas of Kettle and Stony Point
19. Chippewas of Nawash Unceded First Nation
20. Saugeen
21. Mississauga's of Scugog Island First Nation
22. Chippewas of the Thames First Nation
23. Chippewas of Georgina Island
24. Chippewas of Rama First Nation
25. M'Chigeeng First Nation
26. Alderville First Nation

A Notice of Study Commencement was sent to the Indigenous groups identified through ATRIS as well as Indigenous and Northern Affairs Canada (INAC) on January 19, 2017. A copy of the Notice of Commencement is provided in Appendix A-3. Notices of PIC 1, PIC 2 and PIC 3 were sent on March 17, 2017, February 15, 2018, November 15, 2018 respectively.

3.5 AGENCY CONSULTATION

3.5.1 CREDIT VALLEY CONSERVATION CONSULTATION

As a portion of the project area is located within the Credit Valley Conservation's (CVC) regulated area, the need to consult with the CVC was identified early in the process. The project team reached out to the CVC starting in October 2016, prior to the formal commencement of the study in January 2017. Table 3-2 below summarizes the consultation meetings held with the CVC.

Table 3-2 Credit Valley Conservation Consultation Meetings

DATE HELD	MEETING SUMMARY
November 21, 2016	Pre-Consultation Meeting • WSP presented an overview of the scope of the project and the expected corresponding works. • Floodplain limits within the Richard's Memorial Park were discussed and provided. • Existing natural designation and natural heritage features in the Richard's Memorial Park were discussed. • Potential required permits from the CVC for the works associated with the project were discussed.
September 28, 2017	Design Review Meeting • WSP presented their preliminary design concept for the project. • CVC's natural environment investigation and tree inventory was discussed and shared with WSP. • WSP presented their potential pumping station site options within the Richard's Memorial Park to obtain feedback and determine the CVC's preferred site location.

3.5.2 CITY OF MISSISSAUGA CONSULTATION

As the project is located within the City of Mississauga, the need to consult with the City was identified early in the process. The project team reached out to the City starting in October 2016, prior to the formal commencement of the study in January 2017. Table 3-3 below summarizes the consultation meetings held with the CVC.

Table 3-3 City of Mississauga Consultation Meetings

DATE HELD	MEETING SUMMARY
November 7, 2016	Pre-Consultation Meeting • WSP presented an overview of the scope of the project and the expected corresponding works. • Potential stakeholders to be added to the stakeholder contact list were discussed. • The City indicated they are redeveloping the Marina Park area. The redevelopment plan was indicated to be completed in 2017. • The City indicated there is archaeological potential in Port Credit. • Potential required permits from the City for the works associated with the project were discussed.
October 16, 2017	Design Review Meeting • WSP presented their preliminary design concept for the proposed pumping station within the Richard's Memorial Park. • WSP presented their potential pumping station site options within the Richard's Memorial Park to obtain feedback and determine the City's preferred site location.
July 13, 2018	Property Impact Meeting • WSP presented the potential impact to City owned properties due to the expected construction of the proposed pumping station and sewers. • The expected construction timeline and sequencing for the sewers and pumping station was discussed.

4 BASELINE FEATURES AND SERVICING CONDITIONS

The following section describes the project Study Area, including its location, current wastewater servicing system, and existing and future land uses. Also discussed are future infrastructure projects, the socio-economic, physical and natural environments and social/cultural features. Servicing and planning considerations are also presented. The information described in this section was considered when reviewing potential effects of the alternative solutions.

4.1 REGULATORY PLANNING CONTEXT

4.1.1 PROVINCIAL POLICY STATEMENT (2014)

The 2014 Provincial Policy Statement (the "PPS") provides policy direction on matters of Provincial interest related to land use planning and the responsible management of resources. In accordance with Section 3(5)(a) of the Planning Act, all land use decisions are required to be consistent with the PPS. The PPS establishes a framework to build strong communities while ensuring development patterns are efficient and optimize the use of land, resources, and public investment in infrastructure.

Policies relevant to wastewater infrastructure planning include the requirement for infrastructure to be provided in a coordinated, efficient, and cost-effective manner that considers impacts from climate change while accommodating projected needs (Policy 1.6.1). These systems are to be sustainable, feasible, financially viable, in compliance with all regulatory requirements, and integrated with land use considerations across all stages of the planning process (Policy 1.6.6).

4.1.2 GROWTH PLAN FOR THE GREATER GOLDEN HORSESHOE (2017)

The Growth Plan for the Greater Golden Horseshoe, 2017 (the "Growth Plan") builds on the PPS and establishes a comprehensive growth management strategy for the Province of Ontario over the 2041 planning horizon. Section 3(5)(b) of the Planning Act requires that all decisions that affect a planning matter must conform with the Growth Plan. Through its update in 2017, the Growth Plan policies have been strengthened by the province as they apply the integration of land use and infrastructure planning, and the importance of optimizing and improving efficiency within existing systems (s.3.2.6.2).

4.2 PLANNING AND SERVICING CONSIDERATIONS

4.2.1 REGION OF PEEL OFFICIAL PLAN (2014)

The Region of Peel Official Plan ("ROP") is a long- term plan used to assist the Region in managing growth and development. It was adopted by Council on July 11, 1996 and approved with modification by the Minister of Municipal Affairs and Housing on October 22, 1996. The current (2014) Office Consolidation includes Ministry and OMB approvals as well as various approved amendments. The purpose of the Official Plan is to:

- Provide Regional Council with the long-term Regional strategic policy framework for guiding growth and development in Peel while having regard to protecting the environment, managing the renewable and non-renewable resources, and outlining a regional structure that manages this growth within Peel in the most effective and efficient manner;

- Interpret and apply the intent of Provincial legislation and policies within a Regional context using the authority delegated or assigned to the Region by the Province;
- Provide a long-term Regional strategic policy framework for the more specific objectives and land use policies contained in the area municipality official plans which must conform to this Plan;
- Recognize the duality in the Region of Peel between the urban nature of the Cities Brampton and Mississauga and the primarily rural natural of the Town of Caledon;
- Recognize the need for effective environmental protection and management measures to ensure environmental sustainability;
- Recognize the importance of protecting and enriching the natural and cultural heritage of the Region of Peel;
- Provide for the health and safety of those living and working in Peel; and,
- Maintain and enhance the fiscal sustainability of the Region of Peel.

The ROP includes objectives and policies around the natural environment, water resources, and cultural heritage. The objective of the ROP with regards to wastewater services is to provide sanitary sewer services to appropriate areas of the Region in an adequate, efficient, planned and cost-effective manner consistent with public needs and financial realties. Specifically, it is the policy of the ROP:

- Require and provide full municipal sewage and water services to accommodate growth in the Urban System to the year 2031. The provision of full municipal sewage services in the Urban System will be subject to Regional financial and physical capabilities (Policy 6.3.2.1).
- Ensure that the planning, construction, expansion, extension, operation and maintenance of water and sanitary sewer services protects the environmental systems and natural resources of Peel in a manner consistent with the objectives and policies in this Plan, the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan and the Greenbelt Plan.

4.2.2 CITY OF MISSISSAUGA OFFICIAL PLAN (2015)

The City of Mississauga Official Plan establishes policies to manage change and growth within the City through the planning horizon. The official consolidation of the Mississauga Official Plan has been updated to include Ontario Municipal Board decisions and City Council approved Official Plan Amendments as of October 14, 2015. Policies specific to infrastructure established by the Official Plan include the following:

- In cooperation with other levels of government, appropriate agencies and the private sector, Mississauga will ensure that all development will have adequate infrastructure and utilities (Policy 10.6.1).
- Mississauga will ensure that full Regional and municipal services are available to serve all development (Policy 10.6.5).
- Mississauga will maintain and establish programs for renewal of infrastructure and utilities. In doing so, Mississauga will ensure that the capital cost, maintenance cost and environmental impact are minimized. Opportunities for reusing pre-existing infrastructure and utilities for new purposes will be encouraged (Policy 10.6.6).
- Mississauga expects that the Region of Peel will provide appropriate and timely water, and wastewater facilities to serve the City's development (Policy 10.6.9).

The Mississauga Official Plan outlines general policies as well as specific district policies. The Plan contains several Local Area Plans, including the Port Credit Local Area Plan, which establishes policies within the Study Area that reflect heritage, character, environmental, or socio-economic features. The Port Credit Local Area Plan is guided by six principles (Policy 5.1):

- Protect and enhance the urban village character;

- Support Port Credit as a distinct waterfront community;
- Enhance the public realm by promoting and protecting the pedestrian, cyclist and transit environment;
- Support the preservation, restoration and enhancement of the natural environment;
- Balance growth and existing character; and,
- Promote a healthy and complete community.

4.2.3 CITY OF MISSISSAUGA ZONING BY-LAW 0225-2007

The purpose of the City of Mississauga Zoning By-law is to regulate the use of land, building and structures and to implement the City of Mississauga Official Plan. As per Part 2: General Provisions, Section 2.1.1.3 of the Zoning By-law, a structure required for the purpose of providing wastewater management facilities or piped services is a permitted use in all zones.

4.2.4 OLD PORT CREDIT VILLAGE HERTIAGE CONSERVATION DISTRICT PLAN

The City of Mississauga enacted the Old Port Credit Village Heritage Conservation District Plan in 2004 to guide the physical changes to the area over time to ensure that modifications contribute to the area's character. The area under the plan is bound by Lakeshore Road W to the north, the Credit River to the east, Lake Ontario to the south, and Mississauga Road S to the west. The existing Front Street WWPS resides within the area defined in the plan. The area can be seen in Figure 4-1 below with the location of the existing Front Street WWPS circled in red. Policies relevant to the Front Street Wastewater Pumping Station Wastewater Diversion Class EA include the following:

- Undertakings such as road improvements and infrastructure upgrades should be assessed prior to the start of construction to determine if they will negatively affect the existing trees. It may not be possible to incorporate underground electrical services until such time that street trees are being replaced, due to the possibility of damage to trees and root systems (Policy 12.2.1.e).
- The feasibility of adding a grass boulevard and planting appropriate large-canopy trees, randomly spaced, should be investigated as part of future infrastructure and streetscape improvement initiatives (Policy 12.2.1.f).
- Alterations that may be carried out without obtaining a permit under Section 42 of the *Planning Act* include installation and/or of underground utilities or services, such as subsurface excavation for the installation and repair of utilities (water, sewage, gas, or communications) does not require a permit (Policy 17.5.b).

Figure 4-1 Old Port Credit Village Area (City of Mississauga, 2018)

4.3 EXISTING LINEAR FACILITIES

This section presents a summary of the policies affecting land use planning and servicing requirements in the Infrastructure Planning Area.

4.3.1 WASTEWATER SERVICING

The Region of Peel's lake-based wastewater collection system serves the City of Mississauga, the City of Brampton and part of the Town of Caledon. The system consists of two separate gravity trunk sanitary sewer systems that end near Lake Ontario at the G.E. Booth WWTP and the Clarkson WWTP.

There are multiple wastewater pumping stations (WWPS) in the Region of Peel ultimately discharging to the above noted trunk sewers. There are six WWPSs within the Infrastructure Planning Area: Front Street WWPS, Indian Road WWPS, Ben Machree WWPS, Richard's Memorial WWPS, Jack Darling 1 WWPS, and Jack Darling 2 WWPS. The Front Street and Ben Machree WWPSs discharge east toward the G.E. Booth WWTP while the remaining pumping stations discharge west towards the Clarkson WWTP. The existing sanitary sewer network with corresponding WWPS drainage areas within the infrastructure Study Area can be seen in Figure 4-2.

The proposed trunk sewer is designed to receive flows from the local sanitary systems and therefore is located at an elevation below the existing local sewers. However, confirmation of the location of the sanitary sewers is recommended during the detailed design phase to ensure there are no conflicts with the proposed construction shaft locations.

4.3.2 WATERMAINS

The Region of Peel's lake-based water distribution system supplies water to the City of Mississauga, the City of Brampton and parts of the Town of Caledon. The lake-based system includes two water treatment facilities, the Lakeview Water Treatment Plant, and the Lorne Park Water Treatment Plant. Additionally, there are four well-based municipal drinking water systems in Caledon. The lake-based and well-based systems include various reservoirs, elevated tanks and stand pipes, and a total of 4775 kilometers of watermain.

Various watermains are located within the Study Area, and the proposed works include a number of crossings of watermains and water services. Watermains along the proposed trunk sewer alignment have been shown in the preliminary design drawings included in Appendix E-1. The watermain information contained in the design drawings is based on the Region's GIS based database and should not be relied upon for construction purposes. In general, watermains will be located at higher elevations than the proposed trunk sewer, however, the locations and elevations of the watermains should be verified during the detailed design phase.

4.3.3 STORM

Storm sewers located within the Study Area are owned and operated by the City of Mississauga. General information of the storm sewer system along the alignment of the proposed trunk sewer were obtained from the Region of Peel's database and have been included in the preliminary design drawings included in Appendix E-1. The storm sewer information is provided for general information purposes only and should not be relied upon for construction purposes. A detailed storm sewer investigation should be completed during the detailed design phase to confirm storm sewer locations and elevations.

It should be noted that a potential conflict has been identified with an existing 1650mm dia. storm sewer in Jack Darling Memorial Park, just upstream of the terminus of the proposed trunk sewer. The elevation of the 1650mm storm sewer could not be determined over the course of the environmental assessment. Additional investigation will be required to confirm the elevation of the storm sewer at this location. Additionally, a potential conflict with the proposed location of temporary construction shaft for Maintenance Hole 2 has been identified that may require

relocation of a short section of the existing storm sewer in the area. These potential conflicts have been identified in the preliminary design drawing in Appendix E-2.

4.3.4 GAS

Gas pipelines in the City of Mississauga are generally owned and operated by Enbridge Gas Distribution. Natural gas pipelines are known to be present along the alignment of the proposed trunk sewer. Various gas identification markers were observed along the proposed trunk sewer route, as well as paint markings in the right-of-way. A full investigation should be completed during the detailed design phase to determine the locations and elevations of the gas mains to ensure there are no conflicts with proposed shaft locations.

4.3.5 HYDRO

Hydro-electric service in the City of Mississauga is generally provided by Alectra Utilities. Along the trunk sewer alignment hydro lines are primarily buried underground between Front Street and Godfrey's Lane. West of Godfrey's Lane hydro poles were observed along the north side of Lakeshore Road. A detailed investigation will be required during the detailed design phase to ensure there are no conflicts with the construction of the proposed trunk sewer, especially with respect to the location of the proposed shafts and construction compounds.

4.3.6 COMMUNICATIONS

Communications utilities such as telephone lines, cable television lines, and fibre-optic cables were observed along the proposed trunk sewer route. Communications utilities do not typically pose a concern for the design and construction of deep trunk sewers constructed in tunnel. However, a detailed investigation is recommended during the detailed design phase to ensure there are no conflicts with the proposed construction shaft locations

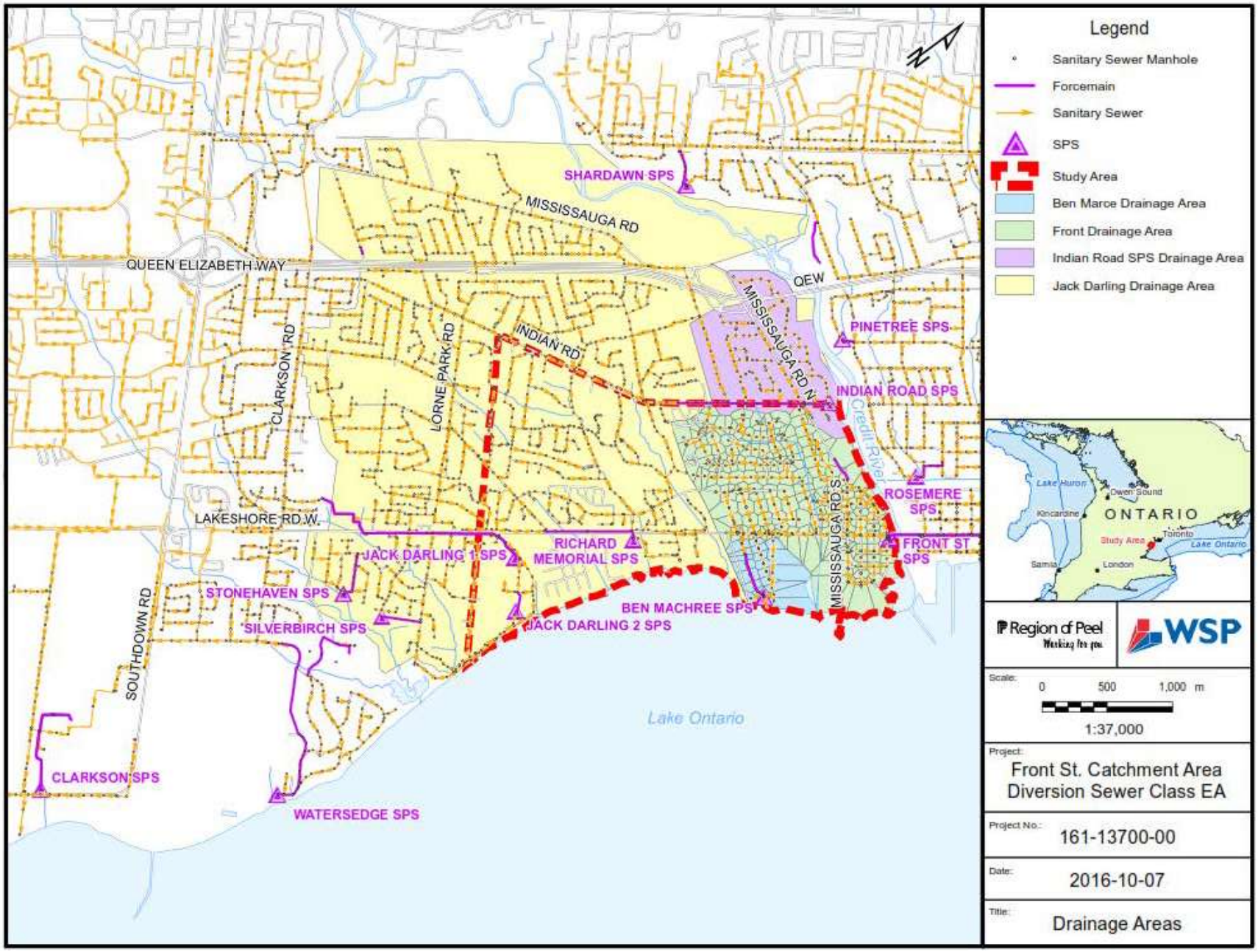


Figure 4-2 Existing Sanitary Sewer Network in Infrastructure Planning Area

4.4 PHYSICAL ENVIRONMENT

4.4.1 SUBWATERSHEDS

The Infrastructure Planning Area is within the jurisdiction of the Credit Valley Conservation Authority (CVC). The CVC has jurisdiction over the following subwatersheds:

- Norval to Port Credit (Subwatershed #9)
- Lake Ontario Shoreline West Tributaries (Subwatershed #21)

4.4.2 TOPOGRAPHY, PHYSIOGRAPHY, AND GEOLOGY

The topography of the Infrastructure Planning Area provides fairly low relief. In general, the ground surface elevation ranges from 80 m to 95 m with several locations that are higher in the west. Several locations near watercourses dip below 80 m, particularly near the Lornewood Creek and the Credit River. The ground surface generally slopes south towards Lake Ontario, with some gentle sloping towards watercourses that cross Lakeshore Road.

The Infrastructure Planning Area is located within the Peel Plain physiographic region (Ontario Ministry of Northern Development and Mines, 1991). The general topography of the Peel Plain region consists of level to gently rolling terrain, sloping gradually southward towards Lake Ontario.

The Peel Plain is cut by several river valleys including the Credit River Valley which cuts into the Till and often into the underlying shale.

4.4.3 GROUNDWATER CONDITIONS

Regional groundwater flow is from the northwest to the southeast towards Lake Ontario. Shallow groundwater flow is influenced by local topography with recharge occurring in the upland areas, especially in the northeast, and discharge occurring within the river valleys and low-lying areas.

Based on the review of the database of the Ontario Ministry Northern Development and Mines, water levels were reportedly varying from 0.5 m to 5.0 m below ground surface (Ontario Ministry of Northern Development and Mines). The approximate locations of these water wells near the proposed wastewater main or forcemain alignment are shown on Drawing No. 5 and the well information is provided in Appendix A of the Desktop Geotechnical Report in Appendix C-3.

4.4.4 AREAS OF POTENTIAL ENVIRONMENTAL CONCERN (APEC)

Based on the findings of the Potential for Contamination Technical Memorandum, found in Appendix B-1, APECs have been identified within the Infrastructure Planning Area. These APECs have been categorized (low, moderate, and high) by assessing the overall relative potential for contamination from the findings in the PFCA report.

The APECs with high, moderate, and low potential for contamination are summarized in Table 1, Table 2, and Table 3 respectively in the Background Hydrogeological Technical Memorandum, found in Appendix C-1. Locations with a high potential for contamination have a high potential of impacting the quality of the soil and/or groundwater within the Infrastructure Planning Area. An incident such as a spill with confirmed or suspected soil and/or groundwater contamination is also categorized as an APEC with high potential for contamination. Twenty (20) areas that are considered high potential for contamination were identified in the Infrastructure Planning Area.

4.5 HYDROGEOLOGICAL ANALYSIS

4.5.1 DESKTOP STUDY

A desktop hydrogeological analysis was undertaken by WSP to establish the existing groundwater conditions within the Infrastructure Planning Area. The complete report can be found in Appendix C-2.

The desktop hydrogeological investigation included the following tasks:

- Review of previous environmental and geotechnical reports that were obtained by Peel Region for properties within the Study Area;
- Review of data obtained from various databases (including MECP water well database, York-Peel-Durham-Toronto conceptual model, OGS geotechnical borehole database); and
- Environmental database reviews, historical records, and aerial photographs conducted as part of the PFCA found in Appendix B-1.

The hydrogeological review determined Regional groundwater flow is generally anticipated to be in a southerly direction towards Lake Ontario and towards the Credit River based on the regional water table mapping in the area, which tends to mimic the topography. The overburden and weathered bedrock aquifers may facilitate some groundwater flow and discharge to the Credit River and possibly to the tributaries that cross the proposed alignment along Lakeshore Road.

Near Front Street WWPS, dewatering volumes may be significant depending on the depth of the overburden and connectivity of the surficial aquifer with the Credit River. In the vicinity of Richard's Memorial WWPS, where the wet well excavation may be up to 15 m bgs, some seepage from the thin overburden and the interface with the weathered shale could occur. Deeper sound bedrock is not expected to require significant dewatering. Dewatering requirements may also be greater near Jack Darling WWPS, where the coarse-grained overburden units are thicker.

Access shaft and tunnelling are anticipated to intersect the water table and deeper bedrock groundwater and depending on construction methods and mitigations techniques used may require construction dewatering. Potential construction dewatering effects might include:

- Change in groundwater levels and direction;
- Vertical migration of water quality between aquifer units;
- Reduction in baseflow of nearby water courses and change in water quality;
- Change in surface water quality due to discharge of extracted groundwater to a surface water receptor; and,
- Mobilization of contaminated water from nearby sources due to groundwater taking.

4.5.2 HYDROGEOLOGICAL DATA REPORT

A Hydrogeological Data Report (HDR) was undertaken by Golder Associates to summarize the factual hydrogeological data (i.e., fieldwork investigation procedures, groundwater conditions, in situ hydraulic testing) collected in the boreholes advanced along the route of the proposed sanitary sewer trunk and associated shaft locations pertaining to groundwater control. The complete draft report can be found in Appendix C-2. The HDR is currently complete in draft and will be finalized during detailed design.

4.6 GEOTECHNICAL ANALYSIS

4.6.1 DESKTOP STUDY

A desktop geotechnical analysis was undertaken by WSP to characterize the general geotechnical conditions of the investigation area, to provide a preliminary interpretation of the ground and groundwater conditions as relevant to the overall geotechnical design and construction of the proposed infrastructure. The complete report can be found in Appendix C-3.

The desktop geotechnical investigation included the following tasks:

- Review of previous environmental and geotechnical reports that were obtained by Peel Region for properties within the Study Area; and,
- Review of data obtained from various databases (including published geological maps and references; Ontario Ministry of Northern Development and Mines, Gas and Salt Library, Ministry of Transportation Foundation Library).

The geotechnical review determined that the alignment is underlain by gravelly sand to silty sand over silty clay to clayey silt, which is underlain by the bedrock of Georgian Bay Formation of the Upper Ordovician period which is a grey shale with light grey siltstone and/or limestone interbeds. In some areas, bedrock is expected to lie at 8 to greater than 15m below the ground surface.

Potential construction excavation water takings are anticipated to be high due to permeability of the soil in some areas. For preliminary design, a microtunnel boring machine or similar can be considered. Secant pile (caisson) walls or cast-in-place concrete shafts should be considered to cut off the ground water seepage within saturated cohesionless soils.

4.6.2 GEOTECHNICAL DATA REPORT

A geotechnical analysis was undertaken by Golder Associates to establish the existing soil and rock conditions within the preferred alignment and WWPS location. The fieldwork for the geotechnical investigation was carried out between January 16 and October 19, 2018 during which time a total of 34 boreholes were advanced along the proposed sewer alignment. A seismic refraction survey was attempted with the objective to investigate anomalies in the bedrock surface topography.

In general, the subsurface conditions below the surficial layers of asphalt/topsoil and/or fill were found to be underlain by a non-cohesive deposit of variable thickness comprised of silt to silty sand in places interlayered with or underlain by a deposit of silty clay. The non-cohesive deposit and cohesive deposit in places is typically underlain by a deposit of glacial till grading from silty clay to clayey sand to clayey gravel. The till deposit overlies shale bedrock of the Georgian Bay Formation along the proposed trunk sewer alignment.

The Geotechnical Data Report (GDR) summarizes the factual geotechnical data including fieldwork investigation procedures, subsurface soil, rock and groundwater conditions, surface water conditions and in situ and laboratory testing results on samples collected from the boreholes advanced along the proposed route of the Project. The complete draft report can be found in Appendix C-4. The GDR is currently complete in draft and will be finalized during detailed design.

4.6.3 PHASE 1 ESA

Phase I Environmental Site Assessments (ESA) were undertaken for each of the preliminary preferred tunnel shaft sites. Potential sources of contamination were identified at some of the compound site and accordingly a Phase Two

ESA investigation is required to support the submission of a Record of Site Condition (RSC) at these locations. Findings of the Phase I ESA can be found in Appendix C-5.

4.7 NATURAL ENVIRONMENT / ECOLOGY

This section summarizes the findings of the Natural Environment Study completed by WSP. The complete report can be found in Appendix B-2. Site visits were conducted between January and November 2017. The purpose of the site visits was to confirm the presence of Natural Heritage Features, complete a vegetation assessment and tree inventory, document breeding birds and amphibians, complete a fish habitat assessment survey, and determine the general characteristics of the Infrastructure Study Area.

4.7.1 WATER COURSES

There is one prominent water course within the Infrastructure Planning Area, the Credit River. The Credit River is approximately 90 km long, spans a drainage area of 860 km^2, and drains into Lake Ontario. There are two main sources for the river and they begin at Orangeville and Alton. It is a meeting point for the Niagara Escarpment and the Oak Ridges Moraine.

4.7.2 AREAS OF NATURAL SCIENTIFIC INTEREST

Areas of Natural and Scientific Interest (ANSI) are defined as areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education. ANSIs can be ranked as Provincially or Regionally significant.

The OMNRF Natural Heritage Areas Mapping was searched for the presence of ANSIs within 120 m of the Study Area. ANSIs were not identified within 120 m of the Study Area.

4.7.3 SIGNIFICANT HABITAT OF ENDANGERED OR THREATENED SPECIES

The Provincial Policy Statement (PPS) defines the habitat of Endangered or Threatened species as the habitat, as approved by the Ontario Ministry of Natural Resources and Forestry (OMNRF), that is necessary for the maintenance, survival and/or the recovery of a naturally occurring or reintroduced population of Endangered or Threatened species as listed in the *Endangered Species Act*, 2007, and where those areas of occurrences are occupied or habitually occupied by the species during all or any part(s) of their life cycle. The OMNRF is mandated to ensure accurate database information for the identification, listing and conduct of ongoing assessments for significant Endangered or Threatened Species and their related habitats.

As part of a desktop review, a search of the OMNRF Natural Heritage Information Centre (NHIC) database was conducted to determine the existence and approximate location of recorded occurrences of Endangered or Threatened Species and Species of Conservation Concern in the general area. The 6 Endangered or Threatened Species and Species of Conservation Concern that were found to have habitat potential within the Infrastructure Planning Area can be seen in Table 4-1 below.

Table 4-1 Potential Habitat of Endangered or Threatened Species within the Infrastructure Planning Area

SPECIES	TYPE
Arthropods	Monarch

Birds	Bank Swallow, Barn Swallow, Bobolink, Chimney Swift, Eastern Meadowlark, Henslow's Sparrow, Least Bittern, Common Nighthawk, Eastern Wood Pewee, Peregrine Falcon, Red-headed Woodpecker, Wood Thrush
Fish	American Eel, Lake Sturgeon, Redside Dace, Shortnose Cisco
Mammals	Eastern Smallfooted Myotis, Little Brown Myotis, Northern Myotis, Tri-Coloured Bat
Reptiles	Blanding's Turtle, Eastern Musk Turtle, Eastern Ribbonsnake, Northern Map Turtle, Snapping Turtle
Vascular Plants	Butternut

4.7.4 AQUATIC FEATURES AND FISH HABITAT

Four watercourses with potential for fish habitat traverse the Infrastructure Planning Area: Birchwood Creek, Moore Creek, Lornewood Creek, and Tecumseh Creek. All the four smaller watercourses assessed flow northwest to southeast across Lakeshore Road, draining directly to Lake Ontario, and were conveyed via underground pipes either upstream or downstream of Lakeshore Road. As a part of the field surveys, a detailed aquatic habitat mapping of the four watercourses was completed and can be found in the Natural Environment Study in Appendix B-2.

No fish were observed at the time of the survey at Birchwood Creek or Moore Creek, however, there is potential for direct fish use in these watercourses due to its direct connection to Lake Ontario when suitable flows are present.

Young-of-the-Year (YOY) and an unknown species were identified on site in the Lornewood Creek and the Tecumseh Creek. As such, these watercourses are considered to be direct fish habitats.

4.7.5 SIGNIFICANT WETLANDS

A significant wetland is defined as an area identified as provincially significant by the OMNRF using evaluation procedures established by the Province. A review of the Natural Heritage mapping did not identify wetlands, whether unevaluated or provincially significant within the Infrastructure Planning Area. Additionally, no wetlands were identified during the field survey.

4.7.6 SIGNIFICANT WILDLIFE HABITAT

Wildlife habitat is defined as areas where plants, animals, and other organisms live and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Guidelines and criteria for the identification of significant wildlife habitat (SWH) are detailed in the Significant Wildlife Habitat: Technical Guide, and the Significant Wildlife Habitat Criterion Schedule for Ecoregion 7E. SWH is described under four main categories: Seasonal Concentrations of Animals, Rare Vegetation Communities or Specialized Habitats for Wildlife, Wildlife Movement Corridors, and Habitats of Species of Conservation Concern.

Three Significant Wildlife Habitats were identified in the area of Richard's Memorial Park:

- A Tall Prairie Grass habitat was identified during the field survey, in open areas in the northeast corner of the park.
- The size of the contiguous woodland (> 32 ha) and its proximity to the Lake Ontario shoreline make it candidate habitat for Landbird Stopover Migratory Habitat.

- The size of the contiguous woodland (>32 ha) and the ELC forest community (FODM7-3) present suggests potential for Candidate Bat Maternity Colony Significant Wildlife Habitat.

4.7.7 SIGNIFICANT WOODLANDS

Significant woodlands are defined as treed areas that provide environmental and economic benefits such as erosion prevention, water retention, and provision of habitat, recreation, and the sustainable harvest of woodland products. Significant woodlands are not depicted in the City of Mississauga Official Plan (OP) schedules. Schedule 3: Natural System of the OP depicts Significant Natural Areas and Natural Green Spaces within the City. There is a Residential Woodland located to the west of Richard's Memorial Park, mapped on Schedule 3: Natural System of the City's Official Plan (City of Mississauga, 2016). Richard's Memorial Park is not identified as part of the Natural Heritage System, and woodlands within the park are not mapped as part of the Residential Woodlands on Schedule 3, however, wooded areas within the park are contiguous with the residential woodland block and are therefore considered significant as per policy 6.3.12(f) of the Official Plan.

An Arborist Report was completed and can be found in Appendix B-3

4.7.8 SIGNIFICANT VALLEYLANDS

The PPS refers to a significant valleyland as a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year and is ecologically important in terms of features, functions, representation or amount, and contributes to the quality or diversity of an identifiable geographic region or natural heritage system.

Based on an assessment of the valleylands criteria indicated in the Natural Heritage Reference Manual, the valleylands associated with any of the watercourses in the Infrastructure Planning Area are not significant valleylands.

The Credit River is located north and east of the Infrastructure Planning Area and fits the criteria to be considered a significant valleyland. Impacts to the Credit River or its riparian corridor are not anticipated.

4.8 ARCHAEOLOGICAL ASSESSMENTS

4.8.1 STAGE 1 ARCHAEOLOGICAL ASSESSMENT

A Stage 1 Archaeological Assessment was completed on February 10, 2017 for the alignment along Lakeshore Road, from the Credit River to Richard's Memorial Park, and within the Richard's Memorial Park. The assessment determined that all greenspace areas located within the Stage 1 assessment area have Stage 2 archaeological potential. As such, a Stage 2 Archaeological Assessment was conducted for these areas in mid-2018.

A Stage 1 Archaeological Assessment was completed on November 1 and 12, 2018 for potential gravity sewer alignments along Godfrey's Lane, Ben Machree Drive, Maple Avenue S and Pine Avenue S for the decommissioning of Ben Machree WWPS. The assessment determined that all sewer alignments within the right-of-way were identified as disturbed or previously assessed and as such a Stage 2 assessment is not required. Should the proposed impacts extend beyond the road platform and associated ditching, a Stage 2 assessment may be required along some sewer routes.

The Stage 1 Archaeological Assessments for Lakeshore Road W and Ben Machree WWPS can be seen in Appendix B-4.

4.8.2 STAGE 2 ARCHAEOLOGICAL ASSESSMENT

A Stage 2 Archaeological Assessment was completed on July 24, 25 and 26, 2018 for alignment along Lakeshore Road, from the Credit River to Jack Darling Memorial Park. The assessment also included Jack Darling Park, Richard's Memorial Park, and Port Credit Park. The assessment determined that no further studies would be required in any of the areas. The Stage 2 Archaeological Assessment can be seen in Appendix B-5.

4.9 BUILT/CULTURAL HERITAGE ASSESSMENT

The Built/Cultural Heritage Assessment was completed on July 24, 2018 and October 20, 2018 for the alignment along Lakeshore Road W from Front Street to Jack Darling Park, and along Pine Avenue S, Godfrey's Lane and Ben Machree Drive to Ben Machree Park. The assessment determined a total of sixteen built heritage resources (BHR) and seven cultural heritage landscapes (CHL). Further, it recommended that should the proposed work affect the Jack Darlington Memorial Park or the Ben Machree Park, further evaluation of these resources be conducted through a Cultural Heritage Evaluation Report (CHER) to identify cultural heritage value or attribute at the earliest stage of detailed design for the project. If found to have cultural heritage value, the impacts of proposed works are to be assessed through a Heritage Impact Assessment, as applicable. The Cultural Heritage Resource Assessment Report can be seen in Appendix B-6.

4.10 TRAFFIC IMPACT ASSESSMENT

Lakeshore Road W is an urban arterial roadway within the jurisdiction of the City of Mississauga with four travel lanes and sidewalks on both sides. The posted speed limit on Lakeshore Road is 50 km/h east of Balboa Drive and 60 km/h west of Balboa Drive. The Waterfront Multi-Use Trail runs on the south side of Lakeshore Road W. The majority of the preferred alignment is located underneath of Lakeshore Road

Pine Avenue S and Maple Avenue S are local roads with two travel lanes (one in each direction) and sidewalks on both sides. Ben Machree Drive is a local road with two travel lanes (one in each direction) with a posted speed limit of 40 km/h. There are no sidewalks on either side of Ben Machree Drive. The Waterfront Trail runs on Lake Ontario shores east of Maple Avenue S and on the road along Machree Drive west of Maple Avenue S.

WSP completed a Traffic Impact Analysis considering the preferred alignment along Lakeshore Road W, Pine Avenue S and potential preliminary shaft locations. The analysis determined that the proposed staging plan was generally adequate, and no significant impact is expected on traffic operations during construction, though monitoring of traffic conditions is recommended. No significant traffic diversion or temporary traffic signals are expected. Temporary sidewalks may be required at some locations. Provisions to temporarily accommodate bicycles and pedestrians in a shared multi-purpose trail will be needed to lessen the impact on active transportation travel in some locations. The Traffic Impact Assessment and Amendment can be found in Appendix D-5.

4.11 PRE-DEMOLITION DESIGNATED SUBSTANCE SURVEY

A Designated Substances and Hazardous Materials Survey (DSS) was carried out within the existing Richard's Memorial WWPS located at 870 Lakeshore Road W. The existing building is single-storey with four (4) wet wells. The survey was conducted to determine the presence/absence of Designated Substances within the building and provide information for correct removal or handling of materials prior to decommissioning or demolition. The full report is provided in Appendix B-7.

5 PHASE 2: ALTERNATIVE SOLUTIONS TO THE PROBLEM

This section describes the process undertaken to identify, develop and evaluate alternative solutions to address the problem/opportunity statement identified in Phase 1 of the Class EA. Alternative solutions were identified, evaluated, and shortlisted through an extensive process to identify the preferred solution. This was achieved following the completion of the baseline inventory of natural, social, and economic factors.

The evaluation methodology in this Class EA Study required a unique process to work through broad ideas, servicing concepts and ultimately specific alternatives with various alignments and sites. Each step provided an increased level of detail starting from high level to detailed infrastructure locations. Each step is documented in the sections below.

5.1 IDENTIFICATION AND SCREENING OF ALTERNATIVE OPTIONS

Various high-level options ("Alternative Options") to address the problem were identified. These include the "Do Nothing" and "Limit Growth" options that are typically used as a baseline for comparison in Class EAs. The alternative options are described in Table 5-1. A detailed review of the alternative options was provided in Technical Memorandum – List of Alternatives provided in Appendix D-1.

Table 5-1 Screening of Alternative Options

OPTION	DESCRIPTION	SCREENING
Option 1: Do Nothing	Do Nothing: The Municipal Class Environmental Assessment document indicates that the "Do Nothing" option should be considered. In the "Do Nothing" option, no improvements or changes would be made to solve the identified problem or opportunity (MEA, 2015).	Option 1 does not address current condition issues and concerns at the three pumping stations, capacity concerns at G.E. Booth, and does not allow further development in the area.
Option 2: Limit Growth	This strategy would limit growth within the community, thus no future wastewater flows to the Front Street WWPS would be expected. No improvements of changes would be made to solve the identified problem or opportunity.	Option 2 does not address the problem statement and is not feasible as it does not address provincial policy.
Option 3: Expand Front Street WWPS and Richard's Memorial WWPS	Expand Front Street WWPS and Richard's Memorial WWPS: This option involves expanding the Front Street WWPS to address the existing deficiencies. Equipment approaching the end of its service life, including the existing forcemain under the Credit River bridge, would be replaced. The Richard's Memorial WWPS would also be expanded to meet current standards and codes and to accommodate future flows.	Option 3 does address the condition and capacity issues at the two stations but does not address the need to divert flows away from G. E. Booth.

OPTION	DESCRIPTION	SCREENING
Option 4: Redirect flows from Front Street WWPS to the west	This option involves redirection of flow from Front St WWPS from the east to the west to Richard's Memorial WWPS. Richard's Memorial WWPS will be expanded and upgraded to accommodate for these additional flows.	Option 4 fully addresses the concerns related to the condition and capacity of the stations, addresses the need to redirect flow away from the G.E. Booth WWTP, and allows for growth.

5.1.1 SCREENING OF ALTERNATIVE OPTIONS

A cursory review of the alternative options described in the sections above relative to the Problem Statement allows to easily screen out alternatives that do not "solve the problem." Based on the screening, only Option 4 sufficiently satisfies the Problem Statement and is therefore carried forward for further evaluation.

5.2 IDENTIFICATION OF LONG LIST OF ALTERNATIVE SOLUTIONS

Option 4 described above can be further broken down into a long list of alternative solutions that address the Problem Statement. All long list alternative solutions include a new WWPS in the Richard's Memorial Park. The long list alternative solutions are described in the sections below. A detailed review of the long list alternative solutions was provided in Technical Memorandum – Evaluation Approach provided in Appendix D-2.

5.2.1 ALTERNATIVE SOLUTION 1 – EXPAND FRONT STREET WWPS AND PUMP TO RICHARD'S MEMORIAL WWPS

This alternative solution involves the expansion of the Front Street WWPS to address the existing deficiencies and to allow for the WWPS to pump west directly via a new forcemain to a new Richard's Memorial WWPS. The new Richard's Memorial WWPS would lift the wastewater and discharge to a nearby maintenance hole on Lakeshore Road W, north on the Richard's Memorial Park. A new gravity sewer would be constructed from the Richard's Memorial WWPS discharge maintenance hole west towards the existing Jack Darling WWPS.

5.2.2 ALTERNATIVE SOLUTION 2 – EXPAND FRONT STREET WWPS AND PUMP TO JACK DARLING WWPS

This alternative solution involves the expansion of the Front Street WWPS to address the existing deficiencies and to allow for the WWPS to pump west directly via a new forcemain to the existing Jack Darling WWPS, bypassing Richard's Memorial Park. A new Richard's Memorial WWPS would be constructed and would lift the wastewater and discharge to a nearby maintenance hole on Lakeshore Road, north on the Richard's Memorial Park. A new gravity sewer would be constructed from the Richard's Memorial WWPS discharge maintenance hole west towards the existing Jack Darling WWPS.

5.2.3 ALTERNATIVE SOLUTION 3 – EXPAND FRONT STREET WWPS TO PUMP TO NEW RHODODENDRON GARDENS WWPS

This alternative solution involves the expansion of the Front Street WWPS to address the existing deficiencies and to allow for the WWPS to pump west directly via a new forcemain to a new WWPS in the Rhododendron Gardens. A new gravity sewer would be constructed, conveying flows from the new Rhododendron WWPS to the existing

Jack Darling WWPS. A new Richard's Memorial WWPS would be constructed and would lift the wastewater and discharge to a nearby maintenance hole on Lakeshore Road, north on the Richard's Memorial Park. A new gravity sewer would be constructed from the Richard's Memorial WWPS discharge maintenance hole west towards the existing Jack Darling WWPS.

5.2.4 ALTERNATIVE SOLUTION 4 – DECOMMISSION FRONT STREET WWPS AND NEW RHODODENDRON GARDENS WWPS

This alternative solution involves the decommissioning of the Front Street WWPS. A new gravity sewer would be constructed, conveying the wastewater flows from the decommissioned Front Street WWPS to a new WWPS in the Rhododendron Gardens. A new gravity sewer would be constructed, conveying flows from the new Rhododendron WWPS to the existing Jack Darling WWPS. A new Richard's Memorial WWPS would be constructed and would lift the wastewater and discharge to a nearby maintenance hole on Lakeshore Road W, north on the Richard's Memorial Park. A new gravity sewer would be constructed from the Richard's Memorial WWPS discharge maintenance hole west towards the existing Jack Darling WWPS.

5.2.5 ALTERNATIVE SOLUTION 5 – DECOMMISSION FRONT STREET WWPS AND NEW RICHARD'S MEMORIAL WWPS

This alternative solution involves the decommissioning of the Front Street WWPS. A new gravity sewer would be constructed, conveying the wastewater flows from the decommissioned Front Street WWPS to a new Richard's Memorial WWPS. The new Richard's Memorial WWPS would lift the wastewater and discharge to a nearby maintenance hole on Lakeshore Road W, north on the Richard's Memorial Park. A new gravity sewer would be constructed from the Richard's Memorial WWPS discharge maintenance hole west towards the existing Jack Darling WWPS. Review the opportunity to maintain Ben Machree WWPS to that of decommissioning and connecting flows by gravity sewer pipe to the new gravity sewer along Lakeshore Road W.

5.3 SCREENING OF ALTERNATIVE SOLUTIONS

A review of the long list of alternative solutions described in the sections above was completed to determine which long list options are feasible. Solutions that are deemed feasible are carried forward to the short list of alternatives.

Long list alternatives 1, 2, and 3 are not deemed feasible as they require pumping over long distances, thus increasing the cost of operation of the Front Street WWPS. Long list alternatives 3 and 4 are deemed not feasible as the proposed new WWPS would be located within the Rhododendron Gardens, thus requiring a large amount of plants and trees to be removed from the community. Therefore, only long list alternative 5 was carried forward to the short list of alternatives for further evaluation.

5.4 IDENTIFICATION OF SHORT LIST OF ALTERNATIVES

Alternative Solution 5 described above can be further broken down into three sets of solutions: potential new WWPS site locations, potential linear infrastructure routes, rationalizing flow from Ben Machree WWPS and potential alternative gravity sewer routes. The short list of alternatives is described in the sections below.

5.4.1 POTENTIAL NEW WASTEWATER PUMPING STATION SITE LOCATIONS

Seven potential site locations were identified within the Richard's Memorial Park. The locations are described briefly below and can be seen in Figure 5-1. The evaluation and selection of the potential site locations can be found in Section 5.5.

SITE 1

Site 1 is located just east of the existing parking lot within the Richard's Memorial Park. Access to the WWPS would be from the driveway into the Park.

SITE 2

Site 2 is located in the southern portion of the Richard's Memorial Park where the existing Park washroom is located. Access to the WWPS would be from the existing Richard's Memorial Parking lot.

SITE 3

Site 3 is located in the north-eastern portion of the Richard's Memorial Park where the Park's existing rock garden is currently located. Access to the WWPS would be from either Lakeshore Road W or Dack Boulevard

SITE 4

Site 4 is located just north of the existing Richard's Memorial Park parking lot and just west of the existing drive way. Access to the WWPS would be from Lakeshore Road W.

SITE 5

Site 5 is located just east of the Richard's Memorial Park's existing driveway. Access to the WWPS would be from Lakeshore Road W.

SITE 6

Site 6 is located north of the Richard's Memorial Park's existing parking lot where the existing Richard's Memorial WWPS is located. Access to the WWPS would be from either Lakeshore Road W or the existing parking lot.

SITE 7

Site 7 is located in the north-western portion of the Richard's Memorial Park. Access would be from Lakeshore Road W.

5.4.2 POTENTIAL NEW LINEAR INFRASTRUCTURE ROUTES

Five potential linear infrastructure routes from Front Street WWPS to Jack Darling WWPS were identified. All potential linear infrastructure routes will convey wastewater by gravity as pumping long distance was screened out in the previous section. These routes are described briefly below and can be seen in Figure 5-2 below. The evaluation and selection of the potential linear infrastructure routes can be found in Section 5.5.

ROUTE 1

Route 1 travels underneath of Lakeshore Road W from Front Street WWPS into a new Richard's Memorial WWPS. The new Richard's Memorial WWPS then "lifts" the wastewater and discharges to a maintenance hole located north of the Richard's Memorial Park on Lakeshore Road W. Route 1 then travels underneath Lakeshore Road W from Richard's Memorial WWPS to the existing Jack Darling WWPS. This route option allows for the opportunity to review decommissioning Ben Machree WWPS and connect flows by gravity sewer pipe to the new gravity sewer along Lakeshore Road W.

ROUTE 2

Route 2 travels underneath Front Street N and Queen Street W from Front Street WWPS to a new Richard's Memorial WWPS. The new Richard's Memorial WWPS then "lifts" the wastewater and discharges to a maintenance hole located north of the Richard's Memorial Park on Lakeshore Road W. Route 2 then travels underneath Lakeshore Road W from Richard's Memorial WWPS to the existing Jack Darling WWPS.

ROUTE 3

Route 3 travels underneath Front Street S, the Waterfront Trail, Ben Machree Dr., and Godfrey's Lane from Front Street WWPS to a new Richard's Memorial WWPS. The new Richard's Memorial WWPS then "lifts" the wastewater and discharges to a maintenance hole located north of the Richard's Memorial Park on Lakeshore Road W. Route 3 then travels underneath Lakeshore Road W from Richard's Memorial WWPS to the existing Jack Darling WWPS.

ROUTE 4

Route 4 is a variation of Route 3, travelling underneath Front Street S, Port Street W, Mississauga Road, west through the 70 Mississauga Road lands, and then south to the Waterfront Trail. Route 4 then continues to a new Richard's Memorial WWPS as previously described in Route 3. The new Richard's Memorial WWPS then "lifts" the wastewater and discharges to a maintenance hole located north of the Richard's Memorial Park on Lakeshore Road W. Route 4 then travels underneath Lakeshore Road W from Richard's Memorial WWPS to the existing Jack Darling WWPS.

ROUTE 5

Route 5 is a variation of Route 3 and Route 4, travelling underneath Front Street S and Bay Street Route 5 then continues to a new Richard's Memorial WWPS as previously described in Route 4. The new Richard's Memorial WWPS then "lifts" the wastewater and discharges to a maintenance hole located north of the Richard's Memorial Park on Lakeshore Road W. Route 5 then travels underneath Lakeshore Road W from Richard's Memorial WWPS to the existing Jack Darling WWPS.

5.4.3 POTENTIAL BEN MACHREE WASTEWATER PUMPING STATION ALTERNATIVES

The New Linear Infrastructure Route Option 1 as presented in Section Potential New Linear Infrastructure Routes5.4.2 would present an opportunity to enable the decommissioning of Ben Machree WWPS and connect flows by gravity sewer pipe to the new sewer along Lakeshore Rd W. Five alternatives were identified. Alternative 1 is to upgrade the existing pumping station and continue current function. The Alternatives 2, 3, 4, and 5 include decommissioning the pumping station and convey wastewater by gravity. These alternatives are described briefly below and can be seen in Figure 5-3. The evaluation and selection of the preliminary preferred solution can be found in Section 5.5. A detailed review of the alternatives was provided in Technical Memorandum – Ben Machree Alignment provided in Appendix D-6.

BEN MACHREE ALTERNATIVE 1

Alternative 1 includes maintaining the existing Ben Machree WWPS and upgrading the facility to comply with latest regulation requirements. This requires land acquisition, increasing the overflow storage capacity and a new forcemain.

BEN MACHREE ALTERNATIVE 2

Alternative 2 involves the decommissioning of the Ben Machree WWPS and replacing with a gravity sewer. The potential gravity sewer route is aligned along Ben Machree Drive and directly connects the Ben Machree WWPS to the Lakeshore Road W.

BEN MACHREE ALTERNATIVE 3

Alternative 3 involves the decommissioning of the Ben Machree WWPS and replacing with a gravity sewer. The potential gravity sewer route runs from the Ben Machree WWPS west along Ben Machree Drive, north along Maple Avenue S, and directly connects the Ben Machree WWPS to the Lakeshore Road W.

BEN MARCHREE ALTERNATIVE 4

Alternative 4 involves the decommissioning of the Ben Machree WWPS and replacing with a gravity sewer. The potential gravity sewer route runs from the Ben Machree WWPS west along Ben Machree Drive, north along Maple Avenue S, north along Pine Avenue S and directly connects the Ben Machree WWPS to the Lakeshore Road W.

BEN MACHREE ALTERNATIVE 5

Alternative 5 involves the decommissioning of the Ben Machree WWPS and replacing with a gravity sewer. The potential gravity sewer route runs from the Ben Machree WWPS east along Ben Machree Drive, north along Godfrey's Lane and directly connects the Ben Machree WWPS to the Lakeshore Road W.

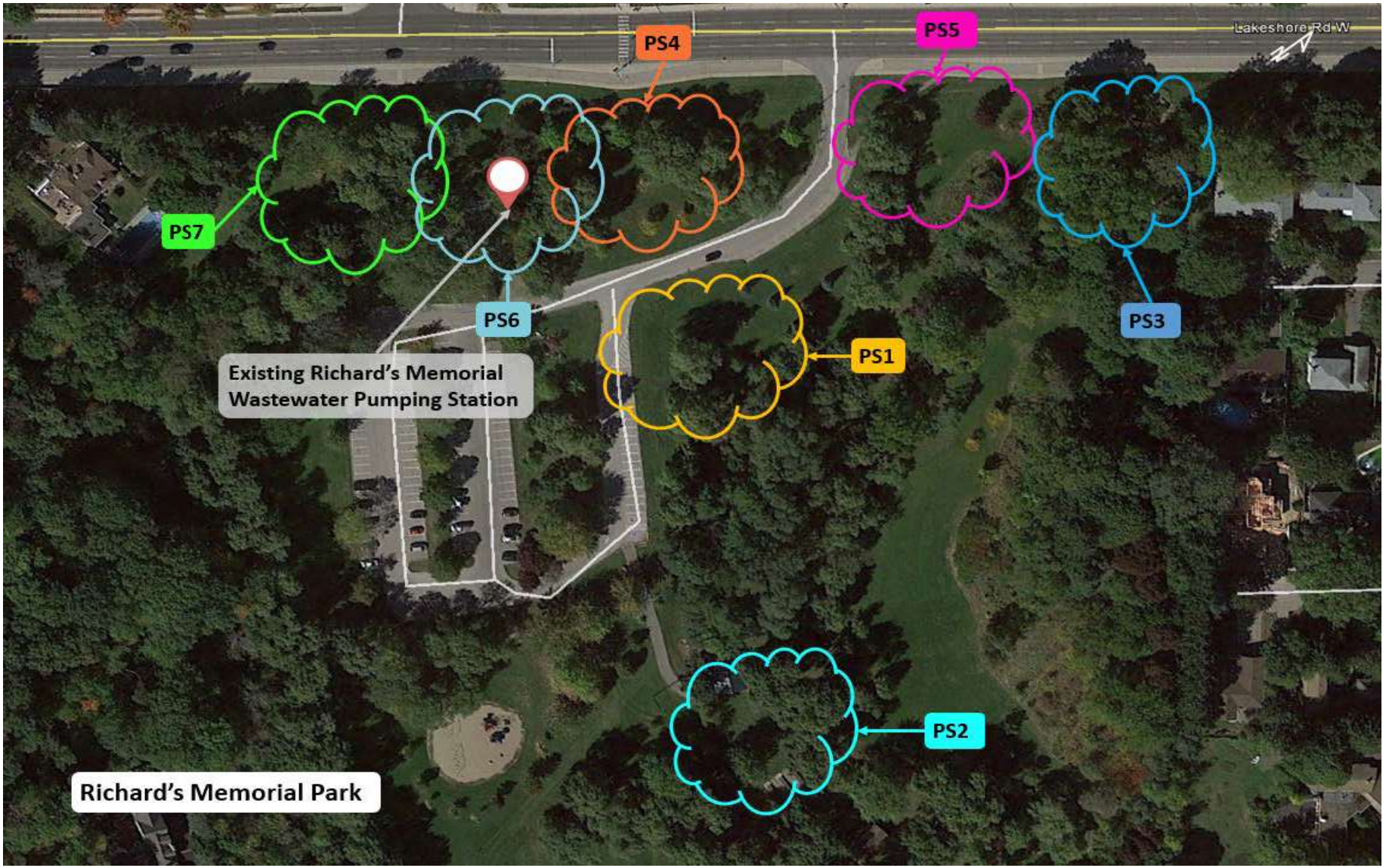


Figure 5-1 Potential Wastewater Pumping Station Site Locations

Figure 5-2 Potential Linear Infrastructure Route

Figure 5-3 Potential Alternatives for Ben Machree WWPS

5.5 COMPARATIVE EVALUATION OF ALTERNATIVE SOLUTIONS

The following sub-sections describe the evaluation process that was used to gather and review all the information to select the preferred alternative. Also included is an overview of how each alternative solution was evaluated including a summary of the advantages, disadvantages or key considerations for each alternative solution.

5.5.1 APPROACH TO EVALUATION OF ALTERNATIVE SOLUTIONS

The following four evaluation criteria were used to evaluate the alternative solutions:

Table 5-2 Evaluation Criteria Descriptions

EVALUATION CRITERIA	DESCRIPTION
Technical	Component that considers the technical suitability and other engineering aspects of the wastewater system.
Natural Environment	Component having regard for protecting the natural and physical components of the environment (i.e., air, land, water and biota), including natural heritage and environmentally sensitive areas.
Social / Cultural	Component that evaluates potential effects on residents, neighbourhoods, businesses, community character, social cohesion, community features and historical/archaeological and heritage components.
Economic / Financial	Component that compares the potential financial costs.

Each alternative solution was evaluated from least to most preferred base on the evaluation criteria presented in Table 5-3 below. The solution with the lowest possible adverse effects was then identified as the preferred solution.

Table 5-3 Criteria for Evaluating Alternative Solution

COMPONENT	EVALUATION CRITERIA
Technical	Constructability: Means challenges or risks associated with undertaking construction of linear infrastructure and the proposed WWPS.
	Impact on Existing Utilities: Means the impact of each alternative to existing utilities.
	Compliance with Applicable Planning and Environmental Policies: Means the compliance with Provincial, Regional, Municipal, and other agency policies, plans, and regulations. This framework controls the use of land and directs development to appropriate locations.
	Property Requirement Impacts: Means the process and cost of acquiring the necessary land to facilitate construction, including impacts to the project timeline and associated complications.

Environment	Impact on Water Features: Means potential for adverse impact(s) to waterbodies, watercourses and associated tributaries, including ground water and surface water features, to ensure hydrologic functions and linkages are maintained.
	Geology and Hydrogeology Considerations: Means the potential impacts and feasibility of design and construction as it relates to soil type, soil quality, water table elevations, and bedrock location.
	Impact on Trees: Means the potential for adverse impacts to trees or the quantity of trees required to be removed to facilitate construction.
	Impact to Species at Risk: Means potential for adverse impact(s) to features and land forms which include the habitat for species identified as at risk by the Province, in accordance with O. Reg. 230/08.
	Land Contamination Considerations: Means the potential for contamination as determined through the Phase 1 ESA.
Socio/Cultural	Impact on Existing Residences, Businesses, and/or Community: Means the potential for short-term and long-term adverse impacts to the local community. Short-term impacts may include traffic congestion, detours, noise pollution, dust, and/or vibration. Long-term impacts may include potential noise pollution or fumes originating from the WWPS, or permanent impacts to community assets due to the final siting of the WWPS.
	Impact to Recreational Uses, Enjoyment of the Park or Community Assets: Means the potential for adverse impacts to existing recreational space, or the use of parks or community assets due to the forcemain alignment, sewer alignment, and/or final siting of the WWPS.
	Visual Impact from Streetscape: Means the degree to which the streetscape is impacted by the WWPS.
	Archaeological Considerations: Means potential for adverse impacts to areas containing artifacts, archaeological sites, marine and archaeological sites, as defined under the *Ontario Heritage Act*. The identification and evaluation of such resources are based upon the Phase I Archaeological Survey.
	Impact on Parking in the Park: Means the potential impact to available parking spaces in Richard's Memorial Park.
Financial	Initial Capital Costs: Means the capital costs required to acquire land, obtain necessary approvals and permits, and construct each option.

The evaluation matrix created for both the potential pumping station sites and the potential linear infrastructure routes can be seen in Table 5-5, Table 5-6 and Table 5-7 respectively. For reference, Table 5-4 shows the colour legend for each table.

Table 5-4 Evaluation Legend

NOT PREFERRED	SOMEWHAT PREFERRED	PREFERRED

Table 5-5 Evaluation Matrix for Potential New Richard's Memorial WWPS Site Locations

	Criteria	Site #1 (East of Existing Richard's Memorial Park Parking Lot)	Site #2 (South of Existing Richard's Memorial Park Parking Lot)	Site #3 (East of Existing Richard's Memorial Park Parking Lot, between CVC Boundary and Property Line)	Site #4 (North of the Existing Richard's Memorial Park Parking Lot)	Site #5 (East of the Entrance Driveway to the Existing Richard's Memorial Park Parking Lot)	Site #6 (Within the Existing Richard's Memorial Wastewater Pumping Station Site)	Site #7 (North-West of the Existing Richard's Memorial Pumping Station Park Parking Lot)
Technical	Constructability	Distance from Lakeshore Road means further tunnelling through the Park for the incoming gravity sewer. Deeper inlet sewer and wet well due to the longer gravity sewer.	Farthest from Lakeshore Road Therefore, tunnelling through the Richard's Memorial Park for the incoming gravity sewer is required. Deeper inlet sewer and wet well due to longer gravity sewer.	Close proximity to Lakeshore Road means less tunnelling through the park and a shallower inlet sewer. Construction impact area would be reduced since the pumping station would be located near the sewer shaft area.	Close proximity to Lakeshore Road means less tunnelling through the park and a shallower inlet sewer. Construction impact area would be reduced since the pumping station would be located near the sewer shaft area.	Close proximity to Lakeshore Road means less tunnelling through the park and a shallower inlet sewer. Construction impact area would be reduced since the pumping station would be located near the sewer shaft area.	Close proximity to Lakeshore Road means less tunnelling through the park and a shallower inlet sewer. As this site is located on top of the existing pumping station, major demolition and site preparation will be required.	Close proximity to Lakeshore Road means less tunnelling through the park and a shallower inlet sewer. Construction impact area would be reduced since the pumping station would be located near the sewer shaft area.
	Impact on existing utilities	Sewers discharging to the existing Richard's Memorial WWPS would be redirected towards a new maintenance hole upstream of the new WWPS inlet.	Conflicts with the existing Lornewood Creek culvert. Sewers discharging to the existing Richard's Memorial WWPS would be redirected towards a new maintenance hole upstream of the new WWPS inlet.	Sewers discharging to the existing Richard's Memorial WWPS would be redirected towards a new maintenance hole upstream of the new WWPS inlet.	Conflicts with the existing Lornewood Creek culvert. Sewers discharging to the existing Richard's Memorial WWPS would be redirected towards a new maintenance hole upstream of the new WWPS inlet.	Sewers discharging to the existing Richard's Memorial WWPS would be redirected towards a new maintenance hole upstream of the new WWPS inlet.	Sewers discharging to the existing Richard's Memorial WWPS would be redirected towards a new maintenance hole upstream of the new WWPS inlet.	Sewers discharging to the existing Richard's Memorial WWPS would be redirected towards a new maintenance hole upstream of the new WWPS inlet.
	Compliance with applicable planning and environmental policies	Within the CVC floodplains area.	Within the CVC floodplains area.	No identified non-compliances.	Within the CVC floodplains area.	Within the CVC floodplains area.	Within the CVC floodplains area.	No identified non-compliances.
	Property Requirements Impacts	Requires a large amount of property acquisition due to the long sewer length. Property acquisition would be required for any alignment through the Park.	Requires a large amount of property acquisition due to the long sewer length. Property acquisition would be required for any alignment through the Park.	Requires a moderate amount of property acquisition due to the sewer length. Property acquisition would be required for any alignment through the Park.	Requires a moderate amount of property acquisition due to the sewer length. Property acquisition would be required for any alignment through the Park.	Requires a moderate amount of property acquisition due to the sewer length. Property acquisition would be required for any alignment through the Park.	Requires a minimal amount of property acquisition due to the short sewer length. Property acquisition would be required for any alignment through the Park.	Requires a minimal amount of property acquisition due to the short sewer length. Property acquisition would be required for any alignment through the Park.
Environmental	Impact on water features/resources	No noted potential effects on water features/resources.	No noted potential effects on water features/resources.	No noted potential effects on water features/resources.	No noted potential effects on water features/resources.	No noted potential effects on water features/resources.	No noted potential effects on water features/resources.	No noted potential effects on water features/resources.
	Geology and hydrogeology considerations	Borehole drilling to determine the bedrock surface and rock coring for testing is required. No geology or hydrogeology concerns.	Borehole drilling to determine the bedrock surface and rock coring for testing is required. No geology or hydrogeology concerns.	Borehole drilling to determine the bedrock surface and rock coring for testing is required. No geology or hydrogeology concerns.	Borehole drilling to determine the bedrock surface and rock coring for testing is required. No geology or hydrogeology concerns.	Borehole drilling to determine the bedrock surface and rock coring for testing is required. No geology or hydrogeology concerns.	Borehole drilling to determine the bedrock surface and rock coring for testing is required. No geology or hydrogeology concerns.	Borehole drilling to determine the bedrock surface and rock coring for testing is required. No geology or hydrogeology concerns.
	Impact on trees and Significant Woodland Features	Mature tree removal is required.	Mature tree removal is required.	Mature tree removal is required.	Mature tree removal is required.	Mature tree removal is required.	Mature tree removal is required.	Mature tree removal is required. Removal of 0.003% of significant woodland).

	Criteria	Site #1 (East of Existing Richard's Memorial Park Parking Lot)	Site #2 (South of Existing Richard's Memorial Park Parking Lot)	Site #3 (East of Existing Richard's Memorial Park Parking Lot, between CVC Boundary and Property Line)	Site #4 (North of the Existing Richard's Memorial Park Parking Lot)	Site #5 (East of the Entrance Driveway to the Existing Richard's Memorial Park Parking Lot)	Site #6 (Within the Existing Richard's Memorial Wastewater Pumping Station Site)	Site #7 (North-West of the Existing Richard's Memorial Pumping Station Park Parking Lot)
	Impact to Species at Risk (SAR) or Their Habitats	Removal of 15 potential bat maternity roosting habitat trees	Removal of 19 potential bat maternity roosting habitat trees	Removal of 8 potential bat maternity roosting habitat trees	Removal of 8 potential bat maternity roosting habitat trees	Removal of 13 potential bat maternity roosting habitat trees	No impact to identified SAR	Removal of 6 potential bat maternity roosting habitat trees
	Land contamination considerations	No potential for contamination areas identified	No potential for contamination areas identified	No potential for contamination areas identified	No potential for contamination areas identified	No potential for contamination areas identified	No potential for contamination areas identified	No potential for contamination areas identified
Social	Impact on existing residences, businesses, and/or community	Not located near any residences or businesses. Minor traffic impact on major community road.	Not located near any residences or businesses. Minor traffic impact on major community road.	Located close to the property line of homes on Dack Boulevard Vehicle and construction machinery noise during construction. Traffic impact on residential road during construction. Minor traffic impact on road during operation.	Not located near any residences or businesses. Minor traffic impact on major community road.	Not located near any residences or businesses. Minor traffic impact on major community road.	Not located near any residences or businesses. Minor traffic impact on major community road.	Located close to the property line of a home on Lakeshore Road Vehicle and construction machinery noise during construction. Minor traffic impact on major community road.
	Impact to recreational uses, enjoyment of the Park or community assets	Significant impact to park access during construction. Significant impact to Park areas during construction due to location being in the middle of the Park.	The existing gazebo and picnic area would need to be relocated. Significant impact to park access during construction.	Existing Rock Garden would need to be relocated.	Significant impact to park access during construction. Minor impact to Park areas during construction.	Significant impact to park access during construction. Minor impact to Park areas during construction.	Significant impact to park access during construction. Significant impact to Park areas during construction due to major demolition and site grading required to remove the existing pumping station.	Significant impact to park access during construction. Minor impact to Park areas during construction.
	Visual impact from streetscape	Moderate impact, near Lakeshore Road	Low impact, far from Lakeshore Road	High impact, close to Lakeshore Road However, architectural design will allow blending in with surroundings and landscaping to provide screening.	High impact, close to Lakeshore Road However, architectural design will allow blending in with surroundings and landscaping to provide screening.	High impact, close to Lakeshore Road However, architectural design will allow blending in with surroundings and landscaping to provide screening.	High impact, close to Lakeshore Road However, architectural design will allow blending in with surroundings and landscaping to provide screening.	High impact, close to Lakeshore Road However, architectural design will allow blending in with surroundings and landscaping to provide screening.
	Archaeological considerations	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.

	Criteria	Site #1 (East of Existing Richard's Memorial Park Parking Lot)	Site #2 (South of Existing Richard's Memorial Park Parking Lot)	Site #3 (East of Existing Richard's Memorial Park Parking Lot, between CVC Boundary and Property Line)	Site #4 (North of the Existing Richard's Memorial Park Parking Lot)	Site #5 (East of the Entrance Driveway to the Existing Richard's Memorial Park Parking Lot)	Site #6 (Within the Existing Richard's Memorial Wastewater Pumping Station Site)	Site #7 (North-West of the Existing Richard's Memorial Pumping Station Park Parking Lot)
	Impact on parking in the Park	Site location does not impact parking. However, would impact access to parking by the public during construction. Access during flood conditions would be limited since the site is located within the floodplain.	Site location does not impact parking. However, would impact access to parking by the public during construction. Access during flood conditions would be limited since the site is located within the floodplain.	Site location does not impact parking. However, some of the parking spots in the park to be used by construction workers for the duration of the project.	Site location does not impact parking. However, would impact access to parking by the public during construction. Access during flood conditions would be limited since the site is located within the floodplain.	Site location does not impact parking. However, would impact access to parking by the public during construction. Access during flood conditions would be limited since the site is located within the floodplain.	Site location does not impact parking. However, would impact access to parking by the public during construction. Access during flood conditions would be limited since the site is located within the floodplain.	Site location does not impact parking. However, some of the parking spots in the park to be used by construction workers for the duration of the project.
Financial	Capital Costs	$21,120,000	$21,120,000	$21,120,000	$21,120,000	$21,120,000	$21,120,000	$21,120,000
Rank	Total rank of site alternative	**Less preferred**	**Least preferred**	**Less preferred**	**Less preferred**	**Less preferred**	**Less preferred**	**Most preferred**

Table 5-6 Evaluation Matrix for Potential Linear Infrastructure Routes

Screening Criteria		Sewer 1 (S1)	Sewer 2 (S2)	Sewer 3 (S3)	Sewer 4 (S4)	Sewer 5 (S5)
		Sewer along Lakeshore Road W	Sewer along Front Street N, Queen Street W, and Ibar Way to Richard's Memorial Park	Sewer along Front Street S, Waterfront Trail, Ben Machree Drive, Godfrey's Lane, and Waterfront Trail to Richard's Memorial Park	Variation of S3 with sewer along Port Street W, Mississauga Road, 70 Mississauga Road S and south to Waterfront Trail	Variation of S3 and S4 with sewer along Bay Street
Technical	Constructability	As S1 runs along a straight line, no constructability issues during tunnelling identified.	An indirect route through several small local roads and residential areas may cause constructability issues during tunnelling. Would require multiple shafts to accommodate turns.	An indirect route along the shore of Lake Ontario may cause constructability (dewatering) issues during tunnelling. Would require multiple shafts to accommodate turns.	An indirect route along the shore of Lake Ontario may cause constructability (dewatering) issues during tunnelling. Would require multiple shafts to accommodate turns.	An indirect route through several small local roads and residential areas may cause constructability issues during tunnelling. Would require multiple shafts to accommodate turns.
	Ease of site access during construction	Along a wide, major community road. No site access restrictions noted. Would potentially require temporary access/curb cut on Lakeshore Road to facilitate access to launch shaft.	Private residential areas restrict access along the route.	Lake Ontario and Waterfront Trail restricts access along the route.	Private residential areas, Lake Ontario, and Waterfront Trail restrict access along the route.	Private residential areas, Lake Ontario, and Waterfront Trail restrict access along the route.
	Compliance with applicable planning and environmental policies	No noted compliance deviations	No noted compliance deviations	No noted compliance deviations	No noted compliance deviations	No noted compliance deviations
	Property requirements impacts	Along the Region right-of-way, minimal acquisition required	Along the Region right-of-way, minimal acquisition required	Easement acquisition along the Waterfront Trail	Easement acquisition through the former Texaco lands and along the Waterfront Trail	Easement acquisition along the Waterfront Trail

	Impact on existing utilities	No known impact on existing utilities.	Runs near the Metrolinx railway where they are completing the electrification of the lines	No known impact on existing utilities.	No known impact on existing utilities.	No known impact on existing utilities.
Environmental	Impact on water features/resources and hydrogeology	No known impact on existing water features/resources.	No known impact on existing water features/resources.	Routed along the shore of Lake Ontario and may allow for contaminants. High ground water table being located near the Lake may require significant dewatering.	Routed along the shore of Lake Ontario and may allow for contaminants. High ground water table being located near the Lake may require significant dewatering.	Routed along the shore of Lake Ontario and may allow for contaminants. High ground water table being located near the Lake may require significant dewatering.
	Impact on trees	Mature tree removal required.	Mature tree removal required.	Mature tree removal required.	Mature tree removal required.	Mature tree removal required.
	Impact to Species at Risk (SAR)	No impact to identified SAR	No impact to identified SAR	No impact to identified SAR	No impact to identified SAR	No impact to identified SAR
	Contamination considerations	No land contamination concerns identified.	No land contamination concerns identified.	Route passes through the Texaco Lands which contain contaminated soils.	Route passes through the Texaco Lands which contain contaminated soils.	Route passes through the Texaco Lands which contain contaminated soils.
Social	Impact of construction traffic on existing residences, businesses, and/or community	Moderate impact to traffic during construction due to being along a major community road.	Large impact to traffic during construction due to being along narrow residential roads	Large impact to traffic during construction due to being along narrow residential roads	Large impact to traffic during construction due to being along narrow residential roads	Large impact to traffic during construction due to being along narrow residential roads
	Impact to community assets	No known impact to community assets	No known impact to community assets	Route runs along the shore of Lake Ontario. May disrupt shoreline beaches and Waterfront Trail.	Route runs along the shore of Lake Ontario. May disrupt shoreline beaches and Waterfront Trail.	Route runs along the shore of Lake Ontario. May disrupt shoreline beaches and Waterfront Trail.
	Alignment with local plans	No known conflict with local plans	No known conflict with local plans	No known conflict with local plans	No known conflict with local plans	No known conflict with local plans
	Archaeological considerations	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.	Stage I and II Assessment completed. No further assessment is required.
Financial	Initial Capital Costs	$ 57, 030,000	Not Determined**	Not Determined*	Not Determined*	Not Determined*
Rank	Total rank of site alternative	**Most preferred**	**Less preferred**	**Less preferred**	**Least preferred**	**Least preferred**

***Note: Costs not determined as approach found to be technically infeasible.**

Table 5-7 Potential Alternatives for Ben Machree WWPS

Screening Criteria		Approach 1 (A1)	Approach 2 (A2)	Approach 3 (A3)	Approach 4 (A4)	Approach 5 (A5)
		Upgrade existing Ben Machree WWPS and maintain existing forcemain system	Decommission Ben Machree WWPS. Sewer along Ben Machree Drive from Ben Machree WWPS to Lakeshore Road W	Decommission Ben Machree WWPS. Sewer along Maple Avenue S from Ben Machree WWPS to Lakeshore Road W	Decommission Ben Machree WWPS. Sewer along Pine Avenue S from Ben Machree WWPS to Lakeshore Road W	Decommission Ben Machree WWPS. Sewer along Godfrey's Lane from Ben Machree WWPS to Lakeshore Road W
Technical	Constructability	The pumping station upgrades required are within the station as well as along the forcemain, located within the right-of-way. No notable constructability issues identified.	Requires multiple tunnelling shafts to accommodate curved road segments. Depth of sewer does not accommodate for open cut excavation.	Requires closure of a signalized intersection. Combination of tunnelling and open cut construction is feasible.	Combination of tunnelling and open cut construction is feasible. No notable constructability issues identified.	Combination of tunnelling and open cut construction is feasible. Restricted access and construction laydown area along narrow laneway.
	Ease of site access during construction	In a public park and along a residential street. No site access restrictions noted.	No site access restrictions noted.	No site access restrictions noted.	No site access restrictions noted.	No site access restrictions noted.
	Compliance with applicable planning and environmental policies	No noted compliance deviations	No noted compliance deviations	No noted compliance deviations	No noted compliance deviations	No noted compliance deviations
	Property requirements impacts	Region right-of-way, minimal acquisition required.	Along the Region right-of-way, minimal acquisition required	Along the Region right-of-way, minimal acquisition required	Along the Region right-of-way, minimal acquisition required	Along the Region right-of-way, minimal acquisition required
	Impact on existing utilities	No known impact on existing utilities.	No known impact on existing utilities.	No known impact on existing utilities.	No known impact on existing utilities.	No known impact on existing utilities.
Environmental	Impact on water features/resources and hydrogeology	No known impact on existing water features/resources.	No known impact on existing water features/resources.	No known impact on existing water features/resources.	No known impact on existing water features/resources.	No known impact on existing water features/resources.
	Impact on trees	No known impact.	No impact on trees	No impact on trees.	No impact on trees	Mature tree removal may be required.
	Impact to Species at Risk (SAR)	No impact to identified SAR	No impact to identified SAR	No impact to identified SAR	No impact to identified SAR	No impact to identified SAR
	Contamination considerations	No land contamination concerns identified.	No land contamination concerns identified.	No land contamination concerns identified.	No land contamination concerns identified.	No land contamination concerns identified.
Social	Impact of construction traffic on existing residences, businesses, and/or community	Moderate impact to traffic during construction due to being along a residential road.	Large impact to residents' traffic during construction due to number of tunnelling shafts required and location along residential roads	Large impact to traffic during construction due to launch shaft location at signalized traffic intersection of major route and residential road	Moderate impact to local business and minor impact to residents due to restricted access to major road. Detour route implementation required.	Moderate impact to residents due to restricted access to local park; potential disruption to park area and heavy equipment traffic along narrow laneway

	Impact to community assets	No known impact to community assets	No known impact to community assets	No known impact to community assets	No known impact to community assets	Route runs adjacent to the Brueckner Rhododendron Gardens. May disrupt park land and restrict access to Waterfront Trail.
	Alignment with local plans	No known conflict with local plans	No known conflict with local plans	No known conflict with local plans	No known conflict with local plans	No known conflict with local plans
	Archaeological considerations	Stage I Assessment completed. No further assessment is required unless construction work area exceeds right-of-way property limits.	Stage I Assessment completed. No further assessment is required unless construction work area exceeds right-of-way property limits.	Stage I Assessment completed. No further assessment is required unless construction work area exceeds right-of-way property limits.	Stage I Assessment completed. No further assessment is required unless construction work area exceeds right-of-way property limits.	Stage I Assessment completed. No further assessment is required unless construction work area exceeds right-of-way property limits.
Financial	Initial Capital Costs**	$125,000	Not Determined*	Approx. $6,017,500	$4,870,000	$5,090,000
Rank	Total rank of site alternative	**Least preferred**	**Least preferred**	**Least preferred**	**Most preferred**	**Less preferred**

***Note: Costs not determined as approach found to be technically infeasible.**
****Note: Lifecycle cost analysis is provided in Technical Memorandum – Ben Machree Alignment in Appendix D-6**

6 EVALUATION SUMMARY AND DESCRIPTION OF THE PREFERRED SOLUTION

6.1 PREFERRED SOLUTION

The preferred solution includes constructing a new gravity sewer along Lakeshore Road W and Pine Avenue S, constructing a new WWPS in Richard's Memorial Park, decommissioning of the current Front Street WWPS located in the Port Credit Lighthouse, decommissioning the existing Richard's Memorial WWPS and decommissioning of Ben Machree WWPS. Decommissioning of the pumping station assets includes decommissioning of the forcemains at each location however, hydraulic relief points to remain in operation.

The preferred solution includes three components:

1 A preferred site location for the new Richard's Memorial Park WWPS;
2 A preferred linear infrastructure route for the proposed wastewater diversion sewer; and,
3 Decommissioning Front Street WWPS and Ben Machree WWPS.

The preferred solution includes Site #7 for the location of the proposed WWPS, Route #1 for the proposed linear infrastructure, and Alternative #4 (decommissioning) of the Ben Machree WWPS. This preferred solution best addresses the Problem Statement based on available technical input and evaluation.

6.2 PROPOSED WWPS SITE LOCATION IN RICHARD'S MEMORIAL PARK

6.2.1 PREFERRED SITE LOCATION

As evaluated in Table 5-5, the preferred site location for the new Richard's Memorial WWPS was determined to be Site #7. Site #7 is located at the north-west corner of the Richard's Memorial Park, from Lakeshore Road W.

The preferred site location for the new Richard's Memorial WWPS is the preferred solution because it offers the following advantages relative to the other site locations that were evaluated:

- Close to Lakeshore Road W, easy construction and operations and maintenance access, minimal Park property acquisition required;
- No identified non-compliance with applicable planning or environmental policies;
- Full access to the site during flood conditions as located outside the Park's existing floodplain;
- No identified archaeological impacts; and,
- Limited Species at Risk potential impacts.

Overall, Site #7 best addresses the Problem Statement by facilitating the redirection of wastewater flow away from G.E. Booth Wastewater Treatment Plant and to Clarkson Wastewater Treatment Plant, while determined to have the least potential for overall environmental impact.

6.2.2 IMPLEMENTATION CONSIDERATIONS

A preliminary site plan was developed for the new Richard's Memorial WWPS. The preferred site location and potential site plan can be seen in Figure 6-1. The footprint of the WWPS was based on preliminary calculations considering the projected flows to the new WWPS. Design implementation considerations are highlighted in Table 6-1. Technical Memorandum – Design Basis, and Technical Memorandum – Design of Richard's Memorial can be found in Appendix D-3 and D-4, respectively.

Table 6-1 Design Implementation Considerations for New Richard's Memorial WWPS

Component	CONSIDERATION
Property Requirements	New site location is proposed within the City of Mississauga Richard's Park Memorial and land acquisition to be coordinated accordingly. The required site area is approximately 2620 m^2. Exact property requirements will be confirmed during detailed design.
Noise and Vibration Considerations	Proposed site is located adjacent to a major arterial road Lakeshore Road W, in a public park Richard's Memorial Park and adjacent to a private residence. Noise and vibration considerations need to be implemented to minimize effect on resident and enjoyment of park to visitors.
Hydrogeological and Geotechnical Considerations	The Regional floodline is in close proximity to the new pumping station and the CVC is proposing to daylight a nearby creek. Hydrogeological and geotechnical preliminary investigations have been conducted and confirm an anticipated high-water table.
Natural Environment	A Butternut tree (Endangered) is located approximately 5m west of the existing Richard's Memorial Park parking lot. A Butternut Health Assessment is required as part of the Detailed Design phase, to determine the tree's health and status as it applies to the Endangered Species Act (ESA), 2007. Exemptions under Ontario Regulation 242/08 of the ESA may be possible if the tree is identified as either a hybrid, a Category 1, or a Category 2 tree. If identified as a Category 3 tree, impacts must be assessed to determine if an Overall Benefit Permit will be required. Approximately 11 trees have been identified for removal from the forested community on the west side of Richard's Memorial Park. An analysis of Tree Inventory information (WSP Arborist Report) suggests that 6 of these trees may have habitat potential Maternity Roosting Habitat (i.e. cavity trees). A minor habitat removal of this nature (0.1ha, or 0.003% of the overall feature) is unlikely to impact the overall ecological function of the feature, provided that mitigation measures such as timing windows to avoid disturbance to bats, migratory songbirds and nesting birds, and appropriate sediment and erosion control are employed. Opportunities to reconfigure the pumping station so that it does not impact or reduces the impact to the forested community are to be explored during detailed design.
Hydraulic Considerations	Estimation of flows to be conveyed to the Richard's Memorial WWPS using flow monitoring data, hydraulic modelling and population and unit flow design criteria. Design peak flow is estimated at 596 L/s. Design average day flow to the station to be 120 L/s.
Implementation Schedule	Subject to the completion of the Class EA, it is anticipated that design award will be issued in 2019 and construction start will begin in 2020. A period of approximately 24 months is assumed for construction.

Co-ordination with other Approved Projects	Project requirements to be coordinated with the proposed infrastructure route along Lakeshore Road W as the inlet tie-ins will be connected. Site access and infrastructure to be coordinated with the City of Mississauga Lakeshore Road Transportation Master Plan and Implementation Strategy. Existing floodplain delineation to be coordinated with Credit Valley Conservation as may alter due to future plans for Lornewood Creek daylighting.

6.2.3 CONSTRUCTION METHOD

Construction of the new Richard's Memorial WWPS will require extension to below the groundwater table and will require buried exterior walls with backfill material. Based on the geotechnical and hydrogeological studies conducted, potential construction excavation water takings are anticipated to be high with a bedrock surface approximately 3.0 – 6.0m below the existing ground surface. Secant pile (caisson) walls or similar should be considered to cut off the groundwater seepage within the area. Review of the most appropriate method of construction should be taken during detailed design.

Figure 6-1 Preferred Site Location for New Richard's Memorial Park WWPS

6.3 PROPOSED LINEAR INFRASTRUCTURE ROUTE

6.3.1 PREFERRED LINEAR INFRASTRUCTURE ROUTE

As evaluated in Table 5-6, the preferred linear infrastructure route for the proposed wastewater diversion sewer was determined to be Route #1. Route #1 travels underneath Lakeshore Road W from the decommissioned Front Street WWPS to the new Site #7 location described in Section 6.1 above. The new Richard's Memorial WWPS then "lifts" the wastewater to a discharge maintenance hole on Lakeshore Road W in front of the WWPS. The wastewater diversion sewer will then continue form the new Richard's Memorial WWPS's discharge maintenance hole west towards the existing Jack Darling WWPS.

The preferred linear infrastructure route for the proposed wastewater diversion sewer provides the following key benefits:

- Straight line route allows for easier construction;
- Within the Region of Peel's right-of-way, minimal property acquisition is expected;
- No identified non-compliance with applicable planning or environmental policies; and,
- No identified archaeological or Species at Risk impacts.

6.3.2 IMPLEMENTATION CONSIDERATIONS

Preliminary plan and profile drawings were developed for the preferred linear infrastructure route indicating potential shaft locations. The plan and profile drawings and sewer design sheet can be seen in Appendix E-1. The size of the sewer was determined considering the projected flows through the sewer.

Table 6-2 Design Implementation Considerations for New Lakeshore Road W Sewer

Component	CONSIDERATION
Property Requirements	The new sewer alignment is proposed within the right-of-way and land acquisition is not expected. Exact property requirements will be confirmed during detailed design.
Transportation Considerations	Construction of the new sewer is within a major arterial roadway. Appropriate traffic measures will need to be implemented to ensure the safety of road motorists, cyclists, and pedestrians is maintained and minimal disruption occurs.
Noise and Vibration Considerations	Noise and vibration considerations need to be implemented to minimize effect on resident and businesses in the area.
Hydrogeological and Geotechnical Considerations	Hydrogeological and geotechnical preliminary investigations have been conducted and confirm an anticipated high-water table. Appropriate design measures are to be implemented during detailed design to ensure an effective construction methodology is implemented.
Hydraulic Considerations	Estimation of flows from the Front St WWPS drainage area and flows to be conveyed to the Richard's Memorial WWPS using flow monitoring data, hydraulic modelling and population and unit flow design criteria.

Component	CONSIDERATION
	Projected beyond 2041 flow is estimated at 596 L/s to be used to size the sewer that diverts flows from the current Front St WWPS to future Richard's Memorial WWPS.
Natural Environment	Compound limits at MH1 and MH2 will impact riparian vegetation along the banks of the Credit River. The impacts to the stability of the banks removal of the tree cluster labeled CL-7 is to be minimized. The compound limits should ensure vegetation along creek banks is not impacted. The gravity sewer crosses four identified watercourses (Birchwood Creek, Moore Creek, Tecumseh Creek, and Lornewood Creek). A minimum depth of 2m from the invert of the creek (crossing) to the obvert of the tunnel is acceptable to the CVC. If 2m depth is not achievable geomorphic assessment is required.
Implementation Schedule	Subject to the completion of the Class EA, it is anticipated that design award will be issued in 2019. A period of approximately 24 months is assumed for construction.
Co-ordination with other Approved Projects	Project requirements to be coordinated with the proposed new infrastructure route along Pine Avenue S and the new Richard's Memorial WWPS as the inlet tie-ins will be connected.

6.3.3 CONSTRUCTION METHOD

The preferred alignment along Lakeshore Road is located in a heavily developed urban neighbourhood. Lakeshore Road is a very busy urban arterial road with commercial, institutional and residential properties on both sides of the roadway. These factors, combined with the required depth of installation for the gravity sewer require the sewer to be constructed by trenchless technologies rather than open cut construction.

The proposed diameter of the sewer (minimum 1800mm) and the distances between potential MH/shaft locations, based on available working space, require that the sewer be constructed by tunnelling. Tunneling is completed by excavating shafts and using tunnel boring equipment to tunnel underground between the shafts. The only surface works involved with the tunnel construction are the temporary construction compounds at each shaft location at the beginning and end of each tunnel drive. In this scenario tunnel drive lengths vary between approximately 0.5 and 1.0 kilometers apart. After completion of construction, maintenance holes will be installed at the shaft locations to provide access to the gravity sewer for inspection and maintenance purposes.

The temporary construction compounds at each shaft will provide a staging area where construction equipment and materials can be stored, and excavated material (spoil) can be brought to the surface and hauled from the site in trucks. Staging areas around shafts will measure approximately 70 m x 50 m and will be fenced off. Once tunnelling is completed, the staging area will be restored to its original condition or enhanced. All potential shaft locations will be further refined upon consultation with property owners and stakeholders along Lakeshore Road W.

Tunnelling methodologies to be considered during the detailed design phase include conventional Tunnel Boring Machine (TBM), Earth Pressure Balance TBM (EPB TBM), and Microtunnel Boring Machine (MTBM). Preliminary geotechnical data indicate the tunnel will be constructed through mixed ground conditions varying from soft ground/overburden to shale bedrock. Combined with the Region's initiative to eliminate inflow and infiltration into the sanitary sewer system, the preferred tunnelling methodology at this point is Microtunnelling. A more detailed assessment of the preferred tunnelling methodology should be completed during the detail design phase once additional information is available and once the detailed geotechnical investigation has been completed.

6.4 PROPOSED BEN MACHREE WASTEWATER PUMPING STATION ALTERNATIVE

6.4.1 PREFERRED ALTERNATIVE FOR BEN MACHREE WWPS

As evaluated in Table 5-7, the preferred alternative for the Ben Machree WWPS was determined to be Alternative # 4. Alternative #4 includes decommissioning the existing Ben Machree wastewater pumping station and installing a gravity sewer which would run east along Ben Machree Drive, north along Maple Avenue S and north along Pine Avenue S to connect to the new gravity sewer along Lakeshore Road W. as per the preferred alignment identified in Section 6.3 above.

The preferred alternative for Ben Machree WWPS and the gravity sewer provides the following key benefits:

- Straight line route allows for easier construction and microtunnelling along the majority of the route, minimizing residential impact and cost;
- Within the Region of Peel's right-of-way, minimal property acquisition is expected;
- No identified non-compliance with applicable planning or environmental policies; and,
- No identified archaeological or Species at Risk impacts.

6.4.2 IMPLEMENTATION CONSIDERATIONS

Preliminary plan and profile drawings were developed for the preferred alternative indicating potential shaft locations. The plan and profile drawings can be seen in Appendix E-1. The size of the sewer was determined considering the projected flows through the sewer and microtunnelling construction restrictions.

Table 6-3 Design Implementation Considerations for New Ben Machree WWPS

Component	CONSIDERATION
Property Requirements	The new sewer alignment is proposed within the right-of-way and land acquisition is not expected. Exact property requirements will be confirmed during detailed design.
Transportation Considerations	Construction of the new sewer is within a residential street and adjacent to some businesses. Appropriate traffic measures will need to be implemented to ensure the safety of motorists, cyclists, and pedestrians is maintained and minimal disruption occurs. Coordination of vehicular access to the car dealership located at Pine Avenue S and Lakeshore Road W will need to be considered.
Noise and Vibration Considerations	Noise and vibration considerations need to be implemented to minimize effect on resident and businesses in the area.
Hydrogeological and Geotechnical Considerations	Hydrogeological and geotechnical preliminary investigations have been conducted and confirm an anticipated high-water table. Appropriate design measures are to be implemented during detailed design to ensure an effective construction methodology is implemented.

Component	CONSIDERATION
Implementation Schedule	Subject to the completion of the Class EA, it is anticipated that design award will be issued in 2019. A period of approximately 18 months is assumed for construction, in conjunction with the Lakeshore Road W sewer.
Co-ordination with other Approved Projects	Project requirements to be coordinated with the proposed new infrastructure route along Lakeshore Road W as the inlet tie-ins will be connected.

6.4.3 CONSTRUCTION METHOD

The gravity sewer proposed along Ben Machree Drive from the existing pumping station to Pine Avenue S may be completed by open cut construction as the sewer is relatively shallow (4-6m below ground surface) and is relatively short in length and therefore will not cause significant disruption to the area. Open cut construction involves excavating a trench and laying the sewer pipe in the trench, and subsequently backfilling the trench.

However, the depth of the proposed sewer along Pine Avenue S, and the urban residential nature of the neighbourhood require the sewer to be constructed in tunnel from Ben Machree Drive to Lakeshore Road. The length of the sewer along Pine Avenue S is approximately 465m. To complete this drive without constructing intermediate shafts will require the use of a 1200mm dia. microtunnel boring machine. It is proposed that the Maintenance hole 3 shaft serve as the launch shaft for the construction of the Pine Avenue S sewer as more space is available for staging tunnelling equipment and materials. The shaft at Ben Machree Drive will serve as the exit shaft. After completion of construction, maintenance holes will be installed at the shaft locations to provide access to the gravity sewer for inspection and maintenance purposes.

6.5 CONSTRUCTION COST ESTIMATE

A construction capital cost estimate was completed for the preferred solution consisting of construction of a new gravity sewer along Lakeshore Road (from Front St to Jack Darling WWPS) and Pine Ave, construction of a new WWPS in Richard's Memorial Park and construction of new twin forcemains.

For the preferred linear route option, the cost estimate reflects the scope of work associated with decommissioning the Front St WWPS, Ben Machree WWPS and Richard's Memorial WWPS and constructing a new sewer along Lakeshore Road W and Pine Avenue S via tunnelling and open cut construction methodology. The capital cost of constructing the Lakeshore Road W sewer was only conducted for the preferred option as it was the only technically viable route. The construction cost breakdown is provided in Table 6-4 below and includes the capital cost of constructing the preferred route option for the Ben Machree WWPS alternative.

As there were a number of technically viable options for the Ben Machree WWPS alternative route, capital cost estimates were provided as part of Technical Memorandum – Ben Machree Alignment provided in Appendix D-6. Further, as the Ben Machree WWPS alternative was not deemed to be critical path, a lifecycle cost analysis was conducted on all the route options to verify whether this work would be cost effective to include as part of the Lakeshore Road W linear infrastructure or to pursue at a later date. The findings of the lifecycle cost analysis indicated that inclusion in conjunction with Lakeshore Road W would be the most cost-effective solution. The detail of the lifecycle cost analysis is provided in Technical Memorandum – Ben Machree Alignment in Appendix D-6. The complete cost estimate of the linear infrastructure preferred route can be found in Appendix D-7.

Table 6-4 Construction Cost Estimate of Linear Infrastructure Preferred Route

Scope Component	Subtotal
Decommissioning of Existing Pumping Stations and Forcemains	$ 600,000.00
Ben Machree Diversion Sewer and Shafts	$ 3,360,000.00
Shaft 1 and MH Construction (Front St. SPS)	$ 360,000.00
1800mm Sewer in Tunnel MH1 to MH2	$ 370,000.00
Shaft 2 and MH Construction	$ 360,000.00
Tunnel MH2 to MH3	$ 4,600,000.00
Shaft 3 and MH Construction	$ 550,000.00
Tunnel MH3 to MH5	$ 19,300,000.00
Shaft 5 and MH Construction	$ 700,000.00
Shaft 6 and MH Construction	$ 250,000.00
Tunnel MH6 to MH7	$ 5,000,000.00
Shaft 7 and MH Construction	$ 450,000.00
Tunnel MH7 to MH8	$ 4,300,000.00
Shaft 8 and MH Construction	$ 650,000.00
Tunnel MH8 to MH9	$ 2,250,000.00
Shaft 9 and MH Construction (Jack Darling)	$ 300,000.00
SUBTOTAL - (LESS H.S.T.)	$ 43,400,000.00

Subtotal	$	43,400,000.00
Engineering (10%)	$	4,340,000.00
Contingency (30%)	$	13,020,000.00
Grand Total	**$**	**60,760,000.00**

For the preferred new Richard's Memorial WWPS, the cost estimate reflects the scope of work associated with constructing the new pumping station using caisson shoring systems. The construction cost breakdown is provided in Table 6-5 below. The complete cost estimate of the pumping station can be found in Appendix D-7.

Table 6-5 Construction Cost Estimate of New Richard's Memorial WWPS

Division	Division Subtotal
Division 01 - General Requirements	$ 3,500,000.00
Division 02 - Site Work	$ 1,177,000.00
Division 03 - ConcreteWork	$ 4,200,000.00
Division 04 - Masonry	$ 101,000.00
Division 05 - Metals	$ 82,000.00
Division 06 - Rough Carpentry	$ 125,000.00
Division 07 - Building Specialties	$ 373,000.00
Division 08 - Doors and Hardware	$ 30,000.00
Division 09 - Drywall and Painting	$ 14,000.00
Division 10 - Miscellaneous Specialties	$ 8,000.00
Division 11 - Equipment	$ 2,560,000.00
Division 13 - Instrumentation and Control	$ 485,000.00
Division 14 - Conveying Systems	$ 900,000.00
Division 15 - Mechanical	$ 2,666,000.00
Division 16 - Electrical	$ 3,150,000.00
SUBTOTAL - Div 1-16 (LESS H.S.T.)	$ 19,370,000.00

Subtotal	$	19,370,000.00
Engineering (10%)	$	1,940,000.00
Contingency (30%)	$	5,810,000.00
Grand Total	**$**	**27,120,000.00**

7 IMPACT MITIGATION MEASURES

A review of existing conditions and consultation with affected landowners identified potential impacts associated with the construction and operation of the new Richard's Memorial WWPS, Sewer along Lakeshore Road W and Pine Avenue S. The potential impacts and mitigation measures to be carried forward into detailed design and construction to eliminate or lessen the potential impacts is listed below.

Table 7-1 Mitigation Measures for Proposed New Richard's Memorial WWPS

Potential Impacts	**Mitigation Measures** **New Richard's Memorial Wastewater Pumping Station**
Emissions and Noise from Pumping Station Operations	Mainly due to mechanical equipment and standby generator operations, exhausts and silencers will be included in the design of the Pumping Station to meet Ministry requirements with respect to emission and noise.
Odorous Gases/ Adverse Air Quality Impacts	Point source odour control measures will be incorporated into the design to reduce the potential for odour issues impacting the surrounding area.
Aesthetic Impacts	Landscaping, vegetation and architectural features will be included in the design to suit the park landscape of its location.
Utility Relocation	Should utility relocations be required during construction of the forcemain and gravity sewers, it shall be coordinated with appropriate utility companies during detailed design.
Use of Privately or Publicly Owned Land	Land transfer from the City of Mississauga is required for the work of this project.
Tree Removal and Excavation Adjacent to Retained Trees	Any tree removals will require appropriate permits prior to removal. Protected trees will be identified and protected per City requirements throughout the duration of construction. All tree/vegetation removals are to be completed outside of the sensitive period for breeding migratory birds (April 1- August 31) to comply with the Migratory Birds Convention Act (MBCA). Opportunities to reconfigure the pumping station so that it does not impact or reduces the impact to the forested community are to be explored during detailed design.
Contaminated Soil Disposal and Spills Prevention	Re-fueling of equipment and fuel storage should be conducted in designated areas (potentially off-site) with spill protection.
Traffic Management	A Traffic Management Plan should be developed to minimize interference with the flow of traffic due to construction activities. The plan may include advance public notice of routing, signage, scheduling operations affecting traffic for off-peak hours; providing a flag person to guide traffic properly and ensure safety at construction sites. The plan will be completed prior to construction, in accordance with the Highway Traffic Act 1990. Construction works impacting roadways will be minimized wherever possible.

Potential Impacts	**Mitigation Measures** **New Richard's Memorial Wastewater Pumping Station**
Dust, Noise and Vibration	Temporary nuisance of noise during construction and other activities to be considered including hours of operation in accordance with City By-laws; use of vehicles/ machinery and equipment that are in good repair, equipped with emission controls, as applicable. Dust control measures may include wetting surfaces using a non-chloride based compound to protect water quality.
Erosion and/or Sedimentation Impacts	Erosion control measures shall be installed to protect exposed surfaces, control run-off and minimize the deposition of silt or suspended sediments due to site clearly, stockpiling, excavation and general construction. Any pumped water from dewatering activities should be discharged to settling areas or through filter media before entering surface water bodies. Temporary mitigation measures will be installed prior to the commencement of any site clearing, grubbing, excavation, filling or grading works and will be maintained on a regular basis. All disturbed areas should be re-vegetated as soon as possible following disturbance to stabilize the area and minimize erosion potential.

Table 7-2 Mitigation Measures for Proposed New Sewer along Lakeshore Road W and Pine Avenue S

Potential Impacts	**Mitigation Measures** **New Sanitary Sewer along Lakeshore Road W and Pine Avenue S**
Traffic Management	Lakeshore Road W is a heavy traffic corridor and consideration is to be given to road traffic including cars, buses, cycling and pedestrian safety. A Traffic Management Plan should be implemented to minimize interference with the flow of traffic due to construction activities. The plan may include advance public notice of routing, signage, scheduling operations affecting traffic for off-peak hours; providing a flag person to guide traffic properly and ensure safety at construction sites. The plan will be completed prior to construction, in accordance with the Highway Traffic Act 1990. Construction works impacting roadways will be minimized wherever possible.
Property Access	Access is within the public right-of-way.
Utility Relocations	Consideration will be given to the protection and support of existing underground utilities that may be impacted. Should utility relocations be required during construction of the gravity sewers, it shall be coordinated with appropriate utility companies during detailed design.
Tree Removal and Excavation Adjacent to Retained Trees	Any required tree removals will require appropriate permits prior to removal. Protected trees will be identified and protected per City requirements throughout the duration of construction.

Potential Impacts	**Mitigation Measures** **New Sanitary Sewer along Lakeshore Road W and Pine Avenue S**
	All tree/vegetation removals are to be completed outside of the sensitive period for breeding migratory birds (April 1- August 31) to comply with the Migratory Birds Convention Act (MBCA).
Erosion and/or Sedimentation Impacts	Consideration to the high water table will be given in the design of open cut sections of construction, and compound locations to ensure ground stabilization is provided to eliminate or minimize erosion. Utilization of groundwater dewatering systems will be employed as best suited to the environment.
Dust, Noise and Vibration	Construction of sewer is anticipated to be by microtunnelling construction for the majority of the route. Open-cut methods are expected at connection points to pumping stations. Depending on the selected construction methodology, the appropriate approval agency will be consulted and appropriate mitigation measures adhered to. Temporary nuisance of noise during construction and other activities to be considered including hours of operation in accordance with City By-laws; use of vehicles/ machinery and equipment that are in good repair, equipped with emission controls, as applicable. Dust control measures may include wetting surfaces using a non-chloride based compound to protect water quality.
Contaminated Soil Disposal and Spills Prevention	Re-fueling of equipment and fuel storage should be conducted in designated areas (potentially off-site) with spill protection.

8 PUBLIC AND AGENCY INPUT

8.1 AGENCY INPUT ON INITIAL FINDINGS

The following summarizes input received from agencies during project initiation.

Table 8-1 Summary of Input on Initial Findings

Source of Input	Input Received
Meeting Notes, City of Mississauga, November 7, 2016	- Traffic impact on Lakeshore Road W should be minimized - Short-term Park Access Permit required for short-term activities such as drilling/geotechnical investigation - Consent to Entry Permit required for non-intrusive activities - Road Occupancy Permit required for short-term activities - Noise By-Law Exemption Permit required if after hours work is needed - Tree Inventory and Landscaping plan should be developed as part of Site Plan Approval
Meeting Notes, Councillor Jim Tovey, November 24, 2016	- Probable important stakeholder locations - Inspiration of Port Credit Lands - Future possible LRT/Subway line along Lakeshore (Metrolinx) - Provide office with updates and distribute contact information to public
Meeting Notes, *Pre-consultation Meeting with CVC November 21, 2016*	- Floodline is not the same as regulation line - Information on existing natural designation features to be provided - Daylighting of adjacent creek in Richard's Memorial Park to be considered
Meeting Notes, Councillor Karen Ras, January 9, 2017	- Probable important stakeholder locations - Inspiration Port Credit Lands - Provide office with updates and distribute contact information to public
Letter – Ministry of Tourism, Culture and Sport, June 20, 2017	- Proponent is required to determine a project's potential impact on cultural heritage resources and built heritage - Screen the project for archaeological assessment requirements
Letter – Credit Valley Conservation, January 30, 2017	- Permit may be required for any grading or construction work within this area - Area traversed by tributaries of Lake Ontario, any alterations or crossings of watercourses require permit

Source of Input	**Input Received**
	- Area partially within Regulatory Storm Flood Plain, construction permit may be required - Area traversed by valley slopes, CVC does not support construction on a valley slope and requires set backs - Area within Credit River Watershed Natural Heritage System - Area within Fudger's Marsh (Clarkson Ravine) ESA - Area within Rattary Marsh Provincially Significant Wetland Complex, CVC does not support new development in these areas and an Environmental Impact Study Report may be required - Area within Lorne Park Prairie Life Science Area of Natural and Scientific Interest (ANSI), CVC does not support incompatible development - Area within Core Greenlands - Area may contain or provide habitat for a known Species-at-Risk, consultation with MNRF is advised, permit may be required - Subject to Lake Ontario Shoreline flooding and erosion hazard - Area within Mississauga Natural Heritage System and Natural Areas Survey, technical support provided by CVC - May be subject to Approved Source Protection Plan

8.2 PUBLIC CONSULTATION COMMENTS AND RESPONSES

The following summarizes input received from the public during community outreach events.

Table 8-2 Summary of Place-Based Comments Received from PIC 1

General Location	Summary of Comments	Response
Rhododendron Gardens	Several plants in Rhododendron Gardens were donated and planted.	These comments will be considered in the evaluation of pumping station alternatives.
	A pump station in this location would not be supported by the community.	
	Maintain existing open space in Rhododendron Park.	
	Opposition to Rhododendron Park being a candidate for a pumping station.	
	Rhododendron gardens has recently been improved so additional disturbance is not ideal.	
	Rhododendron Gardens is the only botanical garden in Mississauga.	
Richard's Memorial Park	The Richard's Memorial Pumping Station is near Lakeshore, and does not interfere with the use of the park.	These comments will be considered in the evaluation of pumping station alternatives.
	Thousands of people use Richard's Memorial Park.	
	Any changes to Richard's Memorial should not negatively impact the use or the beauty of the park.	
Front Street Pumping Station	Coordinate closure with park redevelopment.	These comments will be considered in the evaluation of alternative solutions.
	After decommissioning, suggestion to make better use of the park space.	
Lakeshore Road	Several respondents expressed support for tunneling across Lakeshore Road.	Noted
Texaco / Imperial Oil Lands	How does this new development impact current conditions or align with the EA project?	The Project Team will account for additional flows from this development in the evaluation of alternatives.

Table 8-3 Summary of Additional Comments from PIC 1

Comment	Response
Concern that if everything is diverted to the west, then the west will be overloaded and there could be problems.	The Region has accounted for growth on the west side of Mississauga.
Significant growth already underway in Clarkson.	
The Queen Street West route is not preferred, given the street's uses (i.e. residential, parks, and schools). The disruptions, noise, dust would be problematic for these residents.	These comments will be considered in the evaluation of linear infrastructure alternatives.
The Front St W / Queen St W / Ibar Way option is unnecessarily long and affects residential streets and neighbourhoods.	
One of the alternative routes includes following the Waterfront Trail. This is not preferred because it would involve excavating contaminated soils and disturbing soil at 70 Mississauga Road (former Imperial Oil lands).	These comments will be considered in the evaluation of linear infrastructure alternatives.
Suggestion to hold a PIC at night (i.e. beyond 7:00 p.m.) to accommodate those commuting for work in downtown Toronto.	The Project Team will review internally and discuss with the local Councillor.
Suggestion to host a PIC on the east side of the Credit River for the Lorne Park Residents.	
Ensure that the Port Credit BIA and Ratepayers groups are included on the project contact list and notified about future events.	The Project Team will review the contact list and update accordingly.
The Texaco lands is entering the first phase of development and they may connect to the sewers leading to Front Street Station.	The Project Team will account for additional flows from this development in the evaluation of alternatives.

Table 8-4 Summary of Comments Received at PIC 2

Comment	Response
Concern that efforts in restoring buried creek will be ineffective if entire Lornewood Creek flow is not strictly enforced. Specifically, upstream water flow issues will negatively affect restoration.	This comment will be considered in detailed design phase in discussions with the Region.
Concern of traffic flow along Lakeshore Rd from QEW traffic and few alternative routes over the Credit River.	Recommendation to conduct traffic impact study and review during detailed design.

Table 8-5 Summary of Comments Received at PIC 3

Comment	Response
Suggestion to coordinate works with proposed surface improvements on Lakeshore Road	This comment will be considered during the detailed design phase in consultation with the Region.
Concern for the future of the Ben Machree building	Discussions have been initiated with the City of Mississauga. This will be reviewed during detailed design phase of the project.
Concern for traffic impacts on the community during the construction phase due to road lane restrictions, in particular along Lakeshore Rd.	This comment will be considered during the detailed design phase in consultation with the Region.
Attention should be given to traffic management initiatives long term with respect to synchronized traffic signals along the Port Credit business corridor between Maple and Hurontario.	This comment will be considered during the detailed design phase in consultation with the Region.
Suggestion to coordinate proposed works in Machree Park, Port Credit Memorial Park and the City's redevelopment of those parks in required. Request for further discussions regard the proposed site plan for the new pumping station at Richard's Memorial Park.	This comment was received from the City of Mississauga. A follow up meeting between the Region and the City to discuss these concerns is recommended.
Request to receive benefit\cost ratio analysis justifying removal of the pumping station.	This comment was received from a local resident. It is recommended that a copy of the Ben Machree decommissioning rationale report be provided and that the resident is engaged directly to ensure individual concerns are addressed.

9 IMPLEMENTATION

The following section identified the necessary permits and approvals required from various agencies during detailed design and prior to construction. These agencies include the Ministry of the Environment, Conservation and Parks (MECP), Credit Valley Conservation Authority (CVC), and the City of Mississauga.

9.1 REVIEW AGENCY APPROVALS

9.1.1 MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

Ministry of the Environment, Conservation and Parks (MECP) approvals will be required including:

- An Environmental Compliance Approval (ECA) is required as the wastewater diversion sewer and construction of a new WWPS is considered a "substantial addition to the existing system" for sewage and air/noise.
- An application to MECP may be required for a Permit to Take Water during construction for dewatering purposes.
- The preferred alternative for the location of the new WWPS within Richard's Memorial Park appears to encroach into a forested community. This community may provide suitable habitat for Species at Risk bats protected under the Endangered Species Act.
- The Natural Environment Assessment report (WSP, 2018) indicates an endangered Butternut tree is present adjacent to the preferred location of the new Richard's Memorial Park WWPS. A health assessment of the butternut is required to determine whether it requires protection during construction.

9.1.2 CITY OF MISSISSAUGA

Project components that take place within City of Mississauga owned property (Port Credit Park, Ben Machree Park and Richard's Memorial Park) may require permits to conduct work. Consultation with the City of Mississauga indicated that potential required permits include but is not limited to:

- Tree Removal Permit;
- Road Occupancy Permit;
- Application for Site Plan Approval; and
- Park Access Permit.

9.1.3 CREDIT VALLEY CONSERVATION

The CVC indicates that a permit may be required if development is within the vicinity of a:

- Watercourse;
- Floodplain;
- Valley Slope;
- Wetland;

- Lake Ontario; and/or,
- Hazardous Lands.

As such, a permit from the CVC will be required prior to construction. Although no permanent structures are located within the regulated CVC area, three of the temporary proposed shaft locations (as shown in the plan and profile drawings in Appendix E-1) and new pumping station are located within the regulated CVC area.

9.2 SITE SPECIFIC PERMITS AND APPROVAL

A review of site-specific permits and approvals will be dependant on the final design of the project works and should be reviewed during detailed design. Below is a list of probable permits and approvals to be considered.

Table 9-1 Permits and Approvals

Permit/ Approval	**New Richard's Memorial Wastewater Pumping Station**	**Linear Infrastructure Route**	**Ben Machree WWPS Alternative**
Ministry of the Environment, Conservation and Parks (MECP)	✓ May be exempt from requiring an ECA for standby power system per a new amendment to O.Reg 524/98 (Feb 2017) ✓ Pumping Station Sewage ECA ✓ Air / Noise ECA ✓ Permit to Take Water – for dewatering during construction	✓ Sanitary Sewer ECA ✓ Environmental Activity Sector Registration for construction dewatering activities - OR - ✓ Permit To Take Water – during construction	✓ Sanitary Sewer ECA ✓ Environmental Activity Sector Registration for construction dewatering activities - OR - ✓ Permit To Take Water – during construction
City of Mississauga – Planning and Building Department	✓ Minor Variance ✓ Site Plan Approval ✓ Building Permit ✓ Noise By Law Exception	✓ Noise By Law Exception	✓ Noise By Law Exception
City of Mississauga – Parks and Forestry	✓ Consent to Entry ✓ Parks Access Permit ✓ Tree Removal/ Protection	✓ Consent to Entry ✓ Parks Access Permit ✓ Tree Removal/ Protection	✓ Consent to Entry ✓ Parks Access Permit ✓ Tree Removal/ Protection
City of Mississauga – Transportation and Works Department	✓ Curb Cut Permit ✓ Road Occupancy Permit	✓ Curb Cut Permit ✓ Road Occupancy Permit	✓ Curb Cut Permit ✓ Road Occupancy Permit
Credit Valley Conservation	✓ Notification of Project Start	✓ Notification of Project Start	✓ Notification of Project Start

Permit/ Approval	**New Richard's Memorial Wastewater Pumping Station**	**Linear Infrastructure Route**	**Ben Machree WWPS Alternative**
	✓ CVC Permit	✓ Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Permit – for work adjacent to Credit River ✓ CVC Permit	
Electrical Safety Authority (ESA)	✓ ESA Approval	n/a	n/a
Occupational Health and Safety Act	✓ Pre-Start Health and Safety Review (PSR)	✓ Pre-Start Health and Safety Review (PSR)	✓ Pre-Start Health and Safety Review (PSR)

9.3 PROPERTY REQUIREMENTS

The preferred trunk sewer alignment and the potential construction compounds and shaft locations have been identified and are located either within the right-of-way, or within City of Mississauga lands, thus eliminating the need for acquisition of easements on private property. This will facilitate the detailed design phase and reduce the risk of delays to the detailed design and construction schedules. The City of Mississauga has been involved throughout the entire environmental assessment phase and has provided input for the Compound 1 and Compound 2 locations and was heavily involved in the discussions regarding the Richard's Memorial WWPS design and location. Furthermore, the City of Mississauga has agreed in principle to the proposed works. Combined with the benefits that the proposed trunk sewer and pumping station provide directly to the City, this will facilitate negotiations for the easements required in City of Mississauga property.

The easements required from the City of Mississauga are primarily located in open space and park land. Property impact plans have been prepared for these locations, copies can be found in Appendix E-3.

10 CONCLUSIONS

This Municipal Class EA Project File has been prepared to confirm that the proposed Front Street WWPS Wastewater Diversion project meets the requirements of the Environmental Assessment Act.

The preferred solution recommends decommissioning of the Front Street WWPS and forcemain, currently pumping east crossing the Credit River. Instead, a gravity sewer would be constructed conveying flows from the decommissioned Front Street WWPS west towards Richard's Memorial Park. The existing WWPS and forcemain within the Park will be decommissioned and demolish. A new Richard's Memorial WWPS will be constructed in the north-west corner of the Park, sized for the flows coming from the Front Street WWPS. The new Richard's Memorial WWPS will pump a short distance to a discharge maintenance hole on Lakeshore Road in front of the Park. The gravity sewer will then continue west from the discharge maintenance hole towards the existing Jack Darling WWPS. The existing Ben Machree WWPS and forcemain will be decommissioned and a new gravity sewer will be constructed from the station to Lakeshore Road W along Pine Avenue S.

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Appendix B
Feasibility Study Executive Summary

Feasibility Study for the Lakeshore Road West Sanitary Trunk Sewer Extension

Development and Evaluation of Options for the Lakeshore Road West Sanitary Trunk

June 12, 2020

Prepared for:

Region of Peel

Prepared by:

Stantec Consulting Ltd.

Revision	Description	Author		Quality Check		Independent Review	
1	Draft	D. Vanderydt	3/27/20	J.Ricker	3/27/20	A.Comeau	3/30/20
2	Draft 2	D. Vanderydt	4/21/20	J.Ricker	4/21/20	A.Comeau	4/23/20
3	Executive Summary	D. Vanderydt	5/11/20	J.Ricker	5/12/20	A.Comeau	5/12/20
4	Final	D. Vanderydt	6/10/20	J.Ricker	6/11/20	A.Comeau	6/12/20

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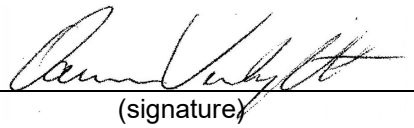
Prepared by 
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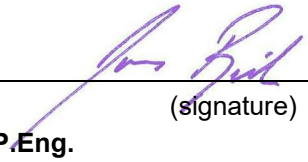
Darren Vanderydt, P.Eng.

Reviewed by 
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James Ricker, P.Eng.

Approved by 
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Adrien Comeau, M.Eng., P.Eng.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

EXECUTIVE SUMMARY

1. Purpose of Feasibility Study

Further to completing the Front Street Pumping Station (PS) Wastewater Diversion Class Environmental Assessment (Class EA) in June 2019, the Region of Peel (the Region) commissioned Stantec, with CIMA+, to advance the design development and implementation of the preferred solution identified in the Class EA. As a first step in advancing the design of the preferred solution, the Region requested Stantec to undertake a feasibility study to examine alternate design configurations that would allow the extension of the preferred solution (either in the near-term or longer-term) in order to maximize the value of the investment by providing added benefits within the context of broader system needs and servicing objectives.

In summary, key questions to be answered by the feasibility study are as follows:

- Should the preferred location for an upgraded pumping station be at Richard's Memorial Park with two tunnels or at Jack Darling Memorial Park with a single continuous tunnel?
- Is there value in deepening the tunnel for constructability and/or functional reasons?
- Is there value in extending the preferred Class EA solution further west to the Clarkson Wastewater Treatment Plant (WWTP)?
- Is there value in making the tunnel deeper so that it can be extended east under the Credit River?
- Is there value in extending the tunnel east as far as the G.E. Booth WWTP?
- Is there value in extending the tunnel(s) beyond the current limits of the Class EA at this time (i.e. east or west of the current limits)?

The Region's long-term master plan recommends that wastewater be diverted away from the G.E. Booth WWTP to the Clarkson WWTP due to G.E. Booth's limited capacity to expand and support the planned growth of its current catchment area. The 2019 Front Street PS Wastewater Diversion Class EA was primarily focused on addressing issues related to the condition of the Front Street PS as well as capacity limitations within the Richard's Memorial PS (RMPS). As such, the Class EA study was focused on the development of a preferred servicing solution for those pumping stations and their respective tributary areas. The result is that, within its current limits and elevation, the shorter trunk sewer represented by the preferred Class EA solution (hereby referred to as the baseline solution) has limited ability in the extent of the tributary area (149 ha) that it can divert from the east to the west and limited storage capacity to attenuate peak flows (or provide for emergency storage for the remaining SPSs).

The feasibility study has thus developed and evaluated a number of alternative options that have the ability to enhance the value of the investment by achieving the following core objectives:

> **Manage flow capacity (in-system and at WWTPs)** – by providing the flexibility to divert flows (east to west) from G.E. Booth WWTP to the Clarkson WWTP. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson WWTP has a greater ability to accommodate future capacity expansions.
>
> **Reduce Total Expenditure -** by considering Total Expenditure costs over the long term, the project can reduce life-cycle costs by reducing the number of operating sewage pumping stations (thus eliminating the need for future upgrade, rehabilitation and on-going operating costs).
>
> **Provide Added System Resiliency for Changing Conditions-** The preferred alternative should have enough capacity to accommodate additional flow without significant added investment or provide the ability to extend/expand the infrastructure in the future. Increased flows could be from growth, climate change or other factors.

The evaluation demonstrated that the baseline solution is limited in its ability to provide added benefits and operational flexibility beyond the specific objectives of the original 2019 Class EA. Relative to the other potential alternatives, the baseline option is limited to diverting 149 ha of area from the east to the west because it is too shallow relative to the elevation of the Credit River. It is also limited in its ability to provide for significant life-cycle cost savings given that it is limited to decommissioning two (2) tributary pumping stations. The shallower tunnel, relative to other options, is also limited in its ability to effectively use the full tunnel volume for in-line storage before backflowing into the connecting sewer from the Ben Machree service area.

2. Alternative Configurations and Options

A long list of alternative options, consisting of six (6) alternate configurations and extensions of the baseline Class EA solution were developed, evaluated and compared relative to each other and the baseline Class EA solution. Each alternative was evaluated for their ability to add value relative to the core project objectives as well as relative to other criteria that included:

- Flexibility for Future Extension of the Tunnel Solution
- Ability to Provide Added Operational Flexibility
- Improve or Maintain Long Term Operational Sustainability
- Impacts on Project Approvals and Schedule
- Mitigation of Constructability Risks
- Mitigation of Socio-Economic Impacts

2.1 Baseline Class EA Solution

The baseline Class EA solution consists of the following components:

1. **Two 1.8 m diameter trunk sewers:** A new deep gravity trunk sewer along Lakeshore Road from Front Street to RMSPS and construction of a new, higher level, gravity trunk sewer along Lakeshore Road from RMSPS to Jack Darling SPS (JDSPS).

2. **Upgraded RMSPS:** Construction of a higher-capacity lift station, complete with an emergency storage tank, to replace the existing RMSPS.

3. **Pump Station Decommissioning:** Decommissioning of both the existing Front Street SPS and Ben Machree SPS (BMSPS) (by construction of a new gravity sewer on Pine Avenue from Lakeshore Road West to BMSPS).

2.2 Alternative Solutions

A total of six (6) alternatives to the baseline Class EA solution, hereby described as alternative options, were developed and evaluated with the view of incrementally assessing added value and answering the key questions posed by the feasibility study. For the purposes of the feasibility study and initial analysis, a preliminary tunnel diameter of 3 m has been selected in order to provide a more conservative estimate of cost in comparing the benefits of the alternatives relative to the baseline solution, which recommends a 1.8 m diameter tunnel. Similarly, increased tunnel depths were conservatively selected for each option based on limited sub-surface conditions data (particularly at the Credit River crossing). The 3 m diameter tunnel diameter was also selected to provide for maximum operational flexibility related to diversion capacity and providing for effective in-tunnel storage volume for the purposes of attenuating peak flows and providing for emergency storage.

The alternative options are illustrated on **Figure ES-1** and **Figure ES-2** and consist of the following:

2.2.1 ALTERNATIVES WITHIN CURRENT LIMITS OF CLASS EA

Option 1: Tunnel Entirely within Rock and Within Current Limits of Class EA

This alternative considers an option that is designed to remain within the current limits of the Class EA boundaries. It explores the added value of lowering the tunnel to an invert depth of roughly 68 m at Front Street (4 m deeper than baseline) in order to mitigate the risks associated with mixed face tunnel construction while also increasing the tunnel diameter to facilitate deeper tunnel construction. It also considers the added benefit that the deeper tunnel has in effectively providing added in-tunnel storage volume for peak flow attenuation as well as emergency storage – thus negating the need for an adjacent storage tank at the Richard's Memorial site. Finally, it also explores the merits of relocating the planned PS upgrades from Richard's Memorial Park to Jack Darling Park through the evaluation of two variations of Option 1, namely:

Option 1a: Upgraded PS at Richard's Memorial Park (complete with 1,975 m long tunnel and 20 m deep wet well pumped to Jack Darling SPS).

Option 1b: Upgraded PS at Jack Darling Park (complete with continuous 2,920 m long tunnel from Front Street to Jack Darling Park with a new 33 m deep wet well integrated into the operation of the existing Jack Darling 1 SPS.

Option 1: Tunnel Entirely within Rock and Within Current Limits of EA (Upgrade at RMSPS or JDSPS)

Option 4: Continuous Tunnel Extension between G.E. Booth and Clarkson WWTPs

Option 2: Tunnel Extension West (from Front St SPS to Clarkson WWTP)

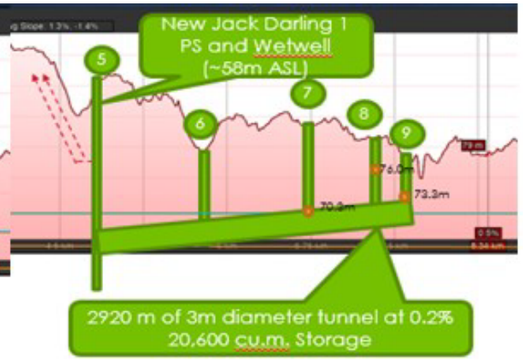
Option 5: Two-Level Tunnel Extensions between Clarkson and G.E. Booth WWTPs

Option 3: Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP)

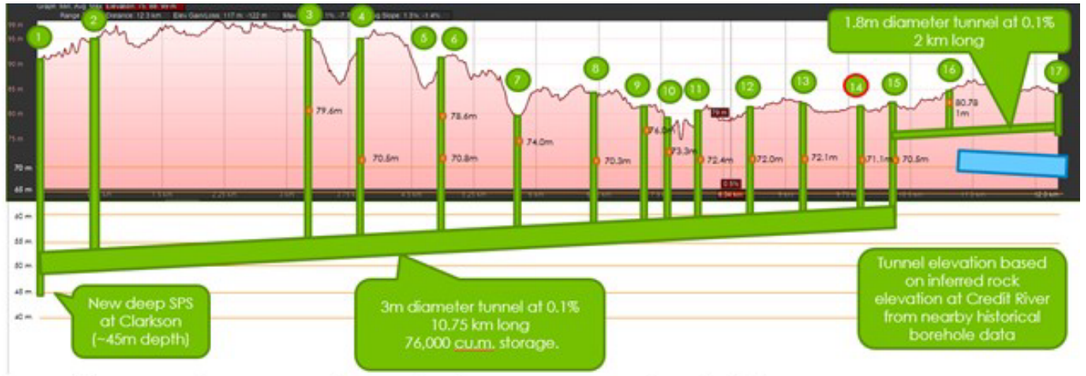
Option 6: Variation of Option 5 with Downstream Forcemain Extension (instead of higher-level tunnel)

Figure ES-1: Alternative Options (Plan View)

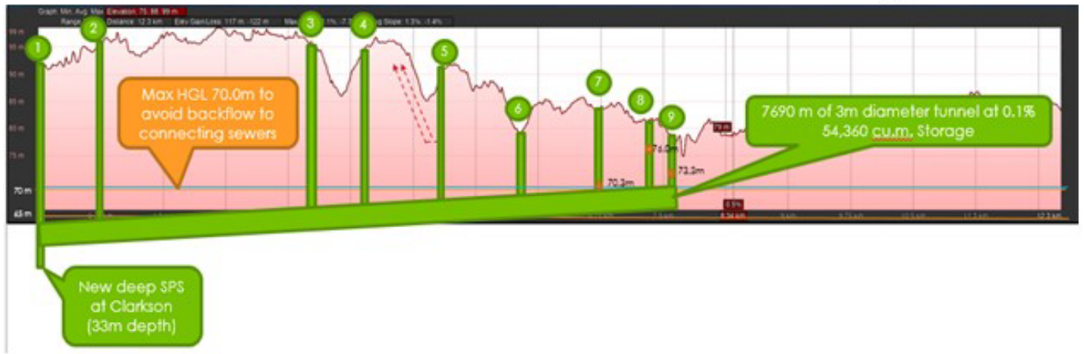
Option 1a: Tunnel Entirely within Rock and Within Current Limits of EA & Upgrade at RMSPS



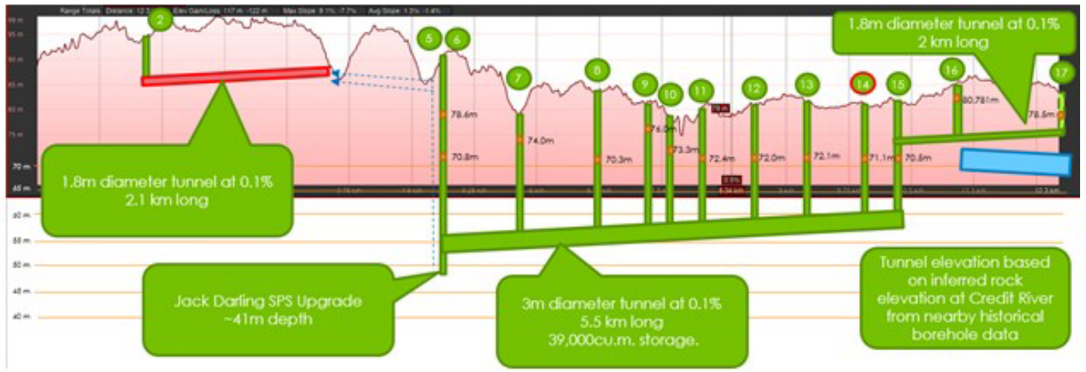
Option 1b: Tunnel Entirely within Rock and Within Current Limits of EA & Upgrade at JDSPS



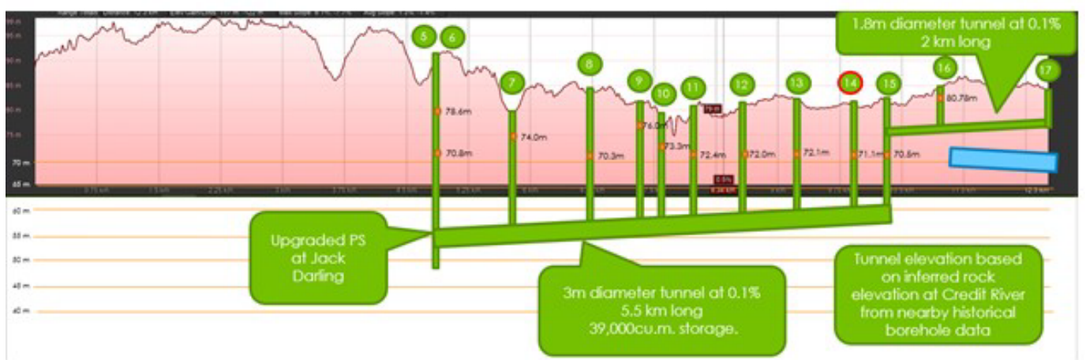
Option 4: Continuous Tunnel Extension between G.E. Booth and Clarkson WWTPs



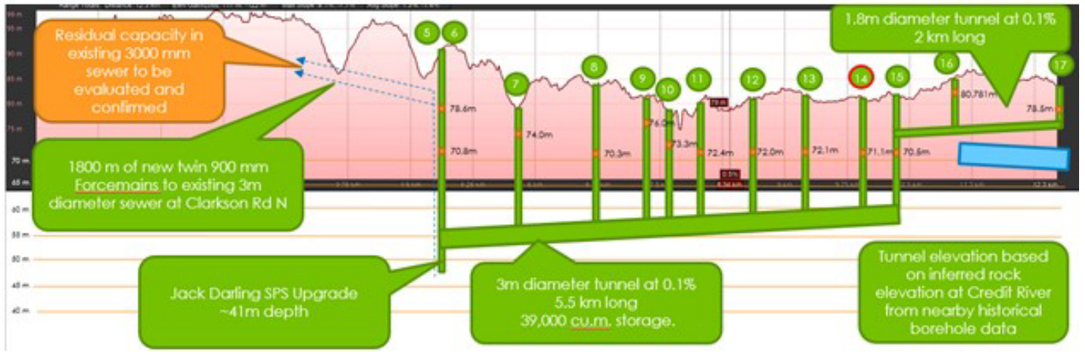
Option 2: Tunnel Extension West (from Front St SPS to Clarkson WWTP)



Option 5: Two-Level Tunnel Extensions between Clarkson and G.E. Booth WWTPs



Option 3: Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP)



Option 6: Variation of Option 5 with Downstream Forcemain Extension (instead of higher-level tunnel)

Figure ES-2: Alternative Options (Profile View)

2.2.2 ALTERNATIVES EXTENDING WEST OR EAST OF CURRENT EA LIMITS

The following options examine the added value of extending the proposed tunnel(s) either west or east of the current Class EA limits:

Option 2: Tunnel Extension West (from Front Street SPS to Clarkson WWTP)

This option considers the merits of only providing an extension west of the current Class EA boundaries by constructing a continuous tunnel from the Front Street SPS to the Clarkson WWTP, complete with a 33 m deep PS wet well at the Clarkson WWTP (i.e. rather than a PS upgrade at Richard's Memorial Park). The alternative thus considers a tunnel depth similar to Option 1 (entirely within rock) and a total tunnel length of 7,690 m at a preliminary tunnel diameter of 3 m.

Option 3: Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP)

This option considers the merits of only providing an extension east of the current Class EA boundaries by constructing a continuous tunnel from the Jack Darling 1 (JD1) SPS to the G.E. Booth WWTP. The tunnel includes a deep adjunct wet well station located at Jack Darling Park that would be integrated with the existing JD1 SPS (i.e. rather than a PS upgrade at Richard's Memorial Park). This option considers a tunnel depth that is deeper than Options 1&2 (and 16 m deeper than baseline at Front Street) to safely cross the Credit River (i.e. the controlling depth for all east extension options). A preliminary tunnel diameter of 3 m is selected for the same reasons as Options 1 and 2.

As illustrated in **Figure ES-1**, this option considers that the 3 m diameter tunnel would be extended from JD1 SPS to Alexandra Road along with a higher level 1800mm and 1.15 km long gravity sewer from Alexandra Road to G.E. Booth WWTP (both at a slope of 0.1%). The 1800 mm sewer would be constructed at a higher elevation in order to cross above and avoid a potential conflict with the Hanlan Feedermain.

While extension of the tunnel to G.E. Booth would allow for the decommissioning of up to 10 sewage pumping stations if the Beechwood SPS were decommissioned. Option 3, however, assumes that nine (9) stations are decommissioned and that the Beechwood SPS would remain in operation for the duration of the life-cycle in order to provide flexibility to direct flows from its service area either east (pumped to G.E. Booth WWTP) or west (by gravity to Clarkson WWTP). The tunnel would still, once extended to Beach Street, provide an outlet and sufficient storage to act as an emergency overflow for the Beechwood SPS's full service area. This considers that the decision to decommission Beechwood may be deferred to the longer term when the costs for a major station upgrade could be avoided by simply decommissioning the station.

2.2.3 ALTERNATIVES EXTENDING BETWEEN CLARKSON AND G.E. BOOTH WWTPs

The following three options (also illustrated in **Figure ES-1**),represent variations on the alternative to fully extend the preferred Class EA solution both east and west from its current limits to provide added capacity to divert flows between the G.E. Booth and Clarkson WWTPs. All three alternatives integrate the same Option 3 tunnel, which represents the conduit between the limits of the east extension between Jack Darling Park and the G.E. Booth WWTP. Each option is further described as follows:

Option 4: Continuous Tunnel Extension between G.E. Booth and Clarkson WWTPs

This option considers the merits of providing a continuous tunnel between G.E. Booth and Clarkson WWTPs, effectively extending the Option 3 tunnel from its westerly limit at Jack Darling Park to the Clarkson WWTP, complete with a deep PS at the Clarkson WWTP. In total, this option would be comprised of a new 10.75 km long deep tunnel from Clarkson WWTP to Alexandra Road along with a higher level 1800mm and 1.15 km long gravity sewer from Alexandra Road to G.E. Booth WWTP. At a preliminary slope of 0.1% and with the controlling elevation of the tunnel being the crossing at the Credit River, the PS wet well at Clarkson WWTP would be 45 m deep (i.e. 12 m deeper than under Option 2).

Option 5: Two-Level Tunnel Extensions between Clarkson and G.E. Booth WWTPs

Option 5 consists of the same elements as Option 3 from Jack Darling SPS to G.E. Booth but with the additional provision that a higher-level 1.8 m diameter gravity sewer can be built downstream of Jack Darling PS. The higher-level sewer would extend to the existing trunk sewer at Southdown Road and Orr Road with the peak flows discharged from the JD1 SPS limited to the capacity of the downstream sewer at the downstream connection point. This considers that the peak flows to, and downstream of, Jack Darling 1 SPS can and would be attenuated by the in-line storage made available by the implementation of the upstream infrastructure under Option 3.

Option 6: Variation of Option 5 with Downstream Forcemain Extension (instead of higher-level tunnel)

Option 6 is similar to Option 5, with the exception that upgraded forcemains and related station upgrades are provided as a lower cost alternative to the construction of a higher-level tunnel to provide for additional discharge capacity downstream of the existing JD1 SPS. Similar to Option 5, the peak flows discharged from the JD1 SPS would be limited to the capacity of the downstream sewer at the downstream connection point. This considers that the peak flows to, and downstream of, Jack Darling 1 SPS can, and would be, attenuated by the in-line storage made available by the implementation of the upstream infrastructure under Option 3.

3. Alternatives Evaluation Results and Conclusions of Analysis

A matrix-based evaluation of alternatives was undertaken by comparing alternatives based on criteria representing the core project objectives as well as the other criteria listed in Section 2 of this summary document. The definitions of the evaluation criteria, their associated criteria weightings, and the alternative options themselves were reviewed and refined with input provided by the Region's stakeholder committee at a workshop held in December 2019. The scoring results of this evaluation are summarized in **Table ES-1** below.

Table ES-1: Summary Scoring Results for Long List of Alternative Options

		Score (%)	
		Unweighted	**Weighted**
Baseline	W20 Port Credit West Tunnel from Front to Richard's Memorial and Higher Tunnel to Jack Darling 1	53	46
Option 1a	Tunnel Entirely within Rock with Upgrade at Richards Memorial Park (within limits of EA Boundaries)	51	45
Option 1b	Tunnel Entirely within Rock with Upgrade at Jack Darling SPS (within limits of EA Boundaries)	58	53
Option 2	Tunnel Extension West (from Front Street SPS to Clarkson WWTP)	47	45
Option 3	Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP)	76	78
Option 4	Continuous Tunnel Extension between G.E. Booth and Clarkson WWTPs	64	70
Option 5	Two-Level Tunnel Extensions between Clarkson and G.E. Booth WWTPs	69	73
Option 6	Variation of Option 5 with Downstream Forcemain Extension (instead of higher-level tunnel)	73	74

From this initial analysis, it was demonstrated that there is limited value in only extending the tunnel west of the current Class EA limits and that the greatest value is derived by making the tunnel deep enough to safely extend east across the Credit River. In this manner, the tunnel can be extended east to divert additional service area from the east to the west while also providing the ability to decommission additional pumping stations for significant life-cycle cost savings over the course of 90 years. It was also demonstrated that a pumping station upgrade at Jack Darling Park is preferred over an upgrade at Richard's Memorial Park – both from the perspective of environmental and social impact mitigation as well as being able to better manage downstream capacity upgrade needs by leveraging additional in-line storage capacity within a tunnel that extends over a longer distance (i.e. from Front Street to Jack Darling Park). The upgrade at Jack Darling Park would also allow for the decommissioning of the SPS at Richard's Memorial Park. If constructed at the depth proposed under Option 3, it would also allow for the gravity connection and decommissioning of the JD2 SPS.

A refined short-list of options was thus defined and evaluated further from a functional and a life-cycle cost assessment basis (based on a 90-year present value life-cycle cost analysis). The lifecycle cost assessment considers capital costs for the proposed tunneling work, decommissioning of SPS's, gravity connections from existing SPS's along with operation and maintenance costs for the new assets over the

90-year lifecycle. The life-cycle cost savings considered in the assessment include operation and maintenance costs along with future replacement costs for decommissioned SPS's over the next 90 years. For each alternative, the present value of the total costs and savings over the lifecycle of the project are compared using the Investment Savings Ratio (ISR), which expresses the lifecycle savings divided by the lifecycle costs.

Summary results of life-cost analysis for the short-listed Options 3 through to 6 are summarized in **Table ES-2** and compared with the baseline option. The cost benefits provided by each option are compared on the basis of the ratio of the overall savings realized over the 90-year life-cycle over the total life cycle costs that will result with the investment of the new infrastructure (hereby referred to as the Investment Savings Ratio). It is clear that the initial investment in the alternative options is significantly larger than the baseline solution cost, however, the magnitude of the overall cost savings in terms of both the absolute value and its proportion relative to the overall resultant life cycle cost is significantly larger than the baseline.

Table ES-2: Summary of Present Value Life-Cycle Cost Analysis of Short-Listed Options

Alternative Option	Baseline Option	Option 3	Option 4	Option 5	Option 6
Capital Cost (2020 Dollars)	$65 M(1)	$187 M	$291 M	$227 M	$209 M
PV Lifecycle Investment (3)	$88 M	$215 M	$324 M	$259 M	$239 M
PV Lifecycle Savings (3)	$24M	$111 M(2)	$157 M(2)	$111 M(2)	$111 M(2)
Investment Savings Ratio	0.28	0.52	0.49	0.43	0.46
Tunnel Length	2,960 m (1.8 m Ø)	5,500 m (3 m Ø) 2,000 m (1.8 m Ø)	10,750 m (3 m Ø) 2,000 m (1.8 m Ø)	5,500 m (3 m Ø) 4,100 m (1.8 m Ø)	5,500 m (3 m Ø) 2,000 m (1.8 m Ø)
No. of SPS's Decommissioned	2	9	12	9	9

(1) Baseline Option does not include decommissioning and gravity connection of Indian Road SPS

(2) Assumes that operation of Beechwood SPS is maintained for operational flexibility. Decommissioning of the station prior to the next major refurbishment (assumed to be 2070) will provide further life cycle cost savings.

(3) Assumed interest rate of 4% and inflation rate of 2%.

The primary conclusions drawn from the analysis of alternatives are discussed further in the following sections.

3.1 Alternatives Within Current Limits of Class EA

Baseline Class EA Solution: The evaluation demonstrated that the baseline solution is amongst the lowest scoring alternatives because it is limited in its ability to provide added benefits and operational flexibility beyond the specific objectives of the original Class EA. Specifically, the baseline option is limited to diverting 149 ha of area from the east to the west because it is too shallow relative to the elevation of the Credit River. Relative to other alternatives, it is also limited in its ability to provide for significant life-cycle cost savings given that it is limited to decommissioning three (3) tributary pumping stations (with Indian Rd SPS) and it is limited in its ability to effectively use the full tunnel volume for in-line storage before backflowing into the connecting sewer from the Ben Machree service area.

Option 1: Tunnel Entirely within Rock and Within Current Limits of Class EA: As represented in the definition of alternatives, Option 1 evaluates the merits of deepening the tunnel solely for the purpose of mitigating construction risks associated with mixed-face tunneling as well as providing for more effective use of tunnel in-line storage capacity. Given that it still represents a relatively shallow tunnel option relative to other options, Option 1 is (like the baseline option) geographically limited in its reach and ability to divert a significant amount of service area from the east to the west. Even though it would be possible to extend Option 1 to the west (as in Option 2), this would not provide the ability to divert additional service area.

While Option 1 is not carried forward as a short-listed option, the primary conclusions that can be drawn and carried forward to other options lie in the evaluation of its Sub-Options 1a and 1b. Through the analysis of these sub-options, it is concluded that a longer tunnel with the location of a deeper wet well at Jack Darling is preferred over a shorter tunnel with the location of the upgraded station at Richard's Memorial Park. The reasons for this preference are:

- The construction of a large and relatively deep pumping station at Jack Darling Park (adjacent to existing Regional water and wastewater facilities) will have a lesser impact on mature trees in the area and will be less disruptive to the general community and adjacent property owners.
- The construction of a pumping facility at Jack Darling Park provides opportunity for the integration of the required deep wet well station with an existing and recently upgraded facility at a common location, rather than having to operate two separate facilities at different locations.
- Compared to a tunnel from Front Street to Richard's Memorial Park, the extension of a continuous tunnel from Front Street to Jack Darling Park provides for significantly more effective in-line tunnel storage volume, combined with a greater discharge capacity through the JD1 SPS, to effectively provide greater operational flexibility for managing peak flow discharges to the downstream system.

Based on the above conclusions, all subsequent options requiring a pumping station within the geographic boundaries of the current Class EA consider that the station will be located at Jack Darling Park.

3.2 Alternatives Extending Either West or East of Current Class EA Limits

Option 2: Tunnel Extension West (from Front Street SPS to Clarkson WWTP): On its own, Option 2 (west extension) is not a viable solution as it represents an additional capital investment in excess of $100M that, even if phased with the implementation of Option 1b, does not provide significant added value over the Baseline Class EA Solution. As a result, Option 2 was not carried forward as a viable alternative.

Option 3: Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP): An extension to the east of the Credit River with a deeper tunnel provides significantly greater value than one that only extends west of the current Class EA's geographic boundary. The primary reasons are as follows:

- Option 3 provides maximum benefit with the greatest amount east-west flow diversion potential (1000+ ha) and the ability to eliminate up to 10 SPS's. Under Option 3, however, it is assumed that the Beechwood SPS would remain in operation in order to provide flexibility for directing flows from its service area either east (i.e. pumped to G.E. Booth WWTP) or west (i.e. by gravity to Clarkson WWTP). The extended tunnel would also serve as an emergency overflow for the Beechwood SPS. As such, Option 3 considers that a total of nine (9) SPS's would be decommissioned (with the flexibility to decommission Beechwood in the future, if desired).

- The deeper tunnel under Option 3 also increases the likelihood that the tunneling can be performed entirely in rock, which reduces risks associated with tunneling in mixed face conditions.

- Option 3 also provides sufficient tunnel storage volume to attenuate and manage peak flows for the 25 year design storm (2041 conditions) in a manner that capacity upgrades downstream of the Jack Darling PS (i.e. beyond the existing capacity of 800 L/s) may not be necessary. Based on a discharge capacity of 800 L/s at JD1 SPS and the effective in-line storage volume provided by the tunnel, Option 3 could be constructed to the Beach Street PS and allowed to divert the full 25-year design flow (including the full diversion of the Beechwood SPS service area) without a need for downstream capacity upgrades. Extension of the tunnel beyond Beach Street (e.g. Option 3 to Lower Cooksville Creek or beyond), where a significant amount of additional diversion area could be directed from east to west, would not be possible without:

    - Controlling the balance of flows being directed between the G.E. Booth and Clarkson WWTPs (i.e. the flow volume above the current JDPS capacity constraint of 800 L/s far exceeds the effective storage volume available in the tunnel).

    - Increasing the downstream conveyance capacity of the JDPS and downstream infrastructure (with either Options 4, 5 or 6).

- Option 3 provides the highest Investment Savings Ratio (ISR) of the short-listed options. This is largely influenced by the lower capital cost associated with the shorter tunnel length compared to the other short-listed alternatives while still benefitting from the lifecycle cost savings associated with the decommissioning of the nine (9) SPS's. However, full implementation of Option 3 would

mean an estimated near-term capital investment of $187 M compared to the $65M investment in the baseline option. To alleviate such a large initial investment, phased implementation of Option 3 is possible, and each phase of implementation would provide benefit at a more manageable level of investment.

3.3 Alternatives Extending Between Clarkson and the G.E. Booth WWTPs

The remaining three options (Options 4, 5 and 6) are each variations on the alternative to fully extend the preferred Class EA solution both east and west from its current limits in order to provide added capacity to divert flows between the G.E. Booth and Clarkson WWTPs (i.e. beyond the 800 L/s capacity of the JD1 SPS). All three options integrate the same Option 3 tunnel, which represents the conduit between the limits of the east extension between Jack Darling Park and the G.E. Booth WWTP. As a result, all three score amongst the highest options because they provide maximum flexibility to allow east-west flow diversion potential and the elimination of SPS's, as well as the ability to integrate and be phased as a follow-on to the implementation Option 3. The primary difference and preferences between the three options will be dictated by the diversion capacity limitations in the downstream infrastructure (i.e. the receiving trunk sewers downstream of Jack Darling PS1 and/or at the Clarkson WWTP itself). Further evaluation considerations for each are highlighted below:

- **Option 4 – Continuous tunnel between Clarkson and Booth WWTPs:** If constructed in a single phase, this option would eliminate the need for a deep wet well and PS integration upgrade at Jack Darling. It would, however, require the highest initial capital cost investment with the construction of a deep tunnel over the full east-west extents (as configured for Option 3 east of JDPS) along with a deep PS at Clarkson. The peak capacity of the flow diversion would be limited by the capacity constraints within the Clarkson WWTP and the economics of the design capacity of the deep PS that would be constructed at Clarkson. The storage volume in the tunnel itself would be effectively used to maintain the discharge capacity of the new PS to the capacity limits within the WWTP. Should the implementation of Option 4 be conducted as a subsequent phase of implementation to Option 3, the investment in the deep wet well and integration with the existing facility at JDPS1 would be a "throw-away" cost given the need to build a new deep PS at Clarkson.

- **Option 5 – Two-level tunnel extension between Clarkson and Booth WWTPs (with deep PS at Jack Darling):** This option would eliminate the need for a deep PS at Clarkson in favour of a deep wet well at Jack Darling and integration with the existing (or upgraded) JD1 SPS (as in Option 3). The peak capacity of the flow diversion would be limited by the capacity constraints within the downstream trunk sewer system at the point of extension of the upper level tunnel and/or the Clarkson WWTP. The storage volume in the tunnel upstream of JD1 SPS would be effectively used to maintain the discharge capacity of the JD1 SPS to the capacity limits of the downstream trunk connection point and/or within the WWTP. Should the implementation of Option 5 be conducted as a subsequent phase of implementation to Option 3, the investment in a capacity upgrade at JD1 SPS to maximize downstream diversion potential could be deferred to a future upgrade.

- **Option 6 – Variation of Option 5 with Downstream Forcemain Extension (instead of higher-level tunnel):** Similar to Option 5, this would eliminate the need for a deep PS at Clarkson WWTP in favour of a deep wet well at Jack Darling and integration with the existing (or upgraded) JD1 SPS (as in Option 3). The difference is that the extents of the upgrades could potentially be less costly if the peak flow diversion requirements from the east can be adequately managed at the JD1 SPS. That is, the storage volume in the tunnel upstream of JD1 SPS would be effectively used to maintain the discharge capacity of the upgraded JD1 SPS to the capacity limits of the downstream trunk connection point of the forcemains and/or within the WWTP. Should the implementation of Option 6 be conducted as a subsequent phase of implementation to Option 3, the investment in a capacity upgrade at JD1 SPS (station and/or forcemains) to maximize downstream diversion potential could be deferred to a future upgrade.

Given the added level of investment required for Options 4, 5 or 6 as well as considering that Option 3 does provide a high degree of operational flexibility to divert flows between the WWTPs (with the highest savings/investment ratio), it is concluded that these options should only be considered as a future extension of Option 3. As a result, Options 5 or 6 are preferred because they can be add-ons to Option 3 without negating the investment in the JD1 SPS. These could be added in the future, should there be a desire to divert additional flows beyond the 800 L/s discharge capacity currently provided by the JD1 SPS.

4. Conclusions and Recommendations

4.1 Conclusions on Fundamental Questions of Feasibility Study

From the above results summary, the fundamental questions posed by the feasibility study can be answered as follows:

- The preferred location for an upgraded pumping station is Jack Darling Park rather than Richard's Memorial Park given that it will have a lesser impact on mature trees in the area and will be less disruptive to the general community and adjacent property owners. The construction of a pumping facility at Jack Darling Park provides the opportunity for integration of the required deep wet well station with an existing and recently upgraded facility at a common location, rather than having to operate two separate facilities at different locations. Furthermore, a continuous tunnel from the Credit River to JD1 SPS provides for significantly more in-line storage and thus greater operational flexibility for managing peak flows and providing emergency storage.

- There is significant value in making the tunnel deeper for both constructability and functional reasons. From a constructability perspective, deepening the tunnel reduces construction risks by avoiding or minimizing the extent of mixed-face tunneling required. From a functional perspective, deepening the tunnel provides the ability to make full use of the tunnel volume for in-line storage and, if made deep enough to safely cross the Credit River, provides significant opportunity to divert additional flow from the east to the west as well as decommission a significant number of pumping stations (5 additional stations).

- The greatest value in extending the tunnel beyond the limits of the current Class EA is derived by making it deeper and extending it east of the Credit River as represented by Option 3. Based on the Region's model simulation for the 25-year design storm, the tunnel can be extended to divert all flows as far as Beach Street without needing to upgrade the capacity of the JD SPS and the downstream system. Extension of the tunnel to the G.E. Booth WWTP is feasible and beneficial but would only allow for balancing flows between the Clarkson and G.E. Booth WWTPs through a flow control structure at Lower Cooksville Creek.

- There is very limited value in only extending the preferred Class EA solution further west to the Clarkson WWTP as it is very costly, does not divert additional area from the east to the west, and does not provide any measurable added benefit from the perspective of decommissioning additional pumping stations. Extending the tunnel west of JD1 SPS should only be considered in a future phase of implementation, if there is a desire to increase the diversion capacity from G.E. Booth WWTP to Clarkson WWTP.

It has been demonstrated that there is significant value in altering the configuration of the baseline solution to provide for greater functionality and operational flexibility. Extending the tunnel across the Credit River and beyond the current limits of the EA has significant value at this time, not only from a functional perspective, but also from an environmental and social perspective in that it mitigates the impact of having a Tunnel Boring Machine launch/extraction shaft nearby the popular Port Credit and harbor front area.

4.2 Recommendation of Option 3

It is concluded that **Option 3 - Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP)** provides the best value in meeting the core objectives of the project and it provides the greatest flexibility for phased implementation with demonstrable incremental benefits provided by each extension. This allows for the selection of an initial phase of implementation that can best provide for added value while being managed within affordability limits and schedule constraints. It does not preclude the westerly extension of the tunnel solution (Options 4, 5 or 6) in future implementation phase should it be determined that a greater diversion capacity is desired.

4.2.1 Rationale for Selection of Option 3

We recommend moving forward with Option 3 as the preferred option to satisfy the Regions core project objectives and provide the greatest long-term value. Specifically, this preferred alternative:

- Provides the ability to divert a significant amount of flow between the G.E. Booth and Clarkson WWTP systems. Using the in-line storage capacity provided by the tunnel and respecting existing downstream capacity constraints (i.e. JD1 SPS limited to 800 L/s discharge capacity), Option 3 can fully divert flows up to Beach Street under a 25-year design storm (including the full diversion of the Beechwood SPS service area). Extension and diversion beyond Beach Street to the G.E. Booth WWTP is also feasible within these same capacity constraints by controlling flows diverted between both treatment facilities at Lower Cooksville Creek.

- Provides full flexibility for future extension of the solution west of JD1 SPS to increase downstream capacity and further maximize flow diversion potential.
- Provides the ability to decommission up to 10 Sanitary Pumping Stations. However, the decommissioning of nine (9) stations is included as it is assumed that the Beechwood SPS will be maintained in operation. This provides added operational flexibility and the ability to decommission up to nine (9) SPS's. The decision to decommission the Beechwood SPS can thus be deferred to the longer term when a major station refurbishing is required (assumed to be in 2070).
- Provides the best Savings/Investment Ratio (SIR) amongst all of the alternatives considered.

4.2.1 Rationale for Phased Implementation of Option 3

Given the high capital cost associated with this option, it is also recommended that the Region proceed with a phased implementation of Option 3 as an integral component of its Capital Phasing and Implementation Plan (CPIP). Proceeding in a phased manner will not only allow for the management of the capital investment over a number of years, but will also provide the Region with a number of further advantages, namely:

- The ability to limit impacts on Class EA requirements and the risk of approval delays by maintaining the first phase of implementation within or close to the geographical limits of the existing Class EA.
- With the full flexibility provided by Option 3, there is no need to invest in the full extents of a diversion at this time. Further extension of the tunnel is possible in future stages through the phased implementation of Option 3 and an ultimate tunnel solution configured as either Options 5 or 6 (if an extension west of JD1 SPS is deemed necessary in the future).
- The ability to continue assessing and refining the operational requirements of the extended solution, and associated flow control requirements, in consideration of broader and evolving systemwide operating strategies (i.e. related to WWTP EAs, RTC implementation, and adaptation to Master Plan updates as well as climate change impacts). As further model refinements and evolving operational needs are defined through these broader Regional initiatives phasing the implementation of the preferred solution provides added time to determine if downstream capacity is in fact required as well as if additional diversion capacity beyond that which is possible with Option 3 is necessary.

4.2 Recommended Phasing of Recommended Preferred Option

Based on the evaluation of phased options, we recommend proceeding with the phased implementation of Option 3 in two (2) phases of construction. As illustrated in **Figure ES-3** and as listed below, four (4) first phase implementation options were evaluated. For each, the second phase of implementation would be to complete the construction of Option 3 (i.e. extend to the G.E. Booth WWTP). Nevertheless,

flexibility remains for the Region to extend the second phase to an intermediate location and fully extend to G.E. Booth in a third phase (only if desired and/or necessary in the future).

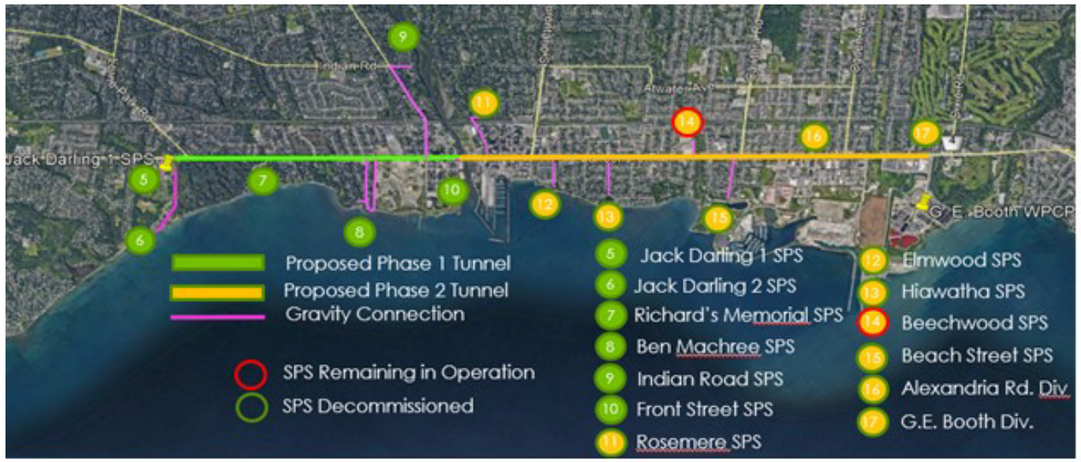
The alternatives considered as a first phase of construction are:

- **Phase 1 - Option a:** From JD1 SPS to Front Street (within EA limits).
- **Phase 1 - Option b:** From JD1 SPS and across the Credit River (to library parking lot).
- **Phase 1 - Option c:** From JD1 SPS to Elmwood Avenue.
- **Phase 1 - Option d:** From JD1 SPS to Beach Street.

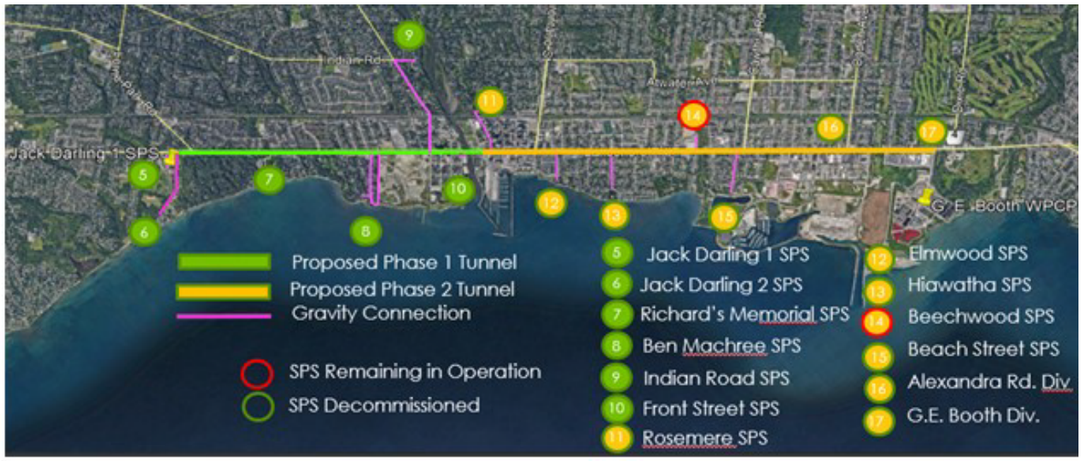
Functional Analysis: An overview of the total amount of flow that would be diverted to the JD1 SPS as simulated by the Region's 2041 development conditions model during the 25-year design storm is presented in **Table ES-3**. Also provided is the volume that would need to be stored in the tunnel if the capacity of the JD1 SPS is maintained at the current 800 L/s. It is observed, from **Table ES-3**, that contemplated tunnel diameters ranging from 1.8 m to 3 m would all have sufficient in-line volume to attenuate peak flows and maintain the existing pumping capacity for each of the four (4) Phase 1 options. In addition, sufficient volume is available to provide 2 hours of emergency storage at the peak of the same 25-year design event.

Table ES-3: Functional Storage Requirements and Availability for 25-year Design Event (based on Region's 2041 development conditions model)

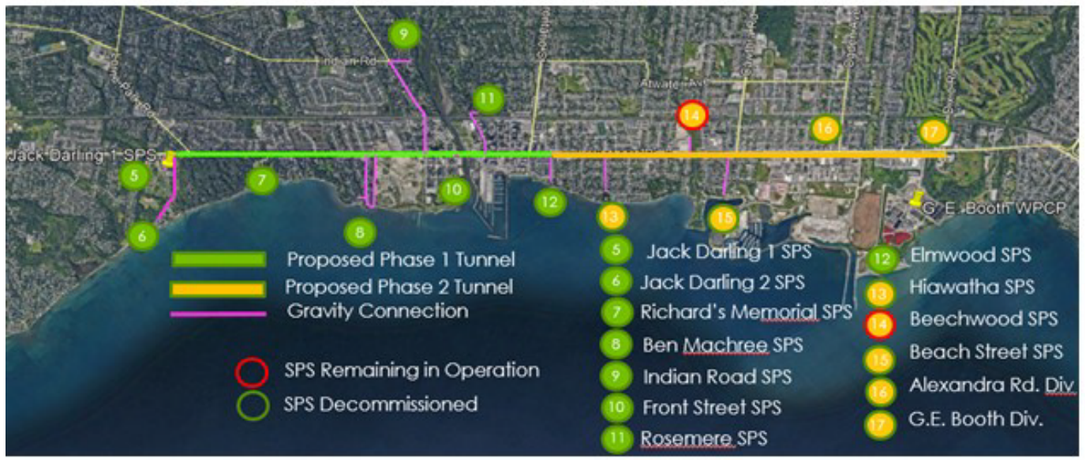
Alternative	Total Tunnel Storage Volume Available (m^3)		In-Line Storage Volume Required (m^3) [to respect D/S Capacity Limitation of 800 L/s (70 MLD)]	Emergency Storage Volume Required [to store peak 2-hr volume during 25-year design event]
	3 m Diameter Tunnel	1.8 m Diameter Tunnel		
Option 3 (Complete Implementation)	45,000 m^3 (40,000 m^3 effective)	18,750 m^3 (9,610 m^3 effective)	80,000 – 90,000 m^3 (need 5,700 m^3 with flow diversion at Lower Cooksville)	30,000 m^3 (need 9,500 m^3 with flow diversion at Lower Cooksville)
Options 1a/1b: Implemented to 1a) Front Street 1b) Library at Stavebank Road	21,000 m^3 (18,000 m^3 effective)	7,250 m^3 (5,050 m^3 effective)	Not required (peak flow < 800 L/s)	4,400 m^3
Option 1c: Implemented to Elmwood PS (Elmwood Avenue)	27,000 m^3 (23,700 m^3 effective)	9,750 m^3 (6,810 m^3 effective)	300 m^3	5,700 m^3
Option1d: Implemented to Beach PS (Aviation Road)	39,000 m^3 (35,000 m^3 effective)	13,750 m^3 (9,610 m^3 effective)	5,700 m^3	9,500 m^3



Phase 1 - Option a: From JD1 SPS to Front St (within EA limits)



Phase 1 - Option b: From JD1 SPS and Across the Credit River (to library parking lot)



Phase 1 - Option c: From JD1 SPS to Elmwood Ave

Phase 1 - Option d: From JD1 SPS to Beach St.

Figure ES-3: Phasing Options for Recommended Preferred Option 3 (Plan View)

Cost Analysis: A summary of the present value life-cycle cost analysis for each of the above Phase 1 options is presented in **Table ES-4**. The table provides the estimated capital cost and the corresponding estimate of the 90-year present value life cycle costs alongside the estimate of the corresponding life cycle cost savings that can be realized through the decommissioning of pumping stations. To facilitate the comparison, the table includes a summary of the total length of tunnel, the number decommissioned pumping stations, and the total area (and population) diverted for each phasing option.

Table ES-4: Present Value Life-Cycle Cost Analysis of Phase 1 Implementation Options

Alternative Option	Option 3 Total	Option 3 Phase 1 Alternatives			
		Phase 1a	Phase 1b	Phase 1c	Phase 1d
No. of SPS's Decommissioned	9	5	5	7	9
Area diverted to Clarkson (Population)	1000 ha (35,000)	149 ha (6,500)	149 ha (6,500)	282 ha (15,700)	1000 ha (35,000)
Costs for Phase 1 Implementation					
Capital Cost (2020 dollars)	$187 M	$95 M	$99 M	$122 M	$161 M
PV Lifecycle Investment	$215 M	$117 M	$122 M	$146 M	$186 M
PV Lifecycle Savings	$111 M	$57 M	$57 M	$78 M	$111 M
Investment Savings Ratio	0.52	0.48	0.47	0.54	0.59
Additional Costs for Phase 2 Implementation					
Phase 2 Capital Cost built in 2031 (2020 dollars)	N/A	$77 M	$73 M	$54 M	$21 M
TOTAL COSTS (Phases 1 and 2)					
Total Capital Cost (Phases 1+2)	$187 M	$172 M	$172 M	$176 M	$182 M
PV Lifecycle Investment (Ph1+Ph2)	$218 M	$198 M	$198 M	$203 M	$209 M
PV Lifecycle Savings (Ph1+Ph2)	$111 M	$100 M	$100 M	$105 M	$111 M
Total Investment Savings Ratio	0.51	0.51	0.51	0.51	0.53

Based on the above evaluation, it is recommended that the first phase of construction of Option 3 be:

Phase 1 – Option c: Extension from Jack Darling SPS to Elmwood Avenue

Although the estimated initial capital cost investment for Phase 1c (estimated $122M) is close to double the cost of the Baseline Class EA (estimated $65M), this recommended first phase of implementation would provide a better return on investment than Phases 1a and 1b (as indicated by the higher ISR in **Table ES-3**). The primary reasons for the recommendation are the following:

- The total drainage area being diverted from G.E. Booth WWTP to Clarkson WWTP in this scenario is significant at 282 ha, serving a population of 15,700.
- The tunnel can be extended to Elmwood and accommodate the additional area without needing to invest in additional capacity upgrades at or downstream of the JDSPS (i.e. beyond the upgrades required to accommodate the integration of Option 3 at the JDSPS).
- Provides the opportunity to decommission a total of seven (7) SPS with the decommissioning of Rosemere and Elmwood SPS's and divert these flows to the tunnel. This would also capture flows being pumped from Hiawatha SPS, given that it currently pumps to Elmwood SPS.
- The extension to Elmwood provides for the location of the Tunnel Boring Machine (TBM) extraction shaft on a City owned property with less of a community and social impact than Options 1a and 1b. Not just for the first phase of construction, but also for the second phase of construction where it could either be used as the site of Phase 2 TBM launch and mucking or Phase 2 TBM extraction.

4.3 Recommended Next Steps

The following are the recommended next steps to advance the findings and recommendations of this feasibility study:

1. **Region Staff Review**

   Further to having circulated the feasibility report for review by Region staff, present and review the findings and recommendations in a Workshop setting. The objectives will be to address any outstanding comments, obtain concurrence with the findings of the study and its recommendations, and confirm the next steps to advancing the project to the design stage.

2. **Confirm Amendment to Existing Class EA**

   From the perspective of Class EA requirements, it is deemed reasonable to advance Phase 1c design and construction as an amendment to the existing Class EA. Similar to all other options, the phased implementation can be presented as a component of the longer-term implementation plan that is part of the Master Plan's overall flow management and diversion strategy.

3. Preliminary Design Investigations and Concept Refinement

As was previously noted, a preliminary tunnel diameter of 3 m was selected for the purposes of the feasibility study. This conservatively sized diameter was selected in order to provide a more conservative estimate of cost in comparing the benefits of the alternatives relative to the baseline solution, which recommends a 1.8 m diameter tunnel. The 3 m diameter tunnel diameter was also selected to provide for maximum operational flexibility related to diversion capacity and providing for effective in-tunnel storage volume for the purposes of attenuating peak flows and providing for emergency storage. Similarly, increased tunnel depths were conservatively selected for each option based on limited sub-surface conditions data (particularly at the Credit River crossing).

It should be noted that, with further investigation, systems model development, and design analysis, it is likely possible and/or may be preferable to proceed with a smaller diameter and shallower tunnel design. It should thus be considered that the current analysis is based on a conservative tunnel design (i.e. diameter and depth) that will be refined in the next stage of design in consideration of a more detailed evaluation of construction risk mitigation measures informed by site specific sub-surface conditions data.

In the final design of the preferred solution, it is thus envisioned that the tunnel diameter could range anywhere from 1.8 m to 3.0 m and the tunnel depth could potentially be raised by 5-10 m from the currently assumed elevations, depending on the preferred operational configuration and refined design parameters. The development of a shallower and smaller tunnel design would not change the conclusions and recommended direction outlined in this feasibility study. It would only strengthen the demonstration of the added value provided by the recommended solution.

1.0 INTRODUCTION

The Region of Peel's wastewater system is comprised of two principal trunk systems; the west trunk system that conveys flows along and near the Credit Valley to the Clarkson Wastewater Treatment Plant; and the east trunk system that conveys flows along and near the Etobicoke Creek Valley to the G.E. Booth Wastewater Treatment Plant.

The Region's long-term master plan recommends that wastewater be diverted away from the G.E. Booth Wastewater Treatment Plant (WWTP) to the Clarkson Wastewater Treatment Plant (WTP) due to G.E. Booth's limited capacity to expand and support the planned growth of its current catchment area. The Region identified the need to address the existing Front Street Pumping Station (FSPS) wastewater catchment area taking into consideration the condition of the facility and growth servicing needs given the limited space for expansion of the FSPS. With the view of considering options to divert the Front Street PS catchment area west to the Clarkson WWTP, the diversion of flows to the west must consider that the Richard's Memorial Wastewater PS has limited capacity and needs to be expanded to accommodate the additional service area.

1.1 THE BASELINE SOLUTION

The Region previously retained WSP Canada Inc. to complete the Front Street Pumping Station Wastewater Diversion Class Environmental Assessment (EA), the purpose of which was to investigate alternatives and determine a preferred solution, route alignment, and recommended design configuration. The Schedule 'B' Class EA Report was published on June 5, 2019. The preferred solution included the following components and is considered the "Baseline Solution" as part of this Feasibility Study:

- Construction of a new deep gravity trunk sewer along Lakeshore Road from Front Street to Richard's Memorial Sewage Pump Station (RMSPS) and construction of a new, higher level, gravity trunk sewer along Lakeshore from RMSPS to Jack Darling SPS (JDSPS). The new gravity trunk sewer has a total length of 3.1 km with a minimum diameter of 1800 mm.
- Construction of a new gravity sewer on Pine Avenue from Ben Machree Sewage Pump Station (BMSPS) to the new trunk sewer on Lakeshore Road West;
- Construction of a new lift station to replace the RMSPS;
- Decommissioning of both the existing FSPS and BMSPS;

1.2 PURPOSE OF FEASIBILITY STUDY

The 2019 Front Street Pumping Station Wastewater Diversion EA was primarily focused on addressing issues related to the condition of the Front Street PS as well as capacity limitations within the Richard's Memorial PS. As such, the EA study was focused on the development of a preferred servicing solution for those pumping stations and their respective tributary areas. In addition to addressing the condition and

capacity needs at the FSPS and RMPS, the Baseline Solution provides for the diversion of 149 ha from G.E. Booth sewershed to the Clarkson sewershed while also allowing for the decommissioning of two (2) existing pumping stations including: the FSPS itself as well as the BMSPS.

Within its current limits and elevation, the shorter trunk sewer represented by the baseline solution has limited reach for diverting the tributary area and limited storage capacity to attenuate peak flows (or provide for emergency storage for the remaining SPSs). With only 149 ha being diverted to the Clarkson WWTP under the current baseline configuration, it is anticipated that the functional value of a modified trunk sewer configuration will be more pronounced under a scenario where additional flow from east of the Credit River can be diverted towards the west. It should also be considered that the extended trunk also makes the operational integration of in-line storage as part of the operating procedures a far more effective option. The value of in-line storage as a means of attenuating peak flows to Clarkson will thus be evaluated, at a high level, both within the context of flow management within the overall collection system as well as from the perspective of managing peak flows diverted to the Clarkson WWTP (i.e. from the expanded tributary area serviced by the new Lakeshore trunk sewer).

As a first step in advancing the design of the preferred solution identified in the Class EA, the Region requested Stantec to undertake a feasibility study to examine alternate design configurations that would allow the extension of the preferred solution (either in the near-term or longer-term) in order to maximize the value of the investment by providing added benefits within the context of broader system needs and servicing objectives. The feasibility study is thus designed to identify alternative options that would provide the Region with added flexibility to extend and “future proof” this investment. For instance, the possibility of extending the sewer across the Credit River could allow diversion of the Elmwood Street and Hiawatha SPS sewersheds into the Clarkson WWTP sewershed, thus allowing for the decommissioning of additional pumping stations and diverting more flow from the G.E. Booth WWTP service area.

1.3 APPROACH TO UNDERTAKING THE ALTERNATIVES EVALUATION

A robust feasibility study boils down to a comprehensive look at alternatives that can meet specific performance objectives while cost-effectively providing added value. To facilitate best-value project selection, it is important to evaluate alternatives within a quasi-quantitative framework. The evaluation of alternatives must consider the degree to which the solution meets the core objectives of the project as well as evaluate the feasibility of the solution in relation to a host of factors. These include both “soft-side” factors related to social, environmental and economic impacts to “hard-side” factors such as depth of an alignment and construction methodology.

The following steps comprise the Decision Science Model Framework and process used for this Feasibility study:

1. Define fatal flaw criteria and eliminate alternatives that cannot pass these criteria. This is the first-tier evaluation.

2. Select decision criteria (i.e. Core and Secondary Project Objectives) representing important non-monetary benefits or attributes of an alternative that are independent, provide differentiation, and are measurable in some quantitative fashion.
3. Weight the decision criteria (i.e. Pairwise Comparison) to prioritize the importance of the attribute to the decision process.
4. Develop a quantitative measurement and scoring methodology to define the alternatives' performance with respect to each decision criteria and score the alternatives.
5. Calculate the alternatives' non-monetary benefits performance.
6. Calculate the alternatives' benefit-to-cost ratio.
7. Perform sensitivity analyses to evaluate the impact of criteria weighting and scoring on the alternatives' benefits and benefits-to-cost ratio performance. This ensures that the scoring is not disproportionately impacted by a single criteria or weighting.
8. Discuss the decision process results and the value of benefits relative to the additional costs or savings afforded to ultimately select a best value alternative.

1.4 PROJECT OBJECTIVES AS EVALUATION CRITERIA

Nine (9) project objectives were developed as criteria to evaluate the feasibility and added value provided by alternative solutions. These are split into Core Objectives and Added Objectives/Opportunity:

1.4.1 Core Objectives

After reviewing the Region's Request for Proposal (RFP), Stantec distilled the Core Project Objectives into the following three (3) objective statements.

1.4.1.1 Manage flow capacity (in system and at WWTPs)

The Region has indicated, within the RFP and at subsequent meetings, that flexibility to divert flows (east to west) from G.E. Booth WPCP to the Clarkson WPCP is imperative given the treatment capacity limitations at G.E. Booth. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson WPCP has room to expand. Additionally, external servicing inputs from the City of Toronto are uncontrolled. Thus, relief to G.E. Booth provides capacity for servicing these external flow inputs.

1.4.1.2 Reduce Total Expenditure

By looking at the Total Expenditure costs over the long term, the project can reduce life-cycle costs by reducing the number of operating sewage pumping stations (thus eliminating the need for future upgrade, rehabilitation and on-going operating costs).

1.4.1.3 Provide Added System Resiliency for Changing Conditions

The preferred alternative should have enough capacity to accommodate additional flow without significant added investment or provide the ability to extend/expand the infrastructure in the future. Increased flows could be from growth, climate change or other factors.

1.4.2 Added Objectives/Opportunity

Additional secondary objectives were developed and used to identify and differentiate the added value provided by each alternative in the evaluation.

1.4.2.1 Flexibility for Future Extension of Tunnel

Each option was assessed to determine its ability to be extended in the future. This will allow the tunnel expansion to be phased to spread out the capital expense, and future proof the solution for the Region by providing flexibility for future expansion. Future expansion allows for additional sewage pumping stations to be taken offline to reduce operational costs and improve reliability as well as provide additional storage for peak flow management and emergency containment during station failures. The selected depth and slope of the tunnel are key to determining the feasible extents of the tunnel expansion.

1.4.2.2 Added Operational Flexibility

Each option was assessed for its ability to provide functional or operational advantages for other projects in the area (e.g. storage & facilitating system upgrades to other assets). Some options provide the ability to eliminate additional pump stations. Longer tunnel options also provide additional storage capacity for peak flow attenuation and provide additional relief to G.E. Booth WWTP. For example, tunnels which pick up flows from Central Mississauga (i.e. Lower Cooksville Creek Sewer) can provide the City with the flexibility to send significant amounts of flow to either G.E. Booth or Clarkson through use of a flow regulator. Other benefits of upstream upgrades include the added flexibility to re-route flows during relining and other sewer maintenance or upgrade projects.

1.4.2.3 Long Term Operational Sustainability

Each option was assessed for its ability to provide long term Operational and Maintenance (O&M) advantages. The elimination of pump stations decreases O&M costs at the stations. However, the replacement of pumping facilities with deep tunnels also introduces operational concerns such as access depth and operational risks for cleaning.

1.4.2.4 Project Approvals and Schedule

Each option was assessed in regard to additional project approval requirements and related impacts on implementation schedules (i.e. minimizing EA impacts, other project approvals, and implementation timelines). Tunnel options that allow a phased implementation option within the limits of the EA or require minor amendments to the EA will score higher.

1.4.2.5 Constructability

Each tunnel option must consider constructability issues associated with the depth and length of tunnel as well as the required sizing of the receiving sewers and pump stations. Each option was assessed with regard to construction risks associated with its depth and associated geotechnical/sub-surface conditions. Shallow tunnels could be located in mixed face conditions or may not provide for sufficient cover when crossing the Credit River. While deeper tunnels will mitigate these sub-surface risks, the impacts and costs of having to design and build deeper drop structures for sewer connections was considered.

1.4.2.6 Socio-Economic

Each option was assessed in regard to impacts on social and economic factors. These include short-term and long-term impacts to local residents and businesses, including the potential to introduce “construction fatigue” in communities as a result of frequent detours, road closures, and narrow passageways. Options that allow for phased works outside of the downtown areas will score higher given the City of Mississauga’s plans for work within the Credit River Harbour area.

1.5 EVALUATION FRAMEWORK – CRITERIA SCORING

1.5.1 Weighting of Evaluation Criteria

The relative weighting of the evaluation categories and underlying sub-criteria was determined through a pair-wise comparison analysis. This approach allows a complex grouping of multiple criteria to be systematically evaluated relative to one another in a traceable and flexible manner. In this manner, sensitivity testing of various weighting scenarios to reflect various stakeholder perspectives can be completed. The systematic comparison of each criterion against each of the others is typically based on a six point scoring system where three and three pair-wise criteria scores are deemed to be equally important, five versus one if one criterion is deemed to be much more important than the other; and four versus two if one criterion is deemed to be somewhat more important than the other.

As illustrated in **Table 1,** "criterion two" on the horizontal is compared to "criterion three" on the vertical. It was determined that the "criterion two" benefits were slightly more important than the "criterion three" benefits so a 4 was entered. In the corresponding white cell, to the right of the blacked-out line, with "criterion three" on the horizontal and "criterion two" on the vertical, a 2 is entered. This establishes the relative comparison value on the "criterion 2" row and keeps the sum of the pair at six. The percent weight of each bottom line is found when each row is summed and divided by the total. In the example, the "criterion one" and "criterion two" categories are given the bulk of the weight as they have ranked higher than the other two criteria.

Each option was screened and evaluated in a pairwise comparison as described in Section 1 utilizing the project objectives. Within the framework of a workshop with the Region’s project steering committee, participants completed the pairwise comparison scoring as a group discussion. These weightings are reflected in **Table 2** and were applied in the scoring of the alternatives.

Table 1: Example Pairwise Comparison of Benefit Criteria

Criteria	Criterion one	Criterion two	Criterion three	Criterion four	Sum	Weight
Criterion one		4	4	3	11	30.6%
Criterion two	2		4	2	8	22.2%
Criterion three	2	2		2	6	16.7%
Criterion four	3	4	4		11	30.6%

Criteria Y

Criteria X in relation to

Total Score of Six for Each Pair-wise Comparison:

- 5 vs. 1 if one criterion is determined to be much more important than the other
- 4 vs. 2 if one criterion is deemed to be somewhat more important than the other
- 3 and 3 if both criteria are deemed to be equally important

Table 2: Evaluation Criteria Weighting Results (Pairwise Comparison)

Criterion	Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions)	Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	Flexibility for Phased Implementation of Tunnel and added Functionality	Resiliency to Adapt for Changing Conditions (Growth, Climate Change, Other...)	Added Operational Flexibility for system upgrades (other assests)	Long Term Operational Sustainability (ease of operation and maintenance)	Project Approvals and Schedule	Constructability (Risks)	Score	Weighting
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions)		5	3	3	5	3	4	4	27	16%
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	1		4	3	4	3	5	4	24	14%
Flexibility for Phased Implementation of Tunnel and added Functionality	3	2		3	4	3	5	4	24	14%
Resiliency to Adapt for Changing Conditions (Growth, Climate Change, Other...)	3	3	3		4	3	5	4	25	15%
Added Operational Flexibility for system upgrades (other assests)	1	2	2	2		2	3	4	16	10%
Long Term Operational Sustainability (ease of operation and maintenance)	3	3	3	3	4		5	5	26	15%
Project Approvals and Schedule	2	1	1	1	3	1		3	12	7%
Constructability (Risks)	2	2	2	2	2	1	3		14	8%
									Total 168	Total 100%

1.5.2 Criteria Scoring and Scoring Indicators

Each alternative solution was evaluated according to the scoring criteria as described in Section 1.4. Each criterion was assessed a score of 1 to 5 with a low score of 1 meaning that the alternative does not adequately meet the requirements of the criterion (or has very little benefit compared to baseline) and a score of 5 meaning that the alternative exceeds the requirements of the criterion (or provides significant benefit compared to baseline). A score of 3 represents an assessment that the alternative meets the requirements and/or provides moderate benefit relative to the baseline. A score of 2 is thus representative of assessed benefits that are between a low to moderate improvement over the baseline while a score of 4 is representative of a moderate to significant benefit. The scoring results along with the scoring indicators used for each are described in **Table 2**. An unweighted and weighted score (based on pairwise comparison criteria weights) was calculated to determine which of the long list alternatives would be carried forward for additional analysis.

2.0 EVALUATION OF LONG LIST OF ALTERNATIVE SOLUTIONS

2.1 DEVELOPMENT AND EVALUATION OF LONG LIST OF ALTERNATIVES

A long list of alternatives was developed to meet the Region's objectives for this project. Stantec utilized the Region's as-built drawings, geological boreholes and available topographic information to analyze the feasibility of several tunnel solutions.

2.2 DESCRIPTION OF ALTERNATIVES

2.2.1 Baseline Solution (EA Solution)

The baseline solution, identified as the preferred alternative in the Class EA report consists of the following components:

1. **Two 1.8 m diameter trunk sewers:** A new deep gravity trunk sewer along Lakeshore Road from Front Street to RMSPS and construction of a new, higher level, gravity trunk sewer along Lakeshore Road from RMSPS to Jack Darling SPS (JDSPS).

2. **Upgraded RMSPS:** Construction of a higher-capacity lift station, complete with an emergency storage tank, to replace the existing RMSPS.

3. **Pump Station Decommissioning:** Decommissioning of both the existing Front Street SPS and Ben Machree SPS (BMSPS) (by construction of a new gravity sewer on Pine Avenue from Lakeshore Road West to BMSPS).

While the total volume of these sewers is approximately 7000 m^3, the effective volume available for storage would be limited to about 4400 m^3 to avoid backflow into the connecting sewers from the Ben Machree SPS. The main advantages and disadvantages of this option are summarized in the **Table 3** below. Refer also to **Figure 1** below for a schematic plan and profile of the Baseline Solution alternative. **Figure 2** depicts the extents of the geographical boundaries of the service areas represented by the alternative. It should be noted that the areas represented in the **Figure 2** below refer to the total geographic area represented by the external boundaries of the tributary area of the polygons in the Region's model. Given that it was not possible to determine from the modelling files provided by the Region, this value does not necessarily represent the effective serviced areas represented in the model.

Table 3: Advantages and Disadvantages of Baseline Option

Advantages	Disadvantages
• Decommissioning of three (3) pumping stations • Diverts 149 ha of sewer shed (population of 6,500) from G.E. Booth to Clarkson WWTP. • Provides 4,400 m^3 of volume for storage.	• Limited opportunity for extension to the West or to the East in the future. • Tunnel is too shallow to cross the Credit River, thus providing limited opportunity to divert additional tributary area from the east to the west. • Socio-economic impact of new PS, Wet well and forcemains at Richard's Memorial • Socio-economic impact of TBM launch or extraction shaft at Front St. • Only approximately half of the lower sewer can be effectively used for storage before backflowing into connector sewer from Ben Machree.

Figure 1: Baseline Solution (EA Solution)

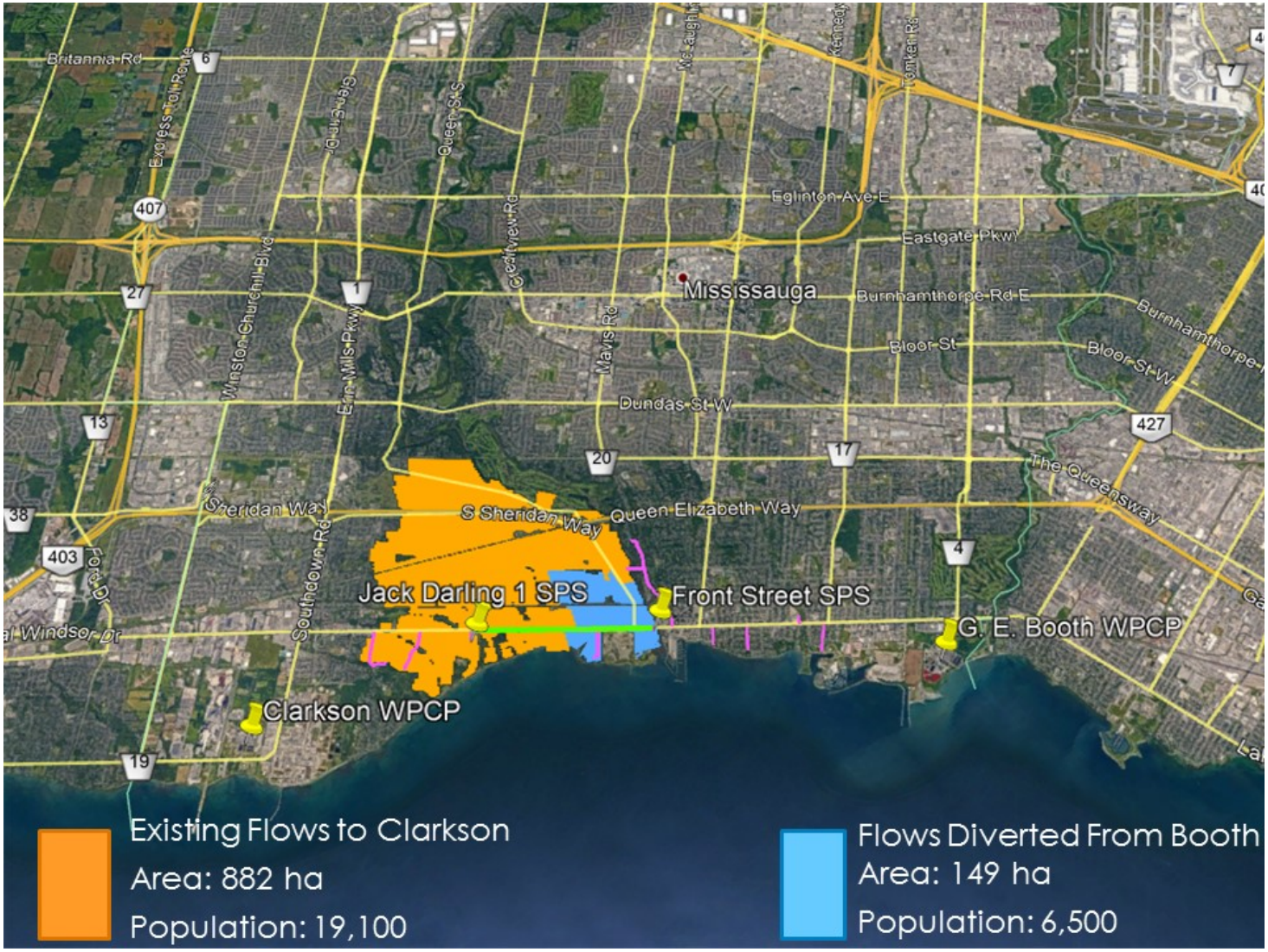


Figure 2: Baseline Solution Total Geographical Areas

2.2.2 Alternatives Within Current Limits of Class EA

These alternatives consider options that are designed to remain within the current limits of EA Boundaries. They explore the added value of lowering the tunnel to an invert depth of roughly 68 m at Front Street (4 m deeper than baseline) in order to mitigate the risks associated with mixed face tunnel construction while also increasing the tunnel diameter to facilitate deeper tunnel construction. Also considered is the added benefit that the deeper tunnel has in effectively providing added in-tunnel storage volume for peak flow attenuation as well as emergency storage – thus negating the need for an adjacent storage tank at the Richard's Memorial site. Finally, they also explore the merits of relocating the planned PS upgrades from Richard's Memorial Park to Jack Darling Park through the evaluation of two variations of Option 1. These variations are expanded on below.

2.2.2.1 Option 1a: Upgraded PS at Richard's Memorial Park

Option 1a consists of the following:

- New deeper 3 m diameter rock tunnel at 0.2% slope from Front St SPS to a new Richard's Memorial pump station and wet well, which would pump flows to Jack Darling SPS.
- Gravity sewers to divert flows from Front St SPS, Indian Road SPS and Ben Machree SPS.
- Decommissioning of Front St SPS, Indian Road SPS and Ben Machree SPS.

This option would provide upwards of 13,000 m^3 of tunnel volume but the effective storage volume for peak flow attenuation and/or emergency storage is still limited to approximately 7000 m^3 by the elevation of the incoming sewer at Ben Machree. The tunnel cannot be extended east under the Credit River given its shallow depth and steeper slope as compared to other options. The main advantages and disadvantages of this option are summarized in the **Table 4** below. Refer also to **Figure 3** and **Figure 4** below.

Table 4: Advantages and Disadvantages of Option 1a

Advantages	Disadvantages
• Decommissioning of three (3) pumping stations • Diverts 149 ha of sewer shed (population of 6,500) from G.E. Booth to Clarkson WWTP. • Provides 7,000 m^3 of volume for storage.	• Too shallow and too much slope for future extension to the East across the Credit River • Limited opportunity to divert additional tributary area from the east to the tunnel in the future • Effective storage capacity limited before backflowing into connecting sewer to Ben Machree • Socio-economic impact of TBM launch/extraction shaft at Front St. and new pump station and wet well at Richard's Memorial Park

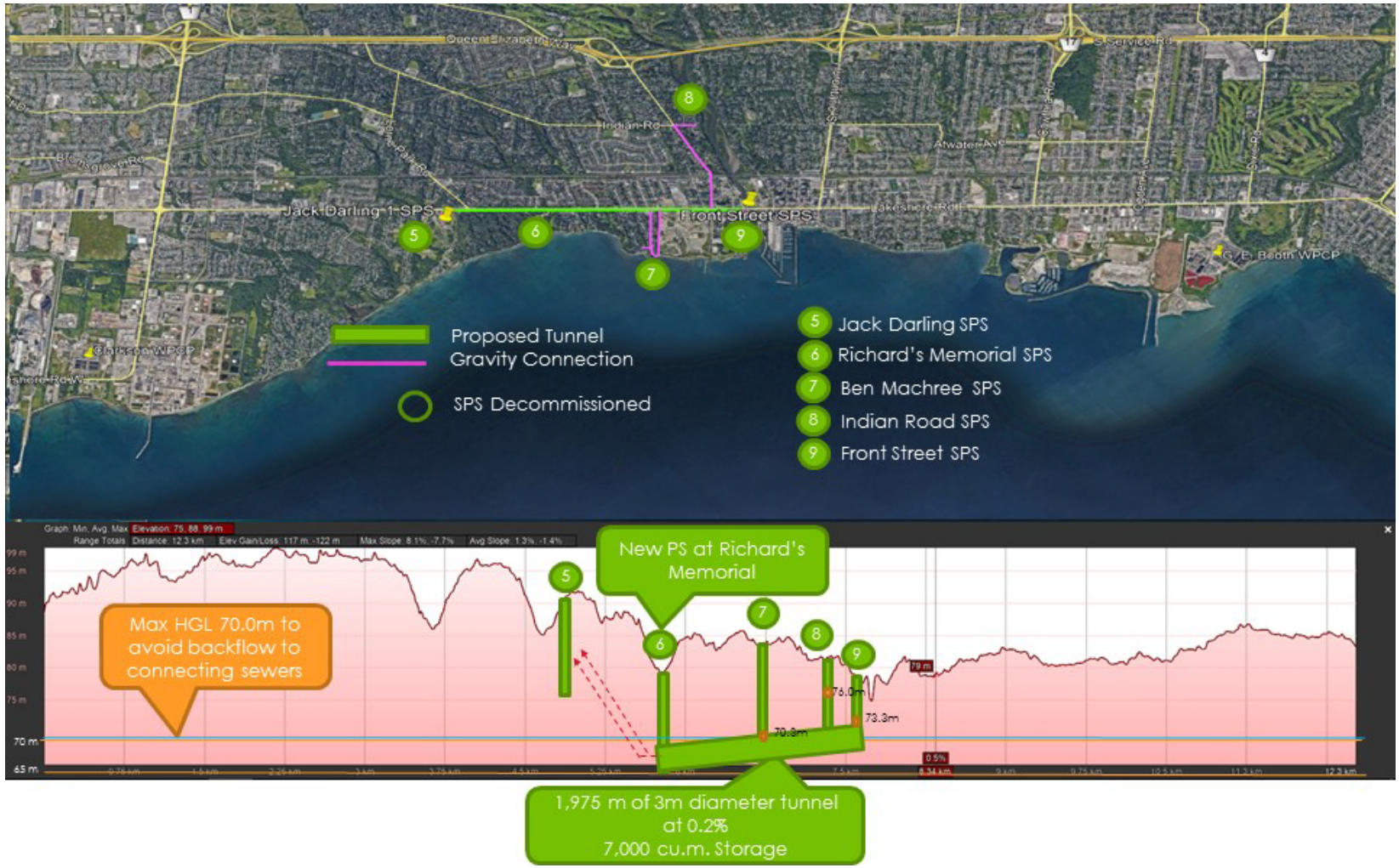


Figure 3: Option 1a - Tunnel Entirely within Rock and Within Current Limits of Class EA (Upgrade at RMSPS)

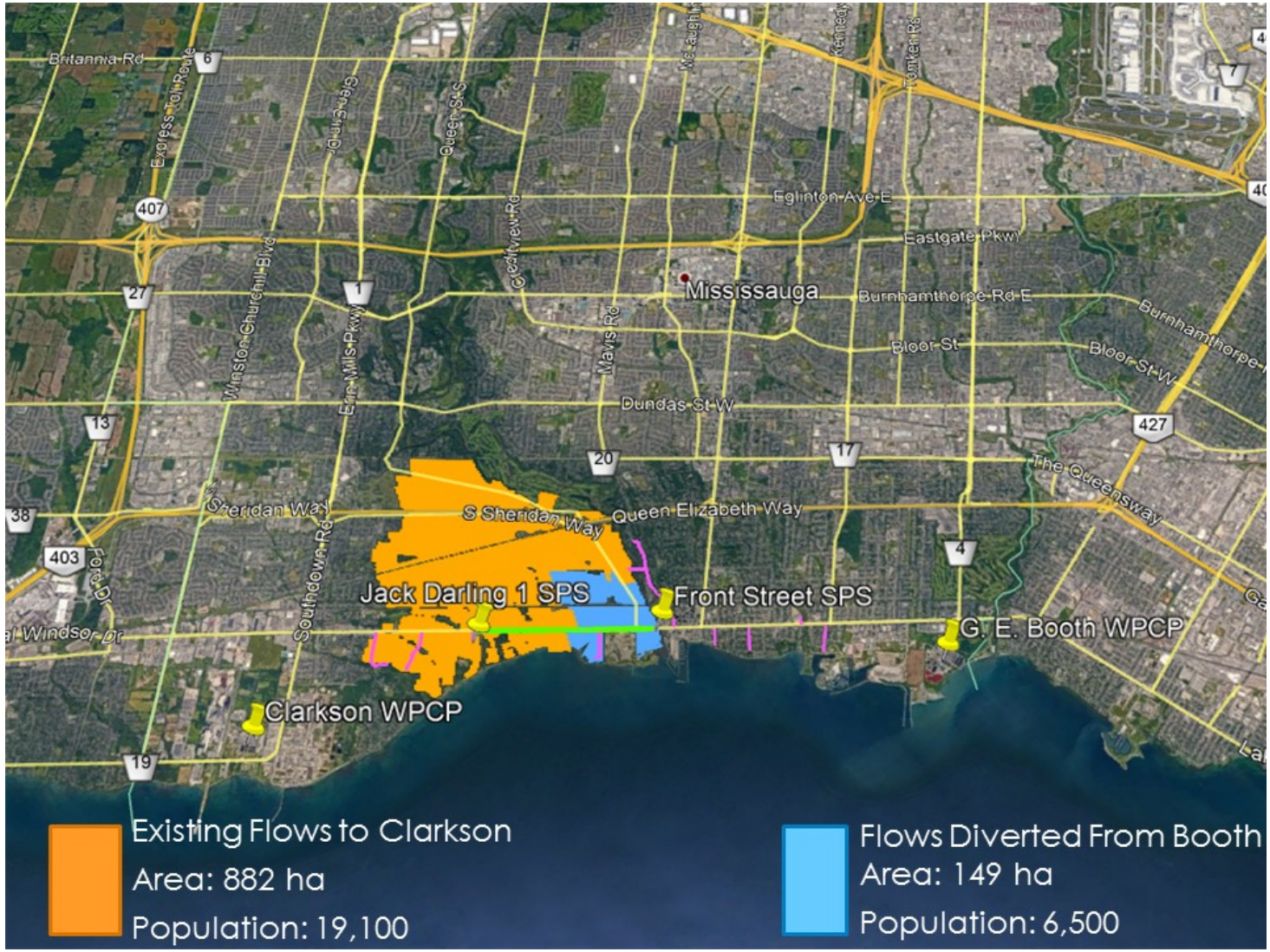


Figure 4: Option 1a Total Geographical Areas

2.2.2.2 Option 1b: Upgraded PS at Jack Darling

Option 1b is an extension of Option 1a to Jack Darling 1 SPS, with an adjacent deep wet well and submersible pumps at Jack Darling rather than at Richard's Memorial Park. This option consists of the following:

- 3m diameter rock tunnel, extended from Front St. SPS to Jack Darling SPS at 0.2% slope.
- New wet well and pump upgrades to be integrated with existing Jack Darling 1 SPS.
- Gravity sewers to divert flows into new trunk sewer from five (5) SPS's (Front St., Indian Road, Ben Machree, Richard's Memorial, Jack Darling 2).
- Decommissioning of five (5) SPS's (Front St, Indian Road, Ben Machree, and Richard's Memorial, Jack Darling 2).

This option provides approximately 21,000 m^3 of total tunnel volume but the effective storage volume for peak flow attenuation and/or emergency storage is limited to approximately 15,000 m^3 by the elevation of the incoming sewer at Ben Machree. This option is also limited to the west side of the Credit River given its shallow depth and steeper slope as compared to other options. **Table 5** below highlights the advantages and disadvantages of Option 1b. Refer also to **Figure 5** and **Figure 6** below.

Table 5: Advantages and Disadvantages of Option 1b

Advantages	Disadvantages
• Decommissioning of five (5) pumping stations • Diverts 149 ha of sewer shed (population of 6,500) from G.E. Booth to Clarkson WWTP. • Provides 15,000 m^3 of tunnel volume for storage (two times greater than Option 1a). • Less socio-economic impact of new wet well and SPS upgrade at Jack Darling vs Richards Memorial Park	• Too shallow and too much slope for future extension to the East across the Credit River • Limited opportunity to divert additional tributary area from the east to tunnel in the future • Effective storage capacity limited before backflowing into connecting sewer to Ben Machree • Socio-economic impact of TBM launch/extraction shaft at Front St.

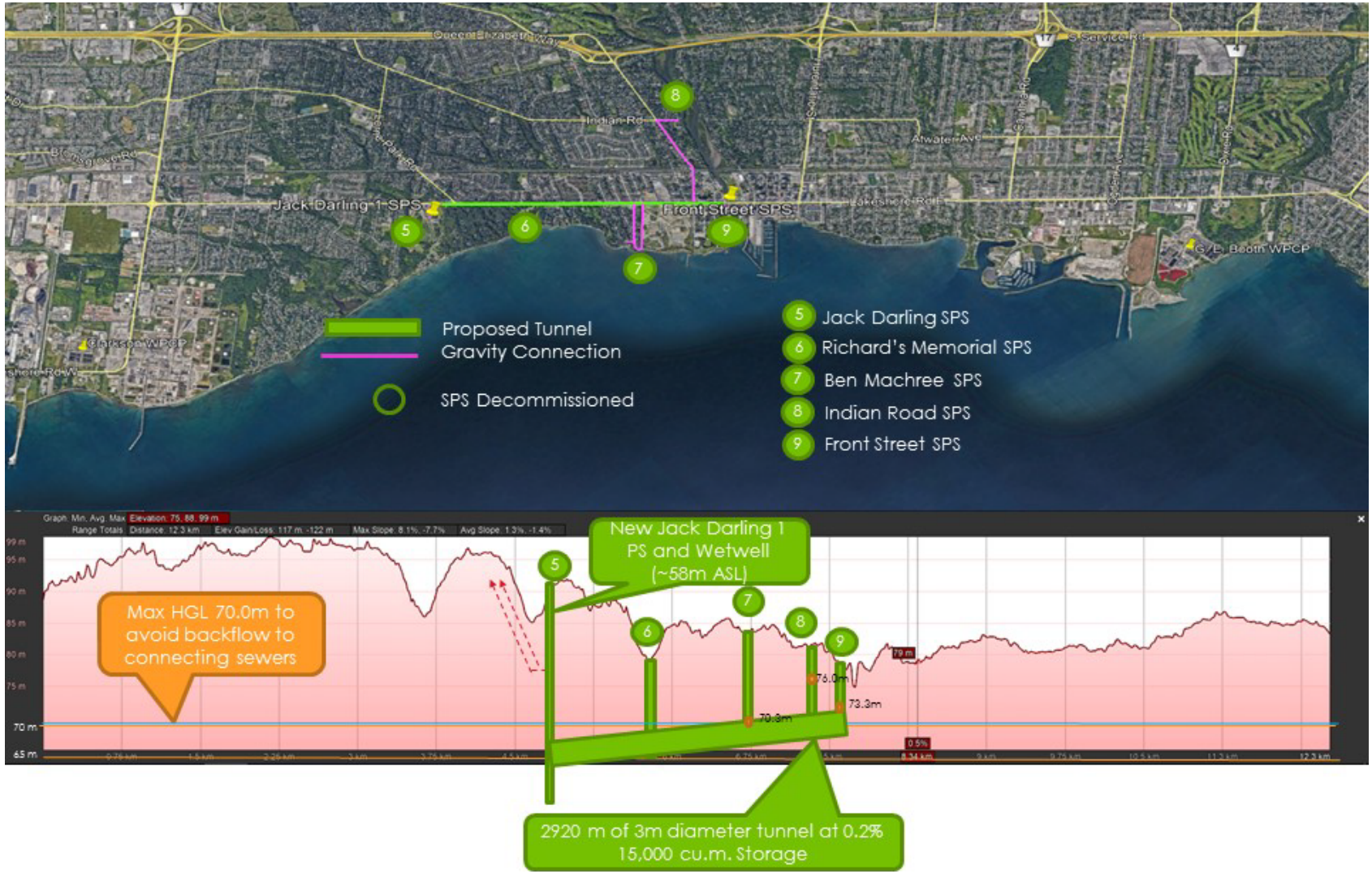


Figure 5: Option 1b – Tunnel Entirely within Rock and Within Current Limits of Class EA (Upgrade at JDSPS)

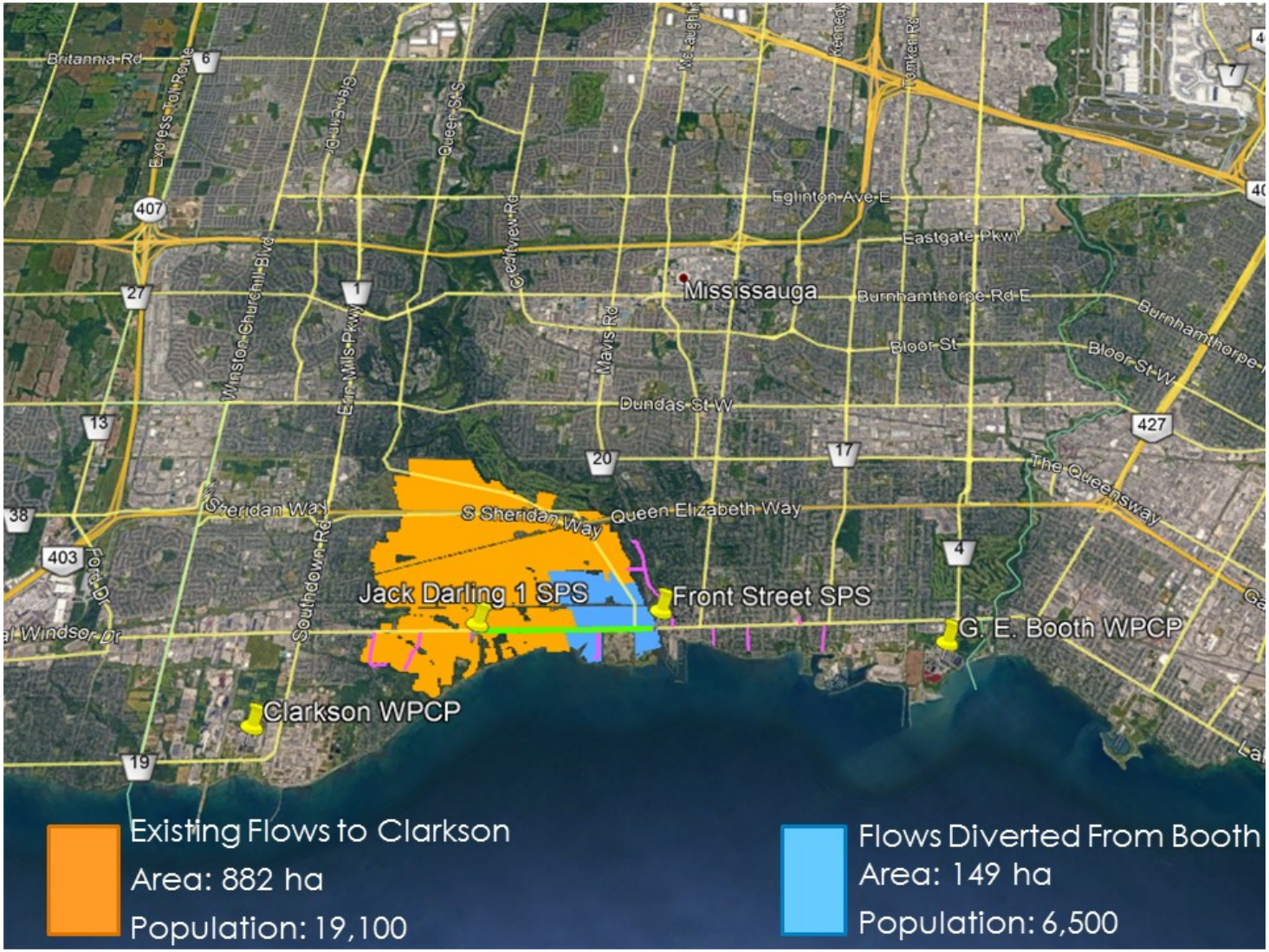


Figure 6: Option 1b Total Geographical Areas

2.2.3 Alternatives Extending West or East of Current EA Limits

The following options examine the added value of extending the proposed tunnel(s) either west or east of the current Class EA limits.

2.2.3.1 Option 2: Tunnel Extension West (from Front St SPS to Clarkson WWTP)

This option effectively considers the merits of only providing an extension west of the current EA boundaries by constructing a continuous tunnel from the Front St SPS to the Clarkson WWTP, complete with a 33 m deep PS wet well at the Clarkson WWTP (i.e. rather than a PS upgrade at Richard's Memorial Park). The alternative thus considers a tunnel depth similar to Option 1 (entirely within rock) and a total tunnel length of 7,690 m at a preliminary tunnel diameter of 3 m.

Option 2 consists of the following:

- New 7690 m long and 3 m diameter rock tunnel extending from Front St. SPS to Clarkson WWTP; routed along Lakeshore Road West and Southdown Rd.,
- New pumping station and deep wet well (approximately 38 m deep) next to Clarkson WWTP.
- Gravity sewers to divert flows into tunnel from eight (8) SPS's (Front St., Indian Road, Ben Machree, Richard's Memorial, Jack Darling 1, Jack Darling 2, Silver Birch, Stonehaven).
- Decommissioning of eight (8) SPS's (Front St, Indian Road, Ben Machree, and Richard's Memorial, Jack Darling 1, Jack Darling 2, Silver Birch, Stonehaven).

With the flows from the additional SPS's being diverted to this sewer, it may be feasible to reduce the slope of the sewer to 0.1% instead of 0.2% proposed in the shorter tunnel section. The depth of this tunnel would still prevent it from being extended to the East beneath the Credit River. This option will be 7,690 m in length and provide approximately 54,000 m^3 in tunnel volume. **Table 6** below highlights the advantages and disadvantages of Option 2. Refer also to **Figure 7** and **Figure 8** below.

Table 6: Advantages and Disadvantages of Option 2

Advantages	Disadvantages
• Decommissioning of eight (8) pumping stations • Diverts 149 ha of sewer shed (population of 6,500) from G.E. Booth to Clarkson WWTP. • Provides 54,000 m^3 of tunnel volume for storage.	• Too shallow for future extension to the East across the Credit River • Limited opportunity to divert additional tributary area from G.E. Booth to Clarkson in the future. • New Deep SPS at Clarkson • Socio-economic impact of TBM launch/extraction shaft at Front St. • High Capital Cost. • Potential mixed face conditions at East end of Tunnel • Potential that new EA is required if constructed all at once (minimum requirement is an EA Amendment).

Figure 7: Option 2 - Tunnel Extension West (from Front St SPS to Clarkson WWTP)

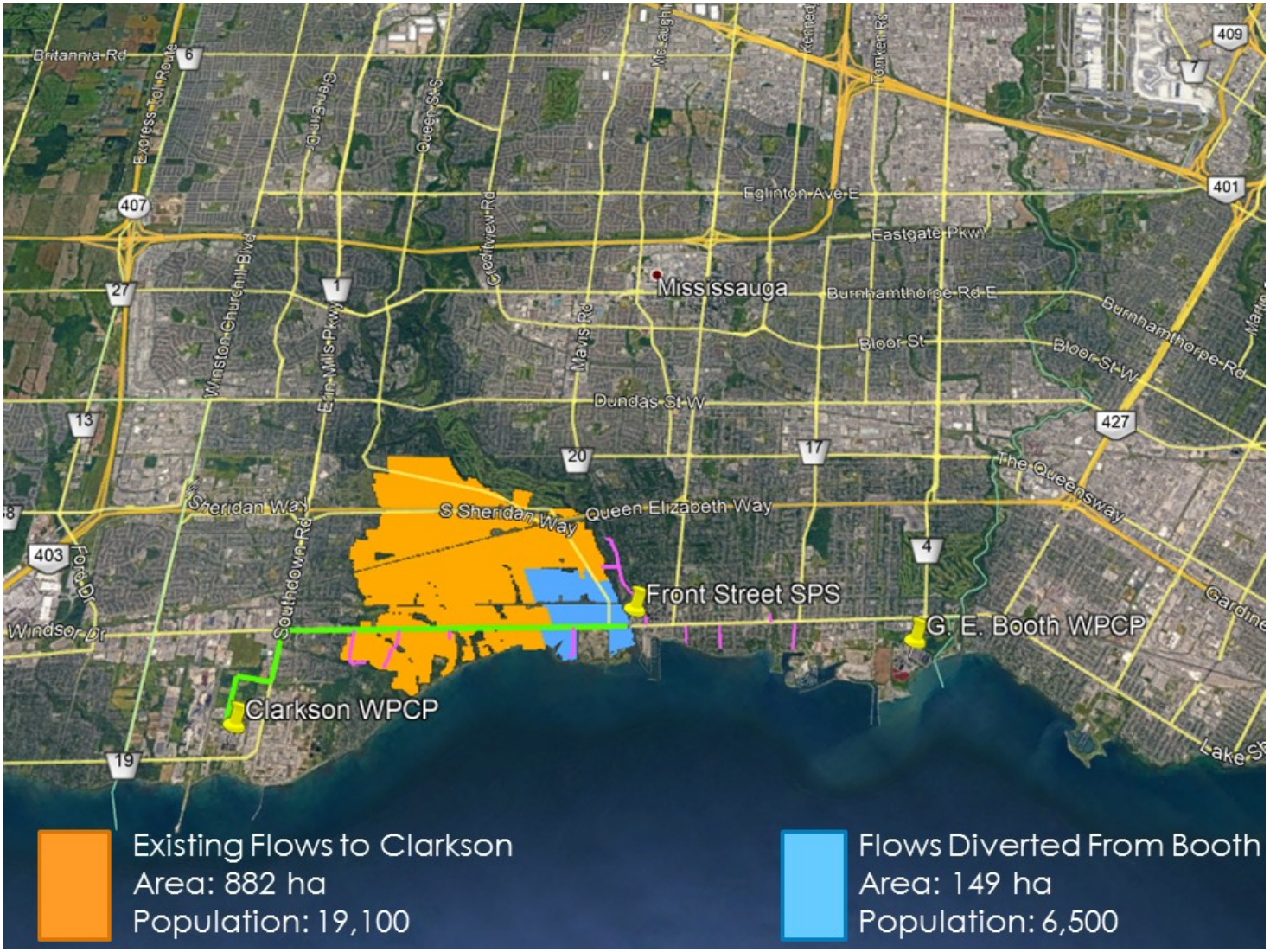


Figure 8: Option 2 Total Geographical Areas

2.2.3.2 Option 3: Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP)

While Option 2 includes the extension of the sewer to the West to Clarkson WWTP, this does not provide added benefit for flow diversion away from G.E. Booth beyond the 149 ha area diverted under the baseline option. Option 3 however, considers deepening and extending the sewer to the East to G.E. Booth WWTP in order to provide for greater diversion potential. This would require the tunnel to be at an elevation low enough to cross at a safe distance beneath the Credit River. For the purposes of the feasibility study, it is assumed that the invert elevation of the tunnel at the river crossing would be approximately 56 m, allowing for two tunnel diameters of clearance from the inferred bedrock elevation of approximately 65m, taken from existing borehole data, to the top of the tunnel. Option 3 consists of the following:

- New 5.5 km long and 3m diameter deep tunnel from Jack Darling to Alexandra Rd along with a higher level 1800mm and 1.15 km long gravity sewer from Alexandra Rd to G.E. Booth WWTP (both at a slope of 0.1%). The 1800 mm sewer would be constructed at a higher elevation in order to cross above and avoid a potential conflict with the Hanlan Feedermain.
- New wet well and upgrades at Jack Darling SPS.
- Diversion structures at the Lower Cooksville Creek sewer at Alexandra Ave. and G.E. Booth into 1800mm sewer.
- Gravity sewers to divert flows into tunnel from 10 SPS's (Jack Darling 2, Richard's Memorial, Ben Machree, Indian Road, Front St., Rosemere, Elmwood, Hiawatha, Beechwood, Beach St.)
- Decommissioning of nine (9) SPS's (Jack Darling 2, Richard's Memorial, Ben Machree, Indian Road, Front St., Rosemere, Elmwood, Hiawatha, Beach St.)

While extension of the tunnel to G.E. Booth would allow for the decommissioning of up to 10 sewage pumping stations if the Beechwood SPS were decommissioned. Option 3, however, assumes that nine (9) stations are decommissioned and that the Beechwood SPS would remain in operation for the duration of the life-cycle in order to provide flexibility to direct flows from its service area either east (pumped to G.E. Booth WWTP) or west (by gravity to Clarkson WWTP). The tunnel would still, once extended to Beach Street, provide an outlet and sufficient storage to act as an emergency overflow for the Beechwood SPS's full service area. This considers that the decision to decommission Beechwood may be deferred to the longer term when the costs for a major station upgrade could be avoided by simply decommissioning the station.

This option provides approximately 45,000 m^3 of available upstream tunnel volume for wet weather flow and emergency storage in the main tunnel for Jack Darling SPS. **Table 7** below highlights the advantages and disadvantages of Option 3. Refer also to **Figure 9** and **Figure 10** below.

Table 7: Advantages and Disadvantages of Option 3

Advantages	Disadvantages
• Decommissioning of nine (9) pumping stations • Diverts 1,009 ha of sewer shed (population of 34,800) from G.E. Booth to Clarkson WWTP. • Provides 45,000 m^3 of tunnel volume for storage. • No mixed face tunneling conditions. • Minimal disruption at harbour front.	• Deep wet well to be constructed and maintained at Jack Darling • New EA required if constructed all at once. • High Capital Cost.

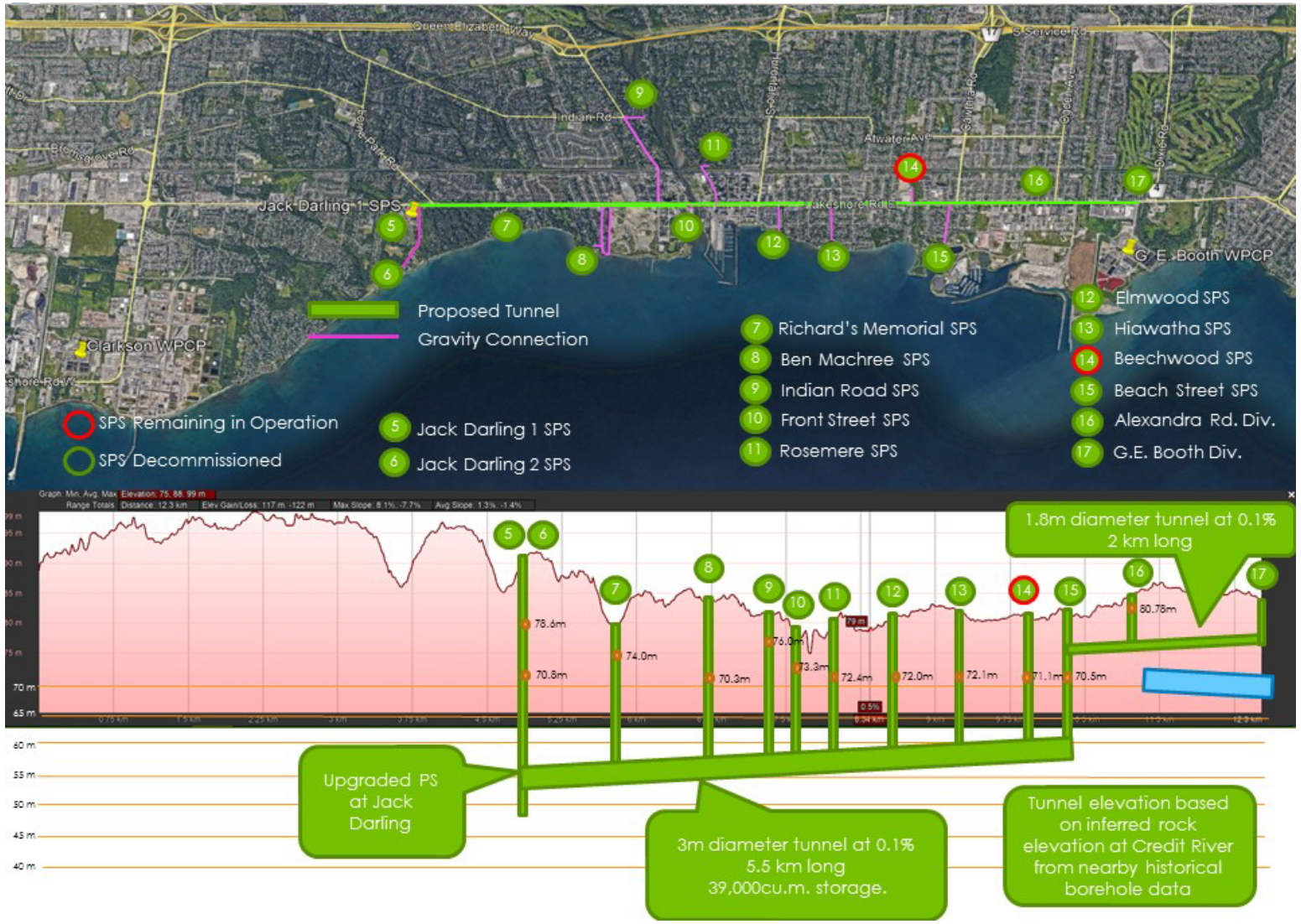


Figure 9: Option 3 - Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP)

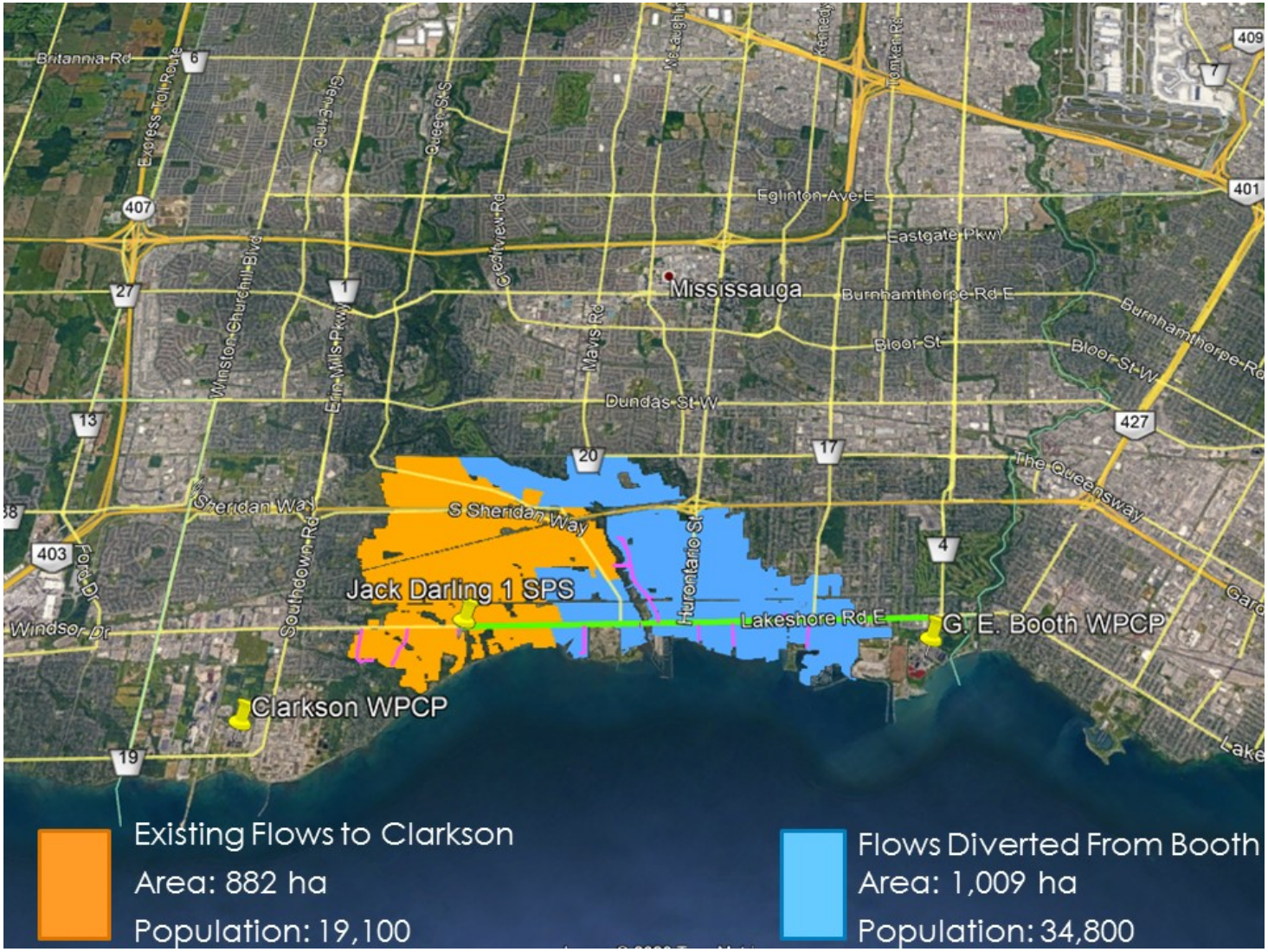


Figure 10: Option 3 Total Geographical Areas

2.2.4 Alternatives Extending Between Clarkson and G.E. Booth WWTPs

The following three options represent variations on the alternative to fully extend the preferred Class EA solution both east and west from its current limits to provide added capacity to divert flows between the G.E. Booth and Clarkson WWTPs. All three alternatives integrate the same Option 3 tunnel, which represents the conduit between the limits of the east extension between Jack Darling Park and the G.E. Booth WWTP.

2.2.4.1 Option 4: Continuous Tunnel Extension between G.E. Booth and Clarkson WWTPs (same tunnel depth as Option 3 at Credit River crossing and with Deep PS at Clarkson)

Option 4 consists of the same elements as Option 3 from Jack Darling SPS to G.E. Booth with the 3m diameter tunnel continuing West to Clarkson WWTP. This option would provide the flexibility to control flows between the two plants. It would also eliminate the need for the recently upgraded Jack Darling 1 SPS among the other SPS's listed. Option 4 includes the following components:

- New 10.75 km long and 3m diameter deep tunnel from Clarkson WWTP Alexandra Rd along with a higher level 1800mm and 1.15 km long gravity sewer from Alexandra Rd to G.E. Booth WWTP (both at a slope of 0.1%). The 1800 mm sewer would be constructed at a higher elevation in order to cross above and avoid a conflict with the Hanlan Feedermain
- New wet well and pump station at Clarkson WWTP approximately 44m deep to pump flows from the tunnel into the treatment plant.
- Optional diversion structures from Lower Cooksville Creek at Alexandra Ave. and G.E. Booth.
- Gravity sewers to divert flows into tunnel from 13 SPS's (Stonehaven, Silver Birch, Jack Darling 1, Jack Darling 2, Richard's Memorial, Ben Machree, Indian Road, Front St., Rosemere, Elmwood, Hiawatha, Beechwood, Beach St.)
- Decommissioning of 12 SPS's (Stonehaven, Silver Birch, Jack Darling 1 & 2, Richard's Memorial, Ben Machree, Indian Road, Front St., Rosemere, Elmwood, Hiawatha, Beach St.)

This option would provide approximately 79,000 m^3 of available upstream tunnel volume for wet weather flow and emergency storage for the new SPS at Clarkson. **Table 8** below highlights the advantages and disadvantages of Option 4. Refer also to **Figure 11** and **Figure 12** below.

Table 8: Advantages and Disadvantages of Option 4

Advantages	Disadvantages
• Decommissioning of twelve (12) pumping stations • Diverts 1,009 ha of sewer shed (population of 34,800) from G.E. Booth to Clarkson WWTP. • Provides full flexibility to divert flows from G.E. Booth (within capacity of Clarkson) • Provides 79,000 m^3 of tunnel volume for storage. • No mixed face tunneling conditions. • Minimal disruption at Port Credit for future expansion	• Deep wet well and new SPS to be constructed and maintained at Clarkson • New EA required if constructed all at once. • Very high capital cost. • Portion of tunnel downstream of Jack Darling is not required at this time given the capacity and in-line storage volume available in the tunnel upstream of Jack Darling PS (i.e. sufficient storage volume to manage peak flows and avoid downstream capacity upgrades).

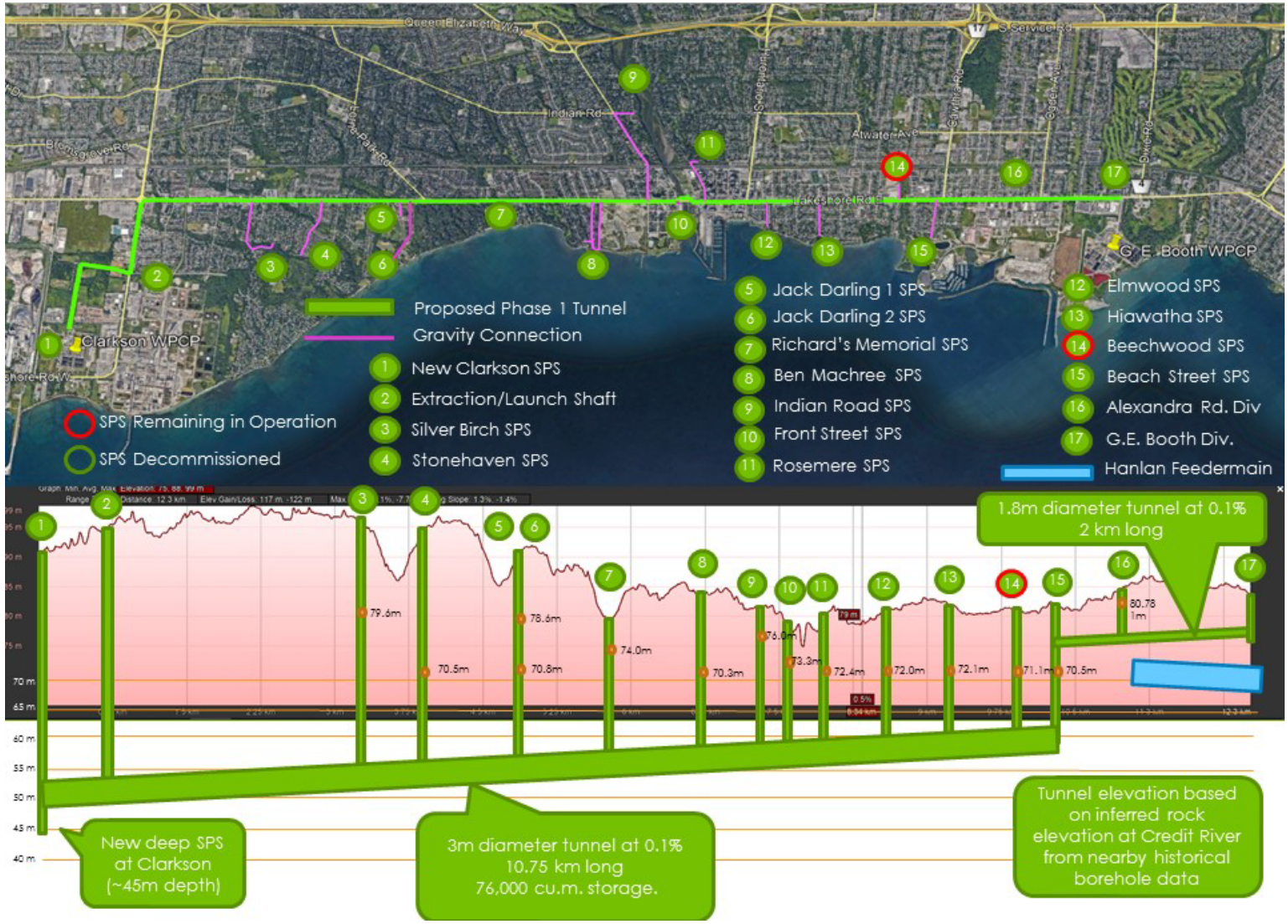


Figure 11: Option 4 - Full Continuous Tunnel Extension (with Deep PS at Clarkson WWTP)

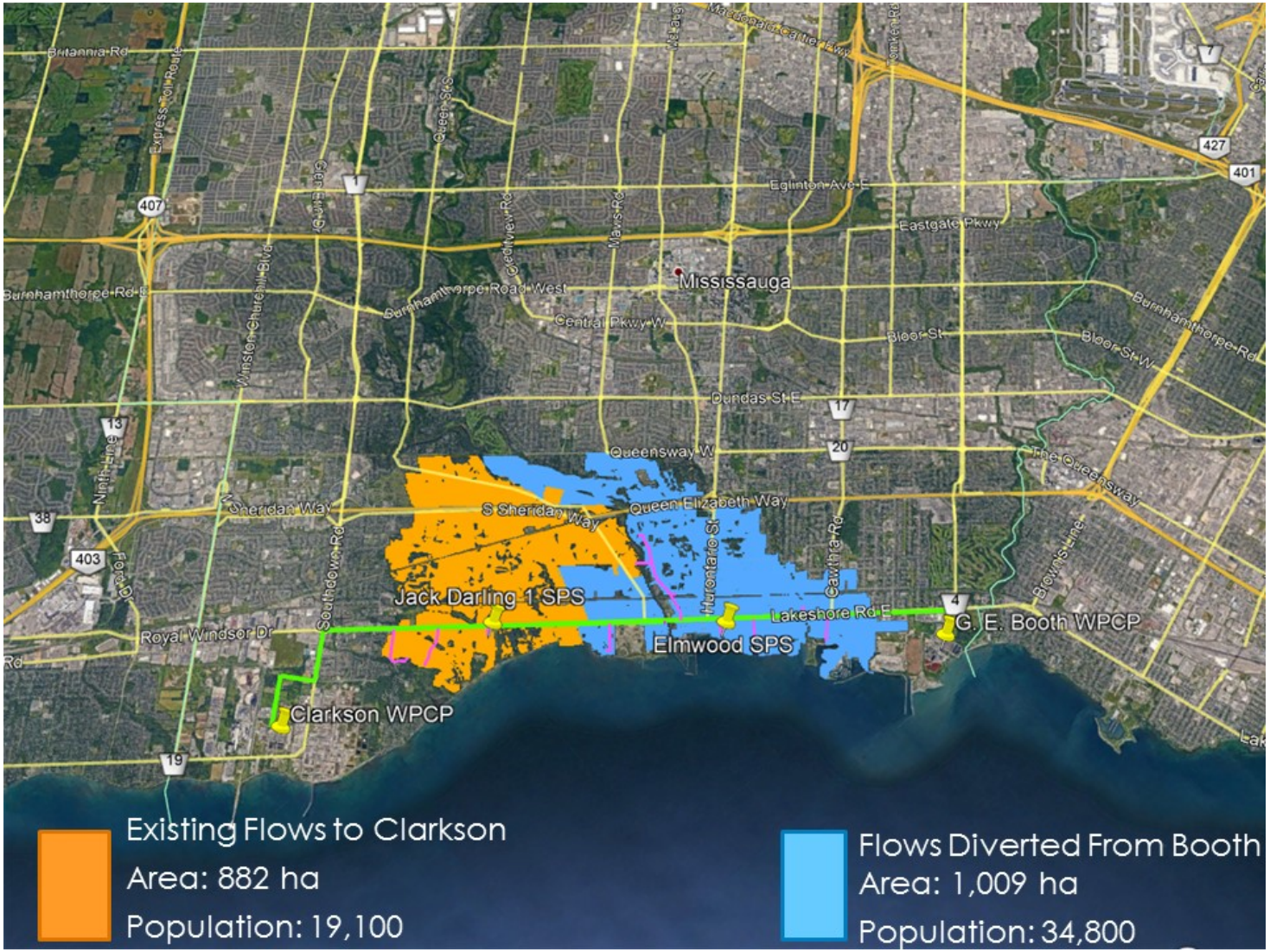


Figure 12: Option 4 Total Geographical Areas

2.2.4.2 Option 5: Two-Level Tunnel Extensions between Clarkson and G.E. Booth WWTPs with Deep PS at Jack Darling)

Option 5 consists of the same elements as Option 3 from Jack Darling SPS to G.E. Booth but with the additional provision that a higher-level gravity sewer can be built downstream of Jack Darling PS. The higher-level sewer would extend to the existing trunk sewer at Southdown Rd and Orr Rd. and would be constructed if it is determined that the downstream infrastructure does not have sufficient capacity to take the additional flows from Jack Darling SPS. This considers that the peak flows to, and downstream of, Jack Darling PS can be attenuated by the in-line storage made available by the implementation of the infrastructure under Option 3. This option includes the following:

- Implementation of Option 3, including.
    - New 41 m deep wet well and pump station upgrades at Jack Darling SPS to pump flows from the tunnel into the new downstream sewer upgrade.
    - Optional diversion structures from Lower Cooksville Creek at Alexandra Ave. and G.E. Booth.
    - Gravity sewers to divert flows into tunnel from 10 SPS's (Jack Darling 2, Richard's Memorial, Ben Machree, Indian Road, Front St., Rosemere, Elmwood, Hiawatha, Beechwood, Beach St.)
    - Decommissioning of 9 SPS's (Jack Darling 2, Richard's Memorial, Ben Machree, Indian Road, Front St., Rosemere, Elmwood, Hiawatha, Beach St.)
- A higher-level sewer downstream of Jack Darling from East of Meadow Wood Rd. to Southdown Rd at Orr Rd (assumed diameter of 1800 mm). The higher-level sewer will pick up flows from new forcemains from the upgraded Jack Darling SPS and convey them to the trunk sewer flowing to Clarkson WWTP.

This option would provide 45,000 m^3 of available upstream tunnel volume for wet weather flow and storage for Jack Darling SPS. **Table 9** below highlights the advantages and disadvantages of Option 5. Refer also to **Figure 13** and **Figure 14** below.

Table 9: Advantages and Disadvantages of Option 5

Advantages	Disadvantages
• Decommissioning of nine (9) pumping stations • Diverts 1,009 ha of sewer shed (population of 34,800) from G.E. Booth to Clarkson WWTP. • Provides 45,000 m^3 of tunnel volume for storage. • Potentially no mixed face tunneling conditions. • Minimal disruption at harbour front.	• Deep wet well to be constructed and maintained at Jack Darling Park • New EA required if constructed all at once. • High capital cost. • Upgrades downstream of Jack Darling may not be required at this time given the capacity and in-line storage volume available in the tunnel upstream of JDPS

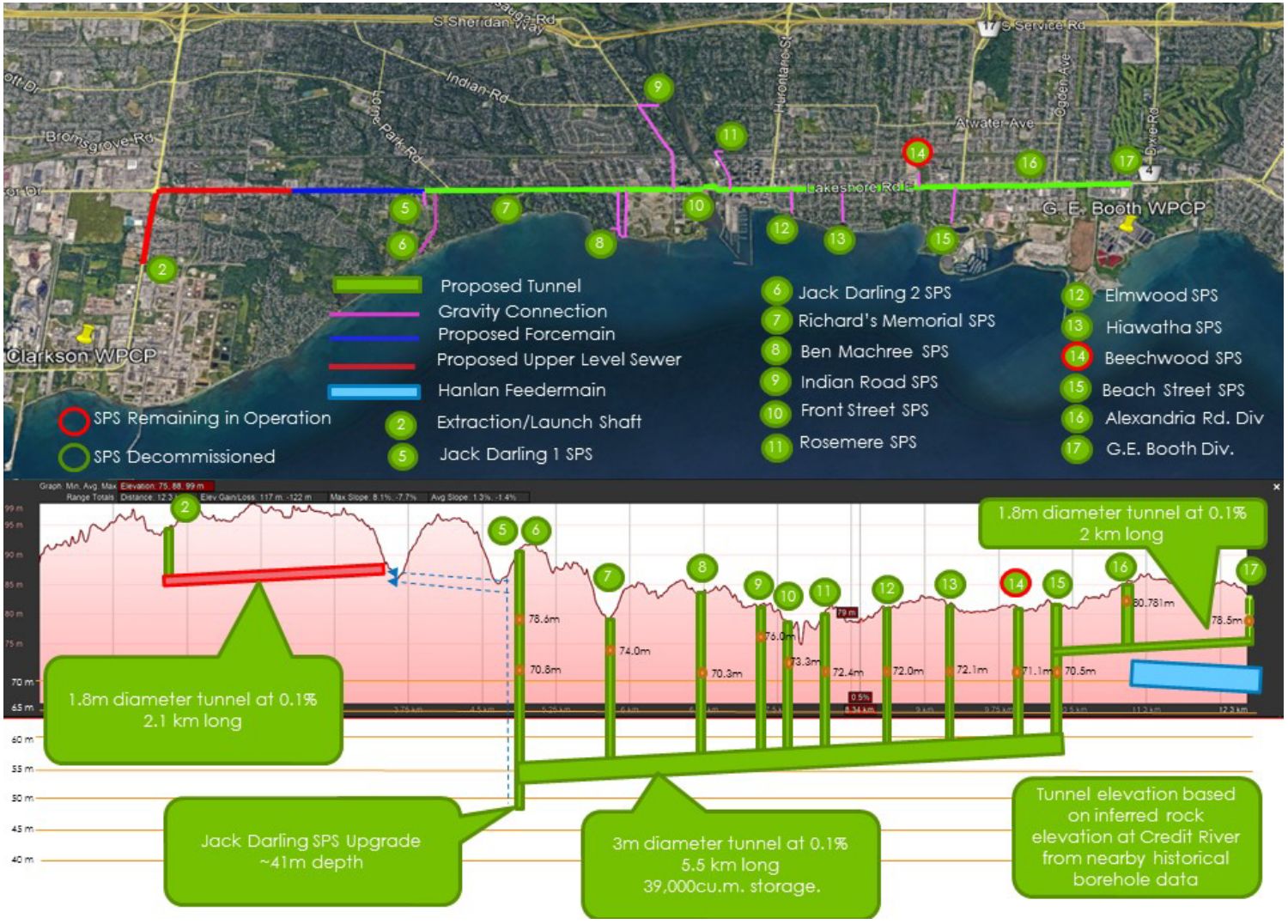


Figure 13: Option 5 - Two-Level Tunnel Extensions between Clarkson and G.E. Booth (with Deep PS at Jack Darling)

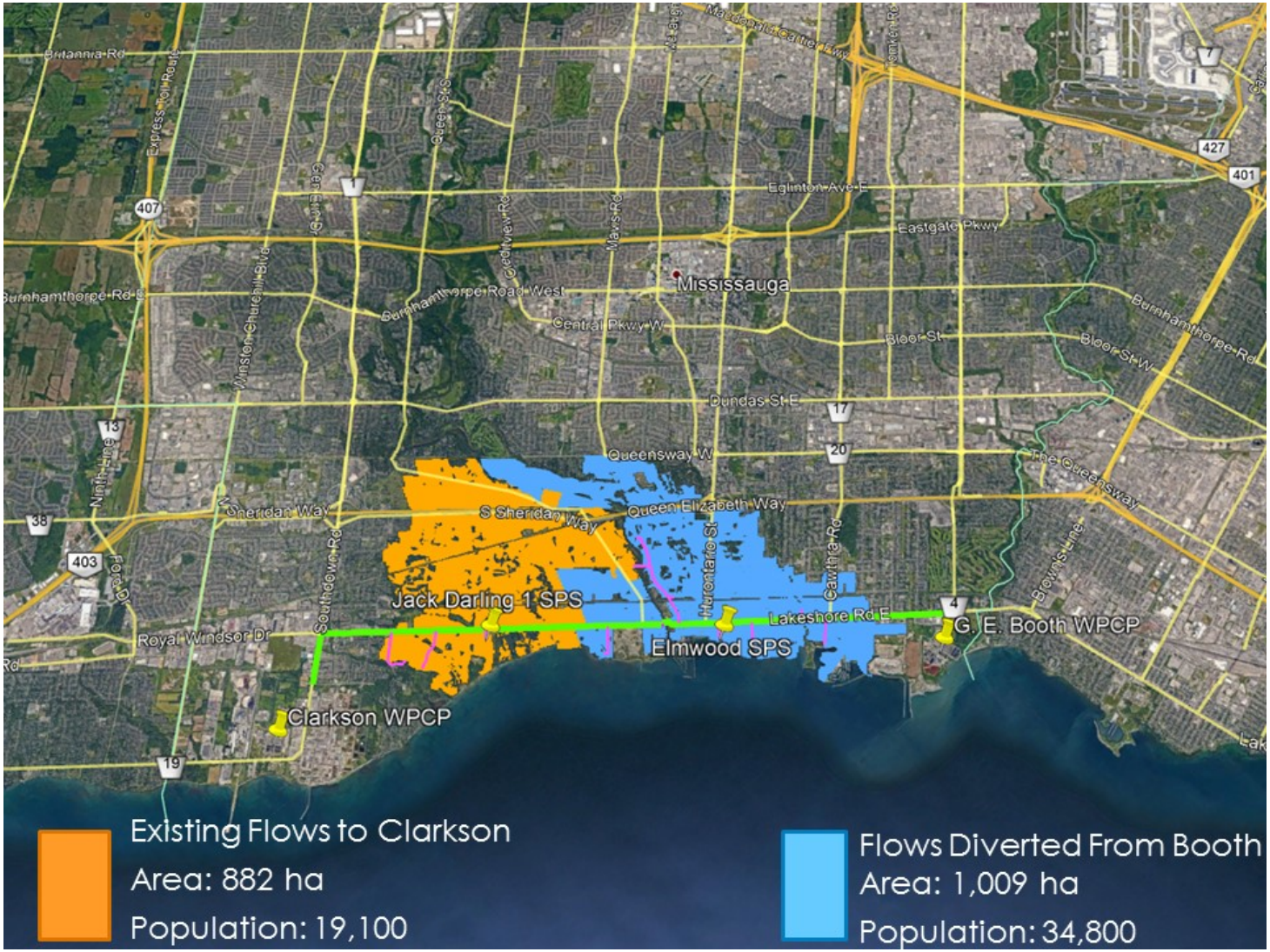


Figure 14: Option 5 Total Geographical Areas

2.2.4.3 Option 6: Variation of Option 5 with Downstream Forcemain Extension (instead of higher-level tunnel)

Option 6 is a variation on Option 5 whereby forcemain upgrades from JDPS to the existing trunk sewer at Clarkson Rd N would be constructed instead of a gravity sewer to the existing trunk sewer at Southdown Rd and Orr Rd. Similarly, this option would provide 45,000 m^3 of available upstream in-line volume for wet weather flow and storage for Jack Darling SPS. This option would involve similar advantages and disadvantages as Option 5 above at a lower cost but is dependent on the existing capacity downstream of Jack Darling which would require further evaluation. Refer also to **Figure 15** and **Figure 16** below.

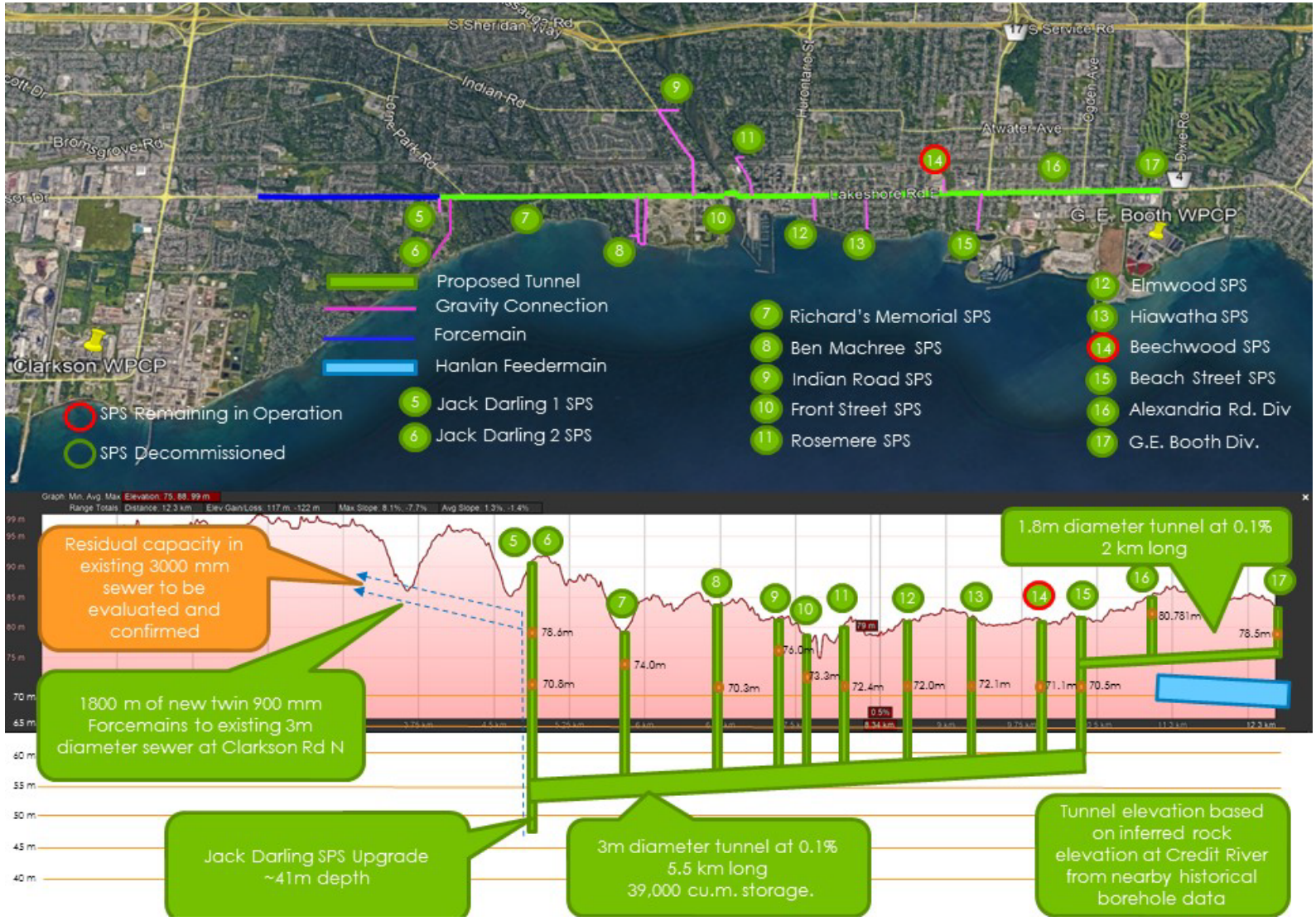


Figure 15: Option 6 - Full East Extension (with Deep PS at Jack Darling and forcemain upgrades/extensions)

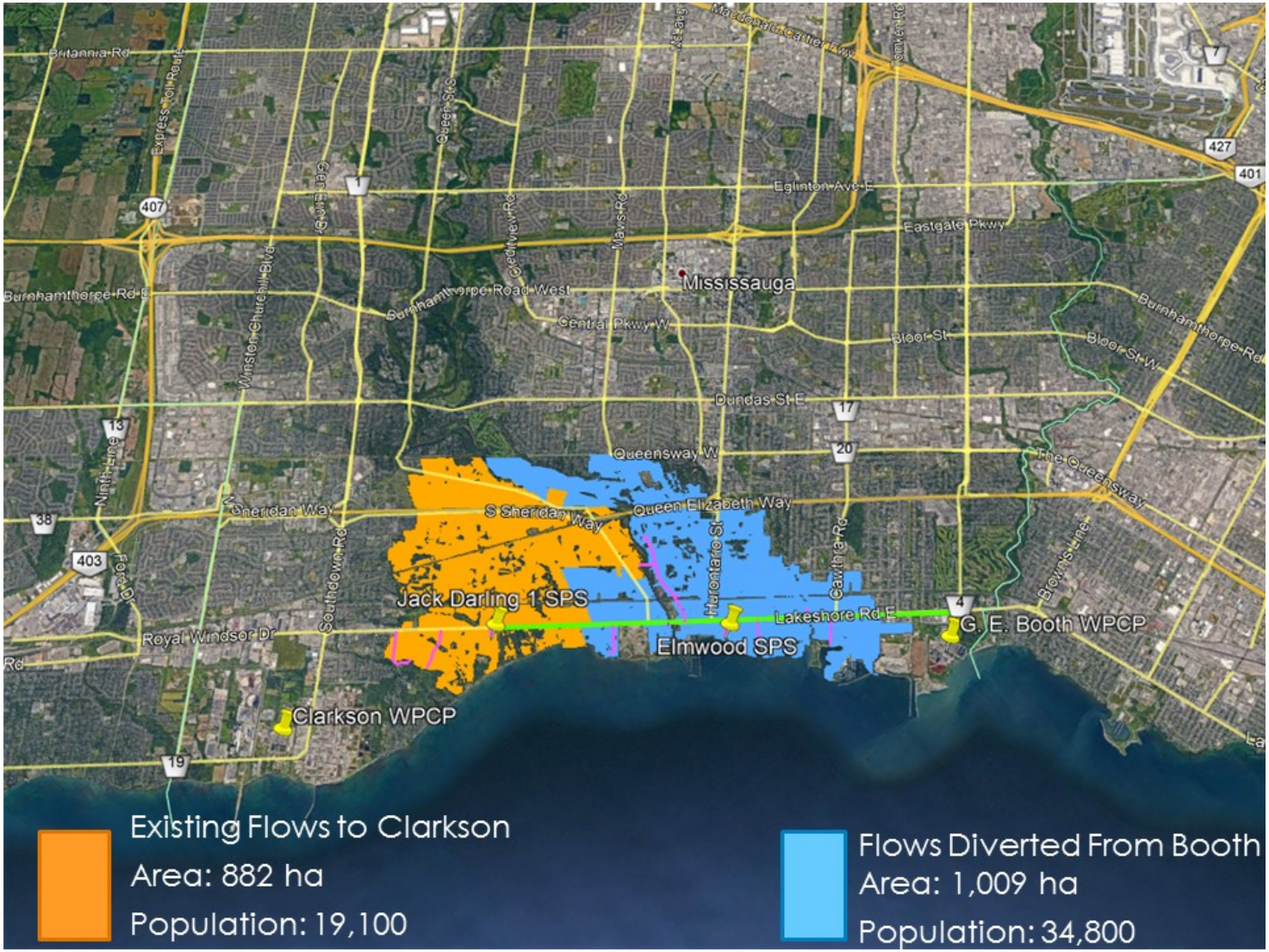


Figure 16: Option 6 Total Geographical Areas

2.3 SHORT-LISTING OF ALTERNATIVE SOLUTIONS

2.3.1 Evaluation of Alternatives

Each of the long list alternative solutions were individually scored against the weighted criteria referenced above on a scale from 1 to 5, with 1 being the least favorable and 5 being the most favorable. The scoring applied to each alternative option are shown in **Table 10** below. These scores were added to develop the weighted and unweighted total scores for each alternative. These total scores are summarized and compared in **Table 11** below. For complete explanations of the each of the individual scores including the indicators used to assign the various scores, refer to the table in **Appendix A**

Table 10: Scoring of Long List of Alternative Options for each Criterion

Criterion	Weighting	BLS	1a	1b	2	3	4	5	6
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions)	**15%**	1	1	1	1	4	5	4	4
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	**12%**	1	1	2	3	5	3	3	3
Flexibility for Future Expansion of Tunnel	**12%**	1	2	2	3	4	4	4	4
Resiliency to Adapt for Changing Conditions (Growth, Climate Change, Other…)	**14%**	1	2	2	3	4	5	5	4
Added Operational Flexibility for system upgrades (other assets)	**13%**	1	1	2	2	4	5	5	5
Long Term Operational Sustainability (ease of operation and maintenance)	**14%**	5	4	4	2	3	2	3	3
Project Approvals and Schedule	**4%**	5	5	5	3	2	2	2	4
Constructability (Risks)	**6%**	5	3	3	2	4	2	3	3
Social-Economic	**11%**	4	4	5	2	4	1	2	3
Unweighted Score		**24**	**23**	**26**	**21**	**34**	**29**	**31**	**33**
Percent (%)		**53**	**51**	**58**	**47**	**76**	**64**	**69**	**73**
Weighted Score		**2.28**	**2.27**	**2.63**	**2.26**	**3.91**	**3.49**	**3.65**	**3.69**
Percent (%)		**46**	**45**	**53**	**45**	**78**	**70**	**73**	**74**

Table 11: Scoring Summary of Long List Alternative Options Evaluation

		Score (%)	
		Unweighted	**Weighted**
Baseline	W20 Port Credit West Tunnel from Front to Richard's Memorial and Higher Tunnel to Jack Darling 1	53	46
Option 1a	Tunnel Entirely within Rock with Upgrade at Richards Memorial Park (within limits of EA Boundaries)	51	45
Option 1b	Tunnel Entirely within Rock with Upgrade at Jack Darling SPS (within limits of EA Boundaries)	58	53
Option 2	Tunnel Extension West (from Front St SPS to Clarkson WWTP)	47	45
Option 3	Deep Tunnel Extension East (from Jack Darling PS to G.E. Booth WWTP)	76	78
Option 4	Continuous Tunnel Extension between G.E. Booth and Clarkson WWTPs	64	70
Option 5	Two-Level Tunnel Extensions between Clarkson and G.E. Booth WWTPs	69	73
Option 6	Variation of Option 5 with Downstream Forcemain Extension (instead of higher-level tunnel)	73	74

2.3.2 Discussion of Evaluation Results (Evaluation of Alternatives Short-List)

As seen from the evaluation exercise above, the highest scoring alternative was Option 3, with Options 4, 5 and 6 following with similar scores. Within the context of achieving the objectives of the feasibility study, a summary discussion of the results and conclusions for each of the Options are provided as follows:

2.3.2.1 Low-scoring Options (Not Carried Forward)

- **Baseline Option (EA Solution):** The primary reasons that the Baseline Option results in a lower score is that it provides for limited flexibility to extend the solution. Specifically, it does not meet the core objectives in that it does not provide added ability to divert a larger service areas from the east to the west and does not provide significant ability to reduce total expenditure costs over the long term (i.e. limited ability to reduce life-cycle costs by reducing the number of operating sewage pumping stations and limited ability to benefit capital investment pans at the WWTPs).

  From a constructability risk perspective, the tunnel depth is such that it is too shallow to cross under the Credit River and would need to be constructed under mixed-face conditions for a portion of its length based on currently available geotechnical data. From a functional perspective, the tunnel diameter and depth provide limited ability to effectively use the tunnel for in-line storage (i.e. to manage downstream capacity and/or provide emergency storage).

  From the perspective of implementation considerations, the baseline solution requires two (2) mobilizations of the 1800mm diameter tunneling machine in order to construct two (2) separate tunnels. Starter tunnel shafts will be required at both Jack Darling SPS and Richard's Memorial

SPS. Exit shafts will be required at Richard's Memorial and adjacent to the Front Street SPS, likely to the north of Front Street SPS in the existing green space. The baseline solution will require significant impacts (tree cutting and access to park) to Richard's Memorial Park in order to construct a new deeper pump station with the required two-hour storage tank.

Baseline Option Conclusion: The baseline option does not meet the core objectives of the feasibility study. It is preferred to make the tunnel deeper to allow extension across the Credit River and, in addition to being deeper, increase the diameter of the tunnel (i.e. 3m) to provide added operational flexibility with effective in-line storage.

- **Option 1 Deeper Rock Tunnel (with Option 1a PS upgrade at Richard's Memorial and Option 1b PS upgrade at Jack Darling):** While Option 1 represents a slightly deeper rock tunnel (i.e. avoiding mixed-face construction) within the existing limits of the EA and larger tunnel diameter (3 m) compared to the baseline option, it is not at a sufficient depth to permit a future crossing of the Credit River. Like the Baseline Option, this option does not meet the core objectives of providing added ability to divert a larger service area from the east to the west and does not provide significant ability to reduce total expenditure costs over the long term.

  The evaluation of Options 1a and 1b, however, highlights several advantages in upgrading the existing pumping facility at Jack Darling 1, rather than at Richard's Memorial Park. The key advantages of this are:

  - The construction of a large and relatively deep pumping station at Jack Darling Park (adjacent to existing Regional water and wastewater facilities) will have a lesser impact on mature trees in the area and will be less disruptive to the general community and adjacent property owners.
  - The construction of a pumping facility at Jack Darling Park provides opportunity for the integration of the required deep wet well station with an existing and recently upgraded facility at a common location, rather than having to operate two separate facilities at different locations.
  - Compared to a tunnel from Front Street to Richard's Memorial Park, the extension of a continuous tunnel from Front Street to Jack Darling Park provides for significantly more effective in-line tunnel storage volume, combined with a greater discharge capacity through the JD1 SPS, to effectively provide greater operational flexibility for managing peak flow discharges to the downstream system.

  Option 1 Conclusion: While Option 1 does not meet core objectives and is not carried forward, it is concluded that the location of a deeper wet well at Jack Darling and integration with the existing facility is preferred over a location at Richard's Memorial Park, as suggested in the baseline solution (EA).

- **Option 2: Tunnel Extension West to Clarkson WWTP (extension of Option 1 with Deep PS at Clarkson).** Similar to Option 1 (with tunnel of similar depth), extension of a tunnel west of the limits of the EA project boundary does not meet the core objectives of providing added expansion flexibility with the ability to divert a larger service area from the east to the west and does not provide significant ability to reduce total expenditure costs over the long term. Option 2 would also require the construction of a deep PS at the Clarkson WWTP rather than a deep wet well at Jack Darling.
  Option 2 Conclusion: On its own, Option 2 is not carried forward as a viable solution in that it does not provide any significant advantage over Option 1 in meeting the core objectives of the feasibility study and would require a very significant capital investment for little added benefit. Extension west of Jack Darling would only be feasible if is part of a solution that also extends the tunnel east of the Credit River.

2.3.2.2 Alternatives Short-List (High-scoring Options Carried Forward)

- **Option 3: Tunnel Extension East from Jack Darling to Booth WWTP.** As a deeper tunnel that provides the ability to extend east across the Credit River all the way to G.E. Booth, Option 3 meets all of the Core objectives of the feasibility study and provides the ability to either construct the solution over its full extents or allows for a phased implementation that would provide for incremental benefits within the Region's Capital Phasing and Implementation Plan (CPIP). Options for phased implementation of Option 3 are discussed further in **Section 3**.

  At the tunnel depth contemplated for Option 3, it is anticipated that the tunneling can be conducted entirely in rock, thereby mitigating the risks associated with mixed face tunneling. This will require deepening the baseline tunnel by 10-15 m; subject to further sub-surface conditions evaluations at the Credit River crossing. It must thus be considered that adopting a larger and deeper tunnel solution will likely require different hydraulic designs for energy dissipation and air handling at drop structures as well as likely introduce a number of operational risks (i.e. related to access, solids deposition, and self-cleaning ability). All these aspects would inherently have been considered and addressed as part of the baseline solution design, however, the deeper tunnel may increase the level of risk and thus level of design effort and costs associated with the mitigation of these risks in design and implementation of the solution.

  Option 3 Conclusion: Option 3 is carried forward for further evaluation given that it scores the highest in the evaluation, provides maximum flexibility to provide East-West flow diversion potential and the elimination of SPS's, as well as the ability to phase the implementation of the extension with incremental benefits. The deeper tunnel also increases the likelihood that the tunneling can be performed entirely in rock, which reduces risks associated with tunneling in mixed face conditions.

- **Options 4, 5 and 6 – Extension of East-West Diversion from G.E. Booth WWTP to Clarkson WWTP:** These alternatives represent three different Options for extending the tunnel to the extent required to provide a functional diversion of flows (to the extent required) between the two WWTP. All three options integrate Option 3 as the extension to the east of Jack Darling and are

each deemed to be feasible at varying levels of complexity as well as cost. Like Option 3, all three score amongst the highest alternatives because they provide maximum flexibility to allow East-West flow diversion potential and the elimination of SPS's, as well as the ability to integrate and be phased as a follow-on to the implementation Option 3. The primary difference and preferences between the three options will be dictated by the diversion capacity limitations in the downstream infrastructure (i.e. the receiving trunk sewers downstream of Jack Darling PS1 and/or at the Clarkson WWTP itself). Further evaluation considerations for each are Highlighted below:

- **Option 4 – Continuous tunnel between Clarkson and Booth WWTPs:** This option would eliminate the need for a deep wet well and PS integration upgrade at Jack Darling but would require the highest initial capital cost investment with the construction of a deep tunnel over the full east-west extents (as configured for Option 3 east of JDPS) along with a deep PS at Clarkson. The peak capacity of the flow diversion would be limited by the capacity constraints within the Clarkson WWTP and the economics of the design capacity of the deep PS that would be constructed at Clarkson. The storage volume in the tunnel itself would be effectively used to maintain the discharge capacity of the new PS to the capacity limits within the WWTP. Should the implementation of Option 4 be conducted as a subsequent phase of implementation to Option 3, the investment in the deep wet well and integration with the existing facility at JDPS1 would be a "throw-away" cost given the need to build a new deep PS at Clarkson.

- **Option 5 – Two-level tunnel extension between Clarkson and Booth WWTPs (with Deep PS at Jack Darling):** This option would eliminate the need for a deep PS at Clarkson in favour of a deep wet well at Jack Darling and integration with the existing (or upgraded) JPPS (as in Option 3). The peak capacity of the flow diversion would be limited by the capacity constraints within the downstream trunk sewer system at the point of extension of the upper level tunnel and/or the Clarkson WWTP. The storage volume in the tunnel upstream of JDPS would be effectively used to maintain the discharge capacity of the JDPS to the capacity limits of the downstream trunk connection point and/or within the WWTP. Should the implementation of Option 5 be conducted as a subsequent phase of implementation to Option 3, the investment in a capacity upgrade at JDPS to maximize downstream diversion potential could be deferred to a future upgrade.

- **Option 6 – Forcemain extension from JDPS to provide diversion between Clarkson and Booth WWTPs (with upgrade of Jack Darling and integrating same configuration as Option 3 at and east of JSPS):** Similar to Option 5, this would eliminate the need for a deep PS at Clarkson in favour of a deep wet well at Jack Darling and integration with the existing (or upgraded) JDPS (as in Option 3). The difference is that the extents of the upgrades could potentially be less costly if the peak flow diversion requirements from the east can be adequately managed at the JDPS. That is, the storage volume in the tunnel upstream of JDPS would be effectively used to maintain the discharge capacity of the upgraded JDPS to the capacity limits of the downstream trunk connection point of the forcemains and/or within the WWTP. Should the implementation

of Option 6 be conducted as a subsequent phase of implementation to Option 3, the investment in a capacity upgrade at JDPS (station and/or forcemains) to maximize downstream diversion potential could be deferred to a future upgrade.

Options 4, 5 and 6 Conclusions: All three options are carried forward for further evaluation given that they score high in the evaluation, they provide maximum flexibility for East-West flow diversion potential and the elimination of SPS's, as well as the ability to phase the implementation of the extension with incremental benefits. The deeper tunnel also increases the likelihood that the tunneling can be performed entirely in rock, which reduces risks associated with tunneling in mixed face conditions. Option 4 provides the greatest potential for the amount of flow that could be diverted given that it would not be constrained by the downstream trunk sewer system (only the WWTP itself) and would provide for the most amount of in-line storage to control peak flows into the WWTP, however, it scores the lower of the three given that it is less conducive to phased implementation without "throw-away" investment. Option 6 scores highest of the three given its potential for being the lower cost alternative of the three. Option 5 scores next highest given that it provides greater potential for maximizing downstream diversion capacity while also allowing for effective phasing of a downstream extension.

3.0 EVALUATION OF SHORT-LISTED OPTIONS

3.1 ALTERNATIVES SHORT-LIST

Further to the evaluation conducted under Section 2, the alternatives short-list consists of the following options:

- **Baseline Option:** (Included only for the purposes of comparison with the baseline EA solution) W20 Port Credit West Tunnel (1.8 m diameter) from Front St PS to Richard's Memorial PS and Higher-Level Tunnel (1.8 m diameter) to Jack Darling 1 PS.
- **Option 3:** Deep Rock Tunnel Extension (3.0 m diameter) East from Jack Darling to Booth WWTP (with deep wet well and integration with recently upgraded JDPS).
- **Option 4:** Continuous Deep Rock Tunnel Extension (3.0 m diameter) between Clarkson and Booth WWTPs (integrating same configuration as Option 3 at and east of JSPS).
- **Option 5:** Two-Level Rock Tunnel Extension (3.0 m diameter) between Clarkson and Booth WWTPs (integrating same configuration as Option 3 at and east of JSPS).
- **Option 6:** Forcemain extension from JDPS to provide diversion between Clarkson and Booth WWTPs (with upgrade of Jack Darling and integrating same configuration as Option 3 at and east of JSPS).

The results from the evaluation of the long list of alternatives demonstrates that, to satisfy the core objectives of the feasibility study and the criteria described above, it is most beneficial to extend the tunnel to the East than to the West. Specifically, extension to the east provides the most opportunity to manage capacity at the plants by diverting flows away from G.E. Booth to Clarkson WWTP, provide resiliency for changing conditions, and reduce overall expenditures by decommissioning pump stations. Therefore, Option 3 would best satisfy these criteria at the lowest capital cost, while still providing flexibility to move forward with a future expansion to the West as described in Options 4, 5 and 6.

To provide further context on the benefits and further evaluate the merits of the short-listed options, the following provides an overview of the hydraulic functionality and lifecycle cost benefits of the various alternatives relative to one another.

3.2 HYDRAULIC FUNCTIONALITY

3.2.1 Capacity Constraints and System Operations

The expansion of the tunnel east of the Credit River presents opportunities to divert flows from several other existing sanitary pump stations to the tunnel by gravity, therefore eliminating the future O&M and replacement costs associated with each SPS. As a 3m diameter tunnel is extended further to the east, it not only provides the ability to divert additional area, but it provides added storage volume within the

tunnel to attenuate and limit peak flows that are diverted towards the Clarkson WWTP as well as provides storage to limit the risk of an emergency by-pass in the event of a pumping station failure. Given the short-listed alternatives, there are two main capacity constraints that are to be considered in the evaluation of alternatives:

- **Capacity of the Clarkson and G.E. Booth WWTPs:** The existing and projected (2041) capacities of both WWTPs are outlined in the table below. The Region is currently undertaking two separate Class EA studies that will develop conceptual designs for the recommended expansion plans to meet the projected 2041 capacity requirements from the Region's Master Plan. Diversion of flow from the east to the west must maintain flow contributions within the operating limits of the WWTP and must be coordinated with the timing of planned plant expansions.

Facility	Existing		Future Projection (2041)	
	Rated Capacity (average day)	Peak Capacity	Rated Capacity (average day)	Peak Capacity
Clarkson WWTP	350 MLD	n/a	500 MLD	n/a
G.E. Booth WWTP	518 MLD	1523 MLD	600 MLD	n/a

A full evaluation of a preferred operating scheme between these two diversion facilities and the WWTPs requires a system-wide assessment and is outside the scope of the current study. However, for the purposes of the current feasibility study, it is considered that all of the short listed alternatives are able to manage and maintain peak flow diversion rates to current peak inflow rates to the Clarkson WWTP (both peak hour and peak day capacity) by adequately balancing flows between both WWTPs during peak wet weather flow conditions. This may be done by attenuating peak flow rates with in-line tunnel storage and/or balancing the rate of diversion between the two plants in order to maintain the peak flows with the capacity limits of each plant. This can be achieved through coordinated and real-time operation of the subject east-west diversion (Potential Lakeshore West Diversion) with the operation of the planned East to West Diversion Sanitary Trunk Sewer (to be constructed along Derry Road/Old Derry Road and Creditview/Old Creditview Road).

- **Capacity of the Jack Darling PS:** The firm capacity of the Jack Darling PS is currently in the order of 800 L/s (~70 MLD). Alternatives that can manage peak flows and while maintaining the discharge capacity of the JDPS to its existing firm capacity will be favoured given that they will not have an impact on downstream trunk sewer and/or WWTP capacities.

3.2.2 Assessment of System Hydraulics

The Region's future conditions (2041) hydraulic model was supplied to the project team and applied to assess peak flow and flow volume conditions for various alternatives. In keeping with the capacity constraints discussion in the previous section, **Figure 17** presents the results of hydraulic model simulations for the 25-year design storm event along with an indication of the storage volume required to control downstream flow rates to the limit of downstream peak flow capacities. That is, relative to the JDPS firm capacity of 800 L/s or 70 MLD (i.e. representative of Option 3 or Option 6) as well as a

hypothetical situation (for illustrative purposes only) where a downstream peak flow capacity increase to 1,500 L/s or 130 MLD is provided by the other Options (e.g. representative of Option 4 or Option 5 – assuming an equivalent peak flow capacity is available at the Clarkson WWTP). **Table 12** presents the estimated results relative to the amount of effective tunnel in-line storage volume in each of the short-listed alternatives.

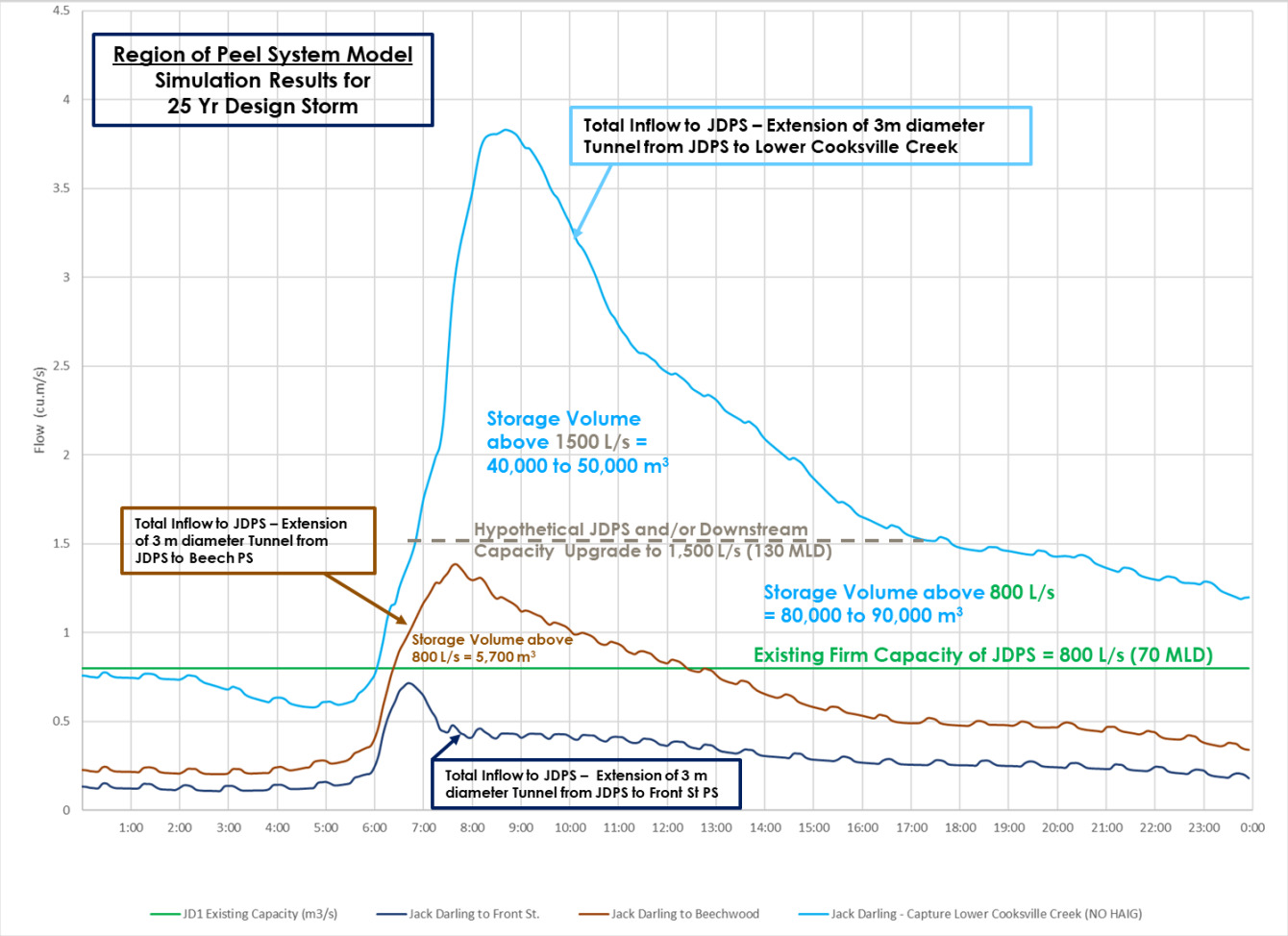


Figure 17: Simulated 25-Year Design Flow Hydrographs to JDPS Relative to Downstream Capacity Constraints (System Model Supplied by Region of Peel)

Table 12: Estimated In-Line Storage Volume Requirements for Short-Listed Options

Alternative	Total Tunnel Storage Volume Available (m^3)	In-Line Storage Volume Required (m^3) to respect D/Capacity Limitation		Emergency Storage Volume Required (to Store Peak 2-hr volume during 25 year design event)
		D/S Capacity = 800 L/s (70 MLD)	D/S Capacity = 1500 L/s (130 MLD)(1)	
Option 3 (2)	45,000 m^3 (40,000 m^3 effective)	80,000 – 90,000 m^3	Not applicable	30,000 m^3
Implemented to Front Street PS (Front St. & Lakeshore Rd.)	21,000 m^3 (18,000 m^3 effective)	Not required	Not applicable	4,400 m^3
Implemented to Beach PS (Aviation Rd. & Lakeshore Rd.)	39,000 m^3 (35,000 m^3 effective)	5,700 m^3	Not applicable	9,500 m^3
Implemented to Lower Cooksville Creek (Alexandra Ave. & Lakeshore Rd.)	45,000 m^3 (40,000 m^3 effective)	80,000 – 90,000 m^3	Not applicable	30,000 m^3
Option 4 (2)	79,000 m^3	80,000 – 90,000 m^3	40,000 - 50,000 m^3	30,000 m^3
Option 5 (2)	45,000 m^3	80,000 – 90,000 m^3	40,000 - 50,000 m^3	30,000 m^3
Option 6 (2)	45,000 m^3	80,000 – 90,000 m^3	Not applicable	30,000 m^3

(1) Hypothetical increase in downstream capacity for illustrative purposes only

(2) Assumes that diverted flows would be controlled and equivalent to diversion at Cooksville Creek (calculated volumes based on full diversion of simulated hydrograph)

Interpretation of Hydraulic Assessment Results: Based on the results of the hydraulic analysis with the Region's hydraulic model, we can draw the following key conclusions:

- With a deep 3 m diameter tunnel, the peak flows from the full 25-year design storm hydrograph can be controlled to the existing firm pumping capacity of the JDPS up to, and including, a diversion of flows to the Beechwood and Beach Street pumping stations. Based on the model results, there are no identified downstream capacity issues for the 25-year storm with the operation of the JDPS at its current firm capacity of 800 L/s. This indicates that Option 3 could be constructed to Beach St. without a need for downstream capacity upgrades.
- Extension of the tunnel beyond Beach Street (e.g. Option 3 to Lower Cooksville Creek or beyond), where a significant amount of additional diversion area could be directed from east to west, would not be possible without:
    - Controlling the balance of flows being directed between the Booth and Clarkson WWTP (i.e. the flow volume above the current JDPS capacity constraint of 800 L/s far exceeds the effective storage volume available in the tunnel).
    - Increasing the downstream conveyance capacity of the JDPS and downstream infrastructure.

Assuming the capacity of the JDPS and the downstream infrastructure were increased to 1,500 L/s (as an example of a reasonable upgrade target under Options 4 or 5), full diversion of the hydrograph at Lower Cooksville could be achieved under Option 4 but would not permit a full diversion under Option 5 (unless the JDPS and downstream capacity were increased to 2,000 L/s (requiring 20,000 – 30,000 m^3 of effective in-line storage).

All tunnel extension options provide sufficient volume to accommodate 2 hours of emergency storage withing the 3 m tunnel in the event of a PS failure be it at the JDPS (Options 3, 5 and 6) or at the new Clarkson PS (Option 4).

Conclusions of Hydraulic Assessment: It is thus concluded, with a good level of certainty, that Option 3 can be extended to at least Beach Street PS without needing to invest in significant capacity upgrades downstream of the JDPS. If extended beyond this point, a flow diversion chamber would be constructed at the Lower Cooksville Creek connection to maintain the ability to divert flows upstream of that connection between the east (Booth) and west (Clarkson) systems. Should there be a desire to divert additional flows beyond the 800 L/s currently dictated by existing constraints, this flow diversion chamber would either allow Option 6 to be a viable alternative (if only a limited increase is required) or require Options 4 or 5 to be constructed if significantly more flow is to be diverted. Given uncertainties in the existing system model and a more detailed perspective broader system operation objective, it is not possible to provide a higher degree of certainty on the specific limit of diversion capacity without further study and analysis. At minimum, it is identified that a significant amount of diversion potential is available and there is flexibility to phase in a solution that can be expanded over time, especially as greater certainty on overall operational control objectives and modelling results are available.

3.3 COST ANALYSIS OF ALTERNATIVES

To compare the shortlisted alternatives from a monetary perspective, a Present Value Analysis (PVA) was completed considering all capital cost investments and lifecycle cost benefits associated with each option over a 90 year period. Costs that were included in the analysis include capital costs associated with new tunnels, shafts, sanitary pump station (SPS) decommissioning, and new or upgraded pump stations, as well as the lifecycle costs associated with operation and maintenance and replacement costs for any new trunk sewer and pumping infrastructure. Credit or cost savings that were considered in the analysis include the savings achieved by negating the need for the on-going operation & maintenance and capital upgrade costs over the lifecycle of the decommissioned SPS's. The purpose of this exercise is to develop an investment savings ratio indicating which option provides the best return on the capital investment over the evaluation period, which has been evaluated over a 90 year life cycle in this case.

3.3.1.1 Cost Analysis

Table 13 presents a summary of the results of the Present Value Life-Cycle Cost Analysis of the alternative options. The complete costing analysis breakdown is provided in **Appendix B**:

Table 13: Summary of Present Value Life-Cycle Cost Analysis of Short-Listed Options

Alternative Option	Baseline Option	Option 3	Option 4	Option 5	Option 6
Capital Cost (2020 Dollars)	$65 M(1)	$187 M	$291 M	$227 M	$209 M
PV Lifecycle Investment (3)	$88 M	$215 M	$324 M	$259 M	$239 M
PV Lifecycle Savings (3)	$24M	$111 M(2)	$157 M(2)	$111 M(2)	$111 M(2)
Investment Savings Ratio	0.28	0.52	0.49	0.43	0.46
Tunnel Length	2,960 m (1.8 m Ø)	5,500 m (3 m Ø) 2,000 m (1.8 m Ø)	10,750 m (3 m Ø) 2,000 m (1.8 m Ø)	5,500 m (3 m Ø) 4,100 m (1.8 m Ø)	5,500 m (3 m Ø) 2,000 m (1.8 m Ø)
No. of SPS's Decommissioned	2	9	12	9	9

(1) Baseline Option does not include decommissioning and gravity connection of Indian Road SPS

(2) Assumes that operation of Beechwood SPS is maintained for operational flexibility. Decommissioning of the station prior to the next major refurbishment (assumed to be 2070) will provide further life cycle cost savings.

(3) Assumed interest rate of 4% and inflation rate of 2%.

As indicated in **Table 13**, Option 3 provides the highest Investment Savings Ratio (ISR) of the short-listed options. This is largely influenced by the lower capital cost associated with the shorter tunnel length while still reaping the lifecycle benefits associated with the decommissioning of the nine (9) SPS's. However, it

would mean an estimated near-term capital investment of $187 M compared to the $65M investment in the baseline option. To alleviate such a large initial investment, a closer look at a phased construction approach over a number of years can be considered, as discussed in Section 4 of this report.

3.4 RECOMMENDED PREFERRED ALTERNATIVE

With the information discussed in the comparative evaluation above, we recommend moving forward with Option 3 as the preferred option to satisfy the Regions core project objectives and provide the greatest long-term value. The key reasons for recommending Option 3 are:

- The preferred alternative meets all of the core objectives of the project:
    - Provides the ability to divert a significant amount of flow between the G.E. Booth and Clarkson WWTP systems (up to 80 MLD) under existing downstream capacity conditions.
    - Provides full flexibility for future extension of the solution west of JDPS to further maximize flow diversion potential.
    - Provides the ability to decommission up to nine (9) Sanitary Pumping Stations (SPS)
    - Provides the best ISR amongst all of the alternatives considered

Given the high capital cost associated with this option, it is also recommended that the Region proceed with a phased implementation of Option 3 as an integral component of its Capital Phasing and Implementation Plan (CPIP). Proceeding in a phased manner will not only allow for the management of the capital investment over a number of years, but will also provide the Region with a number of further advantages, namely:

- The ability to limit impacts on Class EA requirements and the risk of approval delays by maintaining the first phase of implementation within or close to the geographical limits of the existing Class EA.
- The ability to continue assessing and refining the operational requirements of the extended solution, and associated flow control requirements, in consideration of broader and evolving systemwide operating strategies (i.e. related to WWTP EAs, RTC implementation, and adaptation to Master Plan updates as well as climate change impacts).
- With the full flexibility provided by Option 3, there is no need to invest in the full extents of a diversion at this time. Further extension of the tunnel is possible in future stages through the implementation of a tunnel solution configured as either Alternative 4, 5 or 6. Given the recommendation for phased implementation with a deeper wet well at the JDSPS, Option 6 would seem to provide the best value, as evidenced by the ISR result in the cost summary table. However, further model refinements and evolving operational needs will define, with greater certainty, if additional downstream capacity is in fact required as well as if additional diversion capacity beyond that which is possible with Option 3 is necessary.

4.0 EVALUATION OF PHASED IMPLEMENTATION OF OPTION 3

Due to the high capital cost associated with Option 3, and further to the recommendations in Section 3, an approach to construct the tunnel in two (2) separate phases of construction will be considered. The following four (4) separate first phase options are thus evaluated:

- **Option 3 - Phase 1a:** Implementation from Jack Darling to Front St (within current EA limits)
- **Option 3 - Phase 1b:** Implementation from Jack Darling East of Credit River to the Port Credit Library Parking lot just east of the Credit River
- **Option 3 - Phase 1c:** Implementation from Jack Darling East of Credit River to City owned property at Elmwood Ave.
- **Option 3 - Phase 1d:** Implementation from Jack Darling East of Credit River to Beech SPS

Each of the above represent a first phase of construction, the second phase of construction in each case would be to extend it to the limits of Option 3 with a connection to the G.E. Booth WWTP. The objective of the analysis described herein is to establish the most advantageous eastern limit of the initial phase of the tunnel construction. Phase 1 extension options to the Lower Cooksville Creek trunk (with and without connection of the Haig Street sewer) were also considered but, from the perspective of phased implementation options, were deemed to be equivalent to either a full implementation of Option 3 or a second phase extension with a connection to G.E. Booth.

Each of these Phase 1 alternatives include the new wet well and upgrade at Jack Darling SPS along with the decommissioning and diversion of flow from all existing SPS within their limits. The second phase for each of these alternatives could then consist of the completion of the sewer east to G.E. Booth along with the decommissioning and diversion of flow from the remaining SPS's, as described in Option 3, but may also include upgrades downstream of Jack Darling as considered in Options 4 through 6 above if deemed viable at that time.

4.1 EVALUATION OF OPTION 3 - PHASE ONE ALTERNATIVES

4.1.1 Option 3 Phase 1a - Implementation from Jack Darling to Front St (within EA limits)

4.1.1.1 Description of Extents of Phase 1a Implementation

Option 3 phase 1a consists of constructing 2.9 kms of the proposed deep rock tunnel from Jack Darling SPS to Front St. SPS, on the West side of the Credit River. At a diameter of 3 m, this option provides a total tunnel volume of 21,000 m^3 for wet weather flow and emergency storage. Refer also to **Figure 18** and **Figure 19** below.

4.1.1.2 Evaluation of Phase 1a Implementation

Table 14 below highlights the advantages and disadvantages of Option 3 - Phase 1a. If the initial phase of the tunnel were to be constructed to or from Front St., there would be a significant disruption associated with the launch shaft or extraction shaft (depending on the direction of tunneling) for the TBM at this location. The expansion of this tunnel further to the East in the future, would require additional disruption to this socially and environmentally sensitive area. Also, any future expansion from this location would require subsequent disruption and reinstatement following the significant improvements currently planned at the Port Credit waterfront. For this reason, it would be logical to extend the tunnel East, beyond Port Credit to relocate the disruption associated with a second phase of construction to a less problematic area.

Table 14: Advantages and Disadvantages of Phase 1a

Advantages	Disadvantages
• Decommissioning of five (5) pumping stations • Diverts 149 ha of sewer shed (population of 6,500) from G.E. Booth to Clarkson WWTP. • Provides 21,000 m^3 of tunnel volume for storage. • Within limits of existing EA	• Socio-economic impact of TBM launch/extraction shaft at Front St. • Future disruption to harbor front for phase 2 of construction, likely after the harbor front improvements are completed.

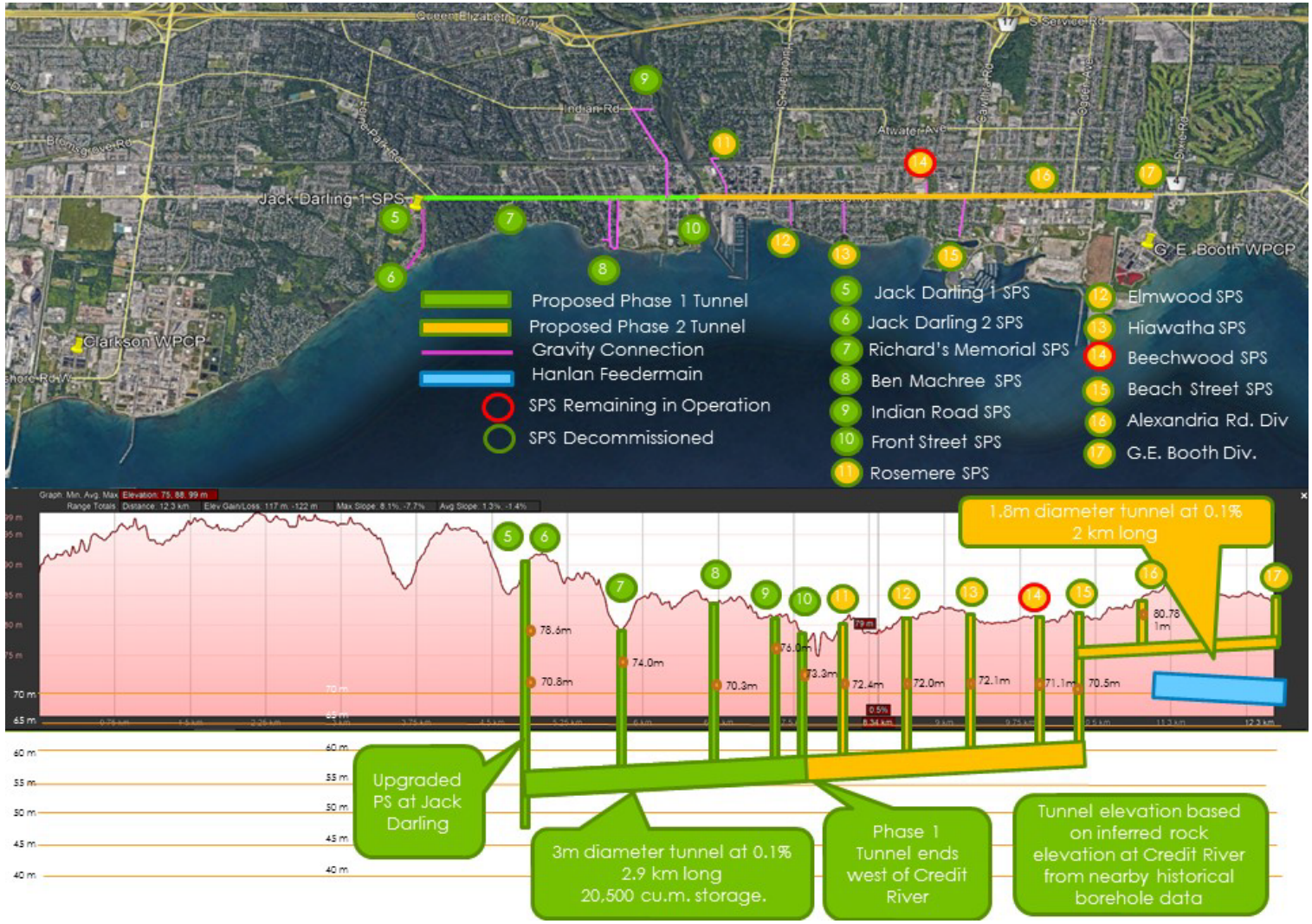


Figure 18: Option 3 Phase 1a Implementation from Jack Darling to Front St SPS

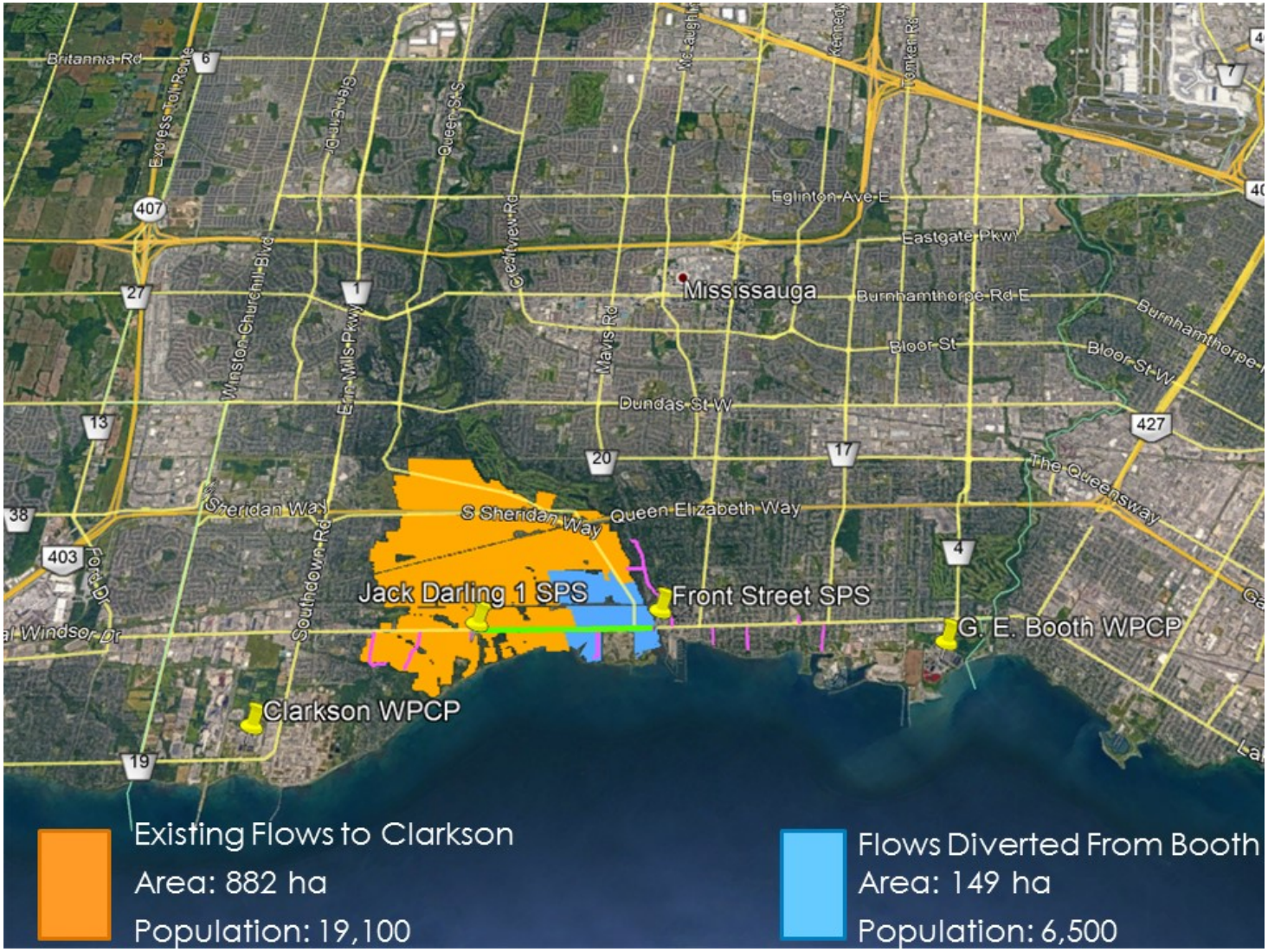


Figure 19: Option 3 Phase 1a Total Geographical Area

4.1.2 Option 3 Phase 1b - Implementation from Jack Darling to East of Credit River

4.1.2.1 Description of Extents of Phase 1b Implementation

Option 3 phase 1a consists of constructing 3.1 kms of the proposed deep rock tunnel from Jack Darling SPS to the Library, just East of the Credit River. At a diameter of 3 m, this option provides a total tunnel volume of 22,000 m^3 for wet weather flow and emergency storage. Refer also to **Figure 20** and **Figure 21** below.

Evaluation of Phase 1b Implementation

Table 15 below highlights the advantages and disadvantages of Option 3 Phase 1b. If the initial phase of the tunnel were to be extended beneath the Credit River to the Library Parking lot, there would be significantly less disruption at the harbor front associated with the launch shaft or extraction shaft for the TBM at this location compared to alternative phase 1a. The expansion of the tunnel East from this location in the future would still have a significant socio-economic impact given the popularity of the Port Credit area, but the construction would not impact the major improvements that the Region is planning at the harbor front. To further reduce the socio-economic impact of both initial tunnel construction and future extensions, it may be more feasible to extend the first phase of the tunnel father to the east as described in Option 3 Phase 1c below.

Table 15: Advantages and Disadvantages of Phase 1b

Advantages	Disadvantages
• Decommissioning of five (5) pumping stations • Diverts 149 ha of sewer shed (population of 6,500) from G.E. Booth to Clarkson WWTP. • Provides 22,000 m3 of volume for storage. • Within limits of existing EA. Minor amendment may be required. • Future disruption associated with second phase of tunneling would be East of the Credit River, away from the planned harbor front improvements.	• Socio-economic impact of TBM launch/extraction shaft nearby the popular Port Credit area

Evaluation of Phased Implementation of Option 3

Figure 20: Option 3 Phase 1b Implementation from Jack Darling to Front St SPS

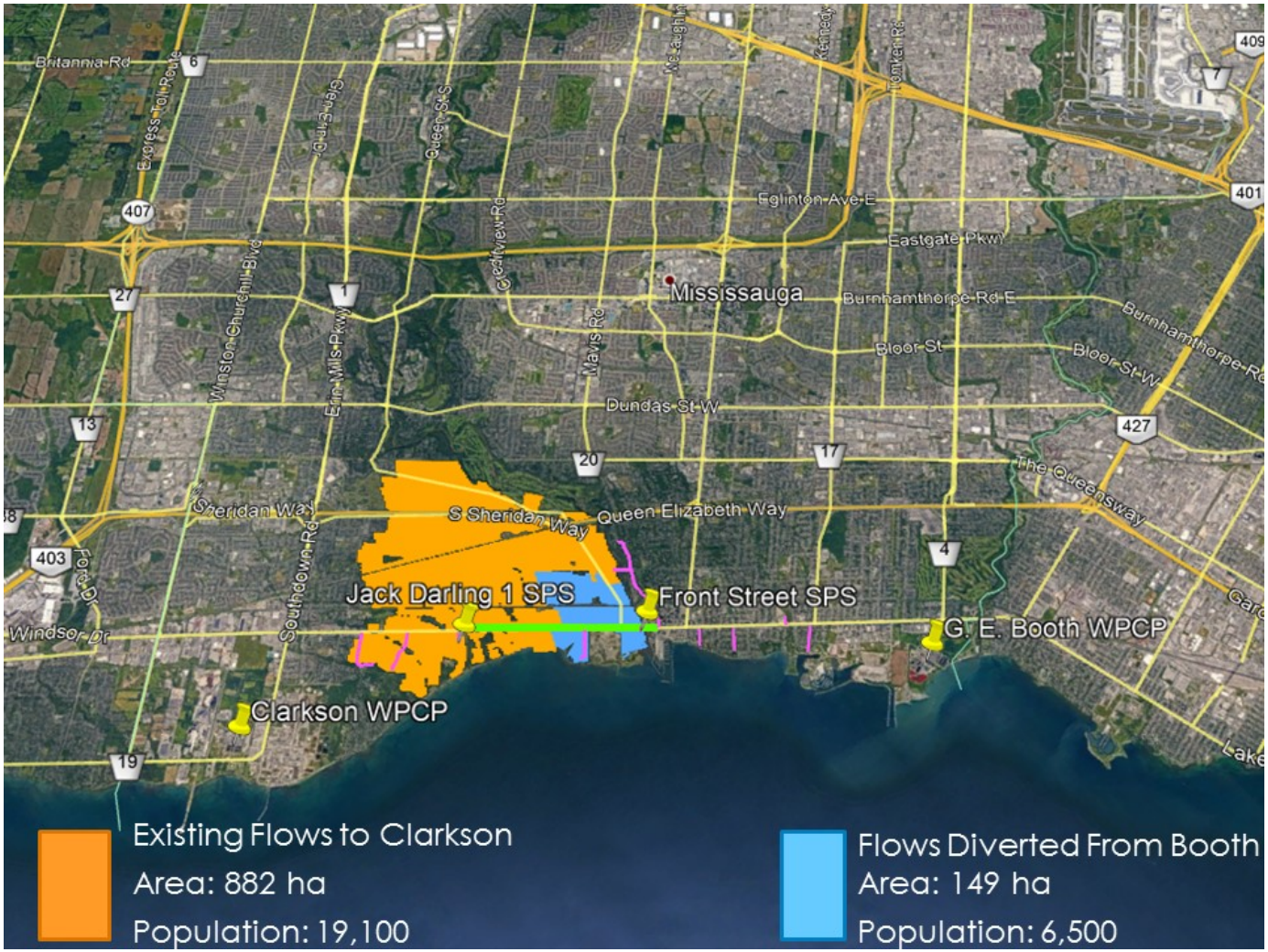


Figure 21: Option 3 Phase 1b Total Geographical Area

4.1.3 Option 3 Phase 1c – Implementation from Jack Darling to Elmwood Ave.

4.1.3.1 Description of Extents of Phase 1c Implementation

Option 3 - Phase 1c consists of constructing 3.9 kms of the proposed deep rock tunnel from Jack Darling SPS to Elmwood Ave., east of the Credit River. At a diameter of 3 m, this option provides a total tunnel volume of approximately 27,500 m^3 for wet weather flow and emergency storage. Refer also to **Figure 22** and **Figure 23** below.

4.1.3.2 Evaluation of Phase 1c Implementation

Table 16 below highlights the advantages and disadvantages of Phase 1c. There would be several advantages with extending the initial phase of tunnel construction father East to Elmwood Ave. Firstly, the significant disruption associated with the launch of extraction shaft would be relocated away from Port Credit to a much less popular area. This reduced impact applies to both the initial tunnel construction as well as any tunnel extension that may take place in the future. In addition, the extension of the tunnel to Elmwood Ave during the initial phase would allow for the diversion of flows from Rosemere, Elmwood, and Hiawatha SPS' to Clarkson WWTP, further relieving the congestion at G.E. Booth.

Table 16: Advantages and Disadvantages of Phase 1c

Advantages	Disadvantages
• Decommissioning of seven (7) pumping stations, while also diverting flow from Hiawatha via Elmwood SPS connection sewer. • Diverts 282 ha of sewer shed (population of 15,700) from G.E. Booth to Clarkson WWTP. • Provides 27,600 m^3 of tunnel volume for storage. • No future impact to harbor front at Port Credit for phase 2 extension	• Slightly higher capital cost • Amendment to existing EA required

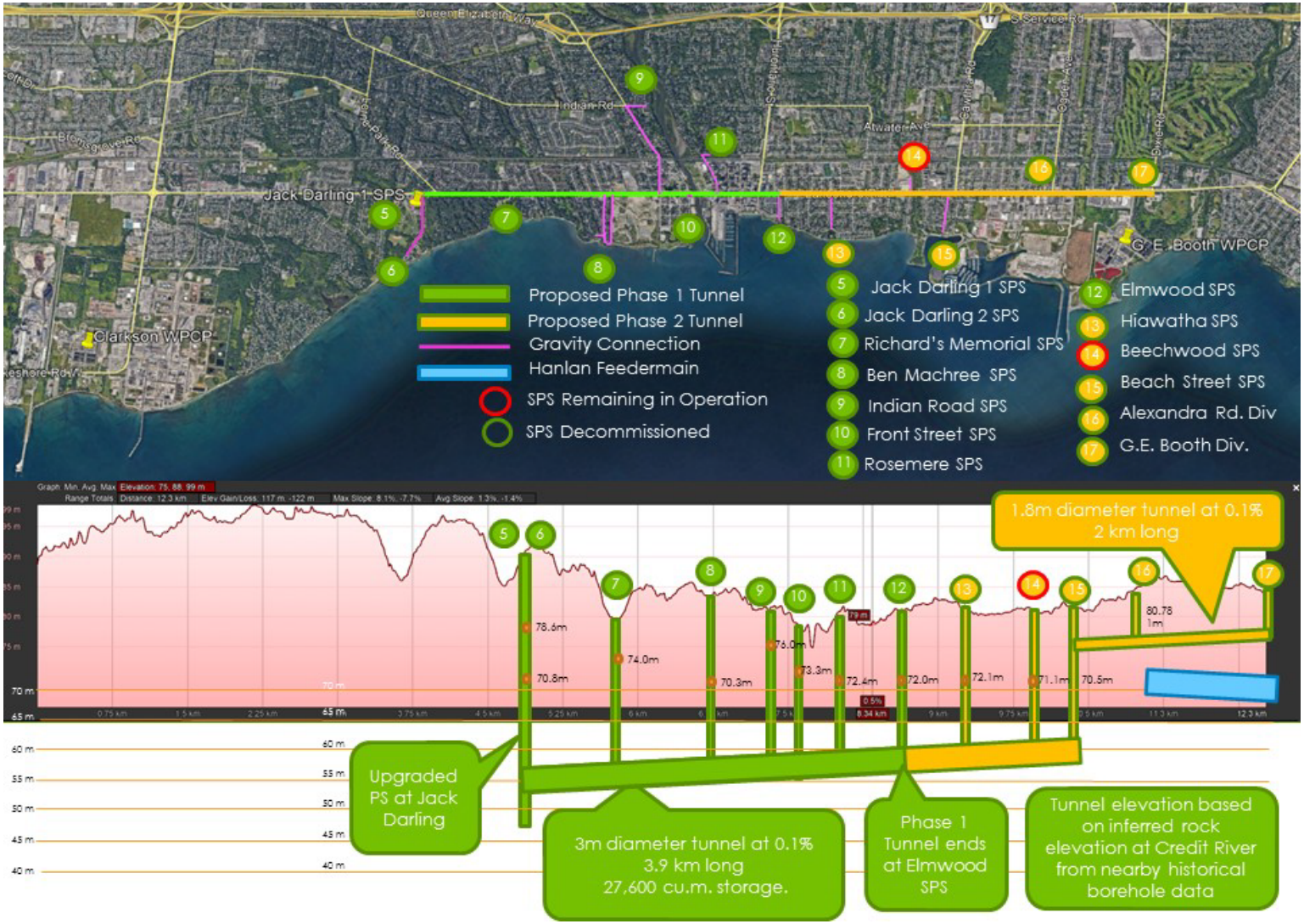


Figure 22: Option 3 Phase 1c - Implementation from Jack Darling to Elmwood

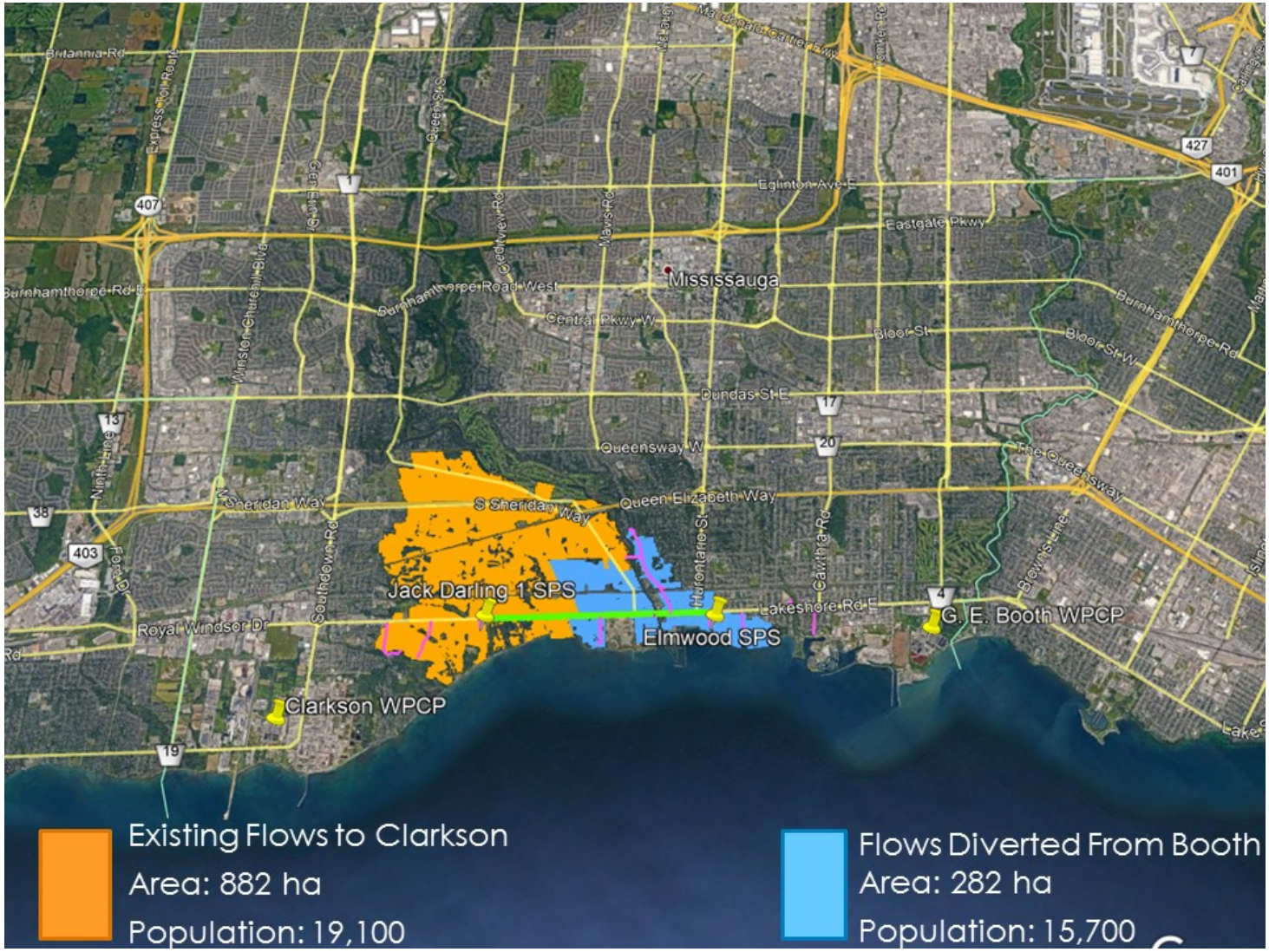


Figure 23: Option 3 Phase 1c Total Geographical Areas

4.1.4 Option 3 Phase 1d – Implementation from Jack Darling to Beach St.

4.1.4.1 Description of Extents of Phase 1d Implementation

Option 3 phase 1d consists of constructing 5.5 kms of the proposed deep rock tunnel from Jack Darling SPS to the Port Beach St. SPS. At a diameter of 3 m, this option provides approximately 39,000 m^3 of total tunnel volume for wet weather flow and emergency storage. Refer also to **Figure 24** and **Figure 25**: Option 3 Phase 1d Total Geographical Areas below. As shown in **Figure 24,** for this phase 1 alternative, it would be preferable to stop the 3m diameter tunnel at Beach St and extend the 1.8 m diameter sewer from G.E. Booth to the shaft at Beech Street, rather than extending the 3 m diameter tunnel for an additional 850 m to Lower Cooksville Creek. In the future, once the 1.8 m diameter sewer is extended further east from Beach St, a diversion chamber would be constructed at Lower Cooksville Creek for connection to the 1.8 m diameter sewer (i.e. in order to divert flows from that connection towards the east or west).

4.1.4.2 Evaluation of Phase 1d Implementation

Table 17 below highlights the advantages and disadvantages of Option 1d. The extension of the initial tunnel construction East, all the way to Beach St would allow for the decommissioning of 4 additional SPS's (Rosemere, Elmwood, Hiawatha, and Beach St.) and diversion of flows from 5 additional SPS's (Rosemere, Elmwood, Hiawatha, Beechwood, and Beach St.), compared to phases 1a and 1b. The Region would have the option to decommission Beechwood but for the purposes of this feasibility study, it is assumed to remain in operation to provide additional operational flexibility. This would divert approximately 1000 ha of sewer shed area, servicing a population of almost 35,000 residents, from G.E. Booth to Clarkson WWTP. The gravity diversion from Beechwood SPS would also have enough capacity to relieve the current overflow constraints at the station. While this alternative carries a significantly higher capital cost, it also provides the most long-term economic benefits resulting from the savings associated with the future operation, maintenance and upgrades to the existing stations over the life cycle of the tunnel. These implications are evaluated in greater detail in Section 4.2 below.

Table 17: Advantages and Disadvantages of Phase 1d

Advantages	Disadvantages
• Decommissioning of nine (9) pumping stations • Diverts 1,009 ha of sewer shed (population of 34,800) from G.E. Booth to Clarkson WWTP. • Provides 39,000 m^3 of tunnel volume for storage. • No future impact to harbor front at Port Credit for phase 2 extension • Relieves existing overflow constraints at Beechwood SPS • Could decommission Beach Street SPS	• Much higher capital cost • Amendment to existing EA or new EA required. • Limited land available for tunnel shafts at Beechwood Avenue

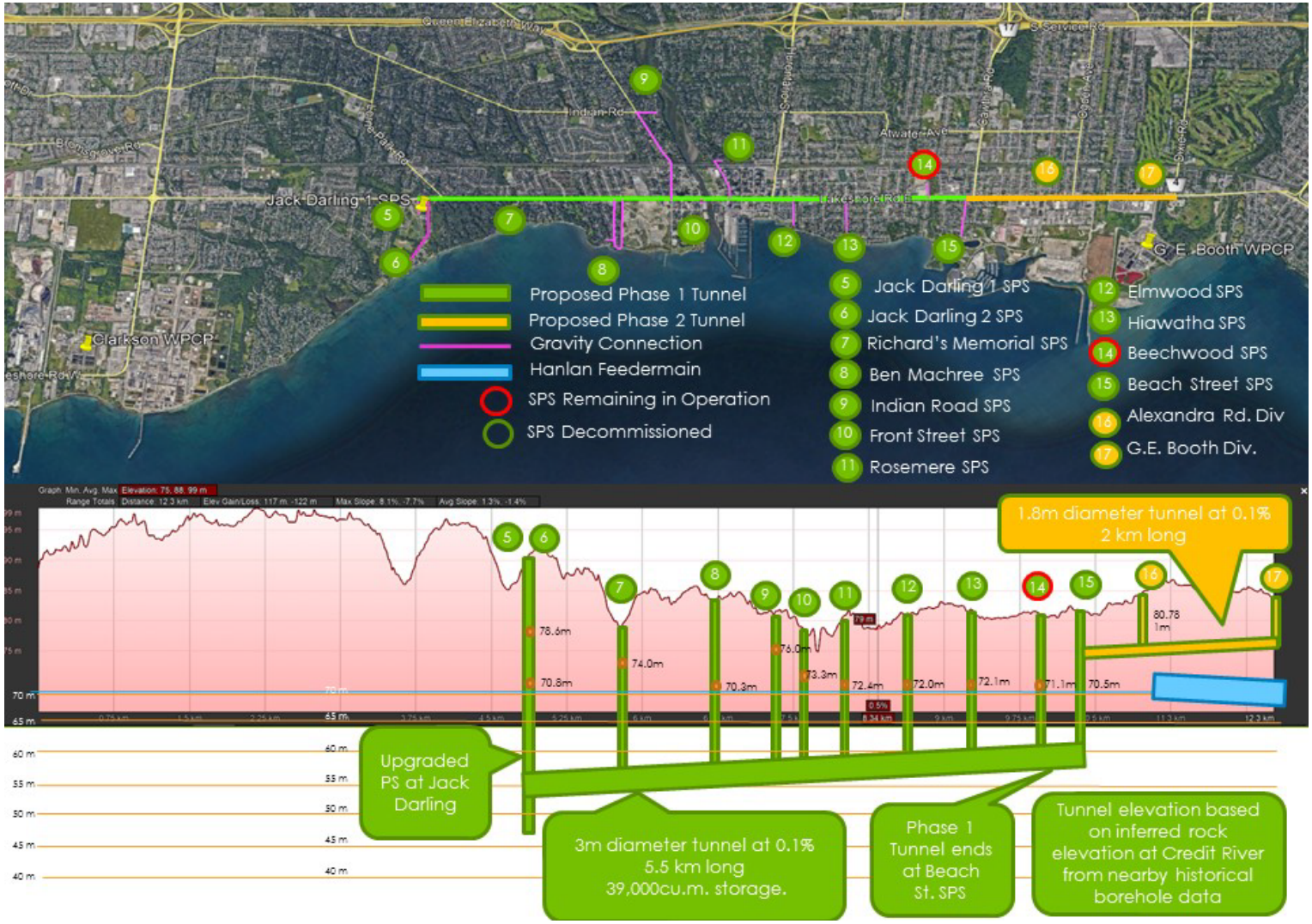


Figure 24: Option 3 Phase 1d - Implementation from Jack Darling to Beach St.

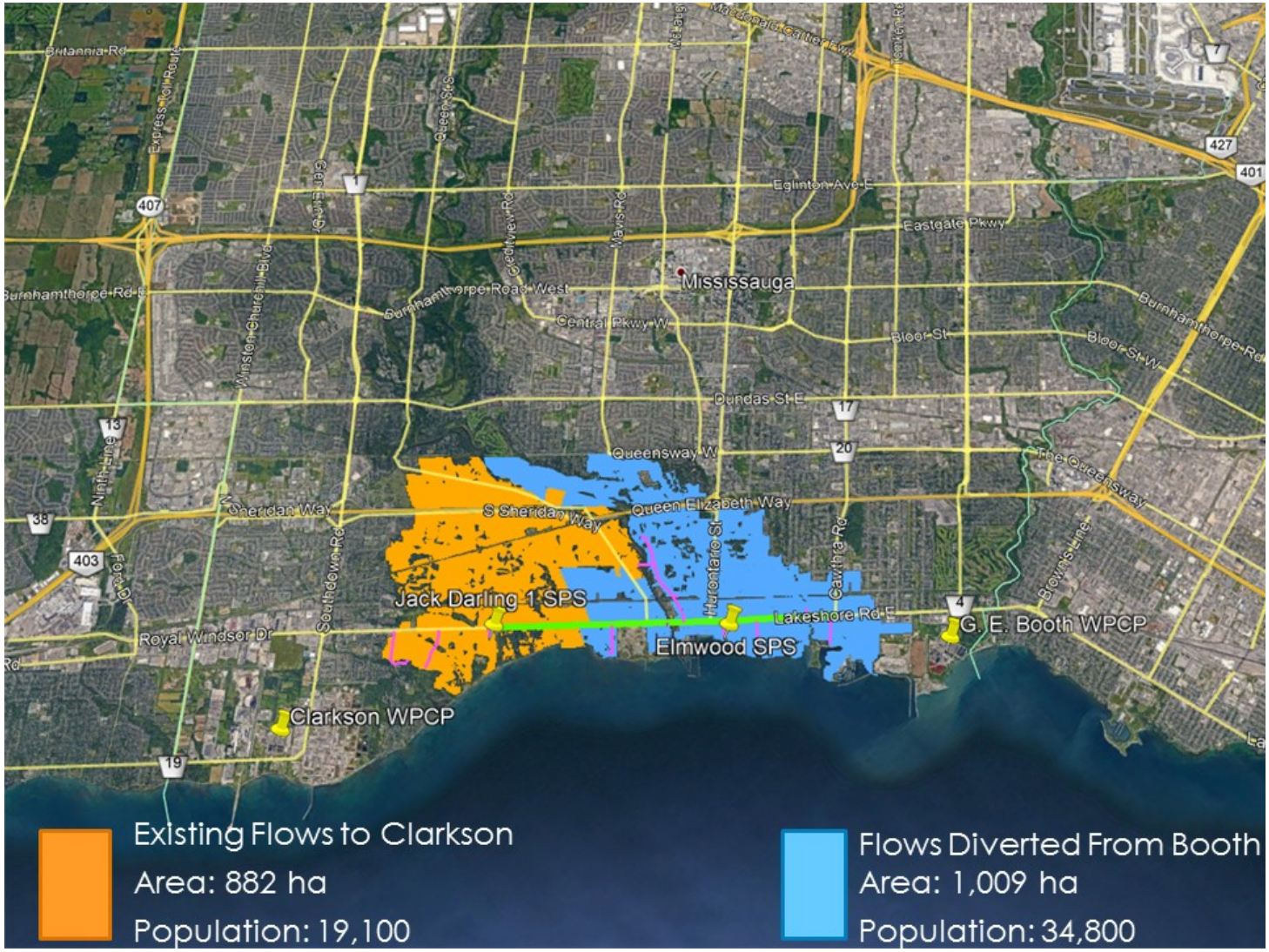


Figure 25: Option 3 Phase 1d Total Geographical Areas

4.2 COMPARATIVE EVALUATION OF OPTION 3 PHASE 1 OPTIONS

4.2.1 Present Value Cost Analysis of Phase 1 Alternatives

A summary of the present value life-cycle cost analysis for each of the above Phase 1 options is presented in **Table 18.** The table provides the estimated capital cost and the corresponding estimate of the 90-year present value life cycle costs alongside the estimate of the corresponding life cycle cost savings that can be realized through the decommissioning of pumping stations. To facilitate the comparison, the table includes a summary of the total length of tunnel, the number decommissioned pumping stations, and the total area (and population) diverted for each phasing option. As reflected in the table, Option 3 Phase 1d provides the highest ISR of 0.59 given that it includes all the same monetary benefits associated with the decommissioning of nine (9) SPSs. This is the same benefit as the complete Option 3, but without the additional costs associated with the extension of the tunnel to G.E. Booth. The estimated capital cost investment is, at $161 M, significantly higher than the $65M estimated for the baseline option identified in the current EA. Phase 1c implementation results in the second best ISR at 0.54 given that it will lead to the decommissioning of seven (7) SPS, but still represents a significantly elevated capital cost investment of $122 Million in 2020 dollars.

Implementation of Phase 1a or 1b in a first phase of construction would, however, allow for the high capital costs to be dispersed over two phases of construction with an initial investment in the range of $95-99M. While the ISR of the initial phase of construction is estimated to be less than that of the other options (i.e. ISR of 0.47 to 0.48), these options still provide a better ISR than that of the baseline solution presented earlier (i.e. ISR of 0.28).

Table 18: Summary of Present Value Life-Cycle Cost Analysis of Phased Option 3

Alternative Option	Option 3 Total	Option 3 Phase 1 Alternatives			
		Phase 1a	Phase 1b	Phase 1c	Phase 1d
No. of SPS's Decommissioned	9	5	5	7	9
Area diverted to Clarkson (Population)	1000 ha (35,000)	149 ha (6,500)	149 ha (6,500)	282 ha (15,700)	1000 ha (35,000)
Costs for Phase 1 Implementation					
Capital Cost (2020 dollars)	$187 M	$95 M	$99 M	$122 M	$161 M
PV Lifecycle Investment	$215 M	$117 M	$122 M	$146 M	$186 M
PV Lifecycle Savings	$111 M	$57 M	$57 M	$78 M	$111 M
Investment Savings Ratio	0.52	0.48	0.47	0.54	0.59
Additional Costs for Phase 2 Implementation					
Phase 2 Capital Cost built in 2031 (2020 dollars)	N/A	$77 M	$73 M	$54 M	$21 M
TOTAL COSTS (Phases 1 and 2)					
Total Capital Cost (Phases 1+2)	$187 M	$172 M	$172 M	$176 M	$182 M
PV Lifecycle Investment (Ph1+Ph2)	$218 M	$198 M	$198 M	$203 M	$209 M
PV Lifecycle Savings (Ph1+Ph2)	$111 M	$100 M	$100 M	$105 M	$111 M
Total Investment Savings Ratio	0.51	0.51	0.51	0.51	0.53

4.2.2 Functionality and Hydraulic Performance

As demonstrated under Section 3.2, each of the phasing options for Option 3 can be extended to at least Beach St PS without needing to invest in significant capacity upgrades downstream of the JDPS. If extended beyond this point, a flow diversion chamber would be constructed at the Lower Cooksville Creek connection to maintain the ability to divert flows upstream of that connection between the east (Booth) and west (Clarkson) systems. Should there be a future desire to divert additional flows beyond the capacity limitation of 800 L/s, the flow diversion chamber at Lower Cooksville Creek would either

allow Option 6 to be a viable alternative (if only a limited downstream capacity increase is required) or require Options 4 or 5 to be constructed if significantly more flow is to be diverted.

In all cases, the tunnel provides sufficient emergency storage volume to detain the estimated peak 2hr volume generated during the 25 year design storm.

4.2.3 Discussion of Environmental and Social Impacts of Option 3 - Phase 1 Alternatives

Under Phase 1a or 1b, the first phase of tunnel extension would be terminated either just east or just west of the Credit River shoreline, respectively. This would provide the benefit of maintaining the initial capital cost investment closer to that of the baseline solution, and would still provide the opportunity to extend the tunnel further to the east in the future. In addition, Phase 1a or 1b construction could likely proceed with only requiring an amendment to the existing Class Environmental Assessment. The total drainage area being diverted from G.E. Booth WWTP to Clarkson WWTP in this scenario is 149 ha serving a population of 6,500. Conversely, there are also some negative implications that must be considered. Firstly, there would be significant disruption at the Port Credit area for the duration of construction associated with the construction of the shaft and extraction of the TBM. Secondly, the expansion of the Tunnel to the East in the future would require the re-use of this same shaft as either the TBM launch/mucking or TBM extraction shaft. This would cause significant community disruption in the vicinity of the lakefront, especially if used as a TBM launch site with the need to haul tunnel muck from the site.

If Phase 1 of the tunnel construction was extended east to Elmwood Dr., as proposed in Phase 1c, the disruption associated with the extraction and future launch shaft would be located further to the east, away from the busy lakefront area at Port Credit. In addition, this option provides the opportunity to decommission Rosemere and Elmwood SPS's and divert these flows to the tunnel. This would also capture flows being pumped from Hiawatha SPS, given that it currently pumps to Elmwood SPS. The total drainage area being diverted from G.E. Booth WWTP to Clarkson WWTP in this scenario would be 282 ha, serving a population of 15,700. Although this option would carry additional capital costs associated with the additional tunnel length, SPS decommissioning, and connector sewers it would provide a better return on investment than Phases 1a and 1b as indicated by the ISR of 0.54 shown in **Table 18** above. The impact on the Environmental Assessment would need to be evaluated further to determine whether an amendment to the existing Class EA would be sufficient or whether a new Class EA would be required.

Extension of the phase 1 tunnel construction all the way to Beach St., as proposed in Phase 1d, would provide the opportunity to decommission and divert flows from Hiawatha, Beechwood and Beach St. PS itself. Despite this option providing the highest ISR at 0.59, it would require a significantly higher capital cost than the baseline solution at roughly $161M and would likely require the undertaking of a new Class Environmental Assessment rather than an amendment to the existing EA.

4.3 RECOMMENDED PHASED IMPLEMENTATION PLAN

Per the conclusions of Section 3, we recommend the extension of the 3m diameter tunneled sewer from Jack Darling SPS to east of the Credit river as a first step in implementing a solution that provides the best value and greatest operational flexibility for both near-term and long-term flow management within the trunk sanitary sewer system. It was further recommended that the Region proceed with a phased implementation of Option 3 as an integral component of its Capital Phasing and Implementation Plan (CPIP). Based on the modelled results, the phased implementation of a 3m diameter tunnel extended east from Jack Darling, and across the Credit River, to one of the four eastern limits associated with Phase 1a to 1d is possible without having to increase capacity downstream of the JDSPS.

Based on the evaluation of phased options, we recommend proceeding with the phased implementation of Option 3 in two (2) phases of construction with the recommended first phase of construction being:

Option 3 - Phase 1c (extension from Jack Darling SPS to Elmwood Ave.).

Although the estimated initial capital cost investment for Phase 1c is close to being double the amount of the Baseline Class EA (at an estimated $122M), this recommended first phase of implementation would provide a better return on investment than Phases 1a and 1b (as indicated by the ISR of 0.54). The primary reasons for the recommendation are the following:

- The total drainage area being diverted from G.E. Booth WWTP to Clarkson WWTP in this scenario is significant at 282 ha, serving a population of 15,700.
- The tunnel can be extended to Elmwood and accommodate the additional area without needing to invest in additional capacity upgrades at or downstream of the JDSPS (i.e. beyond the upgrades required to accommodate the integration of Option 3 at the JDSPS).
- Provides the opportunity to decommission a total of seven (7) SPS with the decommissioning of Rosemere and Elmwood SPS's and divert these flows to the tunnel. This would also capture flows being pumped from Hiawatha SPS, given that it currently pumps to Elmwood SPS.
- The extension to Elmwood provides for the location of the TBM extraction shaft on a City owned property with less of a community and social impact than Options 1a and 1b. Not just for the first phase of construction, but also for the second phase of construction where it could either be used as the site of Phase 2 TBM launch and mucking or Phase 2 TBM extraction.
- From the perspective of Class EA requirements, it may be possible to advance Phase 1c construction as an amendment to the existing EA. Similar to all other options, the phased implementation will be presented as a component of a vision for an extended implementation as part of an overall diversion strategy.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Further to the evaluation of the alternatives, the following key conclusions were made:

- The baseline option does not meet the core objectives of the feasibility study. It is preferred to make the tunnel deeper to allow extension across the Credit River and, in addition to being deeper, increase the diameter of the tunnel (i.e. 3m) to provide added operational flexibility with effective in-line storage.
- While Option 1 does not meet core objectives and is not carried forward, it is concluded that the location of a deeper wet well at Jack Darling and integration with the existing facility is preferred over a location at Richard's Memorial Park.
- On its own, Option 2 (west extension) is not a viable solution as it is costly and does not provide significant added value over the Baseline EA Solution. An extension to the east of the Credit River with a deeper tunnel provides significantly greater value.
- Option 3 provides maximum benefit with the greatest amount East-West flow diversion potential (1000+ ha) and the elimination of up to 9 SPS's, as well as the ability to phase the implementation of the extension with incremental benefits. The deeper tunnel also increases the likelihood that the tunneling can be performed entirely in rock, which reduces risks associated with tunneling in mixed face conditions.
- Option 3 also provides sufficient tunnel storage volume to attenuate and manage peak flows for the 25 year design storm (2041 conditions) in a manner that capacity upgrades downstream of the Jack Darling PS (i.e. beyond the existing capacity of 800 L/s) may not be necessary. Option 3 could be constructed to the Beech PS and allowed to divert the full 25 year design flow without a need for downstream capacity upgrades. Extension of the tunnel beyond Beach St (e.g. Option 3 to Lower Cooksville Creek or beyond), where a significant amount of additional diversion area could be directed from east to west, would not be possible without:
    - Controlling the balance of flows being directed between the Booth and Clarkson WWTP (i.e. the flow volume above the current JDPS capacity constraint of 800 L/s far exceeds the effective storage volume available in the tunnel).
    - Increasing the downstream conveyance capacity of the JDPS and downstream infrastructure.
- Option 3 provides the highest Investment Savings (ISR) of the short-listed options. This is largely influenced by the lower capital cost associated with the shorter tunnel length while still reaping the lifecycle benefits associated with the decommissioning of the nine (9) SPS's. However, full implementation of Option 3 would mean an estimated near-term capital investment of $187 M compared to the $65M investment in the baseline option. To alleviate such a large initial

investment, phased implementation of Option 3 is possible and would provide significant benefit at a more manageable level of investment.

- Options 4, 5 or 6 should only be considered as a future extension of Option 3. Should there be a desire to divert additional flows beyond the 800 L/s currently dictated by existing constraints, this flow diversion chamber would either allow Option 6 to be a viable alternative (if only a limited increase is required) or require Options 4 or 5 to be constructed if significantly more flow is to be diverted. Given uncertainties in the existing system model and a more detailed perspective broader system operation objective, it is not possible to provide a higher degree of certainty on the specific limit of diversion capacity without further study and analysis. At minimum, it is identified that a significant amount of diversion potential is available and there is flexibility to phase in a solution that can be expanded over time, especially as greater certainty on overall operational control objectives and modelling results are available.

5.1 RECOMMENDED SOLUTION

We recommend moving forward with Option 3 as the preferred option to satisfy the Regions core project objectives and provide the greatest long-term value. The key reasons for recommending Option 3 are:

- The preferred alternative meets all of the core objectives of the project:
    - Provides the ability to divert a significant amount of flow between the G.E. Booth and Clarkson WWTP systems (up to 80 MLD) under existing downstream capacity conditions.
    - Provides full flexibility for future extension of the solution west of JDPS to further maximize flow diversion potential.
    - Provides the ability to decommission up to nine (9) Sanitary Pumping Stations (SPS)
    - Provides the best Investment Savings Ratio (ISR) amongst all of the alternatives considered

Given the high capital cost associated with this option, it is also recommended that the Region proceed with a phased implementation of Option 3 as an integral component of its Capital Phasing and Implementation Plan (CPIP). Proceeding in a phased manner will not only allow for the management of the capital investment over a number of years, but will also provide the Region with a number of further advantages, namely:

- The ability to limit impacts on Class EA requirements and the risk of approval delays by maintaining the first phase of implementation within or close to the geographical limits of the existing Class EA.
- The ability to continue assessing and refining the operational requirements of the extended solution, and associated flow control requirements, in consideration of broader and evolving systemwide operating strategies (i.e. related to WWTP EAs, RTC implementation, and adaptation to Master Plan updates as well as climate change impacts).

- With the full flexibility provided by Option 3, there is no need to invest in the full extents of a diversion at this time. Further extension of the tunnel is possible in future stages through the phased implementation of Option 3 and an ultimate tunnel solution configured as either Alternative 4, 5 or 6 (if an extension west of JDPS is deemed necessary in the future. Given the recommendation for phased implementation with a deeper wet well at the JDSPS, Option 6 would seem to provide the best value, as evidenced by the ISR result in the cost summary table. However, further model refinements and evolving operational needs will define, with greater certainty, if additional downstream capacity is in fact required as well as if additional diversion capacity beyond that which is possible with Option 3 is necessary.

5.2 RECOMMENDED PHASING OF RECOMMENDED PREFERRED OPTION

Based on the evaluation of phased options, we recommend proceeding with the phased implementation of Option 3 in two (2) phases of construction with the recommended first phase of construction being:

Option 3 - Phase 1c: Extension from Jack Darling SPS to Elmwood Ave.

Although the estimated initial capital cost investment for Phase 1c is close to being double the amount of the Baseline Class EA (at an estimated $122M), this recommended first phase of implementation would provide a better return on investment than Phases 1a and 1b (as indicated by the ISR of 0.54). The primary reasons for the recommendation are the following:

- The total drainage area being diverted from G.E. Booth WWTP to Clarkson WWTP in this scenario is significant at 282 ha, serving a population of 15,700.
- The tunnel can be extended to Elmwood and accommodate the additional area without needing to invest in additional capacity upgrades at or downstream of the JDSPS (i.e. beyond the upgrades required to accommodate the integration of Option 3 at the JDSPS).
- Provides the opportunity to decommission a total of seven (7) SPS with the decommissioning of Rosemere and Elmwood SPS's and divert these flows to the tunnel. This would also capture flows being pumped from Hiawatha SPS, given that it currently pumps to Elmwood SPS.
- The extension to Elmwood provides for the location of the TBM extraction shaft on a City owned property with less of a community and social impact than Options 1a and 1b. Not just for the first phase of construction, but also for the second phase of construction where it could either be used as the site of Phase 2 TBM launch and mucking or Phase 2 TBM extraction.
- From the perspective of Class EA requirements, it may be possible to advance Phase 1c construction as an amendment to the existing EA. Similar to all other options, the phased implementation will be presented as a component of a vision for an extended implementation as part of an overall diversion strategy.

APPENDIX A
OPTION EVALUATION MATRIX

			Baseline Solution (BLS)	
Criterion	**Indicators**	**Weighting**	**BLS**	**BLS Notes**
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions),	The ability to increase capacity at the G.E. Booth WPCP is limited given property restrictions. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson has room to grow. Additonally, inputs from Toronto are uncontrolled, so relief to G.E. Booth provides capacity for Toronto's flows.	**15%**	1	Diverting only 425 ha of area to Clarkson WPCP. No ability to divert inputs from Toronto/York
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	By installing a tunnel, there is the ability to reduce the number of operational pumping stations. This will reduce O&M costs.	**12%**	1	Elimination of three pump stations (Front, Indian Road and Ben Machree)
Flexibility for Future Expansion of Tunnel	Does the option provide for future expansion to allow for additional stations to be taken offline and provide additional storage	**12%**	1	Possibly too shallow to cross Credit River and if possible too high for effective storage as you flood out Ben Machree and too high to pick up pump stations east of Credit River. Possible to expand tunnel west to Clarkson Pump Station and pick up two additional PS (Silverbirch and Stonehaven)
Resiency to Adapt for Changing Conditions (Growth, Climate Change, Other…)	Does the Option provide sufficient capacity for additonal flow without significant investment?	**14%**	1	lower tunnel would only have about half capacity given Ben Machree Elevation. Minimal Storage (~7000cu.m.) compared to other options. Second tunnel from Richard Memorial to Jack Darling is shallow and will need to be reduced diameter to avoid conflicts with existing infrastructure.
Added Operational Flexibility for system upgrades (other assests)	Does the Option provide advantages to other projects in the area.	**13%**	1	Limited flexibility for expansion in either direction
Long Term Operational Sustainability (ease of operation and maintenance)	Does the Option provide long term O&M advantages (i.e. access locations, depth, bypass)	**14%**	5	Shorter Tunnel, shallower than other options, easier to inspect and maintain
Project Approvals and Schedule	Does the Option require additional project approvals and how long will the design take to implement	**4%**	5	EA already approved. Could go to construction without revisiting EA.
Constructability (Risks)	Does the Option present significant construction risks? (Higher value indicates lower risk, ie. better score)	**6%**	5	No crossing of Credit River. High level tunnel from Richard's Memorial PS to Jack Darling PS may have conflicts given shallow depth to be able to send flows to JDPS1
Socia-Economic	Social and economic impacts on society as a whole. Short and Long term impacts to local residents and businesses	**11%**	4	Less shafts, but more than 1a for additional 1.8 m tunnel. TBM Extraction located next to port credit at Front ST. PS which would cause significant disturbance
	Unweighted Score		**24**	
	Percent (%)		**53**	
	Weighted Score		**2.28**	
	Percent (%)		**46**	

			Larger Tunnel Entirely within Rock (within limits of EA Boundaries	
			Option 1a	
			Upgraded PS at Richard's Memorial Park	
Criterion	**Indicators**	**Weighting**	**1a**	**1a Notes**
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions),	The ability to increase capacity at the G.E. Booth WPCP is limited given property restrictions. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson has room to grow. Additonally, inputs from Toronto are uncontrolled, so relief to G.E. Booth provides capacity for Toronto's flows.	**15%**	1	Diverting only 425 Ha of area to Clarkson WPCP. No ability to expand East across credit River
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	By installing a tunnel, there is the ability to reduce the number of operational pumping stations. This will reduce O&M costs.	**12%**	1	Elimination of two pump stations (Front, Ben Machree)
Flexibility for Future Expansion of Tunnel	Does the option provide for future expansion to allow for additional stations to be taken offline and provide additional storage	**12%**	2	Could extend the tunnel from Richard's Memoral to Clarkson WPCP in future. Depth and slope of tunnel could limit the expansion of tunnel eastwards under the Credit River.
Resiliency to Adapt for Changing Conditions (Growth, Climate Change, Other…)	Does the Option provide sufficient capacity for additonal flow without significant investment?	**14%**	2	Slightly deeper tunnel from Front St. to Richard's Memorial provides substantially more storage then the baseline solution. No ability to capture flows from East of Credit River.
Added Operational Flexibility for system upgrades (other assests)	Does the Option provide advantages to other projects in the area.	**13%**	1	Limited flexibility for expansion in either direction
Long Term Operational Sustainability (ease of operation and maintenance)	Does the Option provide long term O&M advantages (i.e. access locations, depth, bypass)	**14%**	4	Shorter Tunnel, shallower than other options. Steeper slope, more scour velocity, easier to inspect and maintain.
Project Approvals and Schedule	Does the Option require additional project approvals and how long will the design take to implement	**4%**	5	Not significantly different than the EA solution and is already approved. Could go to construction without revisiting EA.
Constructability (Risks)	Does the Option present significant construction risks? (Higher value indicates lower risk, ie. better score)	**6%**	3	Mixed face tunnel at east end of tunnel
Socia-Economic	Social and economic impacts on society as a whole. Short and Long term impacts to local residents and businesses	**11%**	4	Upgrade at Jack Darling would result is less disturbance that new SPS at Richards Memorial given the location. Yet, the TBM extraction shaft would be located next to port credit at Front ST. PS which would cause significant disturbance
		Unweighted Score	**23**	
		Percent (%)	**51**	
		Weighted Score	**2.27**	
		Percent (%)	**45**	

					Tunnel Extension to Clarkson WWTP (Extension of Option 1 with Deep PS at WWTP)	
			Option 1b		Option 2a	
			Upgraded PS at Jack Darling		Full Tunnel Extension with Deep PS at Clarkson WWTP	
Criterion	**Indicators**	**Weighting**	**1b**	**1b Notes**	**2**	**2 Notes**
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions),	The ability to increase capacity at the G.E. Booth WPCP is limited given property restrictions. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson has room to grow. Additonally, inputs from Toronto are uncontrolled, so relief to G.E. Booth provides capacity for Toronto's flows.	**15%**	1	Diverting only 425 Ha of area to Clarkson WPCP. No ability to expand East across credit River	1	Diverting only 425 ha of area to Clarkson WPCP.
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	By installing a tunnel, there is the ability to reduce the number of operational pumping stations. This will reduce O&M costs.	**12%**	2	Elimination of three pump stations (Front, Ben Machree, Richard's Memorial)	3	Potential elimination of 8 pump stations (Front and Ben Machree, Indian Road,Richards Memorial, Jack Darling 1, Jack Darling 2, Silver Birch, Stonehaven).
Flexibility for Future Expansion of Tunnel	Does the option provide for future expansion to allow for additional stations to be taken offline and provide additional storage	**12%**	2	Could extend the tunnel from Jack Darling to Clarkson WPCP in future, but would be deeper than 1a. Depth and slope of tunnel could limit the expansion of tunnel eastwards under the Credit River.	3	Depth and slope of tunnel could limit the expansion of tunnel eastwards under the Credit River.
Resiliency to Adapt for Changing Conditions (Growth, Climate Change, Other…)	Does the Option provide sufficient capacity for additonal flow without significant investment?	**14%**	2	Slightly deeper tunnel from Front St. to Richard's Memorial provides substantially more storage then the baseline solution. No ability to capture flows from East of Credit River.	3	Much greter storage volume vs baseline and Option 1 (55,000 cu.m).
Added Operational Flexibility for system upgrades (other assests)	Does the Option provide advantages to other projects in the area.	**13%**	2	Limited flexibility for expansion in either direction. More capacity at Jack darling that Richards Memorial to accept additional flows in the future. Additional flexibility associated with the extra storage volume.	2	Indian road needs to be addressed (either directly to tunnel by gravity or continue to pump to tunnel via Richards Memorial
Long Term Operational Sustainability (ease of operation and maintenance)	Does the Option provide long term O&M advantages (i.e. access locations, depth, bypass)	**14%**	4	Shorter Tunnel, shallower than Options 3 and 4, but slightly deeper wetwell construciton & maintenance @ Jack Darling. Steeper slope, more scour velocity, easier to inspect and maintain.	2	Longer tunnel, deep wetwell at Clarkson would make for difficult access for maintenance.
Project Approvals and Schedule	Does the Option require additional project approvals and how long will the design take to implement	**4%**	5	Not significantly different than the EA solution and is already approved. Could go to construction without revisiting EA.	3	To construct at once, would require EA ammendment.
Constructability (Risks)	Does the Option present significant construction risks? (Higher value indicates lower risk, ie. better score)	**6%**	3	Mixed face tunnel at east end of tunnel. Slightly deeper wet well expansion at Jack Darling vs Richards Memorial	2	Mixed face tunnel at Credit River. New deep SPS at Clarkson
Socia-Economic	Social and economic impacts on society as a whole. Short and Long term impacts to local residents and businesses	**11%**	5	Upgrade at Jack Darling would result is less disturbance that new SPS at Richards Memorial Park. Yet, the TBM extraction shaft would be located next to port credit at Front ST. PS which would cause significant	2	Additional shaft associated with longer tunnel. Additional disruption along connection tunnels at Stonehaven and Silver Birch. TBM extraction shaft located at Front St.
	Unweighted Score		**26**		**21**	
	Percent (%)		**58**		**47**	
	Weighted Score		**2.63**		**2.26**	
	Percent (%)		**53**		**45**	

			Tunnel Extension to Booth WWTP (Deeper than Options 1&2 to Cross River)	
			Option 3a	
			Full tunnel from Jack Darling to Beech Street with micro-tunnel to Booth	
Criterion	**Indicators**	**Weighting**	**3**	**3 Notes**
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions),	The ability to increase capacity at the G.E. Booth WPCP is limited given property restrictions. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson has room to grow. Additonally, inputs from Toronto are uncontrolled, so relief to G.E. Booth provides capacity for Toronto's flows.	**15%**	4	Diverts 2,305 ha from G.E. Booth to Clarkson. Provide flexibility to send additional flows from Booth to Clarkson during dry weather.
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	By installing a tunnel, there is the ability to reduce the number of operational pumping stations. This will reduce O&M costs.	**12%**	5	Option with the lowest capital cost to eliminate all 11 SPS's. Best BCR Ratio oif all options
Flexibility for Future Expansion of Tunnel	Does the option provide for future expansion to allow for additional stations to be taken offline and provide additional storage	**12%**	4	Could extend the tunnel West from Jack Darling to Clarkson WPCP in future.
Resiency to Adapt for Changing Conditions (Growth, Climate Change, Other…)	Does the Option provide sufficient capacity for additonal flow without significant investment?	**14%**	4	Tunnel provides large storage volume (40,000 cu.m.). Diversion of all 10 SPS and 2 hours of peak flow only uses half of available storage. Additional storage provides resiliency for changing conditions and increased flows in the future.
Added Operational Flexibility for system upgrades (other assests)	Does the Option provide advantages to other projects in the area.	**13%**	4	Large storage capacity provide option to divert additional flows to tunnel in the future. Provides capability to redirect incoming flows from G.E Booth to Clarkson during dry weather.
Long Term Operational Sustainability (ease of operation and maintenance)	Does the Option provide long term O&M advantages (i.e. access locations, depth, bypass)	**14%**	3	Deep wetwell construciton & maintenance @ Jack Darling. Additional flows from sps allow for reduced slope in tunnel which mmay lead to additional maintenance.
Project Approvals and Schedule	Does the Option require additional project approvals and how long will the design take to implement	**4%**	2	Would likely require amendment new EA given the expansion of the project footprint.
Constructability (Risks)	Does the Option present significant construction risks? (Higher value indicates lower risk, ie. better score)	**6%**	4	Non-mixed face, rock tunnel. Deep wet well expansion at Jack Darling
Socia-Economic	Social and economic impacts on society as a whole. Short and Long term impacts to local residents and businesses	**11%**	4	Minimal disruption at Front St. as the extraction shaft would be further east at Beach.
		Unweighted Score	**34**	
		Percent (%)	**76**	
		Weighted Score	**3.91**	
		Percent (%)	**78**	

			ontinuous Tunnel Extension between Booth and Clarkson WWTPs (with Deep PS at Clarkso	
			Option 4a	
			Full Tunnel Extension (with Deep PS at Clarkson WWTP)	
Criterion	**Indicators**	**Weighting**	**4**	**4 Notes**
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions),	The ability to increase capacity at the G.E. Booth WPCP is limited given property restrictions. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson has room to grow. Additonally, inputs from Toronto are uncontrolled, so relief to G.E. Booth provides capacity for Toronto's flows.	**15%**	5	Full flexibilty to divert flows from GE Booth and all SPS's to Clarkson.
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	By installing a tunnel, there is the ability to reduce the number of operational pumping stations. This will reduce O&M costs.	**12%**	3	Elimination of 14 SPS, but at the highest capital cost of all options. 4th highest BCR ratio
Flexibility for Future Expansion of Tunnel	Does the option provide for future expansion to allow for additional stations to be taken offline and provide additional storage	**12%**	4	No expansion necessary. Expansion to Toronto would be possible.
Resiliency to Adapt for Changing Conditions (Growth, Climate Change, Other…)	Does the Option provide sufficient capacity for additonal flow without significant investment?	**14%**	5	Huge storage volume available. Allows for diversion of all flows from GE Booth
Added Operational Flexibility for system upgrades (other assests)	Does the Option provide advantages to other projects in the area.	**13%**	5	Allows for diversion of flow from GE Booth as desired within capacity of Clarkson. Potentially increasing capacity of local sewers nearby exising SPS's that are being eliminated.
Long Term Operational Sustainability (ease of operation and maintenance)	Does the Option provide long term O&M advantages (i.e. access locations, depth, bypass)	**14%**	2	Low maintenance effort/frequency. Difficult for lifecycle upgrades. Deep wet well at clarkson
Project Approvals and Schedule	Does the Option require additional project approvals and how long will the design take to implement	**4%**	2	New or amended EA. Construction would be dalyed in order to obtain required approvals
Constructability (Risks)	Does the Option present significant construction risks? (Higher value indicates lower risk, ie. better score)	**6%**	2	Non-mixed face conditions at credit river. Much longer tunnel. No upgrades at Jack Darling. New deep SPS at Clarkson
Socia-Economic	Social and economic impacts on society as a whole. Short and Long term impacts to local residents and businesses	**11%**	1	Additional disruption associated with additional connection tunnels SPS's US of Front St. and DS Jack Darling. TBM extraction shaft could be located at less disruptive location than Front St. Longer construction duration related to tunnel
		Unweighted Score	**29**	
		Percent (%)	**64**	
		Weighted Score	**3.49**	
		Percent (%)	**70**	

			Two -Level Tunnel Extensions between Clarkson and Booth (with Deep PS at Jack Darling)	
			Option 5a	
			Full Tunnel Extension	
Criterion	**Indicators**	**Weighting**	**5**	**5 Notes**
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions),	The ability to increase capacity at the G.E. Booth WPCP is limited given property restrictions. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson has room to grow. Additonally, inputs from Toronto are uncontrolled, so relief to G.E. Booth provides capacity for Toronto's flows.	**15%**	4	Full flexibilty to divert flows from GE Booth and all SPS's to Clarkson. Limited by capacity of incoming sewers to Clarkson
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	By installing a tunnel, there is the ability to reduce the number of operational pumping stations. This will reduce O&M costs.	**12%**	3	Option to eliminate all SPS's aside from Stonehaven & Silver Birch. Significantly less capital cost than Option 4. 3rd highest BCR ratio. New Jack Darling SPS upgrade not required for option 3 and 4
Flexibility for Future Expansion of Tunnel	Does the option provide for future expansion to allow for additional stations to be taken offline and provide additional storage	**12%**	4	Future expansion West to Clarkson is possible. Expansion to Toronto would be possible.
Resiliency to Adapt for Changing Conditions (Growth, Climate Change, Other…)	Does the Option provide sufficient capacity for additonal flow without significant investment?	**14%**	5	Huge storage volume available. Allows for diversion of all flows from GE Booth.
Added Operational Flexibility for system upgrades (other assests)	Does the Option provide advantages to other projects in the area.	**13%**	5	Allows for diversion of all flow from GE Booth if desired. Potentially increasing capacity of local sewers nearby exising SPS's that are being eliminated.
Long Term Operational Sustainability (ease of operation and maintenance)	Does the Option provide long term O&M advantages (i.e. access locations, depth, bypass)	**14%**	3	Low maintenance requirement. More accessible than full length deep tunnel option. No deep PS at Clarkson
Project Approvals and Schedule	Does the Option require additional project approvals and how long will the design take to implement	**4%**	2	New or amended EA. Construction would be dalyed in order to obtain required approvals
Constructability (Risks)	Does the Option present significant construction risks? (Higher value indicates lower risk, ie. better score)	**6%**	3	No Deep SPS at Clarkson. Shorter deep tunnel length than option 4. Depth to be selected to avoid mixed face tunneling conditions
Socia-Economic	Social and economic impacts on society as a whole. Short and Long term impacts to local residents and businesses	**11%**	2	Smaller shaft required for smaller diameter portions of tunnel. Shafts could be located at location which will have less disruption. Eliminates disruption related to the connection of Stonehaven and Silver Birch SPS's
		Unweighted Score	**31**	
		Percent (%)	**69**	
		Weighted Score	**3.65**	
		Percent (%)	**73**	

			Option 6	
			Deep Tunnel Extension to Booth with Deep PS at Jack Darling and extended forcemains to downstream trunk conveying flows to Clarkson	
Criterion	**Indicators**	**Weighting**	**6**	**6 Notes**
Manage capacity at plants, flexibility to divert flows from G.E. Booth (east to west diversions),	The ability to increase capacity at the G.E. Booth WPCP is limited given property restrictions. The ability to send excess flows westward to Clarkson provides operational flexibility as Clarkson has room to grow. Additonally, inputs from Toronto are uncontrolled, so relief to G.E. Booth provides capacity for Toronto's flows.	**15%**	4	Full flexibilty to divert flows from GE Booth and all SPS's to Clarkson. Limited by capacity of incoming sewers to Clarkson. Phased approach would allow for more accurate model for capacity of sewers at clarkson. Could include upgrades in this area if necessary
Reduction of Total Expenditure (Capital & O&M) by reducing # of operating PS	By installing a tunnel, there is the ability to reduce the number of operational pumping stations. This will reduce O&M costs.	**12%**	3	Option to eliminate all SPS's aside from Stonehaven & Silver Birch. Significantly less capital cost than Option 4 or 5, but more than option 3. Second highest BCR Ratio. New Jack Darling SPS and FM upgrade not required for option 3 and 4
Flexibility for Future Expansion of Tunnel	Does the option provide for future expansion to allow for additional stations to be taken offline and provide additional storage	**12%**	4	Future expansion West to Clarkson is possible. Expansion to Toronto would be possible.
Resiency to Adapt for Changing Conditions (Growth, Climate Change, Other…)	Does the Option provide sufficient capacity for additonal flow without significant investment?	**14%**	4	Large storage volume available (44,500cu.m). Allows for diversion of all flows from GE Booth. Phased approach would allow for modifications to future phases to account for changing conditions. Limited by existing capacity DS of JD
Added Operational Flexibility for system upgrades (other assests)	Does the Option provide advantages to other projects in the area.	**13%**	5	Allows for diversion of all flow from GE Booth if desired. Potentially increasing capacity of local sewers nearby exising SPS's that are being eliminated.
Long Term Operational Sustainability (ease of operation and maintenance)	Does the Option provide long term O&M advantages (i.e. access locations, depth, bypass)	**14%**	3	Low maintenance requirement. More accessible than full length deep tunnel option. No deep PS at Clarkson
Project Approvals and Schedule	Does the Option require additional project approvals and how long will the design take to implement	**4%**	4	Phased approach would allow for Phase 1 to be constructed under current or amended EA. Second EA could be done in advance of phase 2.
Constructability (Risks)	Does the Option present significant construction risks? (Higher value indicates lower risk, ie. better score)	**6%**	3	No Deep SPS at Clarkson. Shorter deep tunnel length. Depth to be selected to avoid mixed face tunneling conditions
Socia-Economic	Social and economic impacts on society as a whole. Short and Long term impacts to local residents and businesses	**11%**	3	Smaller shaft required for smaller diameter portions of tunnel. Shafts could be located at location which will have less disruption. Eliminates disruption related to the connection of Stonehaven and Silver Birch SPS's. Less disruption than 5 associated with additional micro tunnel
		Unweighted Score	**33**	
		Percent (%)	**73**	
		Weighted Score	**3.69**	
		Percent (%)	**74**	

APPENDIX B
PRESENT VALUE ANALYSIS OF OPTIONS

PRESENT VALUE ANALYSIS

LAKESHORE TUNNEL
Region of Peel
Project: **165640286**
Revised: **June 10, 2020**

PRESENT VALUE TABLE

Item	Value	Description
Current	2020	Current year
CE Year	2019	Year of prices in cost estimate
END Year	2110	End of assessment
Interest	4.0%	Interest Rate
Inflation	2.0%	Inflation Rate
Combined	2.0%	Combined inflation and interest rate

Items	O&M (Annual)	Life Cycle	Unit Cost	Before 30% contingency	
New Sewers & Forcemains					
Large Diameter Tunnel (3m)	0.25%	100	$ 14,300.00	$ 11,000.00	
New Microtunnel (<1.8m)	0.38%	100	$ 11,050.00	$ 8,500.00	
New Forcemain (900mm)	0.44%	100	$ 5,850.00	$ 4,500.00	
Shafts					
Total Shaft Depth (Temp Shaft)	0.00%	100	$ 78,000.00	$ 60,000.00	
Total Shaft Depth (Minor Diversion)	0.20%	100	$ 93,600.00	$ 72,000.00	
Total Shaft Depth (Major Diversion)	0.20%	100	$ 117,000.00	$ 90,000.00	
SPS Sewer Connections					
Stonehaven SPS Connection	0.39%	100	$ 6,955,334.88	$ 5,350,257.60	
Silver Birch SPS Connection	0.39%	100	$ 5,566,379.94	$ 4,281,830.72	
Jack Darling 1 SPS Connection	0.39%	100	$ 351,000.00	$ 270,000.00	
Jack Darling 2 SPS Connection	0.39%	100	$ 4,971,720.00	$ 3,824,400.00	
Richard's Memorial SPS Connection	0.39%	100	$ 631,436.00	$ 485,720.00	
Ben Machree SPS Connection	0.39%	100	$ 4,195,880.00	$ 3,227,600.00	
Indian Road SPS Connection	0.39%	100	$ 6,964,230.62	$ 5,357,100.48	
Front Street SPS Connection	0.39%	100	$ 424,528.00	$ 326,560.00	
Pinetree SPS Connection	0.39%	100	$ 5,508,048.00	$ 4,236,960.00	
Rosemere SPS Connection	0.39%	100	$ 4,660,437.60	$ 3,584,952.00	
Elmwood SPS Connection	0.39%	100	$ 1,877,416.32	$ 1,444,166.40	
Hiawatha SPS Connection	0.39%	100	$ 2,445,716.00	$ 1,881,320.00	
Beechwood SPS Connection	0.39%	100	$ 2,377,440.00	$ 1,828,800.00	
Beach St. SPS Connection	0.39%	100	$ 3,341,364.00	$ 2,570,280.00	
SPS Decommissioning	0.00%	100	$ 325,000.00	$ 250,000.00	
New or Upgraded SPS's					
New SPS @ Clarkson	0.50%	50	$ 20,800,000.00	$ 16,000,000.00	* Additional $5.0M accounted for in shaft costs.
Upgrade to Richards Memorial	0.50%	50	$ 19,890,000.00	$ 15,300,000.00	* Additional $1.7M accounted for in shaft costs. *Including Demolition
Upgrade to Jack Darling	0.50%	50	$ 20,150,000.00	$ 15,500,000.00	* Additional $4.7M accounted for in shaft costs.
Lifecycle of Existing SPS's			**Replacement Cost**		
Stonehaven	$ 9,398.74	50	$ 11,016,000.00		
Silverbirch	$ 14,918.81	50	$ 11,756,000.00		
Jack Darling 1	$ 155,687.51	50	$ 26,796,000.00		
Jack Darling 2	$ 11,034.98	50	$ 11,356,000.00		
Richards Memorial	$ 40,791.00	50	$ 14,216,000.00		
Ben Machree	$ 14,017.46	50	$ 11,366,000.00		
Indian Road	$ 15,440.08	50	$ 12,196,000.00		
Front	$ 38,984.93	50	$ 17,078,000.00		
Pinetree	$ 10,633.92	50	$ 11,326,000.00		
Rosemere	$ 7,060.65	50	$ 11,076,000.00		
Elmwood	$ 23,366.19	50	$ 14,796,000.00		
Hiawatha	$ 10,190.49	50	$ 11,236,000.00		
Beechwood	$ 25,668.39	50	$ 27,000,000.00		
Beach St	$ 75,327.80	50	$ 25,596,000.00		

Operation and Maintenance allowance based on a percentage of the Total Construction Estimated Costs including contingency

DESCRIPTION OF ALTERNATIVES					CONSTRUCTION				O&M						Annual Replacement Cost (if Service Life is less than Assessment Period)					Remaining Service Value (if Service Life is greater than Assessment Period)				Net Present Value
Options	Description	Item	# Units	Unit Cost	Capital Cost	2020			Annual		Inflation to Year of Construction	End of Assessment Period (2022 Dollars)	P.V Cost	Total Cost Capital and O&M Costs	Life	Annual Replacement Cost	Inflation to Year of Construction	End of Assessment Period	P.V Cost	Value	Depreciation	Remaining	P.V Cost	Individual
					Component (P)	Year	Future Inflated Capital Cost (F)	P.V Cost	$ or %	Annual Cost		2110	2020					2110	2020	2110	2110	2110	2020	2020
Baseline Option																								
	Costs	New Microtunnel (<1.8m)	2960	$11,050	$32,708,000	2022	$34,029,403	$31,462,096	0.00375	$122,655	$127,610	$5,225,101	$4,830,900	$36,292,996	100	$0	$0	$0.00	$0	$194,387,998	$171,061,438	$23,326,560	$683,676	$35,609,320
		Total Shaft Depth (Minor Diversion)	60	$93,600	$5,616,000	2022	$5,842,886	$5,402,077	0.002	$11,232	$11,686	$478,483	$442,384	$5,844,461	100	$0	$0	$0.00	$0	$33,376,636	$29,371,439	$4,005,196	$117,388	$5,727,073
		Total Shaft Depth (Major Diversion)	15	$117,000	$1,755,000	2022	$1,825,902	$1,688,149	0.002	$3,510	$3,652	$149,526	$138,245	$1,826,394	100	$0	$0	$0.00	$0	$10,430,199	$9,178,575	$1,251,624	$36,684	$1,789,710
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		SPS Decommissioning	2	$325,000	$650,000	2022	$676,260	$625,240	0	$0	$0	$0	$0	$625,240	100	$0	$0	$0.00	$0		$0	$0	$0	$625,240
		Upgrade to Richards Memorial	1	$19,890,000	$19,890,000	2022	$20,693,556	$19,132,356	0.005	$99,450	$103,468	$4,236,568	$3,916,946	$23,049,301	50	$397,800	$413,871	$16,946,273.94	$15,667,783	$0	$0	$0	$0	$38,717,084
					$65,239,408			**$62,754,327**		**$254,867**			**$10,038,196**	**$72,792,523**					**$15,667,783**					**$87,525,981**
	Benefits	Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
					$0			**$0**		**$53,002**			**$2,087,556**	**$2,087,556**					**$22,405,954**					**$24,493,510**
Option 3 - Tunnel Extension East to Booth WWTP																								
Option 3: Full East Tunnel Extension to Booth with Upgraded PS at Jack Darling																								
	Costs	Large Diameter Tunnel (3m)	5500	$14,300	$78,650,000	2022	$81,827,460	$75,654,087	0.0025	$196,625	$204,569	$8,376,222	$7,744,288	$83,398,375	100	$0	$0	$0.00	$0	$467,427,420	$411,336,130	$56,091,290	$1,643,974	$81,754,401
		New Microtunnel (<1.8m)	2000	$11,050	$22,100,000	2022	$22,992,840	$21,258,173	0.00375	$82,875	$86,223	$3,530,474	$3,264,121	$24,522,295	100	$0	$0	$0.00	$0	$131,343,242	$115,582,053	$15,761,189	$461,943	$24,060,351
		Total Shaft Depth (Temp Shaft)	23.5	$78,000	$1,833,000	2022	$1,907,053	$1,763,178	0	$0	$0	$0	$0	$1,763,178	100	$0	$0	$0.00	$0	$10,893,763	$9,586,511	$1,307,252	$38,314	$1,724,864
		Total Shaft Depth (Minor Diversion)	254.75	$93,600	$23,844,600	2022	$24,807,922	$22,936,318	0.002	$47,689	$49,616	$2,031,559	$1,878,291	$24,814,609	100	$0	$0	$0.00	$0	$141,711,632	$124,706,236	$17,005,396	$498,409	$24,316,200
		Total Shaft Depth (Major Diversion)	48	$117,000	$5,616,000	2022	$5,842,886	$5,402,077	0.002	$11,232	$11,686	$478,483	$442,384	$5,844,461	100	$0	$0	$0.00	$0	$33,376,636	$29,371,439	$4,005,196	$117,388	$5,727,073
		Jack Darling 2 SPS Connection	1	$4,971,720	$4,971,720	2022	$5,172,577	$4,782,339	0.0039	$19,390	$20,173	$826,001	$763,685	$5,546,023	100	$0	$0	$0.00	$0	$29,547,594	$26,001,883	$3,545,711	$103,921	$5,442,102
		Richard's Memorial SPS Connection	1	$631,436	$631,436	2022	$656,946	$607,384	0.0039	$2,463	$2,562	$104,907	$96,992	$704,376	100	$0	$0	$0.00	$0	$3,752,708	$3,302,383	$450,325	$13,199	$691,177
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Indian Road SPS Connection	1	$6,964,231	$6,964,231	2022	$7,245,586	$6,698,951	0.0039	$27,160	$28,258	$1,157,037	$1,069,746	$7,768,697	100	$0	$0	$0.00	$0	$41,389,350	$36,422,628	$4,966,722	$145,569	$7,623,128
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		Rosemere SPS Connection	1	$4,660,438	$4,660,438	2022	$4,848,719	$4,482,914	0.0039	$18,176	$18,910	$774,285	$715,870	$5,198,783	100	$0	$0	$0.00	$0	$27,697,601	$24,373,889	$3,323,712	$97,414	$5,101,369
		Elmwood SPS Connection	1	$1,877,416	$1,877,416	2022	$1,953,264	$1,805,902	0.0039	$7,322	$7,618	$311,914	$288,382	$2,094,284	100	$0	$0	$0.00	$0	$11,157,735	$9,818,807	$1,338,928	$39,243	$2,055,042
		Hiawatha SPS Connection	1	$2,445,716	$2,445,716	2022	$2,544,523	$2,352,554	0.0039	$9,538	$9,924	$406,331	$375,676	$2,728,230	100	$0	$0	$0.00	$0	$14,535,216	$12,790,990	$1,744,226	$51,121	$2,677,109
		Beechwood SPS Connection	1	$2,377,440	$2,377,440	2022	$2,473,489	$2,286,879	0.0039	$9,272	$9,647	$394,988	$365,188	$2,652,068	100	$0	$0	$0.00	$0	$14,129,442	$12,433,909	$1,695,533	$49,694	$2,602,373
		Beach St. SPS Connection	1	$3,341,364	$3,341,364	2022	$3,476,355	$3,214,086	0.0039	$13,031	$13,558	$555,134	$513,253	$3,727,338	100	$0	$0	$0.00	$0	$19,858,171	$17,475,191	$2,382,981	$69,843	$3,657,496
		SPS Decommissioning	9	$325,000	$2,925,000	2022	$3,043,170	$2,813,582	0	$0	$0	$0	$0	$2,813,582	100	$0	$0	$0.00	$0		$0	$0	$0	$2,813,582
		Upgrade to Jack Darling	1	$20,150,000	$20,150,000	2022	$20,964,060	$19,382,452	0.005	$100,750	$104,820	$4,291,948	$3,968,148	$23,350,600	50	$403,000	$419,281	$17,167,793.87	$15,872,590	$0	$0	$0	$0	$39,223,190
					$187,008,769			**$179,885,284**		**$563,543**			**$22,195,744**	**$202,081,028**					**$15,872,590**					**$214,527,009**
	Benefits	Richards Memorial	1	$14,216,000		2022	$0	$0	40791	$40,791	$42,439	$1,737,696	$1,606,598	$1,606,598	50	$284,320	$295,807	$12,112,027.67	$11,198,250	$0	$0	$0	$0	$12,804,848
		Jack Darling 2	1	$11,356,000		2022	$0	$0	11034.98	$11,035	$11,481	$470,090	$434,625	$434,625	50	$227,120	$236,296	$9,675,308.54	$8,945,367	$0	$0	$0	$0	$9,379,991
		Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Indian Road	1	$12,196,000		2022	$0	$0	15440.08	$15,440	$16,064	$657,747	$608,124	$608,124	50	$243,920	$253,774	$10,390,988.29	$9,607,053	$0	$0	$0	$0	$10,215,177
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
		Rosemere	1	$11,076,000		2022	$0	$0	7060.65	$7,061	$7,346	$300,784	$278,091	$278,091	50	$221,520	$230,469	$9,436,748.63	$8,724,805	$0	$0	$0	$0	$9,002,896
		Elmwood	1	$14,796,000		2022	$0	$0	23366.19	$23,366	$24,310	$995,399	$920,303	$920,303	50	$295,920	$307,875	$12,606,187.50	$11,655,129	$0	$0	$0	$0	$12,575,432
		Hiawatha	1	$11,236,000		2022	$0	$0	10190.49	$10,190	$10,602	$434,115	$401,363	$401,363	50	$224,720	$233,799	$9,573,068.58	$8,850,840	$0	$0	$0	$0	$9,252,203
		Beach St	1	$25,596,000		2022	$0	$0	75327.8	$75,328	$78,371	$3,208,963	$2,966,867	$2,966,867	50	$511,920	$532,602	$21,807,784.21	$20,162,522	$0	$0	$0	$0	$23,129,389
					$0			**$0**		**$236,214**			**$9,303,527**	**$9,303,527**					**$101,549,919**					**$110,853,446**
Option 3: Phased East Tunnel Extension with Upgraded PS at Jack Darling																								
Phase 1a Implementation from Jack Darling to Front Street (within EA limits)																								
	Costs	Large Diameter Tunnel (3m)	2900	$14,300	$41,470,000	2022	$43,145,388	$39,890,337	0.0025	$103,675	$107,863	$4,416,553	$4,083,352	$43,973,688	100	$0	$0	$0.00	$0	$246,461,731	$216,886,323	$29,575,408	$866,823	$43,106,866
		Total Shaft Depth (Minor Diversion)	102.75	$93,600	$9,617,400	2022	$10,005,943	$9,251,057	0.002	$19,235	$20,012	$819,402	$757,583	$10,008,640	100	$0	$0	$0.00	$0	$57,157,489	$50,298,590	$6,858,899	$201,027	$9,807,613
		Total Shaft Depth (Major Diversion)	41	$117,000	$4,797,000	2022	$4,990,799	$4,614,274	0.002	$9,594	$9,982	$408,704	$377,870	$4,992,144	100	$0	$0	$0.00	$0	$28,509,210	$25,088,104	$3,421,105	$100,269	$4,891,875
		Jack Darling 2 SPS Connection	1	$4,971,720	$4,971,720	2022	$5,172,577	$4,782,339	0.0039	$19,390	$20,173	$826,001	$763,685	$5,546,023	100	$0	$0	$0.00	$0	$29,547,594	$26,001,883	$3,545,711	$103,921	$5,442,102
		Richard's Memorial SPS Connection	1	$631,436	$631,436	2022	$656,946	$607,384	0.0039	$2,463	$2,562	$104,907	$96,992	$704,376	100	$0	$0	$0.00	$0	$3,752,708	$3,302,383	$450,325	$13,199	$691,177
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Indian Road SPS Connection	1	$6,964,231	$6,964,231	2022	$7,245,586	$6,698,951	0.0039	$27,160	$28,258	$1,157,037	$1,069,746	$7,768,697	100	$0	$0	$0.00	$0	$41,389,350	$36,422,628	$4,966,722	$145,569	$7,623,128
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		SPS Decommissioning	5	$325,000	$1,625,000	2022	$1,690,650	$1,563,101	0	$0	$0	$0	$0	$1,563,101	100	$0	$0	$0.00	$0		$0	$0	$0	$1,563,101
		Upgrade to Jack Darling	1	$20,150,000	$20,150,000	2022	$20,964,060	$19,382,452	0.005	$100,750	$104,820	$4,291,948	$3,968,148	$23,350,600	50	$403,000	$419,281	$17,167,793.87	$15,872,590	$0	$0	$0	$0	$39,223,190
					$94,847,195			**$91,234,302**		**$300,286**			**$11,827,096**	**$103,061,399**					**$15,872,590**					**$117,406,605**
	Benefits	Richards Memorial	1	$14,216,000		2022	$0	$0	40791	$40,791	$42,439	$1,737,696	$1,606,598	$1,606,598	50	$284,320	$295,807	$12,112,027.67	$11,198,250	$0	$0	$0	$0	$12,804,848
		Jack Darling 2	1	$11,356,000		2022	$0	$0	11034.98	$11,035	$11,481	$470,090	$434,625	$434,625	50	$227,120	$236,296	$9,675,308.54	$8,945,367	$0	$0	$0	$0	$9,379,991
		Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Indian Road	1	$12,196,000		2022	$0	$0	15440.08	$15,440	$16,064	$657,747	$608,124	$608,124	50	$243,920	$253,774	$10,390,988.29	$9,607,053	$0	$0	$0	$0	$10,215,177
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
					$0			**$0**		**$120,268**			**$4,736,903**	**$4,736,903**					**$52,156,623**					**$56,893,526**
Phase 1b Implementation from Jack Darling to East of Credit River																								
	Costs	Large Diameter Tunnel (3m)	3100	$14,300	$44,330,000	2022	$46,120,932	$42,641,394	0.0025	$110,825	$115,302	$4,721,143	$4,364,962	$47,006,357	100	$0	$0	$0.00	$0	$263,459,091	$231,844,001	$31,615,091	$926,603	$46,079,753
		Total Shaft Depth (Temp Shaft)	21	$78,000	$1,638,000	2022	$1,704,175	$1,575,606	0	$0	$0	$0	$0	$1,575,606	100	$0	$0	$0.00	$0	$9,734,852	$8,566,670	$1,168,182	$34,238	$1,541,368
		Total Shaft Depth (Minor Diversion)	102.75	$93,600	$9,617,400	2022	$10,005,943	$9,251,057	0.002	$19,235	$20,012	$819,402	$757,583	$10,008,640	100	$0	$0	$0.00	$0	$57,157,489	$50,298,590	$6,858,899	$201,027	$9,807,613
		Total Shaft Depth (Major Diversion)	41	$117,000	$4,797,000	2022	$4,990,799	$4,614,274	0.002	$9,594	$9,982	$408,704	$377,870	$4,992,144	100	$0	$0	$0.00	$0	$28,509,210	$25,088,104	$3,421,105	$100,269	$4,891,875
		Jack Darling 2 SPS Connection	1	$4,971,720	$4,971,720	2022	$5,172,577	$4,782,339	0.0039	$19,390	$20,173	$826,001	$763,685	$5,546,023	100	$0	$0	$0.00	$0	$29,547,594	$26,001,883	$3,545,711	$103,921	$5,442,102
		Richard's Memorial SPS Connection	1	$631,436	$631,436	2022	$656,946	$607,384	0.0039	$2,463	$2,562	$104,907	$96,992	$704,376	100	$0	$0	$0.00	$0	$3,752,708	$3,302,383	$450,325	$13,199	$691,177
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Indian Road SPS Connection	1	$6,964,231	$6,964,231	2022	$7,245,586	$6,698,951	0.0039	$27,160	$28,258	$1,157,037	$1,069,746	$7,768,697	100	$0	$0	$0.00	$0	$41,389,350	$36,422,628	$4,966,722	$145,569	$7,623,128
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		SPS Decommissioning	5	$325,000	$1,625,000	2022	$1,690,650	$1,563,101	0	$0	$0	$0	$0	$1,563,101	100	$0	$0	$0.00	$0		$0	$0	$0	$1,563,101
		Upgrade to Jack Darling	1	$20,150,000	$20,150,000	2022	$20,964,060	$19,382,452	0.005	$100,750	$104,820	$4,291,948	$3,968,148	$23,350,600	50	$403,000	$419,281	$17,167,793.87	$15,872,590	$0	$0	$0	$0	$39,223,190
					$99,345,195			**$95,560,966**		**$307,436**			**$12,108,707**	**$107,669,673**					**$15,872,590**					**$121,920,860**
	Benefits	Richards Memorial	1	$14,216,000		2022	$0	$0	40791	$40,791	$42,439	$1,737,696	$1,606,598	$1,606,598	50	$284,320	$295,807	$12,112,027.67	$11,198,250	$0	$0	$0	$0	$12,804,848
		Jack Darling 2	1	$11,356,000		2022	$0	$0	11034.98	$11,035	$11,481	$470,090	$434,625	$434,625	50	$227,120	$236,296	$9,675,308.54	$8,945,367	$0	$0	$0	$0	$9,379,991
		Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Indian Road	1	$12,196,000		2022	$0	$0	15440.08	$15,440	$16,064	$657,747	$608,124	$608,124	50	$243,920	$253,774	$10,390,988.29	$9,607,053	$0	$0	$0	$0	$10,215,177
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
					$0			**$0**		**$120,268**			**$4,736,903**	**$4,736,903**					**$52,156,623**					**$56,893,526**
Phase 1c Implementation from Jack Darling to Elmwood Ave.																								
	Costs	Large Diameter Tunnel (3m)	3875	$14,300	$55,412,500	2022	$57,651,165	$53,301,743	0.0025	$138,531	$144,128	$5,901,429	$5,456,203	$58,757,946	100	$0	$0	$0.00	$0	$329,323,864	$289,805,001	$39,518,864	$1,158,254	$57,599,691
		Total Shaft Depth (Temp Shaft)	23.75	$78,000	$1,852,500	2022	$1,927,341	$1,781,935	0	$0	$0	$0	$0	$1,781,935	100	$0	$0	$0.00	$0	$11,009,654	$9,688,496	$1,321,158	$38,722	$1,743,213
		Total Shaft Depth (Minor Diversion)	150.25	$93,600	$14,063,400	2022	$14,631,561	$13,527,701	0.002	$28,127	$29,263	$1,198,201	$1,107,804	$14,635,505	100	$0	$0	$0.00	$0	$83,580,658	$73,550,979	$10,029,679	$293,959	$14,341,547
		Total Shaft Depth (Major Diversion)	41	$117,000	$4,797,000	2022	$4,990,799	$4,614,274	0.002	$9,594	$9,982	$408,704	$377,870	$4,992,144	100	$0	$0	$0.00	$0	$28,509,210	$25,088,104	$3,421,105	$100,269	$4,891,875

DESCRIPTION OF ALTERNATIVES					CONSTRUCTION				O&M						Annual Replacement Cost (if Service Life is less than Assessment Period)					Remaining Service Value (if Service Life is greater than Assessment Period)				Net Present Value
Options	Description	Item	# Units	Unit Cost	Capital Cost	2020			Annual		Inflation to Year of Construction	End of Assessment Period (2022 Dollars)	P.V Cost	Total Cost Capital and O&M Costs	Life	Annual Replacement Cost	Inflation to Year of Construction	End of Assessment Period	P.V Cost	Value	Depreciation	Remaining	P.V Cost	Individual
					Component (P)	Year	Future Inflated Capital Cost (F)	P.V Cost	$ or %	Annual Cost		2110	2020					2110	2020	2110	2110	2110	2020	2020
		Jack Darling 2 SPS Connection	1	$4,971,720	$4,971,720	2022	$5,172,577	$4,782,339	0.0039	$19,390	$20,173	$826,001	$763,685	$5,546,023	100	$0	$0	$0.00	$0	$29,547,594	$26,001,883	$3,545,711	$103,921	$5,442,102
		Richard's Memorial SPS Connection	1	$631,436	$631,436	2022	$656,946	$607,384	0.0039	$2,463	$2,562	$104,907	$96,992	$704,376	100	$0	$0	$0.00	$0	$3,752,708	$3,302,383	$450,325	$13,199	$691,177
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Indian Road SPS Connection	1	$6,964,231	$6,964,231	2022	$7,245,586	$6,698,951	0.0039	$27,160	$28,258	$1,157,037	$1,069,746	$7,768,697	100	$0	$0	$0.00	$0	$41,389,350	$36,422,628	$4,966,722	$145,569	$7,623,128
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		Rosemere SPS Connection	1	$4,660,438	$4,660,438	2022	$4,848,719	$4,482,914	0.0039	$18,176	$18,910	$774,285	$715,870	$5,198,783	100	$0	$0	$0.00	$0	$27,697,601	$24,373,889	$3,323,712	$97,414	$5,101,369
		Elmwood SPS Connection	1	$1,877,416	$1,877,416	2022	$1,953,264	$1,805,902	0.0039	$7,322	$7,618	$311,914	$288,382	$2,094,284	100	$0	$0	$0.00	$0	$11,157,735	$9,818,807	$1,338,928	$39,243	$2,055,042
		SPS Decommissioning	7	$325,000	$2,275,000	2022	$2,366,910	$2,188,341	0	$0	$0	$0	$0	$2,188,341	100	$0	$0	$0.00	$0		$0	$0	$0	$2,188,341
		Upgrade to Jack Darling	1	$20,150,000	$20,150,000	2022	$20,964,060	$19,382,452	0.005	$100,750	$104,820	$4,291,948	$3,968,148	$23,350,600	50	$403,000	$419,281	$17,167,793.87	$15,872,590	$0	$0	$0	$0	$39,223,190
					$122,276,049			**$117,618,344**		**$369,532**			**$14,554,420**	**$132,172,764**					**$15,872,590**					**$145,958,228**
	Benefits	Richards Memorial	1	$14,216,000		2022	$0	$0	40791	$40,791	$42,439	$1,737,696	$1,606,598	$1,606,598	50	$284,320	$295,807	$12,112,027.67	$11,198,250	$0	$0	$0	$0	$12,804,848
		Jack Darling 2	1	$11,356,000		2022	$0	$0	11034.98	$11,035	$11,481	$470,090	$434,625	$434,625	50	$227,120	$236,296	$9,675,308.54	$8,945,367	$0	$0	$0	$0	$9,379,991
		Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Indian Road	1	$12,196,000		2022	$0	$0	15440.08	$15,440	$16,064	$657,747	$608,124	$608,124	50	$243,920	$253,774	$10,390,988.29	$9,607,053	$0	$0	$0	$0	$10,215,177
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
		Rosemere	1	$11,076,000		2022	$0	$0	7060.65	$7,061	$7,346	$300,784	$278,091	$278,091	50	$221,520	$230,469	$9,436,748.63	$8,724,805	$0	$0	$0	$0	$9,002,896
		Elmwood	1	$14,796,000		2022	$0	$0	23366.19	$23,366	$24,310	$995,399	$920,303	$920,303	50	$295,920	$307,875	$12,606,187.50	$11,655,129	$0	$0	$0	$0	$12,575,432
					$0			**$0**		**$150,695**			**$5,935,297**	**$5,935,297**					**$72,536,557**					**$78,471,854**
Phase 1d Implementation from Jack Darling to Beach St.																								
	Costs	Large Diameter Tunnel (3m)	5500	$14,300	$78,650,000	2022	$81,827,460	$75,654,087	0.0025	$196,625	$204,569	$8,376,222	$7,744,288	$83,398,375	100	$0	$0	$0.00	$0	$467,427,420	$411,336,130	$56,091,290	$1,643,974	$81,754,401
		Total Shaft Depth (Temp Shaft)	23.5	$78,000	$1,833,000	2022	$1,907,053	$1,763,178	0	$0	$0	$0	$0	$1,763,178	100	$0	$0	$0.00	$0	$10,893,763	$9,586,511	$1,307,252	$38,314	$1,724,864
		Total Shaft Depth (Minor Diversion)	221.25	$93,600	$20,709,000	2022	$21,545,644	$19,920,159	0.002	$41,418	$43,091	$1,764,406	$1,631,293	$21,551,451	100	$0	$0	$0.00	$0	$123,076,344	$108,307,183	$14,769,161	$432,868	$21,118,584
		Total Shaft Depth (Major Diversion)	41	$117,000	$4,797,000	2022	$4,990,799	$4,614,274	0.002	$9,594	$9,982	$408,704	$377,870	$4,992,144	100	$0	$0	$0.00	$0	$28,509,210	$25,088,104	$3,421,105	$100,269	$4,891,875
		Jack Darling 2 SPS Connection	1	$4,971,720	$4,971,720	2022	$5,172,577	$4,782,339	0.0039	$19,390	$20,173	$826,001	$763,685	$5,546,023	100	$0	$0	$0.00	$0	$29,547,594	$26,001,883	$3,545,711	$103,921	$5,442,102
		Richard's Memorial SPS Connection	1	$631,436	$631,436	2022	$656,946	$607,384	0.0039	$2,463	$2,562	$104,907	$96,992	$704,376	100	$0	$0	$0.00	$0	$3,752,708	$3,302,383	$450,325	$13,199	$691,177
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Indian Road SPS Connection	1	$6,964,231	$6,964,231	2022	$7,245,586	$6,698,951	0.0039	$27,160	$28,258	$1,157,037	$1,069,746	$7,768,697	100	$0	$0	$0.00	$0	$41,389,350	$36,422,628	$4,966,722	$145,569	$7,623,128
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		Rosemere SPS Connection	1	$4,660,438	$4,660,438	2022	$4,848,719	$4,482,914	0.0039	$18,176	$18,910	$774,285	$715,870	$5,198,783	100	$0	$0	$0.00	$0	$27,697,601	$24,373,889	$3,323,712	$97,414	$5,101,369
		Elmwood SPS Connection	1	$1,877,416	$1,877,416	2022	$1,953,264	$1,805,902	0.0039	$7,322	$7,618	$311,914	$288,382	$2,094,284	100	$0	$0	$0.00	$0	$11,157,735	$9,818,807	$1,338,928	$39,243	$2,055,042
		Hiawatha SPS Connection	1	$2,445,716	$2,445,716	2022	$2,544,523	$2,352,554	0.0039	$9,538	$9,924	$406,331	$375,676	$2,728,230	100	$0	$0	$0.00	$0	$14,535,216	$12,790,990	$1,744,226	$51,121	$2,677,109
		Beechwood SPS Connection	1	$2,377,440	$2,377,440	2022	$2,473,489	$2,286,879	0.0039	$9,272	$9,647	$394,988	$365,188	$2,652,068	100	$0	$0	$0.00	$0	$14,129,442	$12,433,909	$1,695,533	$49,694	$2,602,373
		Beach St. SPS Connection	1	$3,341,364	$3,341,364	2022	$3,476,355	$3,214,086	0.0039	$13,031	$13,558	$555,134	$513,253	$3,727,338	100	$0	$0	$0.00	$0	$19,858,171	$17,475,191	$2,382,981	$69,843	$3,657,496
		SPS Decommissioning	9	$325,000	$2,925,000	2022	$3,043,170	$2,813,582	0	$0	$0	$0	$0	$2,813,582	100	$0	$0	$0.00	$0		$0	$0	$0	$2,813,582
		Upgrade to Jack Darling	1	$20,150,000	$20,150,000	2022	$20,964,060	$19,382,452	0.005	$100,750	$104,820	$4,291,948	$3,968,148	$23,350,600	50	$403,000	$419,281	$17,167,793.87	$15,872,590	$0	$0	$0	$0	$39,223,190
					$160,954,169			**$154,823,148**		**$472,759**			**$18,620,111**	**$173,443,259**					**$15,872,590**					**$186,433,844**
	Benefits	Richards Memorial	1	$14,216,000		2022	$0	$0	40791	$40,791	$42,439	$1,737,696	$1,606,598	$1,606,598	50	$284,320	$295,807	$12,112,027.67	$11,198,250	$0	$0	$0	$0	$12,804,848
		Jack Darling 2	1	$11,356,000		2022	$0	$0	11034.98	$11,035	$11,481	$470,090	$434,625	$434,625	50	$227,120	$236,296	$9,675,308.54	$8,945,367	$0	$0	$0	$0	$9,379,991
		Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Indian Road	1	$12,196,000		2022	$0	$0	15440.08	$15,440	$16,064	$657,747	$608,124	$608,124	50	$243,920	$253,774	$10,390,988.29	$9,607,053	$0	$0	$0	$0	$10,215,177
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
		Rosemere	1	$11,076,000		2022	$0	$0	7060.65	$7,061	$7,346	$300,784	$278,091	$278,091	50	$221,520	$230,469	$9,436,748.63	$8,724,805	$0	$0	$0	$0	$9,002,896
		Elmwood	1	$14,796,000		2022	$0	$0	23366.19	$23,366	$24,310	$995,399	$920,303	$920,303	50	$295,920	$307,875	$12,606,187.50	$11,655,129	$0	$0	$0	$0	$12,575,432
		Hiawatha	1	$11,236,000		2022	$0	$0	10190.49	$10,190	$10,602	$434,115	$401,363	$401,363	50	$224,720	$233,799	$9,573,068.58	$8,850,840	$0	$0	$0	$0	$9,252,203
		Beach St	1	$25,596,000		2022	$0	$0	75327.8	$75,328	$78,371	$3,208,963	$2,966,867	$2,966,867	50	$511,920	$532,602	$21,807,784.21	$20,162,522	$0	$0	$0	$0	$23,129,389
					$0			**$0**		**$236,214**			**$9,303,527**	**$9,303,527**					**$101,549,919**					**$110,853,446**
Option 4 - Continuous Tunnel Extension between Booth and Clarkson WWTPs (with Deep PS at Clarkson)																								
	Costs	Large Diameter Tunnel (3m)	10750	$14,300	$153,725,000	2022	$159,935,490	$147,869,351	0.0025	$384,313	$399,839	$16,371,707	$15,136,563	$163,005,914	100	$0	$0	$0.00	$0	$913,608,140	$803,975,163	$109,632,977	$3,213,222	$159,792,693
		New Microtunnel (<1.8m)	2000	$11,050	$22,100,000	2022	$22,992,840	$21,258,173	0.00375	$82,875	$86,223	$3,530,474	$3,264,121	$24,522,295	100	$0	$0	$0.00	$0	$131,343,242	$115,582,053	$15,761,189	$461,943	$24,060,351
		Total Shaft Depth (Temp Shaft)	67.5	$78,000	$5,265,000	2022	$5,477,706	$5,064,447	0	$0	$0	$0	$0	$5,064,447	100	$0	$0	$0.00	$0	$31,290,596	$27,535,724	$3,754,872	$110,051	$4,954,396
		Total Shaft Depth (Minor Diversion)	373.75	$93,600	$34,983,000	2022	$36,396,313	$33,650,438	0.002	$69,966	$72,793	$2,980,551	$2,755,687	$36,406,124	100	$0	$0	$0.00	$0	$207,908,626	$182,959,591	$24,949,035	$731,229	$35,674,895
		Total Shaft Depth (Major Diversion)	50	$117,000	$5,850,000	2022	$6,086,340	$5,627,163	0.002	$11,700	$12,173	$498,420	$460,817	$6,087,981	100	$0	$0	$0.00	$0	$34,767,329	$30,595,249	$4,172,079	$122,279	$5,965,702
		Stonehaven SPS Connection	1	$6,955,335	$6,955,335	2022	$7,236,330	$6,690,394	0.0039	$27,126	$28,222	$1,155,559	$1,068,379	$7,758,773	100	$0	$0	$0.00	$0	$41,336,481	$36,376,103	$4,960,378	$145,383	$7,613,390
		Silver Birch SPS Connection	1	$5,566,380	$5,566,380	2022	$5,791,262	$5,354,347	0.0039	$21,709	$22,586	$924,798	$855,028	$6,209,375	100	$0	$0	$0.00	$0	$33,081,737	$29,111,929	$3,969,808	$116,351	$6,093,024
		Jack Darling 1 SPS Connection	1	$351,000	$351,000	2022	$365,180	$337,630	0.0039	$1,369	$1,424	$58,315	$53,916	$391,545	100	$0	$0	$0.00	$0	$2,086,040	$1,835,715	$250,325	$7,337	$384,209
		Jack Darling 2 SPS Connection	1	$4,971,720	$4,971,720	2022	$5,172,577	$4,782,339	0.0039	$19,390	$20,173	$826,001	$763,685	$5,546,023	100	$0	$0	$0.00	$0	$29,547,594	$26,001,883	$3,545,711	$103,921	$5,442,102
		Richard's Memorial SPS Connection	1	$631,436	$631,436	2022	$656,946	$607,384	0.0039	$2,463	$2,562	$104,907	$96,992	$704,376	100	$0	$0	$0.00	$0	$3,752,708	$3,302,383	$450,325	$13,199	$691,177
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Indian Road SPS Connection	1	$6,964,231	$6,964,231	2022	$7,245,586	$6,698,951	0.0039	$27,160	$28,258	$1,157,037	$1,069,746	$7,768,697	100	$0	$0	$0.00	$0	$41,389,350	$36,422,628	$4,966,722	$145,569	$7,623,128
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		Rosemere SPS Connection	1	$4,660,438	$4,660,438	2022	$4,848,719	$4,482,914	0.0039	$18,176	$18,910	$774,285	$715,870	$5,198,783	100	$0	$0	$0.00	$0	$27,697,601	$24,373,889	$3,323,712	$97,414	$5,101,369
		Elmwood SPS Connection	1	$1,877,416	$1,877,416	2022	$1,953,264	$1,805,902	0.0039	$7,322	$7,618	$311,914	$288,382	$2,094,284	100	$0	$0	$0.00	$0	$11,157,735	$9,818,807	$1,338,928	$39,243	$2,055,042
		Hiawatha SPS Connection	1	$2,445,716	$2,445,716	2022	$2,544,523	$2,352,554	0.0039	$9,538	$9,924	$406,331	$375,676	$2,728,230	100	$0	$0	$0.00	$0	$14,535,216	$12,790,990	$1,744,226	$51,121	$2,677,109
		Beechwood SPS Connection	1	$2,377,440	$2,377,440	2022	$2,473,489	$2,286,879	0.0039	$9,272	$9,647	$394,988	$365,188	$2,652,068	100	$0	$0	$0.00	$0	$14,129,442	$12,433,909	$1,695,533	$49,694	$2,602,373
		Beach St. SPS Connection	1	$3,341,364	$3,341,364	2022	$3,476,355	$3,214,086	0.0039	$13,031	$13,558	$555,134	$513,253	$3,727,338	100	$0	$0	$0.00	$0	$19,858,171	$17,475,191	$2,382,981	$69,843	$3,657,496
		SPS Decommissioning	12	$325,000	$3,900,000	2022	$4,057,560	$3,751,442	0	$0	$0	$0	$0	$3,751,442	100	$0	$0	$0.00	$0		$0	$0	$0	$3,751,442
		New SPS @ Clarkson	1	$20,800,000	$20,800,000	2022	$21,640,320	$20,007,692	0.005	$104,000	$108,202	$4,430,398	$4,096,152	$24,103,845	50	$416,000	$432,806	$17,721,593.67	$16,384,610	$0	$0	$0	$0	$40,488,454
					$291,385,883			**$280,286,495**		**$827,429**			**$32,589,175**	**$312,875,670**					**$16,384,610**					**$323,685,905**
	Benefits	Stonehaven	1	$11,016,000		2022	$0	$0	9398.74	$9,399	$9,778	$400,386	$370,180	$370,180	50	$220,320	$229,221	$9,385,628.65	$8,677,541	$0	$0	$0	$0	$9,047,721
		Silverbirch	1	$11,756,000		2022	$0	$0	14918.81	$14,919	$15,522	$635,541	$587,593	$587,593	50	$235,120	$244,619	$10,016,108.42	$9,260,455	$0	$0	$0	$0	$9,848,049
		Jack Darling 1	1	$26,796,000		2022	$0	$0	155687.51	$155,688	$161,977	$6,632,286	$6,131,921	$6,131,921	50	$535,920	$557,571	$22,830,183.84	$21,107,788	$0	$0	$0	$0	$27,239,709
		Jack Darling 2	1	$11,356,000		2022	$0	$0	11034.98	$11,035	$11,481	$470,090	$434,625	$434,625	50	$227,120	$236,296	$9,675,308.54	$8,945,367	$0	$0	$0	$0	$9,379,991
		Richards Memorial	1	$14,216,000		2022	$0	$0	40791	$40,791	$42,439	$1,737,696	$1,606,598	$1,606,598	50	$284,320	$295,807	$12,112,027.67	$11,198,250	$0	$0	$0	$0	$12,804,848
		Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Indian Road	1	$12,196,000		2022	$0	$0	15440.08	$15,440	$16,064	$657,747	$608,124	$608,124	50	$243,920	$253,774	$10,390,988.29	$9,607,053	$0	$0	$0	$0	$10,215,177
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
		Rosemere	1	$11,076,000		2022	$0	$0	7060.65	$7,061	$7,346	$300,784	$278,091	$278,091	50	$221,520	$230,469	$9,436,748.63	$8,724,805	$0	$0	$0	$0	$9,002,896
		Elmwood	1	$14,796,000		2022	$0	$0	23366.19	$23,366	$24,310	$995,399	$920,303	$920,303	50	$295,920	$307,875	$12,606,187.50	$11,655,129	$0	$0	$0	$0	$12,575,432
		Hiawatha	1	$11,236,000		2022	$0	$0	10190.49	$10,190	$10,602	$434,115	$401,363	$401,363	50	$224,720	$233,799	$9,573,068.58	$8,850,840	$0	$0	$0	$0	$9,252,203
		Beach St	1	$25,596,000		2022	$0	$0	75327.8	$75,328	$78,371	$3,208,963	$2,966,867	$2,966,867	50	$511,920	$532,602	$21,807,784.21	$20,162,522	$0	$0	$0	$0	$23,129,389
					$0			**$0**		**$416,219**			**$16,393,221**	**$16,393,221**					**$140,595,704**					**$156,988,925**
Option 5 - Two -Level Tunnel Extensions between Clarkson and Booth (with Deep PS at Jack Darling)																								
	Costs	Large Diameter Tunnel (3m)	5500	$14,300	$78,650,000	2022	$81,827,460	$75,654,087	0.0025	$196,625	$204,569	$8,376,222	$7,744,288	$83,398,375	100	$0	$0	$0.00	$0	$467,427,420	$411,336,130	$56,091,290	$1,643,974	$81,754,401
		New Microtunnel (<1.8m)	4100	$11,050	$45,305,000	2022	$47,135,322	$43,579,255	0.00375	$169,894	$176,757	$7,237,471	$6,691,449	$50,270,704	100	$0	$0	$0.00	$0	$269,253,646	$236,943,209	$32,310,438	$946,983	$49,323,720
		New Forcemain (900mm)	2706	$5,850	$15,830,100	2022	$16,469,636	$15,227,104	0.0044	$69,652	$72,466	$2,967,193	$2,743,337	$17,970,441	100	$0	$0	$0.00	$0	$94,080,392	$82,790,745	$11,289,647	$330,887	$17,639,554
		Total Shaft Depth (Temp Shaft)	23.5	$78,000	$1,833,000	2022	$1,907,053	$1,763,178	0	$0	$0	$0	$0	$1,763,178	100	$0	$0	$0.00	$0	$10,893,763	$9,586,511	$1,307,252	$38,314	$1,724,864

DESCRIPTION OF ALTERNATIVES					CONSTRUCTION				O&M						Annual Replacement Cost (if Service Life is less than Assessment Period)					Remaining Service Value (if Service Life is greater than Assessment Period)				Net Present Value
Options	Description	Item	# Units	Unit Cost	Capital Cost	2020			Annual		Inflation to Year of Construction	End of Assessment Period (2022 Dollars)	P.V Cost	Total Cost Capital and O&M Costs	Life	Annual Replacement Cost	Inflation to Year of Construction	End of Assessment Period	P.V Cost	Value	Depreciation	Remaining	P.V Cost	Individual
					Component (P)	Year	Future Inflated Capital Cost (F)	P.V Cost	$ or %	Annual Cost		2110	2020					2110	2020	2110	2110	2110	2020	2020
		Total Shaft Depth (Minor Diversion)	268.75	$93,600	$25,155,000	2022	$26,171,262	$24,196,803	0.002	$50,310	$52,343	$2,143,205	$1,981,514	$26,178,317	100	$0	$0	$0.00	$0	$149,499,514	$131,559,572	$17,939,942	$525,800	$25,652,517
		Total Shaft Depth (Major Diversion)	48	$117,000	$5,616,000	2022	$5,842,886	$5,402,077	0.002	$11,232	$11,686	$478,483	$442,384	$5,844,461	100	$0	$0	$0.00	$0	$33,376,636	$29,371,439	$4,005,196	$117,388	$5,727,073
		Jack Darling 2 SPS Connection	1	$4,971,720	$4,971,720	2022	$5,172,577	$4,782,339	0.0039	$19,390	$20,173	$826,001	$763,685	$5,546,023	100	$0	$0	$0.00	$0	$29,547,594	$26,001,883	$3,545,711	$103,921	$5,442,102
		Richard's Memorial SPS Connection	1	$631,436	$631,436	2022	$656,946	$607,384	0.0039	$2,463	$2,562	$104,907	$96,992	$704,376	100	$0	$0	$0.00	$0	$3,752,708	$3,302,383	$450,325	$13,199	$691,177
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Indian Road SPS Connection	1	$6,964,231	$6,964,231	2022	$7,245,586	$6,698,951	0.0039	$27,160	$28,258	$1,157,037	$1,069,746	$7,768,697	100	$0	$0	$0.00	$0	$41,389,350	$36,422,628	$4,966,722	$145,569	$7,623,128
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		Rosemere SPS Connection	1	$4,660,438	$4,660,438	2022	$4,848,719	$4,482,914	0.0039	$18,176	$18,910	$774,285	$715,870	$5,198,783	100	$0	$0	$0.00	$0	$27,697,601	$24,373,889	$3,323,712	$97,414	$5,101,369
		Elmwood SPS Connection	1	$1,877,416	$1,877,416	2022	$1,953,264	$1,805,902	0.0039	$7,322	$7,618	$311,914	$288,382	$2,094,284	100	$0	$0	$0.00	$0	$11,157,735	$9,818,807	$1,338,928	$39,243	$2,055,042
		Hiawatha SPS Connection	1	$2,445,716	$2,445,716	2022	$2,544,523	$2,352,554	0.0039	$9,538	$9,924	$406,331	$375,676	$2,728,230	100	$0	$0	$0.00	$0	$14,535,216	$12,790,990	$1,744,226	$51,121	$2,677,109
		Beechwood SPS Connection	1	$2,377,440	$2,377,440	2022	$2,473,489	$2,286,879	0.0039	$9,272	$9,647	$394,988	$365,188	$2,652,068	100	$0	$0	$0.00	$0	$14,129,442	$12,433,909	$1,695,533	$49,694	$2,602,373
		Beach St. SPS Connection	1	$3,341,364	$3,341,364	2022	$3,476,355	$3,214,086	0.0039	$13,031	$13,558	$555,134	$513,253	$3,727,338	100	$0	$0	$0.00	$0	$19,858,171	$17,475,191	$2,382,981	$69,843	$3,657,496
		SPS Decommissioning	9	$325,000	$2,925,000	2022	$3,043,170	$2,813,582	0	$0	$0	$0	$0	$2,813,582	100	$0	$0	$0.00	$0		$0	$0	$0	$2,813,582
		Upgrade to Jack Darling	1	$20,150,000	$20,150,000	2022	$20,964,060	$19,382,452	0.005	$100,750	$104,820	$4,291,948	$3,968,148	$23,350,600	50	$403,000	$419,281	$17,167,793.87	$15,872,590	$0	$0	$0	$0	$39,223,190
					$227,354,269			**$218,693,954**		**$722,835**			**$28,469,632**	**$247,163,586**					**$15,872,590**					**$258,766,249**
	Benefits	Richards Memorial	1	$14,216,000		2022	$0	$0	40791	$40,791	$42,439	$1,737,696	$1,606,598	$1,606,598	50	$284,320	$295,807	$12,112,027.67	$11,198,250	$0	$0	$0	$0	$12,804,848
		Jack Darling 2	1	$11,356,000		2022	$0	$0	11034.98	$11,035	$11,481	$470,090	$434,625	$434,625	50	$227,120	$236,296	$9,675,308.54	$8,945,367	$0	$0	$0	$0	$9,379,991
		Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Indian Road	1	$12,196,000		2022	$0	$0	15440.08	$15,440	$16,064	$657,747	$608,124	$608,124	50	$243,920	$253,774	$10,390,988.29	$9,607,053	$0	$0	$0	$0	$10,215,177
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
		Rosemere	1	$11,076,000		2022	$0	$0	7060.65	$7,061	$7,346	$300,784	$278,091	$278,091	50	$221,520	$230,469	$9,436,748.63	$8,724,805	$0	$0	$0	$0	$9,002,896
		Elmwood	1	$14,796,000		2022	$0	$0	23366.19	$23,366	$24,310	$995,399	$920,303	$920,303	50	$295,920	$307,875	$12,606,187.50	$11,655,129	$0	$0	$0	$0	$12,575,432
		Hiawatha	1	$11,236,000		2022	$0	$0	10190.49	$10,190	$10,602	$434,115	$401,363	$401,363	50	$224,720	$233,799	$9,573,068.58	$8,850,840	$0	$0	$0	$0	$9,252,203
		Beach St	1	$25,596,000		2022	$0	$0	75327.8	$75,328	$78,371	$3,208,963	$2,966,867	$2,966,867	50	$511,920	$532,602	$21,807,784.21	$20,162,522	$0	$0	$0	$0	$23,129,389
					$0			**$0**		**$236,214**			**$9,303,527**	**$9,303,527**					**$101,549,919**					**$110,853,446**
Option 6 - Downstream Alternative to Option 5 - Extended forcemains to downstream trunk conveying flows to Clarkson																								
	Costs	Large Diameter Tunnel (3m)	5500	$14,300	$78,650,000	2022	$81,827,460	$75,654,087	0.0025	$196,625	$204,569	$8,376,222	$7,744,288	$83,398,375	100	$0	$0	$0.00	$0	$467,427,420	$411,336,130	$56,091,290	$1,643,974	$81,754,401
		New Microtunnel (<1.8m)	2000	$11,050	$22,100,000	2022	$22,992,840	$21,258,173	0.00375	$82,875	$86,223	$3,530,474	$3,264,121	$24,522,295	100	$0	$0	$0.00	$0	$131,343,242	$115,582,053	$15,761,189	$461,943	$24,060,351
		New Forcemain (900mm)	3700	$5,850	$21,645,000	2022	$22,519,458	$20,820,505	0.0044	$95,238	$99,086	$4,057,137	$3,751,052	$24,571,556	100	$0	$0	$0.00	$0	$128,639,117	$113,202,423	$15,436,694	$452,432	$24,119,124
		Total Shaft Depth (Temp Shaft)	23.5	$78,000	$1,833,000	2022	$1,907,053	$1,763,178	0	$0	$0	$0	$0	$1,763,178	100	$0	$0	$0.00	$0	$10,893,763	$9,586,511	$1,307,252	$38,314	$1,724,864
		Total Shaft Depth (Minor Diversion)	262.75	$93,600	$24,593,400	2022	$25,586,973	$23,656,595	0.002	$49,187	$51,174	$2,095,357	$1,937,275	$25,593,870	100	$0	$0	$0.00	$0	$146,161,850	$128,622,428	$17,539,422	$514,061	$25,079,809
		Total Shaft Depth (Major Diversion)	48	$117,000	$5,616,000	2022	$5,842,886	$5,402,077	0.002	$11,232	$11,686	$478,483	$442,384	$5,844,461	100	$0	$0	$0.00	$0	$33,376,636	$29,371,439	$4,005,196	$117,388	$5,727,073
		Jack Darling 2 SPS Connection	1	$4,971,720	$4,971,720	2022	$5,172,577	$4,782,339	0.0039	$19,390	$20,173	$826,001	$763,685	$5,546,023	100	$0	$0	$0.00	$0	$29,547,594	$26,001,883	$3,545,711	$103,921	$5,442,102
		Richard's Memorial SPS Connection	1	$631,436	$631,436	2022	$656,946	$607,384	0.0039	$2,463	$2,562	$104,907	$96,992	$704,376	100	$0	$0	$0.00	$0	$3,752,708	$3,302,383	$450,325	$13,199	$691,177
		Ben Machree SPS Connection	1	$4,195,880	$4,195,880	2022	$4,365,394	$4,036,052	0.0039	$16,364	$17,025	$697,103	$644,511	$4,680,563	100	$0	$0	$0.00	$0	$24,936,673	$21,944,273	$2,992,401	$87,704	$4,592,859
		Indian Road SPS Connection	1	$6,964,231	$6,964,231	2022	$7,245,586	$6,698,951	0.0039	$27,160	$28,258	$1,157,037	$1,069,746	$7,768,697	100	$0	$0	$0.00	$0	$41,389,350	$36,422,628	$4,966,722	$145,569	$7,623,128
		Front Street SPS Connection	1	$424,528	$424,528	2022	$441,679	$408,357	0.0039	$1,656	$1,723	$70,531	$65,210	$473,567	100	$0	$0	$0.00	$0	$2,523,026	$2,220,263	$302,763	$8,874	$464,693
		Rosemere SPS Connection	1	$4,660,438	$4,660,438	2022	$4,848,719	$4,482,914	0.0039	$18,176	$18,910	$774,285	$715,870	$5,198,783	100	$0	$0	$0.00	$0	$27,697,601	$24,373,889	$3,323,712	$97,414	$5,101,369
		Elmwood SPS Connection	1	$1,877,416	$1,877,416	2022	$1,953,264	$1,805,902	0.0039	$7,322	$7,618	$311,914	$288,382	$2,094,284	100	$0	$0	$0.00	$0	$11,157,735	$9,818,807	$1,338,928	$39,243	$2,055,042
		Hiawatha SPS Connection	1	$2,445,716	$2,445,716	2022	$2,544,523	$2,352,554	0.0039	$9,538	$9,924	$406,331	$375,676	$2,728,230	100	$0	$0	$0.00	$0	$14,535,216	$12,790,990	$1,744,226	$51,121	$2,677,109
		Beechwood SPS Connection	1	$2,377,440	$2,377,440	2022	$2,473,489	$2,286,879	0.0039	$9,272	$9,647	$394,988	$365,188	$2,652,068	100	$0	$0	$0.00	$0	$14,129,442	$12,433,909	$1,695,533	$49,694	$2,602,373
		Beach St. SPS Connection	1	$3,341,364	$3,341,364	2022	$3,476,355	$3,214,086	0.0039	$13,031	$13,558	$555,134	$513,253	$3,727,338	100	$0	$0	$0.00	$0	$19,858,171	$17,475,191	$2,382,981	$69,843	$3,657,496
		SPS Decommissioning	9	$325,000	$2,925,000	2022	$3,043,170	$2,813,582	0	$0	$0	$0	$0	$2,813,582	100	$0	$0	$0.00	$0		$0	$0	$0	$2,813,582
		Upgrade to Jack Darling	1	$20,150,000	$20,150,000	2022	$20,964,060	$19,382,452	0.005	$100,750	$104,820	$4,291,948	$3,968,148	$23,350,600	50	$403,000	$419,281	$17,167,793.87	$15,872,590	$0	$0	$0	$0	$39,223,190
					$209,402,569			**$201,426,065**		**$660,278**			**$26,005,781**	**$227,431,846**					**$15,872,590**					**$239,409,743**
	Benefits	Richards Memorial	1	$14,216,000		2022	$0	$0	40791	$40,791	$42,439	$1,737,696	$1,606,598	$1,606,598	50	$284,320	$295,807	$12,112,027.67	$11,198,250	$0	$0	$0	$0	$12,804,848
		Jack Darling 2	1	$11,356,000		2022	$0	$0	11034.98	$11,035	$11,481	$470,090	$434,625	$434,625	50	$227,120	$236,296	$9,675,308.54	$8,945,367	$0	$0	$0	$0	$9,379,991
		Ben Machree	1	$11,366,000		2022	$0	$0	14017.46	$14,017	$14,584	$597,144	$552,093	$552,093	50	$227,320	$236,504	$9,683,828.54	$8,953,244	$0	$0	$0	$0	$9,505,337
		Indian Road	1	$12,196,000		2022	$0	$0	15440.08	$15,440	$16,064	$657,747	$608,124	$608,124	50	$243,920	$253,774	$10,390,988.29	$9,607,053	$0	$0	$0	$0	$10,215,177
		Front	1	$17,078,000		2022	$0	$0	38984.93	$38,985	$40,560	$1,660,757	$1,535,464	$1,535,464	50	$341,560	$355,359	$14,550,450.80	$13,452,710	$0	$0	$0	$0	$14,988,173
		Rosemere	1	$11,076,000		2022	$0	$0	7060.65	$7,061	$7,346	$300,784	$278,091	$278,091	50	$221,520	$230,469	$9,436,748.63	$8,724,805	$0	$0	$0	$0	$9,002,896
		Elmwood	1	$14,796,000		2022	$0	$0	23366.19	$23,366	$24,310	$995,399	$920,303	$920,303	50	$295,920	$307,875	$12,606,187.50	$11,655,129	$0	$0	$0	$0	$12,575,432
		Hiawatha	1	$11,236,000		2022	$0	$0	10190.49	$10,190	$10,602	$434,115	$401,363	$401,363	50	$224,720	$233,799	$9,573,068.58	$8,850,840	$0	$0	$0	$0	$9,252,203
		Beach St	1	$25,596,000		2022	$0	$0	75327.8	$75,328	$78,371	$3,208,963	$2,966,867	$2,966,867	50	$511,920	$532,602	$21,807,784.21	$20,162,522	$0	$0	$0	$0	$23,129,389
					$0			**$0**		**$236,214**			**$9,303,527**	**$9,303,527**					**$101,549,919**					**$110,853,446**

Future Cost (F) = P x (1+f)n
Present Value Cost (PV) = F / (1+i)n
O & M Costs (P) = F x [1/(1+f)] [(1+f')n2 - 1) / (f' x (1+f')n2)] , where n2 = End of Assessment Year - Construction Year

Option 3 - Phase 2 Capital Costs

DESCRIPTION OF ALTERNATIVES					CONSTRUCTION				O&M						Annual Replacement Cost (if Service Life is less than Assessment Period)					Remaining Service Value (if Service Life is greater than Assessment Period)				Net Present Value
Options	Description	Item	# Units	Unit Cost	Capital Cost	2031			Annual		Inflation to Year of Construction	End of Assessment Period (2022 Dollars)	P.V Cost	Total Cost Capital and O&M Costs	Life	Annual Replacement Cost	Inflation to Year of Construction	End of Assessment Period	P.V Cost	Value	Depreciation	Remaining	P.V Cost	Individual
					Component (P)	Year	Future Inflated Capital Cost (F)	P.V Cost	$ or %	Annual Cost		2110	2020					2110	2020	2110	2110	2110	2020	2020
Phase 2a Construction from Front St. SPS to G.E. Booth																								
	Costs	Large Diameter Tunnel (3m)	2600	$14,300	$37,180,000	2031	$46,228,657	$30,029,254	0.0025	$92,950	$92,950	$3,645,197	$2,367,850	$32,397,104	100	$0	$0	$0.00	$0	$177,714,537	$140,394,484	$37,320,053	$1,093,810	$31,303,295
		New Microtunnel (<1.8m)	2000	$11,050	$22,100,000	2031	$27,478,572	$17,849,557	0.00375	$82,875	$82,875	$3,250,088	$2,111,195	$19,960,752	100	$0	$0	$0.00	$0	$105,634,515	$83,451,267	$22,183,248	$650,167	$19,310,585
		Total Shaft Depth (Temp Shaft)	44.5	$78,000	$3,471,000	2031	$4,315,752	$2,803,430	0	$0	$0	$0	$0	$2,803,430	100	$0	$0	$0.00	$0	$16,590,833	$13,106,758	$3,484,075	$102,114	$2,701,316
		Total Shaft Depth (Minor Diversion)	17	$93,600	$1,591,200	2031	$1,978,457	$1,285,168	0.002	$3,182	$3,182	$124,803	$81,070	$1,366,238	100	$0	$0	$0.00	$0	$7,605,685	$6,008,491	$1,597,194	$46,812	$1,319,426
		Total Shaft Depth (Major Diversion)	128.5	$117,000	$15,034,500	2031	$18,693,511	$12,142,948	0.002	$30,069	$30,069	$1,179,208	$765,991	$12,908,940	100	$0	$0	$0.00	$0	$71,862,539	$56,771,406	$15,091,133	$442,304	$12,466,635
		Rosemere SPS Connection	1	$4,660,438	$4,660,438	2031	$5,794,668	$3,764,106	0.0039	$18,176	$18,176	$712,792	$463,016	$4,227,122	100	$0	$0	$0.00	$0	$22,276,157	$17,598,164	$4,677,993	$137,107	$4,090,015
		Elmwood SPS Connection	1	$1,877,416	$1,877,416	2031	$2,334,331	$1,516,337	0.0039	$7,322	$7,322	$287,142	$186,522	$1,702,859	100	$0	$0	$0.00	$0	$8,973,754	$7,089,266	$1,884,488	$55,232	$1,647,627
		Hiawatha SPS Connection	1	$2,445,716	$2,445,716	2031	$3,040,940	$1,975,337	0.0039	$9,538	$9,538	$374,061	$242,983	$2,218,320	100	$0	$0	$0.00	$0	$11,690,137	$9,235,208	$2,454,929	$71,951	$2,146,368
		Beechwood SPS Connection	1	$2,377,440	$2,377,440	2031	$2,956,048	$1,920,192	0.0039	$9,272	$9,272	$363,618	$236,200	$2,156,392	100	$0	$0	$0.00	$0	$11,363,788	$8,977,393	$2,386,396	$69,943	$2,086,449
		Beach St. SPS Connection	1	$3,341,364	$3,341,364	2031	$4,154,566	$2,698,727	0.0039	$13,031	$13,031	$511,046	$331,966	$3,030,693	100	$0	$0	$0.00	$0	$15,971,193	$12,617,242	$3,353,951	$98,301	$2,932,392
		SPS Decommissioning	4	$325,000	$1,300,000	2031	$1,616,387	$1,049,974	0	$0	$0	$0	$0	$1,049,974	100	$0	$0	$0.00	$0	$6,213,795	$4,908,898	$1,304,897	$38,245	$1,011,729
					$95,379,074		**$118,591,890**	**$77,035,030**		**$266,416**			**$6,786,793**	**$83,821,823**					**$0**					**$81,015,838**
	Benefits	Rosemere	1	$11,076,000		2031	$0	$0	7060.65	$7,061	$8,779	$344,285	$223,641	$223,641	50	$221,520	$275,432	$10,801,558.09	$7,016,486	$0	$0	$0	$0	$7,240,127
		Elmwood	1	$14,796,000		2031	$0	$0	23366.19	$23,366	$29,053	$1,139,361	$740,107	$740,107	50	$295,920	$367,939	$14,429,383.67	$9,373,052	$0	$0	$0	$0	$10,113,160
		Hiawatha	1	$11,236,000		2031	$0	$0	10190.49	$10,190	$12,671	$496,899	$322,776	$322,776	50	$224,720	$279,411	$10,957,593.60	$7,117,844	$0	$0	$0	$0	$7,440,620
		Beach St	1	$25,596,000		2031	$0	$0	75327.8	$75,328	$93,661	$3,673,066	$2,385,954	$2,385,954	50	$511,920	$636,508	$24,961,780.51	$16,214,697	$0	$0	$0	$0	$18,600,650
					$0			**$0**		**$115,945**			**$3,672,478**	**$3,672,478**					**$39,722,079**					**$43,394,557**

DESCRIPTION OF ALTERNATIVES					CONSTRUCTION				O&M						Annual Replacement Cost (if Service Life is less than Assessment Period)					Remaining Service Value (if Service Life is greater than Assessment Period)				Net Present Value
Options	Description	Item	# Units	Unit Cost	Capital Cost	2020	Future Inflated Capital Cost (F)	P.V Cost	Annual		Inflation to Year of Construction	End of Assessment Period (2022 Dollars)	P.V Cost	Total Cost Capital and O&M Costs	Life	Annual Replacement Cost	Inflation to Year of Construction	End of Assessment Period	P.V Cost	Value	Depreciation	Remaining	P.V Cost	Individual
					Component (P)	Year			$ or %	Annual Cost		2110	2020					2110	2020	2110	2110	2110	2020	2020
Phase 2b Construction from Credit Library to G.E. Booth																								
	Costs	Large Diameter Tunnel (3m)	2400	$14,300	$34,320,000	2031	$42,672,606	$27,719,311	0.0025	$85,800	$85,800	$3,364,797	$2,185,708	$29,905,019	100	$0	$0	$0.00	$0	$164,044,188	$129,594,909	$34,449,279	$1,009,670	$28,895,349
		New Microtunnel (<1.8m)	2000	$11,050	$22,100,000	2031	$27,478,572	$17,849,557	0.00375	$82,875	$82,875	$3,250,088	$2,111,195	$19,960,752	100	$0	$0	$0.00	$0	$105,634,515	$83,451,267	$22,183,248	$650,167	$19,310,585
		Total Shaft Depth (Temp Shaft)	44.5	$78,000	$3,471,000	2031	$4,315,752	$2,803,430	0	$0	$0	$0	$0	$2,803,430	100	$0	$0	$0.00	$0	$16,590,833	$13,106,758	$3,484,075	$102,114	$2,701,316
		Total Shaft Depth (Minor Diversion)	128.5	$93,600	$12,027,600	2031	$14,954,809	$9,714,359	0.002	$24,055	$24,055	$943,367	$612,793	$10,327,152	100	$0	$0	$0.00	$0	$57,490,031	$45,417,125	$12,072,907	$353,844	$9,973,308
		Total Shaft Depth (Major Diversion)	17	$117,000	$1,989,000	2031	$2,473,071	$1,606,460	0.002	$3,978	$3,978	$156,004	$101,337	$1,707,797	100	$0	$0	$0.00	$0	$9,507,106	$7,510,614	$1,996,492	$58,515	$1,649,282
		Rosemere SPS Connection	1	$4,660,438	$4,660,438	2031	$5,794,668	$3,764,106	0.0039	$18,176	$18,176	$712,792	$463,016	$4,227,122	100	$0	$0	$0.00	$0	$22,276,157	$17,598,164	$4,677,993	$137,107	$4,090,015
		Elmwood SPS Connection	1	$1,877,416	$1,877,416	2031	$2,334,331	$1,516,337	0.0039	$7,322	$7,322	$287,142	$186,522	$1,702,859	100	$0	$0	$0.00	$0	$8,973,754	$7,089,266	$1,884,488	$55,232	$1,647,627
		Hiawatha SPS Connection	1	$2,445,716	$2,445,716	2031	$3,040,940	$1,975,337	0.0039	$9,538	$9,538	$374,061	$242,983	$2,218,320	100	$0	$0	$0.00	$0	$11,690,137	$9,235,208	$2,454,929	$71,951	$2,146,368
		Beechwood SPS Connection	1	$2,377,440	$2,377,440	2031	$2,956,048	$1,920,192	0.0039	$9,272	$9,272	$363,618	$236,200	$2,156,392	100	$0	$0	$0.00	$0	$11,363,788	$8,977,393	$2,386,396	$69,943	$2,086,449
		Beach St. SPS Connection	1	$3,341,364	$3,341,364	2031	$4,154,566	$2,698,727	0.0039	$13,031	$13,031	$511,046	$331,966	$3,030,693	100	$0	$0	$0.00	$0	$15,971,193	$12,617,242	$3,353,951	$98,301	$2,932,392
		SPS Decommissioning	4	$325,000	$1,300,000	2031	$1,616,387	$1,049,974	0	$0	$0	$0	$0	$1,049,974	100	$0	$0	$0.00	$0	$6,213,795	$4,908,898	$1,304,897	$38,245	$1,011,729
					$89,909,974		**$111,791,752**	**$72,617,790**		**$254,047**			**$6,471,720**	**$79,089,510**					**$0**					**$76,444,421**
	Benefits	Rosemere	1	$11,076,000		2031	$0	$0	7060.65	$7,061	$8,779	$344,285	$223,641	$223,641	50	$221,520	$275,432	$10,801,558.09	$7,016,486	$0	$0	$0	$0	$7,240,127
		Elmwood	1	$14,796,000		2031	$0	$0	23366.19	$23,366	$29,053	$1,139,361	$740,107	$740,107	50	$295,920	$367,939	$14,429,383.67	$9,373,052	$0	$0	$0	$0	$10,113,160
		Hiawatha	1	$11,236,000		2031	$0	$0	10190.49	$10,190	$12,671	$496,899	$322,776	$322,776	50	$224,720	$279,411	$10,957,593.60	$7,117,844	$0	$0	$0	$0	$7,440,620
		Beach St	1	$25,596,000		2031	$0	$0	75327.8	$75,328	$93,661	$3,673,066	$2,385,954	$2,385,954	50	$511,920	$636,508	$24,961,780.51	$16,214,697	$0	$0	$0	$0	$18,600,650
					$0			**$0**		**$115,945**			**$3,672,478**	**$3,672,478**					**$39,722,079**					**$43,394,557**
Phase 2c Construction from Elmwood Ave. to G.E. Booth																								
	Costs	Large Diameter Tunnel (3m)	1625	$14,300	$23,237,500	2031	$28,892,910	$18,768,284	0.0025	$58,094	$72,232	$2,832,715	$1,840,078	$20,608,361	100	$0	$0	$0.00	$0	$138,103,556	$109,101,809	$29,001,747	$850,009	$19,758,352
		New Microtunnel (<1.8m)	2000	$11,050	$22,100,000	2031	$27,478,572	$17,849,557	0.00375	$82,875	$103,045	$4,041,076	$2,625,006	$20,474,562	100	$0	$0	$0.00	$0	$131,343,242	$103,761,161	$27,582,081	$808,400	$19,666,162
		Total Shaft Depth (Temp Shaft)	47.25	$78,000	$3,685,500	2031	$4,582,456	$2,976,676	0	$0	$0	$0	$0	$2,976,676	100	$0	$0	$0.00	$0	$21,903,417	$17,303,700	$4,599,718	$134,813	$2,841,863
		Total Shaft Depth (Minor Diversion)	71	$93,600	$6,645,600	2031	$8,262,968	$5,367,467	0.002	$13,291	$16,526	$648,093	$420,989	$5,788,456	100	$0	$0	$0.00	$0	$39,495,686	$31,201,592	$8,294,094	$243,091	$5,545,365
		Total Shaft Depth (Major Diversion)	17	$117,000	$1,989,000	2031	$2,473,071	$1,606,460	0.002	$3,978	$4,946	$193,972	$126,000	$1,732,460	100	$0	$0	$0.00	$0	$11,820,892	$9,338,505	$2,482,387	$72,756	$1,659,704
		Hiawatha SPS Connection	1	$2,445,716	$2,445,716	2031	$3,040,940	$1,975,337	0.0039	$9,538	$11,860	$465,098	$302,119	$2,277,455	100	$0	$0	$0.00	$0	$14,535,216	$11,482,820	$3,052,395	$89,462	$2,187,993
		Beechwood SPS Connection	1	$2,377,440	$2,377,440	2031	$2,956,048	$1,920,192	0.0039	$9,272	$11,529	$452,114	$293,684	$2,213,877	100	$0	$0	$0.00	$0	$14,129,442	$11,162,260	$2,967,183	$86,965	$2,126,912
		Beach St. SPS Connection	1	$3,341,364	$3,341,364	2031	$4,154,566	$2,698,727	0.0039	$13,031	$16,203	$635,421	$412,758	$3,111,485	100	$0	$0	$0.00	$0	$19,858,171	$15,687,955	$4,170,216	$122,224	$2,989,260
		SPS Decommissioning	2	$325,000	$650,000	2031	$808,193	$524,987	0	$0	$0	$0	$0	$524,987	100	$0	$0	$0.00	$0	$3,863,037	$3,051,799	$811,238	$23,776	$501,210
					$66,472,120		**$82,649,726**	**$53,687,686**		**$190,080**			**$6,020,633**	**$59,708,320**					**$0**					**$57,276,823**
	Benefits	Hiawatha	1	$11,236,000		2031	$0	$0	10190.49	$10,190	$12,671	$496,899	$322,776	$322,776	50	$224,720	$279,411	$10,957,593.60	$7,117,844	$0	$0	$0	$0	$7,440,620
		Beach St	1	$25,596,000		2031	$0	$0	75327.8	$75,328	$93,661	$3,673,066	$2,385,954	$2,385,954	50	$511,920	$636,508	$24,961,780.51	$16,214,697	$0	$0	$0	$0	$18,600,650
					$0			**$0**		**$85,518**			**$2,708,730**	**$2,708,730**					**$23,332,540**					**$26,041,271**
Phase 2d Construction from Beach St. to G.E. Booth																								
	Costs	New Microtunnel (<1.8m)	2000	$11,050	$22,100,000	2031	$27,478,572	$17,849,557	0.00375	$82,875	$103,045	$4,041,076	$2,625,006	$20,474,562	100	$0	$0	$0.00	$0	$131,343,242	$103,761,161	$27,582,081	$808,400	$19,666,162
		Total Shaft Depth (Temp Shaft)	23.5	$78,000	$1,833,000	2031	$2,279,105	$1,480,463	0	$0	$0	$0	$0	$1,480,463	100	$0	$0	$0.00	$0	$10,893,763	$8,606,073	$2,287,690	$67,050	$1,413,414
		Total Shaft Depth (Major Diversion)	17	$117,000	$1,989,000	2031	$2,473,071	$1,606,460	0.002	$3,978	$4,946	$193,972	$126,000	$1,732,460	100	$0	$0	$0.00	$0	$11,820,892	$9,338,505	$2,482,387	$72,756	$1,659,704
					$25,922,000		**$32,230,749**	**$20,936,480**		**$86,853**			**$2,751,006**	**$23,687,486**					**$0**					**$22,739,280**

Appendix C
Consultation

Online PIC 1 Materials

Public Notice

Region of Peel
working with you

NOTICE OF ADDENDUM AND ONLINE PUBLIC INFORMATION CENTRE

Front Street Wastewater Pumping Station and Wastewater Diversion

Study Background

In 2019, the Region of Peel completed a Schedule B Municipal Class Environmental Assessment (Class EA) Study to address wastewater flows from the Front Street Sewage Pumping Station (SPS) catchment area to align with the Region's long-term sustainable plan to provide wastewater services. When the EA was completed, a Feasibility Study began to review alternate design configurations to maximize the Region's investment. The Feasibility Study identified an additional opportunity to extend the Lakeshore Road sanitary trunk sewer across the Credit River from Jack Darling Memorial Park to east of the Credit River using trenchless technology. Also identified is an opportunity to move the proposed Richards Memorial Sewage Pumping Station to Jack Darling Memorial Park.

Based on the Feasibility Study, the Region of Peel is preparing an Addendum to the 2019 Class EA Study. The focus of the Addendum is the construction of a new pumping station at Jack Darling Memorial Park and the elimination of a new pumping station identified at Richard's Memorial Park.

Online Public Consultation

An online Public Information Centre is planned to present a summary of the changes to the 2019 Class EA recommendations and preferred solution. The presentation boards will be available on the Region's website at peelregion.ca/construction under the Environmental Assessments for your review from December 13, 2021 to January 10, 2022.

If you have any questions, feedback, or would like to be added to the study mailing list, please contact one of the team members:

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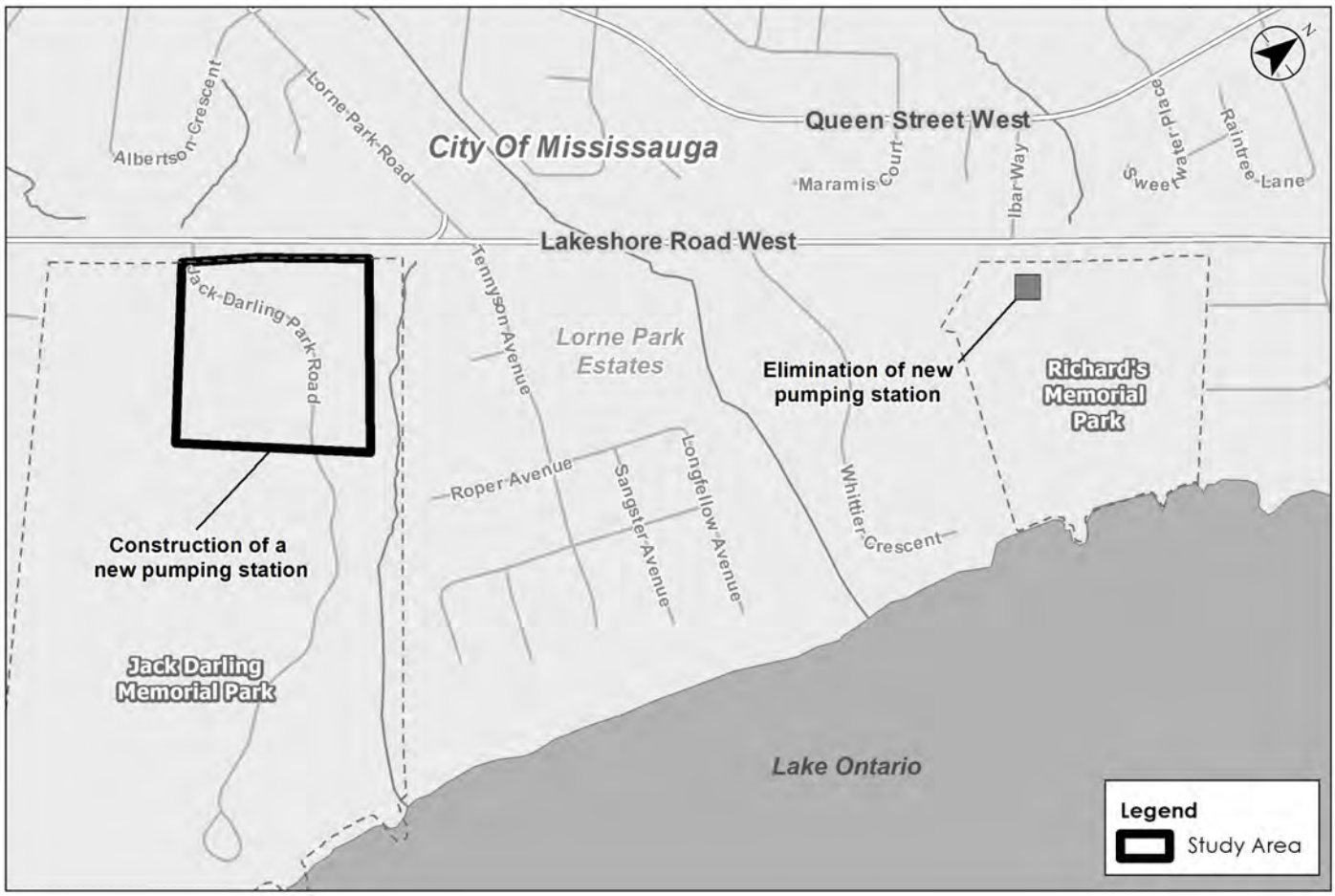
The Region of Peel is committed to ensure that all Regional services, programs, and facilities are inclusive and accessible for persons with disabilities. Please contact a Project Manager if you need any disability accommodations to provide comments or feedback for this study.

This notice was first issued on December 9, 2021.

Study Area for the Addendum to the 2019 Class EA Study



Hohner, Paula

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Monday, January 10, 2022 5:01 PM
To: Harvey, Neil; Hohner, Paula
Cc: Abreu, David; Hamara, Danielle
Subject: 19-2215 - Lakeshore - EA Comments - Councillor

Hi Neil / Paula,

Had a meeting with Councillor Ras last Friday (as well as Andrea and Anthony) to go over the Jack Darling EA addendum. As mentioned earlier, Councillor wasn't happy with our proposal but hope that our breakdown of specifics during the meeting was beneficial to keep the project moving forward. However, there were a few tasks that we've agreed to, specifically:

- Add the Parkland and Lorne Park Estates Rate Payers associations to our contact list and ensure they are aware of the EA.
- Provide hard copies of the notice to the homes directly adjacent to both JD and Richards.
- Conduct a Virtual PIC but not until March.
- Leverage the Councillor's newsletter to further "get the word out" (hence why the virtual PIC is to be conducted later).

So please add these tasks to the "to do" list and we'll go over a plan to get them done next time we meet.

Lyle LeDrew C.E.T.
Project Manager, Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

Region of Peel
working with you

Hohner, Paula

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Monday, December 13, 2021 10:10 PM
To: LeDrew, Lyle
Cc: Hohner, Paula; Harvey, Neil; Abreu, David
Subject: Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion
Attachments: 19-2215 - ad_40286_Lakeshore_Notice_Addendum-PIC1.pdf

Please find attached the Notice of Virtual Public Consultation Centre for the Addendum to the Front Street Wastewater Pumping Station and Wastewater Diversion EA project. The focus of the Addendum is the construction of a new pumping station at Jack Darling Memorial Park and the elimination of a new pumping station identified at Richard's Memorial Park. An online Public Information Centre is planned to present a summary of the changes to the 2019 Class EA recommendations and preferred solution. The presentation boards will be available on the Region's website at Front Street Wastewater Pumping Station and Wastewater Diversion - Region of Peel (peelregion.ca) **for review from December 13, 2021 to January 10, 2022.**

Please contact a member of the project team listed below if you have any questions, comments, or concerns:

Lyle LeDrew, C.E.T.
Project Manager, Engineering Wastewater Collection
Region of Peel
905-791-7800, ext. 7836
lyle.ledrew@peelregion.ca

David Abreu, P.Eng.
Project Manager
Region of Peel
416-274-9164
david.abreu@peelregion.ca

Neil Harvey, P.Eng., PMP
Consultant Project Manager
Stantec Consulting Ltd.
905-381-3234
neil.harvey@stantec.com

Hohner, Paula

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Tuesday, December 14, 2021 1:48 PM
To: Hohner, Paula; Harvey, Neil
Cc: Romano, Jess; Lang, Sarah
Subject: RE: Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

I'll take care of it, just want to ensure the list is kept up to date

Lyle

From: Hohner, Paula <Paula.Hohner@stantec.com>
Sent: December 14, 2021 1:28 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>; Harvey, Neil <Neil.Harvey@stantec.com>
Cc: Romano, Jess <Jess.Romano@stantec.com>; Lang, Sarah <Sarah.Lang@stantec.com>
Subject: RE: Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

Hi Lyle
Sarah provided some updates as requested and is keeping the list current based on emails sent:

- Peel Police contact update – Assistant to the Chief, angela.butterwick@peelpolice.ca
- Bell contact update – Right of Way Associates, mary.mccartney@bell.ca, bell.moc@telecon.ca

Will you be sending the email to these new addresses or would you like us to?
Thanks
Paula

Paula Hohner, MScPl, MCIP, RPP
Associate, Senior Environmental Planner
Environmental Team Lead - Transportation
Stantec
600-171 Queens Avenue London ON N6A 5J7
Phone: 519-675-6666
Mobile: 226-926-6682
paula.hohner@stantec.com

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Tuesday, December 14, 2021 10:28 AM
To: Hohner, Paula <Paula.Hohner@stantec.com>; Harvey, Neil <Neil.Harvey@stantec.com>
Subject: FW: Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

Another adjustment to the stakeholder list in the email below….

LYle

From: BILD Member Services <Membership@bildgta.ca>
Sent: December 14, 2021 9:56 AM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Subject: RE: Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

Thank you for your message.

Please send all future enquiries to Paula Tenuta, ptenuta@bildgta.ca.

Samir Bakhit
Member Services Representative
416-391-5785
Building Industry and Land Development Association

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Monday, December 13, 2021 10:10 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: 'Hohner, Paula' <Paula.Hohner@stantec.com>; Neil Harvey (neil.harvey@stantec.com) <neil.harvey@stantec.com>; Abreu, David <david.abreu@peelregion.ca>
Subject: Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

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Please contact a member of the project team listed below if you have any questions, comments, or concerns:

Lyle LeDrew, C.E.T.
Project Manager, Engineering Wastewater Collection
Region of Peel
905-791-7800, ext. 7836
lyle.ledrew@peelregion.ca

Hohner, Paula

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Tuesday, December 14, 2021 11:14 AM
To: Hayes, Kate
Cc: Abreu, David; Harvey, Neil; Hohner, Paula
Subject: RE: [External] Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

Hello Kate,

There will still be works completed by Peel at Richards Memorial in the form of a shaft compound and some ancillary piping to decommission the existing sanitary sewer pumping station. So the overall scope of works at Richards Memorial will no longer include a new pumping station, just the gravity line to convey the flows.

We would still like to be included in conversations around CVC's Lornewood Creek daylighting.

Thank you

Lyle LeDrew C.E.T.
Project Manager, Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

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From: Hayes, Kate <Kate.Hayes@cvc.ca>
Sent: December 14, 2021 7:57 AM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Subject: FW: [External] Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

Good morning Lyle:

Am I correct in reading attached (and below) that this would mean that no work by Peel would be required at Richard's Memorial Park?

If that is the case, then we would limit our discussions to City of Mississauga staff as we explore the potential daylighting of Lornewood Creek at Richard's Memorial Park.

Thank you

Kate

I'm working remotely. The best way to reach me is by MS Teams, email or mobile.

Kate Hayes | she/her/hers
Senior Manager, Restoration and Management | Credit Valley Conservation
905-670-1615 ext 428 | M: 647-204-2538
kate.hayes@cvc.ca | cvc.ca

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Monday, December 13, 2021 10:10 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: 'Hohner, Paula' <Paula.Hohner@stantec.com>; Neil Harvey (neil.harvey@stantec.com) <neil.harvey@stantec.com>; Abreu, David <david.abreu@peelregion.ca>
Subject: [External] Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

Please find attached the Notice of Virtual Public Consultation Centre for the Addendum to the Front Street Wastewater Pumping Station and Wastewater Diversion EA project. The focus of the Addendum is the construction of a new pumping station at Jack Darling Memorial Park and the elimination of a new pumping station identified at Richard's Memorial Park. An online Public Information Centre is planned to present a summary of the changes to the 2019 Class EA recommendations and preferred solution. The presentation boards will be available on the Region's website at Front Street Wastewater Pumping Station and Wastewater Diversion - Region of Peel (peelregion.ca) for review from December 13, 2021 to January 10, 2022.

Please contact a member of the project team listed below if you have any questions, comments, or concerns:

Company/Organization	Title	First Name	Last Name	Department	Job Title	Street	City	Province	Postal Code	Phone	Fax	Email Address	Comments
Indigenous Communities													
Haudenosaunee Confederacy	Mr.	Hohahes Leroy	Hill		Chiefs Council Secretary	2634 6th Line RR2	Ohsweken	ON	N0A 1M0			jocko@sixnationsns.com	
Mississaugas of the Credit First Nation		Fawn	Sault		Consultation Coordinator	4065 Highway 6 North	Hagersville	ON	N0A 1H0			fawn.sault@mncfn.ca	
Mississaugas of the Credit First Nation	Chief	Stacey	LaForme		Chief	4065 Highway 6 North	Hagersville	ON	N0A 1H0			communications@mncfn.ca	
Six Nations of the Grand River	Chief	Mark	Hill		Chief	P.O. Box 5000	Ohsweken	ON	N0A 1M0			markhill@sixnations.ca	
Six Nations of the Grand River	Mr.	Lonny	Bomberry		Lands and Resource Director	1695 Chiefswood Road., P.O. Box 5000	Ohsweken	ON	N0A 1M0	519-445-2201		lonnybomberry@sixnations.ca	
Huron-Wendat Nation	chief	Remy	Vincent									administration@cnhw.qc.ca	
Huron-Wendat Nation	Mr.	Maxime	Picard									maxime.picard@cnhw.qc.ca	
Metis Nation of Ontario												consultations@metisnation.org	
Hiawatha First Nation		Tom	Cowie		Lands Resource Consultation Liaison							tcowie@hiawathafn.ca	
Hiawatha First Nation		Sean	Davison		Lands Resource Consultation Liaison							sdavison@hiawathafn.ca	
Provincial/Federal Contacts													
Environment and Climate Change		Megan	Eplett									megan.eplett@ontario.ca	
Environment and Climate Change												enviroinfo@ec.gc.ca	
Ministry of Natural Resources and Forestry													
Ministry of the Environment, Conservation and Parks	Mr.	Trevor	Bell	Central Region	Environmental Resource Planner & EA Coordinator							trevor.bell@ontario.ca	
Ministry of the Environment, Conservation and Parks		Tina	Dufresne	Halton-Peel Region	Manager							tina.dufresne@ontario.ca	
Ministry of the Environment, Conservation and Parks												eanotification.cregion@ontario.ca	**SEND PIF**
Ministry of Heritage, Sport, Tourism, Culture Industries		Joseph	Harvey		Heritage Planner							joseph.harvey@ontario.ca	
Ministry of Heritage, Sport, Tourism, Culture Industries		Karla	Barboza		Heritage Planner							karla.barboza@ontario.ca	
Infrastructure Ontario		Tate	Kelly									tate.kelly@infrastructureontario.ca	
Infrastructure Ontario		Lisa	Myslicki		Environmental Specialist							lisa.myslicki@infrastructureontario.ca	
Infrastructure Ontario												noticereview@infrastructureontario.ca	
Ministry of Indigenous Relations and Reconciliation	Mr.	Shawn	Batise	Deputy Minister								shawn.batise@ontario.ca	
Department of Fisheries and Oceans												info@dfo-mpo.gc.ca	
Department of Fisheries and Oceans		Lisa	Wren	Fisheries Protection Program	Senior Fisheries Protection Biologist							lisa.wren@dfo-mpo.gc.ca	
Ontario Heritage Trust		Beth-Anne	Mendes		Plaque Program Coordinator							beth-anne.mendes@heritagetrust.on.ca	Plaque Coordinator - send letter regarding heritage plaque removals
Municipal Contacts													
Peel Region Police		Angela	Butterwick		Executive Assistant to the Chief							angela.butterwick@peelpolice.ca	
Region of Peel		Sally	Rook		Manager, Infrastructure Programming & Studies							sally.rook@peelregion.ca	
Region of Peel		Richa	Dave		Principal Planner, Strategic Policy and Projects, Transportation Division							richa.dave@peelregion.ca	
Region of Peel		Tina	Detaramani		Sustainable Transportation & Strategic Initiatives							tina.detaramani@peelregion.ca	
City of Mississauga		Helen	Noehammer		Director, Transportation and Infrastructure Planning							helen.noehammer@mississauga.ca	
City of Mississauga		Auryn	Soares		Storm Drainage Coordinator							auryn.soares@mississauga.ca	
City of Mississauga		Evelyn	Krolicka		Storm Drainage Specialist							evelyn.krolicka@mississauga.ca	
Mississauga Fire and Emergency Services	Chief	Deryn	Rizzi		Chief							deryn.rizzi@mississauga.ca	
Mississauga Fire and Emergency Services												fire.administration@mississauga.ca	
Peel Region Health Service		Danny	Martin		Manager of Environmental Health							environmental@peelregion.ca	
Region of Peel EMS		Peter	Dundas		Chief							peter.dundas@peelregion.ca	
Utilities													
Enbridge												Arnel.mangalino@enbridge.com	
Enbridge		Jim	Arnott		Municipal Coordination Advisor/GTA							jim.arnott@enbridge.com	
Enbridge		Ryan	Werenich									ryan.werenich@enbridge.com	
Alectra												james.handy@alectrautilities.com	
Alectra		Daniel	Pastoric		Vice President, Strategic Growth & Special Projects							daniel.pastoric@alectrautilities.com	
Alectra		Navneet	Budhia		Manager, Special Projects							navneet.budhia@alectrautilities.com	
Bell												bell.moc@telecon.ca	
Bell		Mary	McCartney		Easements - Right of Way Associates							mary.mccartney@bell.ca	
Hydro One												secondarylanduse@hydroone.com	
Hydro One Telecom												ian.mitchell@hydroone.com	
Local Agencies													
Credit Valley Conservation		Kate	Hayes		Senior Manager, Restoration and Management							kate.hayes@cvc.ca	
Credit Valley Conservation		Tyler	Slaght		Regulations Officer							tyler.slaght@cvc.ca	
Credit Valley Conservation		Gary	Murphy		Director, Planning and Development Services							gary.murphy@cvc.ca	
Toronto and Region Conservation Authority		Laurie	Nelson		Director, Policy Planning							laurie.nelson@trca.ca	
Metrolinx		Halim	Abdihalim									Halim.Abdihalim@metrolinx.com	
Metrolinx		Leah	Chishimba Simwanza									Leah.ChishimbaSimwanza@metrolinx.com	
Canadian National Railway		Michael	Vallins		Manager, Public Works							michael.vallins@cn.ca	
Dufferin-Peel Catholic District School Board		Stephanie	Cox	Manager of Planning								stephanie.cox@dpcdsb.org	
Dufferin-Peel Catholic District School Board		Matthew	Thomas	Superintendent, Planning and Operations								matthew.thomas@dpcdsb.org	
Peel District School Board		Julianna	Trauzzi									julianna.trauzzi@peelsb.com	
Building Industry and Land Development Association (BILD)		Paula	Tenuta									ptenuta@bildgta.ca	
Sierra Club of Ontario Peel Region												ontario@sierraclub.ca	
Credit River Anglers Association												info@craa.on.ca	
Port Credit BIA												info@portcredit.com	
Town of Port Credit Association												topca@topca.net	
Port Credit Branch Library		Suzanne	Coles		Manager, Library Facilities and Operations							Suzanne.Coles@mississauga.ca	
Credit Village Marina												cvm.portcredit@mississauga.ca	

From:	LeDrew, Lyle
To:	Stephen Dasko
Cc:	Harvey, Neil; Hohner, Paula; Jimenez, Juan
Subject:	19-2215 - Lakeshore Trunk Sewer - Jack Darling Park to Front Street
Date:	Tuesday, May 3, 2022 9:03:32 AM
Attachments:	Scoping Package for Watermain Replacement on Lakeshore Rd W 4.pdf

Hello Councillor Dasko,

Our project team has been working on the detailed design of an upcoming sanitary trunk sewer and watermain along Lakeshore Road from Jack Darling Park to Front Street. We've spent some time working through project details with Councillor Ras and recently Councillor Mullin but since a section of the proposed works are located in Ward 1, wanted to provide you with a project update and solicit your feedback/input. I've attached a general sketch of the planned work area for reference.

Would you have any dates / times that you could spare 30 minutes in the next few weeks? If so, please let me know and I'll set up a virtual meeting.

Thank you,

Lyle LeDrew C.E.T.
Manager (acting), Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

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2019 CITY OF MISSISSAUGA WATERMAIN REPLACEMENT PROGRAM STREET - Lakeshore Road West

Date: 1/31/2019

Figure:

Drawn By: KA

Checked By: NG/MP

Meters
0 90 180

Legend

- Proposed Existing CPP/DI 400mm Diameter Watermain Replacement
- Proposed New DC 600mm Diameter Watermain Installation Work
- Proposed New DC 1500mm Diameter Sanitary Sewer Installation Work
- Main Watercourse
- Railway Line

Online PIC 1 Extension Materials

Public Notice

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ONLINE PUBLIC INFORMATION CENTRE REVIEW EXTENDED

Front Street Wastewater Pumping Station and Wastewater Diversion

Study Background

In 2019, the Region of Peel completed a Schedule B Municipal Class Environmental Assessment (Class EA) Study to address wastewater flows from the Front Street Sewage Pumping Station (SPS) catchment area to align with the Region's long-term sustainable plan to provide wastewater services. When the EA was completed, a Feasibility Study began to review alternate design configurations to maximize the Region's investment. The Feasibility Study identified an additional opportunity to extend the Lakeshore Road sanitary trunk sewer across the Credit River from Jack Darling Memorial Park to east of the Credit River using trenchless technology. Also identified is an opportunity to move the proposed Richards Memorial Sewage Pumping Station to Jack Darling Memorial Park.

Based on the Feasibility Study, the Region of Peel is preparing an Addendum to the 2019 Class EA Study. The focus of the Addendum is the construction of a new pumping station at Jack Darling Memorial Park and the elimination of a new pumping station identified at Richard's Memorial Park.

Online Public Consultation Review Date Extended

An online Public Information Centre is planned to present a summary of the changes to the 2019 Class EA recommendations and preferred solution. The presentation will be available on the Region's website at peelregion.ca/construction under the Environmental Assessments for review until **May 27, 2022**.

If you have any questions, feedback, or would like to be added to the study mailing list, please contact one of the team members:

Lyle LeDrew, C.E.T.
Project Manager, Engineering
Wastewater Collection
Region of Peel
905-791-7800, ext. 7836
lyle.ledrew@peelregion.ca

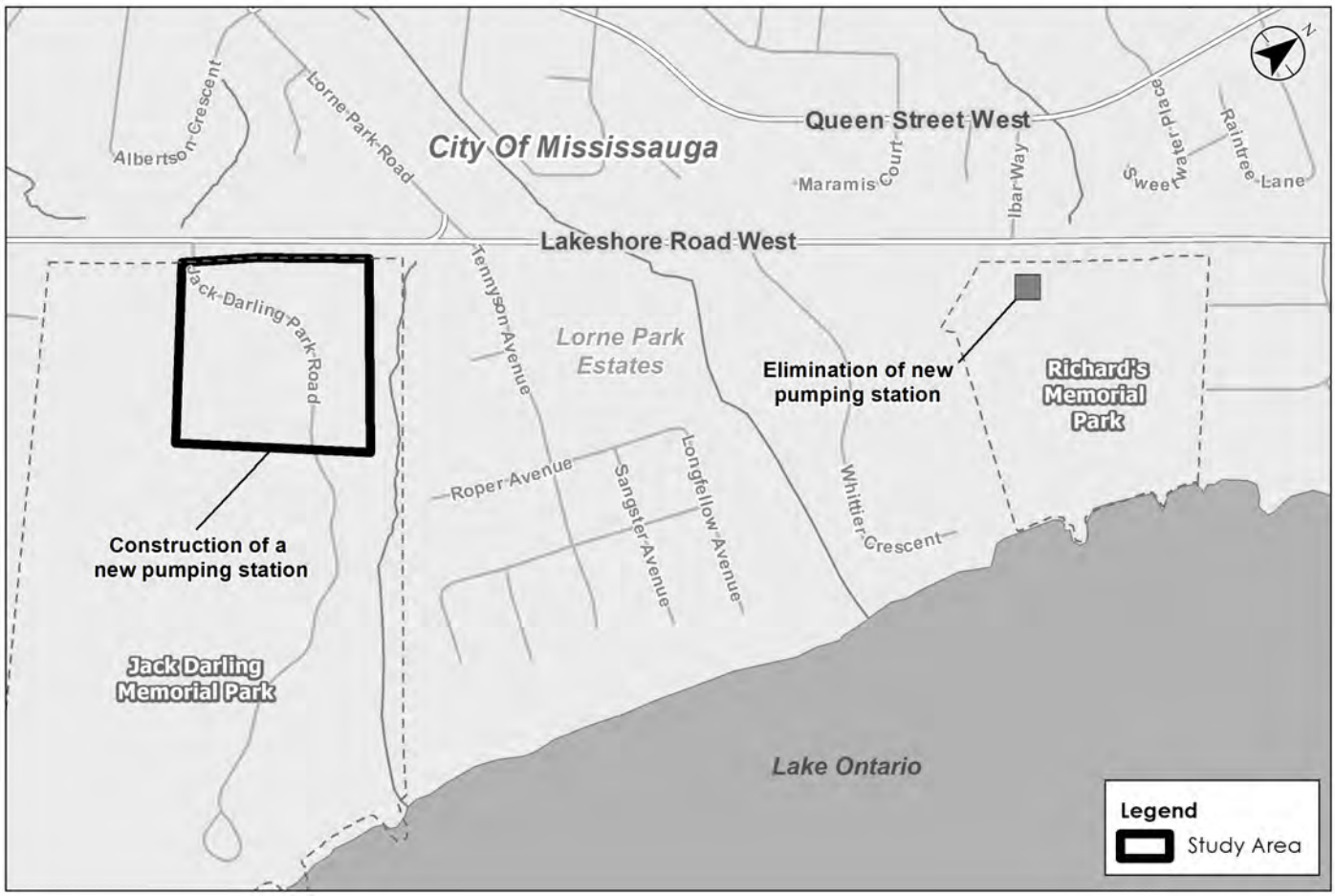
David Abreu, P.Eng.
Project Manager
Region of Peel
416-274-9164
david.abreu@peelregion.ca

Neil Harvey, P.Eng., PMP
Consultant Project Manager
Stantec Consulting Ltd.
905-381-3234
neil.harvey@stantec.com

The Region of Peel is committed to ensure that all Regional services, programs, and facilities are inclusive and accessible for persons with disabilities. Please contact a Project Manager if you need any disability accommodations to provide comments or feedback for this study.

This notice was first issued on January 6, 2022.

Study Area for the Addendum to the 2019 Class EA Study



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working with you

Notice of addendum and online public information centre

Front Street Wastewater Pumping Station and Wastewater Diversion

Study Background

In 2019, the Region of Peel completed a Schedule B Municipal Class Environmental Assessment (Class EA) Study to address wastewater flows from the Front Street Sewage Pumping Station (SPS) catchment area to align with the Region's long-term sustainable plan to provide wastewater services. When the EA was completed, a Feasibility Study began to review alternate design configurations to maximize the Region's investment. The Feasibility Study identified an additional opportunity to extend the Lakeshore Road sanitary trunk sewer across the Credit River from Jack Darling Memorial Park to east of the Credit River using trenchless technology. Also identified is an opportunity to move the proposed Richards Memorial Sewage Pumping Station to Jack Darling Memorial Park.

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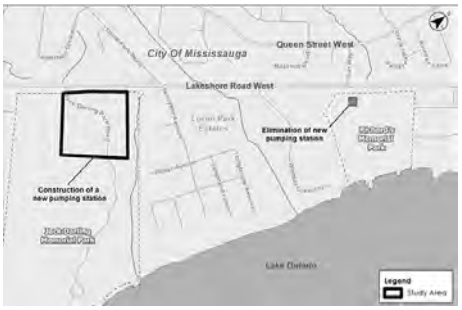

Study Area for the Addendum to the 2019 Class EA Study (https://peelregion.ca/public-works/environmental-assessments/_media/front-street-map.jpg)

Online Public Consultation (date extended)

> An online Public Information Centre is planned to present a summary of the changes to the 2019 Class EA recommendations and preferred solution. In the meantime, the presentation boards (https://peelregion.ca/public-works/environmental-assessments/_media/presentation.pptx) are available for review.

If you have any questions, feedback, or would like to be added to the study mailing list, please contact one of the team members:

Lyle LeDrew, C.E.T.
Project Manager, Engineering Wastewater Collection
Region of Peel
905-791-7800, ext. 7836
lyle.ledrew@peelregion.ca (mailto:lyle.ledrew@peelregion.ca)

David Abreu, P.Eng.
Project Manager
Region of Peel
416-274-9164
david.abreu@peelregion.ca (mailto:david.abreu@peelregion.ca)

Neil Harvey, P.Eng., PMP
Consultant Project Manager
Stantec Consulting Ltd.
905-381-3234
neil.harvey@stantec.com (mailto:neil.harvey@stantec.com)

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This notice was first issued on December 9, 2021.

Front Street Wastewater Pumping Station Wastewater Diversion

Addendum to the
Schedule ‘B’ Municipal Class Environmental Assessment

ONLINE PUBLIC INFORMATION CENTRE

May 9, 2022

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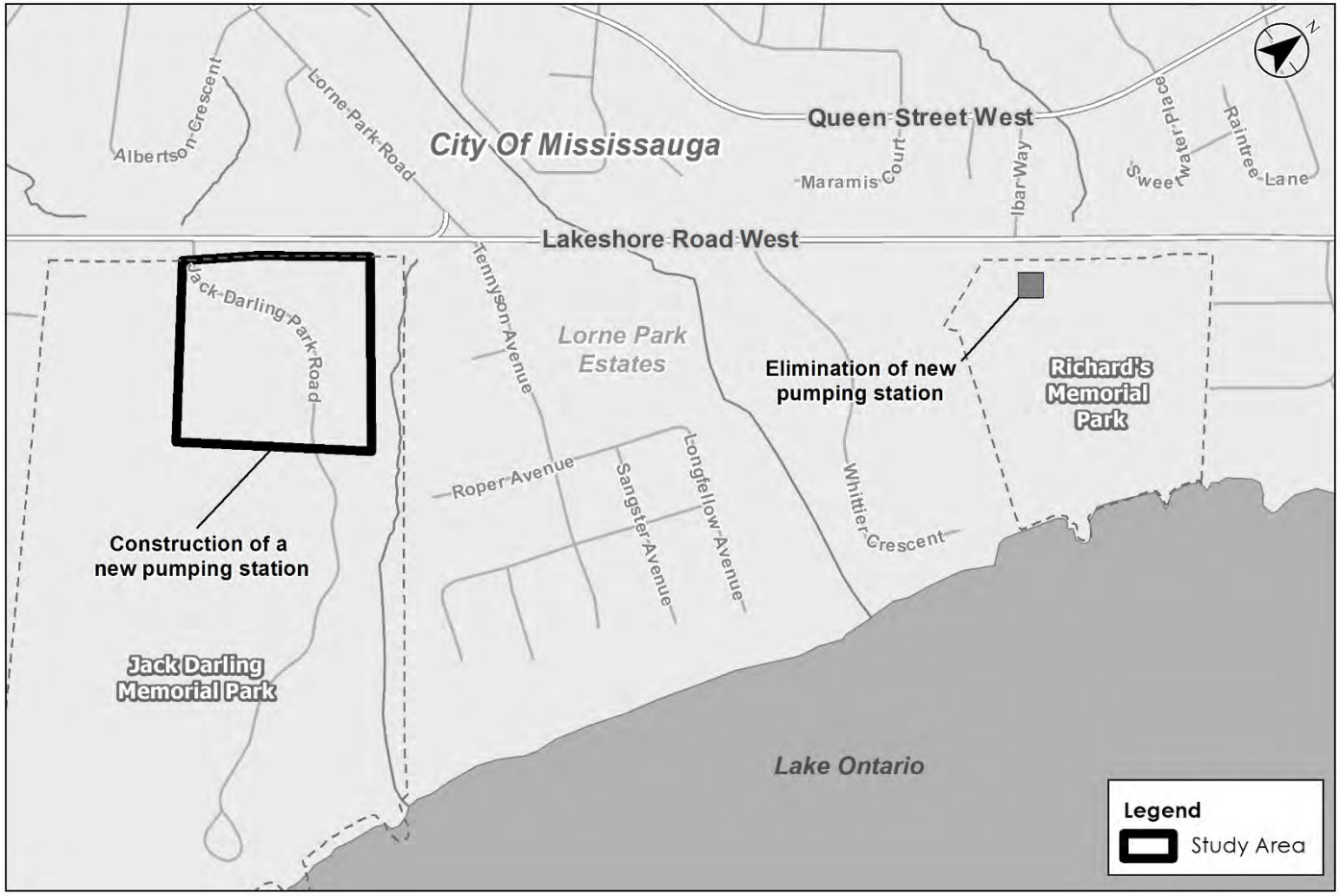
Welcome!

Goals of this Public Information Centre:

- Provide an overview of the Feasibility Study completed and EA Addendum requirements
- Provide a summary of the revised alternatives and preliminary recommendations
- Provide contact information for project team member to discuss questions or comments

Feasibility Study & 2021 EA Addendum

Revised Strategy from 2019 Municipal Class Environmental Assessment



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Stantec

Jack Darling Memorial Park Pumping Station

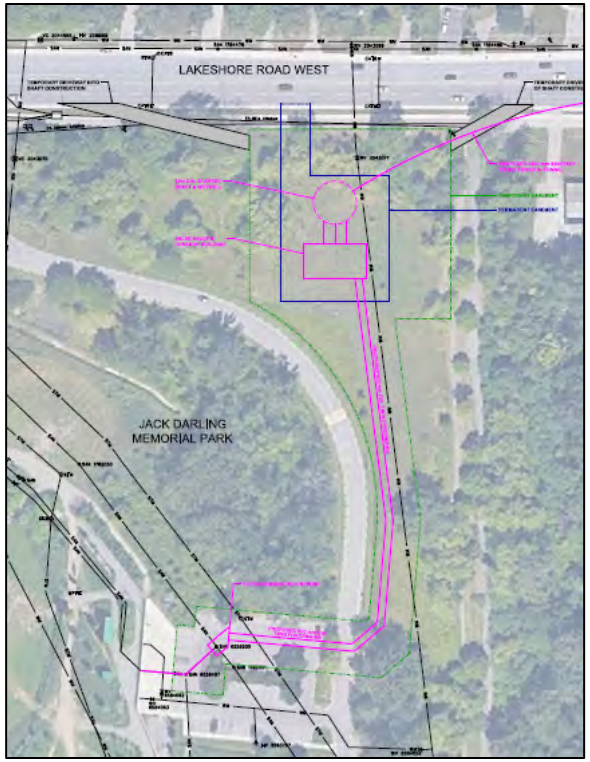
Constructing an upgraded pumping station at Jack Darling Memorial Park results in the following benefits over constructing at Richard's Memorial Park:

- Allows for the consolidation of Regional infrastructure
- Requires only one facility and allows construction to occur in one location
- Allows for the decommissioning of 2 additional pumping stations
- Minimizes impacts to Richard's Memorial Park and returns park space

Alternative Sites at Jack Darling Memorial Park

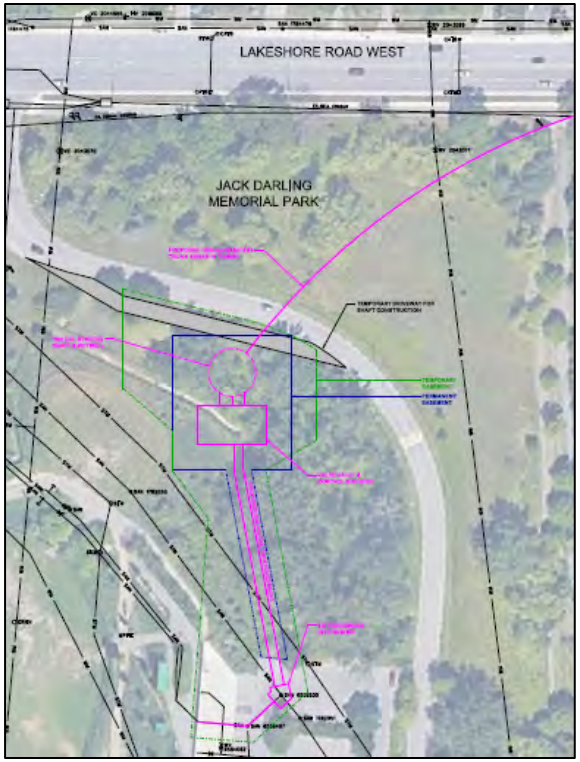
Three (3) alternative locations for the pumping station at Jack Darling Memorial Park were developed and evaluated.

Site Option 1



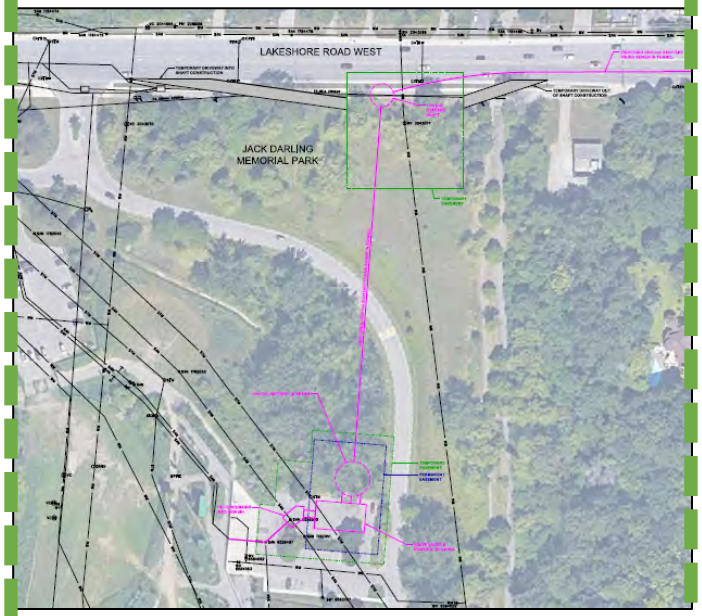
✗

Site Option 2



✗

Site Option 3



Recommended

✓

Region of Peel working with you

Stantec

Preferred Location – Site Option 3

The Alternatives Sites were assessed using the following evaluation criteria:

- Technical Considerations
- Environmental Considerations
- Socio-Economic Environment
- Cultural Environment
- Financial Considerations

Site Option 3 was selected as the preferred location for the following reasons:

- ✓ Reduces multiple impacts to the park and local community by allowing for tunnel and station construction at the same time
- ✓ Avoids a portion of the mixed tall grass prairie restoration area at the northeast corner of the park boundary, which is dominated by native plant species. Temporary impacts to this area are anticipated, and a rehabilitation plan will be prepared to re-naturalize the area and retain the ecological function of the natural heritage features
- ✓ Avoids impacts to existing dog park and focuses impact on the paved parking lot area
- ✓ Clusters the existing Jack Darling facility and the new station closer together providing for potential shared infrastructure as well as operational advantages
- ✓ Follows similar alignment and shaft locations to the preferred alignment from the 2019 EA

Summary of Recommendations

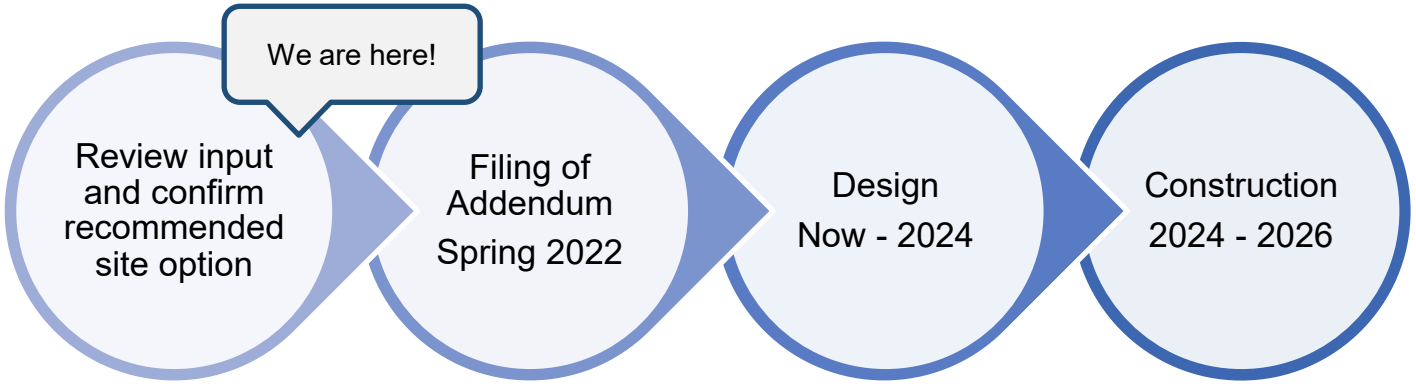
The overall Preferred Solution for the Front Street Wastewater Pumping Station Wastewater Diversion Class EA as a result of the Feasibility Study and EA Addendum includes the following:

- Elimination of the new pumping station identified at Richard's Memorial Park
- Construction of a new pumping station at Jack Darling Memorial Park

EA Addendum Process

- An Addendum Report to the 2019 Class EA Study will be prepared for public and agency review
- A "Notice of Filing Addendum" will be sent to the project contact list to notify of the 30-day review period
- Interested persons may provide written comments to our project team
- Only changes from the 2019 Class EA Study, noted above, are open for review and comment

Contact the Project Team



If you would like to provide comment, or discuss further, please contact one of the following study team members by **May 27, 2022**:

Lyle LeDrew, C.E.T
Project Manager, Engineering
Wastewater Collection
Region of Peel
905-791-7800 ext. 7836
Lyle.LeDrew@peelregion.ca

David Abreu, P.Eng.
Project Manager, Water Division
Region of Peel
416-274-9164
David.Abreu@peelregion.ca

Neil Harvey, P.Eng., PMP
Consultant Project Manager
Stantec Consulting Ltd.
905-381-3234
Neil.Harvey@stantec.com

Region of Peel working with you

Stantec

Front Street Wastewater Pumping Station Wastewater Diversion

Addendum to the Schedule 'B' Municipal Class Environmental Assessment

Public Information Centre – May 9, 2022

Slide 1 (Introduction)

Welcome to this Public Information Centre (PIC) for the Front Street Wastewater Pumping Station Wastewater Diversion project being presented by the Region of Peel. Thank you for taking the time to watch this presentation and learn more about this study! Your input is valuable to us.

Slide 2 (Welcome)

The purpose of this PIC is to:

- Provide an overview of the Feasibility Study completed, and the Municipal Class EA Addendum requirements
- Provide a summary of the revised alternatives and preliminary recommendations
- Provide you with an opportunity to contact a project team member with questions or comments

We encourage you to submit your comments. Contact information is available on the Region's website or at the end of this presentation.

Slide 3 (Feasibility Study & EA Addendum Requirements)

Following the 2019 EA for the Front Street Wastewater Pumping Station Wastewater Diversion and as part of the preliminary design process, a Feasibility Study was undertaken. Additional opportunities were identified to consolidate infrastructure elements and provide greater flexibility within the Region's wastewater system to meet long-term servicing goals.

Because of the recommended changes to the original strategy presented in the 2019 Municipal Class EA, the Region initiated an Addendum to address the construction of the new pumping station at Jack Darling Memorial Park. The Addendum Report prepared for this project describes the reasons for the changes to the project as planned in 2019 and provides an assessment of the potential environmental impacts and proposed mitigation requirements.

A Notice of Filing Addendum will be published to allow for review and response by affected parties for a period of 30 days. Only the items in the Addendum are open for review during this time.

The study area for the EA Addendum is shown on the map and includes the following changes from the 2019 EA:

- Construction of a new pumping station at Jack Darling Memorial Park

- Elimination of the new pumping station identified at Richard's Memorial Park and decommissioning of the existing pumping station

Slide 4 (Jack Darling Memorial Park Pumping Station)

In the 2019 EA Richard's Memorial Park was the recommended location for a new upgraded pumping station. However, this Addendum is recommending constructing an upgraded pumping station at Jack Darling Memorial Park, for the following reasons:

- Allows for the consolidation of Regional infrastructure
- Requires only one facility and allows construction to occur in one location
- Allows for the decommissioning of 2 additional pumping stations
- Minimizes impacts to Richard's Memorial Park and returns park space

No pumping station would be required at Richard's Memorial Park.

Slide 5 (Alternative Sites at Jack Darling Memorial Park)

Three alternative locations for the pumping station at Jack Darling Memorial Park were developed and evaluated:

- Site Option 1 – This option is located in the grassed area in the north-east corner of the park. The area is open and would provide direct access to Lakeshore Road during construction. This area is kept as a grassed area within the park. This location would install forcemains along the park access road for flows to be conveyed to the existing Jack Darling station.

- Site Option 2 – This option would be located further into the park area, closer to the existing dog park. During construction, a portion of the dog park would have to be temporarily closed. A portion of this area has been previously disturbed; however, some trees would need to be removed. The length of forcemains would be much shorter than those needed for Option 1.

- Site Option 3 – closely resembles the solution outlined in the 2019 Class EA. There will be a shaft located right next to Lakeshore Road at the northeast corner of the park, which would allow tunneling to occur to the exit shaft located in the parking lot adjacent to the existing sewage pumping station. A portion of this site has been previously disturbed; however, some trees would need to be removed and the site raised slightly to match the existing station elevation. Parking would be temporarily impacted during construction, and depending on the final building site, some parking may be lost in the long term. The forcemains would be much shorter than in Option 2, as they would be discharging into a new manhole located within the existing parking area.

For all alternatives, all surface works would be designed to blend into the surrounding park and water treatment plant as well as possible.

Slide 6 (Preferred Location – Site Option 3)

The site options were assessed against evaluation criteria to determine the preferred design solution. This included:

- Technical Considerations, such as constructability, future flexibility and design considerations, and operations and maintenance
- Environmental Considerations, such as the potential effects on water features, impacts to trees, and Species at Risk
- Socio-Economic Environment, such as the short and long-term effects on existing land uses, enjoyment of the park and visual impacts
- Cultural Environment, such as impacts to Built Heritage Resources and Archaeological Resources
- Financial Considerations, such as Capital Costs, and the cost to operate and maintain

Of the alternative site locations, Site Option 3 was determined to be the preferred alternative site for the sewage pumping station in Jack Darling Memorial Park, for the following reasons:

- Reduces multiple impacts to the park and local community by allowing for tunnel and station construction at the same time
- Avoids a portion of the mixed tall grass prairie restoration area at the northeast corner of the park boundary, which is dominated by native plant species. Temporary impacts to a portion of this area are anticipated, and a rehabilitation plan will be prepared to re-naturalize the area and retain the ecological function of the natural heritage features
- Avoids impacts to the existing dog park and focuses impact on the paved parking lot area
- Clusters the existing Jack Darling facility and the new station closer together providing for potential shared infrastructure as well as operational advantages
- Follows similar sewer alignment and shaft locations to the preferred alignment from the 2019 EA

Slide 7 (Summary of Recommendations)

The overall Preferred Solution for the Front Street Wastewater Pumping Station Wastewater Diversion Class EA as a result of the Feasibility Study and EA Addendum includes the following:

- Elimination of the new pumping station identified at Richard's Memorial Park
- Construction of a new pumping station at Jack Darling Memorial Park

An Addendum Report to the 2019 Class EA Study will be prepared and a "Notice of Filing Addendum" will be sent to the project contact list to notify of the 30-day review period. Interested persons may provide written comments to our project team. Please

note that only changes from the 2019 Class EA Study, noted above, are open for review and comment.

Slide 8 (Contact the Project Team)

The Region of Peel is interested in hearing your comments and understanding your concerns and would like to hear from you. We encourage you to submit and comments or questions to a member of the project team, provided on this slide, by May 27, 2022.

The project team will be reviewing and responding to comments received from agencies and members of the public.

Once the preferred site option is confirmed following the 30-day review period of the Addendum Report, the detailed design will be completed. Construction is planned to commence in Spring of 2024, subject to funding and approvals.

Thank you for watching this presentation and for your interest in the Region of Peel Front Street Wastewater Pumping Station Wastewater Diversion Addendum project. Your input is important to us!

Communications

From:	Megan DeVries
To:	LeDrew, Lyle
Cc:	Mark LaForme; Fawn Sault; Muir, Jeff; Hohner, Paula; Harvey, Neil
Subject:	RE: PIF Notification - Lakeshore EA Addendum
Date:	Thursday, February 04, 2021 1:37:56 PM

Hi Lyle,

Thank you for the update. We look forward to hearing from you once you've had a chance to review the agreements.

Kind regards,
Megan.

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Wednesday, February 3, 2021 11:22 PM
To: Megan DeVries <Megan.DeVries@mncfn.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Muir, Jeff <Jeff.Muir@stantec.com>; Hohner, Paula <Paula.Hohner@stantec.com>; Neil Harvey (neil.harvey@stantec.com) <neil.harvey@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Evening Megan,

My apologies for the delayed response. I confirm receipt of your December email that includes the participation agreement. As these agreements are still relatively new to the Region of Peel, its taking us sometime to get things moving on our end.

We will ensure that no fieldwork takes place without your participation and its our intent to respect the rights of the Mississauga's of the Credit First Nation.

Lyle LeDrew C.E.T.
Project Manager
Wastewater Capital Works
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

Region of Peel
working with you

From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: January 8, 2021 1:16 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Muir, Jeff <Jeff.Muir@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good afternoon,

I am writing to confirm receipt of the previous email which was sent to you on December 9, 2020. At this time, we have not received an executed Field Liaison Representative [FLR] participation agreement or any reply to our previous correspondence. Please let me know if you require the agreement to be resent or if there has been a change to the project start date.

If there are any concerns or questions you have regarding the FLR participation agreement, please feel free to get in touch with us.

It is our expectation that no fieldwork will take place without the participation of our FLRs. As we have explained to you in our previous correspondence, MCFN has an Aboriginal and Treaty Right to protect the environment and our archaeological heritage and our FLRs are our boots on the ground to ensure our interests are protected. MCFN considers it disrespectful to our rights as Indigenous peoples if our natural and cultural heritage is interfered with without our involvement.

Kind regards,
Megan.

Megan DeVries, M.A.
Archaeological Operations Supervisor

Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)
4065 Highway 6 North, Hagersville, ON N0A 1H0
P: 905-768-4260 | M: 289-527-2763
http://www.mncfn.ca

From: Megan DeVries
Sent: Wednesday, December 9, 2020 9:36 AM
To: lyle.ledrew@peelregion.ca
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@newcreditfirstnation.com>; Muir, Jeff <Jeff.Muir@stantec.com>
Subject: FW: PIF Notification - Lakeshore EA Addendum

Good morning,

Please find attached a letter from the Mississaugas of the Credit First Nation ("MCFN") regarding the upcoming assessment for Lakeshore EA Addendum, as identified below.

Please note that this year, in order to continue maintaining DOCA capacity for fulsome project participation, DOCA will be introducing charges for technical review of project information. In the exercise of its stewardship responsibility, DOCA seeks to work together with project proponents and their archaeological consultants to ensure that archaeological work is done properly and respectfully. DOCA has retained technical advisers with expertise in the field of archaeology. These experts will review the technical aspects and cultural appropriateness of the archaeological assessments and strategies associated with your project. Upon completion of these reviews, MCFN will identify, if necessary, mitigation measures to address any project impacts upon MCFN rights. For cultural materials and human remains, DOCA may advise that this includes ceremonies required by Anishinaabe law, as well as request adjustments to the proposed fieldwork strategy.

The proponent is expected to pay the costs for MCFN to engage in a technical review of the project. DOCA anticipates at this time that all archaeological review will be undertaken by in-house technical experts, but will advise the proponent if an outside peer-review is required. Please find attached the agreement that covers MCFN's inhouse technical review of the archaeological assessments and strategies associated with your project(s). If you could please fill in the additional required information, highlighted in yellow, and return to us a signed copy, that would be greatly appreciated. After we have received it, we can execute the contract on our end and return the completed contract to you. Afterwards, I can arrange scheduling and other related matters directly with the consultant if you prefer.

Sincerely,
Megan.

Megan DeVries, M.A.
Archaeological Operations Supervisor

Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)
4065 Highway 6 North, Hagersville, ON N0A 1H0
P: 905-768-4260 | M: 289-527-2763
http://www.mncfn.ca

HOLIDAY ALERT: Please note that MCFN-DOCA will be closed from December 19th until January 3rd.

From: Muir, Jeff <Jeff.Muir@stantec.com>
Sent: Tuesday, December 8, 2020 8:15 AM
To: Megan DeVries <Megan.DeVries@mncfn.ca>; LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Figura, Arthur <Arthur.Figura@stantec.com>; Harvey, Neil <Neil.Harvey@stantec.com>; Hohner, Paula <Paula.Hohner@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good morning Megan,

Sorry for our delay in replying. We have completed the Stage 1 property inspection well prior to the onset of winter conditions and are currently producing a Stage 1 archaeological assessment report. The appropriate contact for this project is at the Region of Peel, Lyle LeDrew. I have copied him on this email too (he has already been provided with your correspondence). His full contact information is as follows:

Lyle LeDrew C.E.T.
Project Manager
Wastewater Capital Works
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

Thank you,
Jeff

Jeffrey Muir BA, CAHP

Senior Archaeologist

Direct: 905 381-3209
Mobile: 289 208-5298
Fax: 905 385-3534
Jeff.Muir@stantec.com

Stantec
200-835 Paramount Drive
Stoney Creek ON L8J 0B4

From: Figura, Arthur <Arthur.Figura@stantec.com>
Sent: Monday, November 9, 2020 12:20 PM
To: Muir, Jeff <Jeff.Muir@stantec.com>
Subject: FW: PIF Notification - Lakeshore EA Addendum

Arthur Figura, MA
Project Archaeologist

Direct: 519 675-6641
Mobile: 226 927-1026
arthur.figura@stantec.com

Stantec
600-171 Queens Avenue
London ON N6A 5J7

From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: Monday, November 09, 2020 11:11 AM
To: Figura, Arthur <Arthur.Figura@stantec.com>; John Dunlop <John.Dunlop@mississauga.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Archaeology (MHSTCI) <archaeology@ontario.ca>
Subject: PIF Notification - Lakeshore EA Addendum

Good morning,

Please see the attached letter from the Mississaugas of the Credit First Nation regarding your upcoming archaeological assessment.

Regards,
Megan.

Megan DeVries, M.A.
Archaeological Operations Supervisor

Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)
4065 Highway 6 North, Hagersville, ON N0A 1H0
P: 905-768-4260 | M: 289-527-2763
http://www.mncfn.ca

From: LeDrew, Lyle
To: Marie-Annick Prevost
Cc: Hohner, Paula; Harvey, Neil; Adam LaForme
Subject: RE: PIF Notification - Lakeshore EA Addendum
Date: Tuesday, November 15, 2022 9:15:12 PM
Attachments: image001.png
image003.png
image004.png
dft_P083-0399-2022_14Nov2022_RE.pdf

Good Evening Marie-Annick,

Attached is the updated Archeological Assessment for Jack Darling Park that includes the additional information requested.

The following revisions were made to the report to address MCFN's comments:

- Section 2 "Methods" - added information on soil description.
- Section 8 "Images" - Two photos were added illustrating soil stratigraphy.
- Figure 10 – updated mapping to show locations of where the two new photos were taken

Please let me know if you have any questions or require additional information.

Lyle LeDrew C.E.T.
Project Manager, Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

Region of Peel
working with you

From: Marie-Annick Prevost <Marie-Annick.Prevost@mncfn.ca>
Sent: October 21, 2022 3:47 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Hohner, Paula <Paula.Hohner@stantec.com>; Harvey, Neil <Neil.Harvey@stantec.com>; Adam LaForme <Adam.LaForme@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Aanii Lyle,

On behalf of the Mississaugas of the Credit First Nation, Department of Consultation and Accommodation, I reviewed the Stage 2 Archaeological Assessment report prepared by Stantec for the Lakeshore EA Addendum/Jack Darling Park.

Would it be possible to get more information on, and pictures of, the types of soils and stratigraphy encountered during the test-pitting survey (number of layers, colour, depth…)?

Miigwech,

Marie-Annick Prevost, Ph.D. (she/her)
Field archaeologist
Mississaugas of the Credit First Nation (MCFN)
Department of Consultation and Accommodation (DOCA)
4065 Highway 6 North, Hagersville, ON N0A 1H0
Cell: 905-870-5844

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Thursday, October 20, 2022 10:46 PM
To: Adam LaForme <Adam.LaForme@mncfn.ca>
Cc: Hohner, Paula <Paula.Hohner@stantec.com>; Harvey, Neil <Neil.Harvey@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Evening Adam,

Attached is the DRAFT Stage 2 Archeological Assessment completed at Jack Darling Park in association with the Lakeshore EA addendum.

Additional field work doesn't seem to be required.

Please let me know if you have any questions or require additional information.

Lyle LeDrew C.E.T.
Project Manager, Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

From: Adam LaForme <Adam.LaForme@mncfn.ca>
Sent: June 7, 2022 9:58 AM
To: LeDrew, Lyle <Lyle.LeDrew@peelregion.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Morning Lyle,

Thank you for reaching out. We will not have a FLR available this week. We would like to receive the stage 2 report when it is available and would like to have in field participation in the stage 3, if one is required.

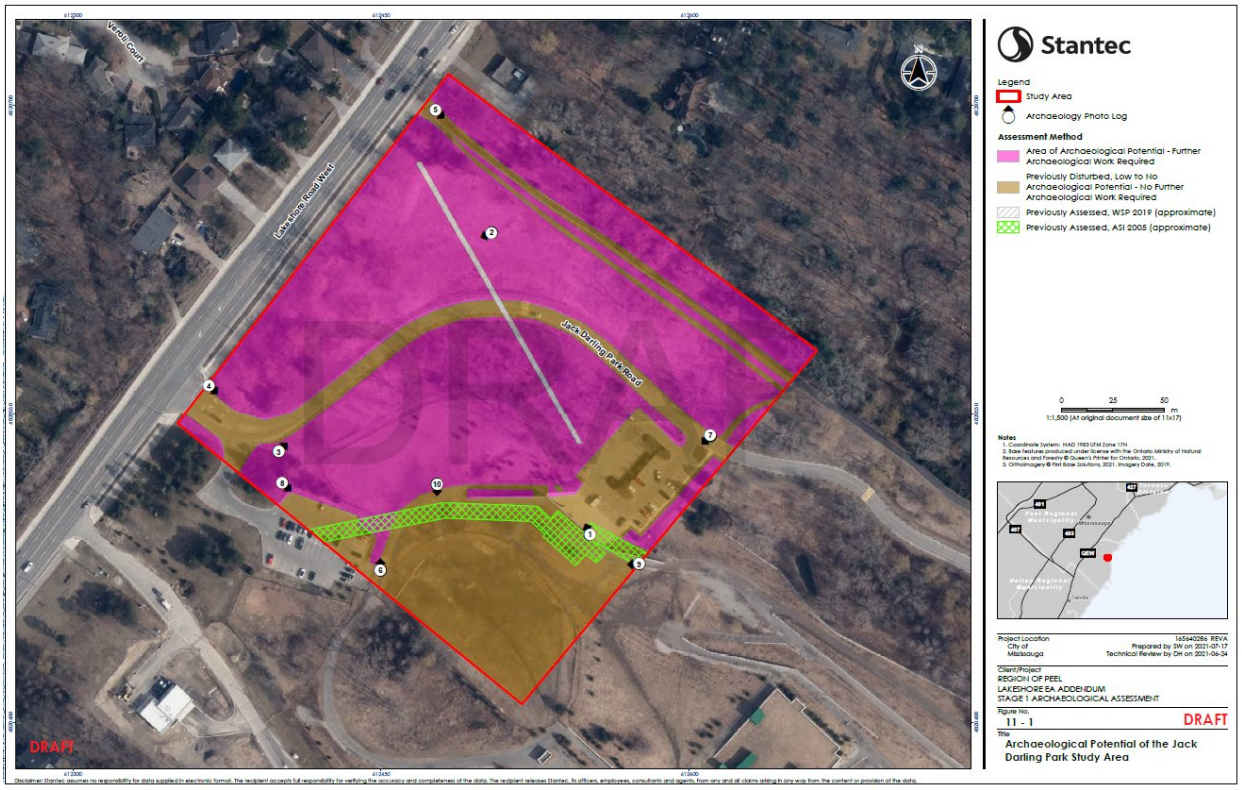
Thank you,

Adam LaForme (he/him)
Archaeological Operations Supervisor
Mississaugas of the Credit First Nation (MCFN)
Department of Consultation and Accomodation (DOCA)
4065 Highway 6 North, Hagersville, ON N0A 1H0
Cell 289-527-2763

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: June 6, 2022 9:59 PM
To: Adam LaForme <Adam.LaForme@mncfn.ca>; Adrian Blake <Adrian.Blake@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Hello Adam,

Following up on the email below. We're planning to start field investigations at Jack Darling park this week (June 8) and would like to ensure the MCFN have the opportunity to participate. Field work will take about 2 days to complete the hand digging and Stantec will have a team of six. I've attached a copy of the Phase 1 archeo as a reference as well as a snip of the area we'll be investigating below….



Please return a signed copy of the attached agreement if interested in participating.

Thank you

Lyle LeDrew C.E.T.
Manager (acting), Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works

Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

From: LeDrew, Lyle
Sent: April 26, 2022 9:01 AM
To: Adam LaForme <Adam.LaForme@mncfn.ca>; Adrian Blake <Adrian.Blake@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Morning Adam,

I was working with my Legal Team and they advised that I need to be using a template agreement that's been developed between Peel and the MNCFN. I've attached a DRAFT version for your review and reference. Can you please advise if this document is acceptable.

If so, will have the dates finalized and get a FINAL copy to you asap.

Lyle LeDrew C.E.T.
Manager (acting), Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

From: Adam LaForme <Adam.LaForme@mncfn.ca>
Sent: April 13, 2022 1:26 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>; Adrian Blake <Adrian.Blake@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Afternoon Lyle,

Thank you for reaching out.

I have attached the 2022 Participation and Review agreements for your review and signature. If you have any questions regarding either agreement please feel free to contact me.

Regards,

Adam LaForme (he/him)
Archaeological Operations Supervisor
Mississaugas of the Credit First Nation (MCFN)
Department of Consultation and Accomodation (DOCA)
4065 Highway 6 North, Hagersville, ON N0A 1H0
Cell 289-527-2763

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: April 13, 2022 12:06 PM
To: Adrian Blake <Adrian.Blake@mncfn.ca>
Cc: Adam LaForme <Adam.LaForme@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Thanks for pointing me in the right direction Adrian,

Adam, as mentioned below, we're looking to get moving on a Stage 2 Archeo at Jack Darling Park. If MCFN are still interested in participating in the field work, let me know and will get an agreement sorted and keep you in the loop on the timing.

Lyle LeDrew C.E.T.
Project Manager, Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9

Office: 905-791-7800 x 7836
Mobile: 416-573-0263

From: Adrian Blake <Adrian.Blake@mncfn.ca>
Sent: April 13, 2022 11:50 AM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Adam LaForme <Adam.LaForme@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Drew,

Thank you for this information. I have passed this along to Adam LaForme (adam.laforme@mncfn.ca) and have cc'd him here. Adam is our current Archaeological Operations Supervisor and you should reach out to him for notifications on projects the Region is under taking.

Best Regards,
Adrian Blake, MSc. (he/him)
Field Archaeologist

Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)
4065 Highway 6 North, Hagersville, ON N0A 1H0
M: 905-979-3862
http://www.mncfn.ca

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Wednesday, April 13, 2022 11:27 AM
To: Adrian Blake <Adrian.Blake@mncfn.ca>
Subject: FW: PIF Notification - Lakeshore EA Addendum

Good Morning Adrian,

I understand from my colleagues that you are our new contact in lieu of Megan at the MCFN.

We have an Archeo Phase 2 work set to move forward (finally) that we were discussing back in 2020. In preparation for a new trunk sewer along Lakeshore Road West in the City of Mississauga, a section of Jack Darling Park includes an area that requires further archeological investigation. We would like to proceed with this investigation at the end of April / early May. I've attached a copy of the proposed work area as a reference. If you are still interested in participating in the field work, we've got an updated agreement template that appears to be ready to go between Peel and the MCFN (That's what Ive been told) in DRAFT sent along soon for your review and consideration.

Please let me know if you have any questions or require additional information.

Lyle LeDrew C.E.T.
Project Manager, Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: October 14, 2021 1:56 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Neil Harvey (neil.harvey@stantec.com) <neil.harvey@stantec.com>; Fawn Sault <Fawn.Sault@mncfn.ca>; Adrian Blake <Adrian.Blake@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Hi Lyle,

Please find attached the updated 2021 agreements for your review and execution.

Cheers,
Megan.

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Wednesday, October 13, 2021 11:53 PM
To: Megan DeVries <Megan.DeVries@mncfn.ca>
Cc: Neil Harvey (neil.harvey@stantec.com) <neil.harvey@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Evening Megan,

We're finally getting this Project and EA addendum sorted out.

My next step is to provide the FLR participation and DOCA review agreements to my legal department for review. Before I do so, I thought that it would be prudent to ensure that the agreements provided December 2020 would still be the appropriate / current templates.

Thank you

Lyle LeDrew C.E.T.
Project Manager, Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: February 4, 2021 1:38 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Muir, Jeff <Jeff.Muir@stantec.com>; Hohner, Paula <Paula.Hohner@stantec.com>; Neil Harvey (neil.harvey@stantec.com) <neil.harvey@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Hi Lyle,

Thank you for the update. We look forward to hearing from you once you've had a chance to review the agreements.

Kind regards,
Megan.

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Wednesday, February 3, 2021 11:22 PM
To: Megan DeVries <Megan.DeVries@mncfn.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Muir, Jeff <Jeff.Muir@stantec.com>; Hohner, Paula <Paula.Hohner@stantec.com>; Neil Harvey (neil.harvey@stantec.com) <neil.harvey@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Evening Megan,

My apologies for the delayed response. I confirm receipt of your December email that includes the participation agreement. As these agreements are still relatively new to the Region of Peel, its taking us sometime to get things moving on our end.

We will ensure that no fieldwork takes place without your participation and its our intent to respect the rights of the Mississauga's of the Credit First Nation.

Lyle LeDrew C.E.T.
Project Manager
Wastewater Capital Works
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: January 8, 2021 1:16 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Muir, Jeff <Jeff.Muir@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good afternoon,

I am writing to confirm receipt of the previous email which was sent to you on December 9, 2020. At this time, we have not received an executed Field Liaison Representative [FLR] participation agreement or any reply to our previous correspondence. Please let me know if you require the agreement to be resent or if there has been a change to the project start date.

If there are any concerns or questions you have regarding the FLR participation agreement, please feel free to get in touch with us.

It is our expectation that no fieldwork will take place without the participation of our FLRs. As we have explained to you in our previous correspondence, MCFN has an Aboriginal and Treaty Right to protect the environment and our archaeological heritage and our FLRs are our boots on the ground to ensure our interests are protected. MCFN considers it disrespectful to our rights as Indigenous peoples if our natural and cultural heritage is interfered with without our involvement.

Kind regards,
Megan.

Megan DeVries, M.A.
Archaeological Operations Supervisor

Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)
4065 Highway 6 North, Hagersville, ON N0A 1H0
P: 905-768-4260 | M: 289-527-2763
http://www.mncfn.ca

From: Megan DeVries
Sent: Wednesday, December 9, 2020 9:36 AM
To: lyle.ledrew@peelregion.ca
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@newcreditfirstnation.com>; Muir, Jeff <Jeff.Muir@stantec.com>
Subject: FW: PIF Notification - Lakeshore EA Addendum

Good morning,

Please find attached a letter from the Mississaugas of the Credit First Nation ("MCFN") regarding the upcoming assessment for Lakeshore EA Addendum, as identified below.

Please note that this year, in order to continue maintaining DOCA capacity for fulsome project participation, DOCA will be introducing charges for technical review of project information. In the exercise of its stewardship responsibility, DOCA seeks to work together with project proponents and their archaeological consultants to ensure that archaeological work is done properly and respectfully. DOCA has retained technical advisers with expertise in the field of archaeology. These experts will review the technical aspects and cultural appropriateness of the archaeological assessments and strategies associated with your project. Upon completion of these reviews, MCFN will identify, if necessary, mitigation measures to address any project impacts upon MCFN rights. For cultural materials and human remains, DOCA may advise that this includes ceremonies required by Anishinaabe law, as well as request adjustments to the proposed fieldwork strategy.

The proponent is expected to pay the costs for MCFN to engage in a technical review of the project. DOCA anticipates at this time that all archaeological review will be undertaken by in-house technical experts, but will advise the proponent if an outside peer-review is required. Please find attached the agreement that covers MCFN's inhouse technical review of the archaeological assessments and strategies associated with your project(s). If you could please fill in the additional required information, highlighted in yellow, and return to us a signed copy, that would be greatly appreciated. After we have received it, we can execute the contract on our end and return the completed contract to you. Afterwards, I can arrange scheduling and other related matters directly with the consultant if you prefer.

Sincerely,
Megan.

Megan DeVries, M.A.
Archaeological Operations Supervisor

Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)
4065 Highway 6 North, Hagersville, ON N0A 1H0
P: 905-768-4260 | M: 289-527-2763
http://www.mncfn.ca

HOLIDAY ALERT: Please note that MCFN-DOCA will be closed from December 19th until January 3rd.

From: Muir, Jeff <Jeff.Muir@stantec.com>
Sent: Tuesday, December 8, 2020 8:15 AM
To: Megan DeVries <Megan.DeVries@mncfn.ca>; LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Figura, Arthur <Arthur.Figura@stantec.com>; Harvey, Neil <Neil.Harvey@stantec.com>; Hohner, Paula <Paula.Hohner@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good morning Megan,

Sorry for our delay in replying. We have completed the Stage 1 property inspection well prior to the onset of winter conditions and are currently producing a Stage 1 archaeological assessment report. The appropriate contact for this project is at the Region of Peel, Lyle LeDrew. I have copied him on this email too (he has already been provided with your correspondence). His full contact information is as follows:

Lyle LeDrew C.E.T.
Project Manager
Wastewater Capital Works
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

Thank you,
Jeff

Jeffrey Muir BA, CAHP
Senior Archaeologist

Direct: 905 381-3209
Mobile: 289 208-5298
Fax: 905 385-3534
Jeff.Muir@stantec.com

Stantec
200-835 Paramount Drive
Stoney Creek ON L8J 0B4

From: Figura, Arthur <Arthur.Figura@stantec.com>
Sent: Monday, November 9, 2020 12:20 PM
To: Muir, Jeff <Jeff.Muir@stantec.com>
Subject: FW: PIF Notification - Lakeshore EA Addendum

Arthur Figura, MA
Project Archaeologist

Direct: 519 675-6641
Mobile: 226 927-1026
arthur.figura@stantec.com

Stantec
600-171 Queens Avenue
London ON N6A 5J7

From: Megan DeVries <Megan.DeVries@mncfn.ca>
Sent: Monday, November 09, 2020 11:11 AM
To: Figura, Arthur <Arthur.Figura@stantec.com>; John Dunlop <John.Dunlop@mississauga.ca>
Cc: Mark LaForme <Mark.LaForme@mncfn.ca>; Fawn Sault <Fawn.Sault@mncfn.ca>; Archaeology (MHSTCI) <archaeology@ontario.ca>
Subject: PIF Notification - Lakeshore EA Addendum

Good morning,

Please see the attached letter from the Mississaugas of the Credit First Nation regarding your upcoming archaeological assessment.

Regards,
Megan.

Megan DeVries, M.A.
Archaeological Operations Supervisor

Department of Consultation and Accommodation (DOCA)
Mississaugas of the Credit First Nation (MCFN)
4065 Highway 6 North, Hagersville, ON N0A 1H0
P: 905-768-4260 | M: 289-527-2763
http://www.mncfn.ca

Region of Peel – Front Street Wastewater Pumping Station and Wastewater Diversion
Municipal Class Environmental Assessment Addendum"
Indigenous Communities Communication Log

Contact	Date	Comment	Draft Response/ Status
Indigenous Communities			
Megan DeVries Archaeological Operations Supervisor Mississaugas of the Credit First Nation 905-768-4260 Megan.DeVries@mncfn.ca	November 9, 2020 Email	Would like to be involved in Stage 1 AA field investigations.	**Response December 8, 2020:** We have completed the Stage 1 property inspection and are producing the Stage 1 AA report. The appropriate contact is Lyle LeDrew. I've copied him on this email and his contact information is Lyle.LeDrew@peelregion.ca and 905-791-7800 ext. 7836.
	December 9, 2020 Email	Please note that this year, in order to continue maintaining DOCA capacity for fulsome project participation, DOCA will be introducing charges for technical review of project information. In the exercise of its stewardship responsibility, DOCA seeks to work together with project proponents and their archaeological consultants to ensure that archaeological work is done properly and respectfully. DOCA has retained technical advisers with expertise in the field of archaeology. These experts will review the technical aspects and cultural appropriateness of the archaeological assessments and strategies associated with your project. Upon completion of these reviews, MCFN will identify, if necessary, mitigation measures to address any project impacts upon MCFN rights. For cultural materials and human remains, DOCA may advise that this includes ceremonies required by Anishinaabe law, as well as request adjustments to the proposed fieldwork strategy. The proponent is expected to pay the costs for MCFN to engage in a technical review of the project. DOCA anticipates at this time that all archaeological review will be undertaken by in-house technical experts, but will advise the proponent if an outside peer-review is required. Please find attached the agreement that covers MCFN's inhouse technical review of the archaeological assessments and strategies associated with your project(s). If you could please fill in the additional required information, highlighted in yellow, and return to us a signed copy, that would be greatly appreciated. After we have received it, we can execute the contract on our end and return the completed contract to you. Afterwards, I can arrange scheduling and other related matters directly with the consultant if you prefer.	
	January 8, 2021 Email	I am writing to confirm receipt of the previous email which was sent to you on December 9, 2020. At this time, we have not received an executed Field Liaison Representative [FLR] participation agreement or any reply to our previous correspondence. Please let me know if you require the agreement to be resent or if there has been a change to the project start date. If there are any concerns or questions you have regarding the FLR participation agreement, please feel free to get in touch with us. It is our expectation that no fieldwork will take place without	**Email Response February 3, 2021:** My apologies for the delayed response. I confirm receipt of your December email that includes the participation agreement. As these agreements are still relatively new tot eh Region of Peel, it's taking us some time to get things moving on our end. We will ensure that no fieldwork takes place without your participation and we intend to respect the rights of the Missisauga's of the Credit First Nation.

		the participation of our FLRs. As we have explained to you in our previous correspondence, MCFN has an Aboriginal and Treaty Right to protect the environment and our archaeological heritage and our FLRs are our boots on the ground to ensure our interests are protected. MCFN considers it disrespectful to our rights as Indigenous peoples if our natural and cultural heritage is interfered with without our involvement.	
	February 4, 2021 Email	Thank you for the update. We look forward to hearing from you once you've had a chance to review the agreements.	**October 13, 2021** We're finally getting this Project and EA addendum sorted out. My next step is to provide the FLR participation and DOCA review agreements to my legal department for review. Before I do so, I thought that it would be prudent to ensure that the agreements provided December 2020 would still be the appropriate / current templates.
	October 14, 2021 Email	Please find attached the updated 2021 agreements for your review and execution.	**April 13 2022** I understand from my colleagues that you are our new contact in lieu of Megan at the MCFN. We have an Archeo Phase 2 work set to move forward (finally) that we were discussing back in 2020. In preparation for a new trunk sewer along Lakeshore Road West in the City of Mississauga, a section of Jack Darling Park includes an area that requires further archeological investigation. We would like to proceed with this investigation at the end of April / early May. I've attached a copy of the proposed work area as a reference. If you are still interested in participating in the field work, we've got an updated agreement template that appears to be ready to go between Peel and the MCFN (That's what Ive been told) in DRAFT sent along soon for your review and consideration. Please let me know if you have any questions or require additional information.
Adrian Blake Field Archaeologist Mississaugas of the New Credit First Nation 905-979-3862 Adrian.blake@mncfn.ca	April 13, 2022 Email	Thank you for this information. I have passed this along to Adam LaForme (adam.laforme@mncfn.ca) and have cc'd him here. Adam is our current Archaeological Operations Supervisor and you should reach out to him for notifications on projects the Region is under taking.	**April 13, 2022** Thanks for pointing me in the right direction Adrian, Adam, as mentioned below, we're looking to get moving on a Stage 2 Archeo at Jack Darling Park. If MCFN are still interested in participating in the field work, let me know and will get an agreement sorted and keep you in the loop on the timing.
Adam LaForme Archaeological Operations Supervisor 289-527-2763 Adam.laforme@mncfn.ca	April 13, 2022 Email	Thank you for reaching out. I have attached the 2022 Participation and Review agreements for your review and signature. If you have any questions regarding either agreement please feel free to contact me.	**April 26, 2022** I was working with my Legal Team and they advised that I need to be using a template agreement that's been developed between Peel and the MNCFN. I've attached a DRAFT version for your review and reference. Can you please advise if this document is acceptable. If so, will have the dates finalized and get a FINAL copy to you asap.
			June 6, 2022 Following up on the email below. We're planning to start field investigations at Jack Darling park this week (June 8) and would like to ensure the MCFN have the opportunity to participate. Field work will take about 2 days to complete the hand digging and Stantec will have a team of six. I've

			attached a copy of the Phase 1 archeo as a reference as well as a snip of the area we'll be investigating below….  Please return a signed copy of the attached agreement if interested in participating.
	June 7, 2022 Email	Thank you for reaching out. We will not have a FLR available this week. We would like to receive the stage 2 report when it is available and would like to have in field participation in the stage 3, if one is required.	**October 20, 2022** Attached is the DRAFT Stage 2 Archeological Assessment completed at Jack Darling Park in association with the Lakeshore EA addendum. Additional field work doesn't seem to be required. Please let me know if you have any questions or require additional information.
Marie-Annick Prevost Field Archaeologist Mississaugas of New Credit First Nation 905-870-5844 Marie-annick.prevost@mncfn.ca	October 21, 2022	On behalf of the Mississaugas of the Credit First Nation, Department of Consultation and Accommodation, I reviewed the Stage 2 Archaeological Assessment report prepared by Stantec for the Lakeshore EA Addendum/Jack Darling Park. Would it be possible to get more information on, and pictures of, the types of soils and stratigraphy encountered during the test-pitting survey (number of layers, colour, depth…)?	November 15, 2022 Attached is the updated Archeological Assessment for Jack Darling Park that includes the additional information requested. The following revisions were made to the report to address MCFN's comments: • Section 2 "Methods" - added information on soil description. • Section 8 "Images" - Two photos were added illustrating soil stratigraphy. • Figure 10 – updated mapping to show locations of where the two new photos were taken. Please let me know if you have any questions or require additional information.

Region of Peel – Front Street Wastewater Pumping Station and Wastewater Diversion
Municipal Class Environmental Assessment Addendum
Communication Log

Contact	Date	Comment	Draft Response/ Status
Agencies			
Kate Hayes Credit Valley Conservation Senior Manager, Restoration and Management 905-670-1615 ext. 428 Kate.hayes@cvc.ca	December 14, 2021 Email	Am I correct in reading attached (and below) that this would mean that no work by Peel would be required at Richard's Memorial Park? If that is the case, then we would limit our discussions to City of Mississauga staff as we explore the potential daylighting of Lornewood Creek at Richard's Memorial Park.	**Email Response December 14, 2021:** There will still be works completed by Peel at Richards Memorial Park in the from of a shaft compound and some ancillary piping to decommission the existing sanitary sewer pumping station. So the overall scope of works at Richards Memorial will no longer include a new pumping station, just the gravity line to convey the flows. We would still like to be included in conversations around CVC's Lornewood Creek daylighting.
		Thank you for the clarification. Sally Betts is now managing the Lornewood Creek daylighting initiative, and will be in touch.	
Jakub Kilis Credit Valley Conservation Jakub.Kilis@cvc.ca	December 22, 2021 Email	We took a quick look at the PIC presentation and note that the proposed preferred location for the new pumping station at Jack Darling is located within the floodplain of Brichwood Creek. As you know CVC policies generally do not support locating new infrastructure within the floodplain. I think it would be a good idea to have a quick meeting and discuss your addendum in the New Year.	**Meeting with CVC was subsequently held January 21, 2022.**
Kate Hayes Credit Valley Conservation Kate.hayes@cvc.ca	December 14, 2021 Email	Am I correct in reading that this would mean no work by Peel would be required at Richard's Memorial Park? If that is the case, then we would limit our discussions to City of Mississauga staff as we explore the potential daylighting of Lornewood Creek at Richard's Memorial Park.	**Email Response December 14, 2021:** There will still be works completed by Peel at Richards Memorial in the form of a shaft compound and some ancillary piping to decommission the existing sanitary sewer pumping station. So the overall scope of works at Richards Memorial will no longer include a new pumping station, just the gravity line to convey the flows. We would still like to be included in conversations around CVC's Lornewood Creek daylighting,
	December 14, 2021 Email	Thank you for the clarification. Sally Betts is now managing the Lornewood Creek daylighting initiative and will be in touch in January.	
Trevor Bell Regional Environmental Planner	December 22, 2021 Letter/Email	Letter responding to Notice of Addendum, noting: • Areas of Interest • Duty to consult Aboriginal communities, and list of communities to contact • Notice of Completion requirements including Section 16 orders • Ministry's 30 day review of Addendum Report	
Joseph Harvey Heritage Planner Joseph.Harvey@ontario.ca	January 6, 2022 Letter/Email	Letter responding to Notice of Addendum, noting: • Need to identify cultural heritage resources • Need to identify archaeological resources • Notify MHSTCI of any technical cultural heritage studies	

From:	Hohner, Paula
To:	Kilis, Jakub
Cc:	LeDrew, Lyle; Harvey, Neil; Goodwin, Colin; Romano, Jess
Subject:	RE: CVC Comments - Front Street SPS EA Addendum (CVC File No FF 16/017)
Date:	Tuesday, October 25, 2022 4:47:04 PM

Hi Jakub,
Thank you for your comments on the draft EA Addendum Report provided below. The project team's responses are provided in blue text after each comment. We are in the process of finalizing the report to file for the 30-day public review period and would like to ensure CVC is on-board with our responses below. We would be happy to set up a Teams meeting to discuss in more detail. Please send a few dates/times that work best for you if you would like to meet.
Have a good day,
Paula

Paula Hohner, MScPl, MCIP, RPP
Associate, Senior Environmental Planner
Environmental Team Lead - Transportation
Stantec
600-171 Queens Avenue London ON N6A 5J7
Mobile: 226-926-6682
paula.hohner@stantec.com

From: Kilis, Jakub <Jakub.Kilis@cvc.ca>
Sent: Monday, October 3, 2022 11:15 AM
To: Hohner, Paula <Paula.Hohner@stantec.com>
Cc: LeDrew, Lyle <lyle.ledrew@peelregion.ca>; Harvey, Neil <Neil.Harvey@stantec.com>; Romano, Jess <Jess.Romano@stantec.com>; Goodwin, Colin <Colin.Goodwin@stantec.com>
Subject: CVC Comments - Front Street SPS EA Addendum (CVC File No FF 16/017)

Hi Paula,

CVC staff has completed our review of the Front Street SPS EA Addendum and offer the following comments for your consideration:

Engineering

1. Table 1 of the Addendum Report (Stantec, August 2022) identifies one of the impacts of Option 3 on existing utilities as "*Existing storm sewer may need to be locally relocated for construction of control building*". Please note that the existing storm sewer traversing the proposed Option 3 building footprint is the extension of Lakeshore Road West culvert and any reduction in the capacity of the existing culvert may result in increase in overtopping of Lakeshore Road West and a risk assessment is required based on a detailed hydraulic analysis to assess the offsite impact of culvert relocation. Please update Table 1 accordingly.

Under "Impact on Existing Utilities" of Table 1, the following statement has been added: "Existing storm sewer may need to be locally relocated for construction of control building. This storm sewer is the

extension of Lakeshore Road West culvert and any reduction in the capacity of the existing culvert may result in increase in risk of overtopping of Lakeshore Road West and a risk assessment will be prepared during detailed design based on a detailed hydraulic analysis to assess the offsite impact of culvert relocation." In addition, the statement "Surface works would need to be raised above the flood plain" has been deleted from this section of Table 1.

2. Table 1 of the Addendum Report identifies another impact of Option 3 on existing utilities as "*Surface works would need to be raised above the flood plain*". Note that according to CVC Technical Guidelines for Floodproofing, both Option 2 and 3 buildings must be dry floodproofed, i.e., buildings must be raised above the Regulatory flood elevation plus a 0.3 m freeboard. Additionally, a flood free access to the building must be provided for both options. Please update Table 1 accordingly.

Under "CVC Floodplain" of Table 1, the following statement has been added to Option 2 and Option 3: "The building will need to be floodproofed in accordance with the CVC Technical Guidelines, including providing flood free access to the building. A detailed hydraulic analysis and associated risk assessment will be required during detailed design to assess the offsite impact of the proposed building and flood free access to confirm the feasibility of dry floodproofing, where appropriate floodplain compensation/re-routing may be required." Option 1 is not within CVC regulated area.

3. Considering the existing Water Treatment Plant on the west side of the proposed Option 3 building, construction of a flood free building and a flood free access to the building is expected to have a major impact on flood conveyance. A flood free building and access at Option 2 would also form a significant obstruction. Please provide a risk assessment based on detailed hydraulic analysis to assess the offsite impact of the proposed Option 2 and 3 building/access and to confirm feasibility of dry floodproofing the proposed buildings and flood free access based on the post construction condition.

The project team noted your request for a detailed hydraulic analysis. A commitments table has been added to the EA Addendum report that provides a list of items to address during detailed design and/or construction. The requirement of a detailed hydraulic analysis and associated risk assessment has been included in this table for completion during detailed design and will assess the offsite impact of the proposed building and flood free access to confirm the feasibility of dry floodproofing, where appropriate floodplain compensation/re-routing may be required.

4. Provide information about risk of spill from the proposed WWPS site locations at Jack Darling Memorial Park.

As noted above, a commitments table has been added to the EA Addendum report and a commitment to review the risk of spills during detailed design has been added. Notes have been added as well indicating that emergency overflow from existing JD1 will be redirected to spill into JD3 as the upstream tunnel provides significant storage in event of SPS shutdown. In addition, it has been noted that a new emergency overflow for JD3 is required, however risk of an overflow occurring is low since the upstream tunnel provides over 8 hours of emergency storage for JD1, JD2, and JD3 in event of full SPS shutdown during a 25 year rainfall event; this level of service exceeds the MECP requirements outlined in the sewer design guidelines.

Ecology
Terrestrial EIA

5. Page 5 and 6, please reconcile the calculated removals area for the CODM8-3 ELC community (Page 5 indicates 0.4 Ha, while Page 6 indicates 0.04 Ha)

Comment noted. The number on page 6 has been corrected to 0.04 HA in the EIA memo.

Recommended additional mitigation for future detailed design stage

The following recommended additional mitigation measures (items 6 to 13 below) have been added to the commitments table in the EA Addendum report.

6. Transplanting rare plants from within the MEMM1 community prior to disturbing the area for staging and construction.

7. Laying down landscape fabric, wood chips and horizontal hoarding over the component of the staging area that extends into the MEMM1 community in order to minimize soil compaction.

8. Please provide a comprehensive dewatering plan (as appropriate) at detailed design showing the location of proposed groundwater discharge locations, dissipation technologies, and calculations showing discharge within the erosion thresholds.

Restoration and Offsetting

9. Please provide an arborist report and vegetation protection plan as related to proposed vegetation removals.

10. Please provide a comprehensive restoration plan for all impacted ELC communities

11. Please ensure restoration plans include decompaction and soil amendments (e.g. the additions of 300mm of organic topsoil) as appropriate

12. It is recommended that CVC Offsetting Guideline and offsetting tables (for DBH and/or basal area as appropriate) be used to ensure no net loss of ecosystem services as a result of this project through additional plantings to replace lost area and function of FOD communities. Opportunities should also be sought to replace lost MEMM1 area and function.

13. Please consider providing an invasive species management plan for the removal and management of phragmites from the FODM8-3 ELC community

Please let me know if you have any questions or comments about the above,
Jakub

I'm working remotely. The best way to reach me is by email, mobile phone or Microsoft Teams.

Jakub Kilis | RPP
Senior Manager, Infrastructure and Regulations | Credit Valley Conservation
905-670-1615 ext 287 | M: 647-212-6554
jakub.kilis@cvc.ca | cvc.ca

Credit Valley Conservation
inspired by nature

2021 CANADA'S GREENEST EMPLOYERS

GREATER TORONTO'S TOP 2021 EMPLOYERS

View our privacy statement

Romano, Jess

From: Harvey, Neil
Sent: Friday, October 21, 2022 3:56 PM
To: Romano, Jess
Subject: Fwd: PIF Notification - Lakeshore EA Addendum

Get Outlook for iOS

From: Marie-Annick Prevost <Marie-Annick.Prevost@mncfn.ca>
Sent: Friday, October 21, 2022 3:50 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: Hohner, Paula <Paula.Hohner@stantec.com>; Harvey, Neil <Neil.Harvey@stantec.com>; Adam LaForme <Adam.LaForme@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Aanii Lyle,

On behalf of the Mississaugas of the Credit First Nation, Department of Consultation and Accommodation, I reviewed the Stage 2 Archaeological Assessment report prepared by Stantec for the Lakeshore EA Addendum/Jack Darling Park.

Would it be possible to get more information on, and pictures of, the types of soils and stratigraphy encountered during the test-pitting survey (number of layers, colour, depth…)?

Miigwech,

Marie-Annick Prevost, Ph.D. (she/her)
Field archaeologist
Mississaugas of the Credit First Nation (MCFN)
Department of Consultation and Accommodation (DOCA)
4065 Highway 6 North, Hagersville, ON N0A 1H0
Cell: 905-870-5844

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Thursday, October 20, 2022 10:46 PM
To: Adam LaForme <Adam.LaForme@mncfn.ca>

Cc: Hohner, Paula <Paula.Hohner@stantec.com>; Harvey, Neil <Neil.Harvey@stantec.com>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Evening Adam,

Attached is the DRAFT Stage 2 Archeological Assessment completed at Jack Darling Park in association with the Lakeshore EA addendum.

Additional field work doesn't seem to be required.

Please let me know if you have any questions or require additional information.

Lyle LeDrew C.E.T.
Project Manager, Engineering
Wastewater Collection and Conveyance
Engineering Services Division
Public Works
Region of Peel
10 Peel Centre Dr., suite B, 4th Floor
Brampton, ON L6T 4B9
Office: 905-791-7800 x 7836
Mobile: 416-573-0263

From: Adam LaForme <Adam.LaForme@mncfn.ca>
Sent: June 7, 2022 9:58 AM
To: LeDrew, Lyle <Lyle.LeDrew@peelregion.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Good Morning Lyle,

Thank you for reaching out. We will not have a FLR available this week. We would like to receive the stage 2 report when it is available and would like to have in field participation in the stage 3, if one is required.

Thank you,

Adam LaForme (he/him)
Archaeological Operations Supervisor

Mississaugas of the Credit First Nation (MCFN)
Department of Consultation and Accomodation (DOCA)
4065 Highway 6 North, Hagersville, ON N0A 1H0
Cell 289-527-2763

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: June 6, 2022 9:59 PM
To: Adam LaForme <Adam.LaForme@mncfn.ca>; Adrian Blake <Adrian.Blake@mncfn.ca>
Subject: RE: PIF Notification - Lakeshore EA Addendum

Hello Adam,

Following up on the email below. We're planning to start field investigations at Jack Darling park this week (June 8) and would like to ensure the MCFN have the opportunity to participate. Field work will take about 2 days to complete the hand digging and Stantec will have a team of six. I've attached a copy of the Phase 1 archeo as a reference as well as a snip of the area we'll be investigating below….

Ministry of Heritage, Sport, Tourism and Culture Industries

Programs and Services Branch
400 University Ave, 5th Flr
Toronto, ON M7A 2R9
Tel: 416.786.7553

Ministère des Industries du Patrimoine, du Sport, du Tourisme et de la Culture

Direction des programmes et des services
400, av. University, 5e étage
Toronto, ON M7A 2R9
Tél: 416.786.7553

Ontario

January 6, 2022 EMAIL ONLY

Lyle LeDrew, C.E.T.
Project Manager, Engineering
Wastewater Collection
Region of Peel
lyle.ledrew@peelregion.ca

MHSTCI File	**:**	**0009361**
Proponent	**:**	**Region of Peel**
Subject	**:**	**Notice of Addendum and Public Information Centre**
Project	**:**	**Front Street Wastewater Pumping Station and Wastewater Diversion**
Location	**:**	**Region of Peel**

Dear Lyle LeDrew:

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

Under the EA process, the proponent is required to determine a project's potential impact on known (previously recognized) and potential cultural heritage resources.

Project Summary
In 2019, the Region of Peel completed a Schedule B Municipal Class Environmental Assessment (Class EA) Study to address wastewater flows from the Front Street Sewage Pumping Station (SPS) catchment area to align with the Region's long-term sustainable plan to provide wastewater services. When the EA was completed, a Feasibility Study began to review alternate design configurations to maximize the Region's investment. Based on the Feasibility Study, the Region of Peel is preparing an Addendum to the 2019 Class EA Study. The focus of the Addendum is the construction of a new pumping station at Jack Darling Memorial Park and the elimination of a new pumping station identified at Richard's Memorial Park.

Identifying Cultural Heritage Resources
While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation.

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

Built Heritage Resources and Cultural Heritage Landscapes
A Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment will be undertaken for the entire study area during the planning phase and will be summarized in the EA Report. This study will:

1. Describe the existing baseline cultural heritage conditions within the study area by identifying all known or potential built heritage resources and cultural heritage landscapes, including a historical summary of the study area. MHSTCI has developed screening criteria that may assist with this exercise: *Criteria for Evaluating for Potential Built Heritage Resources and Cultural Heritage Landscapes*.

2. Identify preliminary potential project-specific impacts on the known and potential built heritage resources and cultural heritage landscapes that have been identified. The report should include a description of the anticipated impact to each known or potential built heritage resource or cultural heritage landscape that has been identified.

3. Recommend measures to avoid or mitigate potential negative impacts to known or potential built heritage resources and cultural heritage landscapes. The proposed mitigation measures are to inform the next steps of project planning and design.

Given that this project covers a large study area, MHSTCI recommends that the Cultural Heritage Report is carried out so that step 1 described above is undertaken early in the planning process. Then, steps 2 and 3 can be undertaken once the preferred alternatives have been selected.

Cultural Heritage Reports will be undertaken by a qualified person who has expertise, recent experience, and knowledge relevant to the type of cultural heritage resources being considered and the nature of the activity being proposed.

Community input should be sought to identify locally recognized and potential cultural heritage resources. Sources include, but are not limited to, municipal heritage committees, historical societies and other local heritage organizations.

Cultural heritage resources are often of critical importance to Indigenous communities. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Indigenous communities includes a discussion about known or potential cultural heritage resources that are of value to them.

Environmental Assessment Reporting

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

Thank you for consulting MHSTCI on this project and please continue to do so throughout the EA process. If you have any questions or require clarification please contact Dan Minkin.

Sincerely,

Joseph Harvey
On behalf of

Dan Minkin
Heritage Planner
Heritage Planning Unit
Dan.Minkin@ontario.ca

Copied to: David Abreu, Project Manager, Region of Peel
Neil Harvey, Consultant Project Manager, Stantec Consulting Ltd.
Paula Hohner, Stantec Consulting Ltd.

Ministry of the Environment, Conservation and Parks

Environmental Assessment Branch

1st 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
Téléc. : 416 314-8452

December 22, 2021

Lyle LeDrew, C.E.T.
Project Manager, Engineering Wastewater Collection
Region of Peel
lyle.ledrew@peelregion.ca

BY EMAIL ONLY

Re: **Front Street Wastewater Pumping Station and Wastewater Diversion**
Region of Peel
Schedule B Municipal Class Environmental Assessment Addendum
Notice of Addendum

Dear Mr. LeDrew,

This letter is in response to the Notice of Addendum for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the study is following the approved environmental planning process for an addendum to a Schedule B project under the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA).

The attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please identify the areas of interest which are applicable to the project and ensure they are addressed. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule.

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:

- Mississaugas of the Credit First Nation;
- Six Nations of the Grand River;
- Haudenosaunee Confederacy Chiefs Council; and
- Huron-Wendat Nation (if there is potential for the project to impact archeological resources).

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

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.

The proponent must contact the Director of Environmental Assessment Branch under the following circumstances after 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; or
- A Section 16 Order request is expected based on 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.

Once the 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.

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, Section 16 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

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

Please note the project cannot proceed until at least 30 days after the end of the public review period provided for in the Notice of Completion.

Further, the project may not proceed after this time if:

- a Section 16 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.

The public can 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 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.

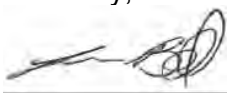
Once the requested information has been received, the Minister will have 30 days to make a decision or impose conditions on your project.

A draft copy of the report should be sent 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) after the report is finalized.

Should you or your project team members have any questions regarding the material above, please contact me at trevor.bell@ontario.ca.

Sincerely,



Trevor Bell
Regional Environmental Planner

cc: Loralyn Wild, Manager (A), Halton Peel District Office, MECP
Katy Potter, Supervisor (A), Project Review Unit, MECP
David Abreu, Project Manager, Region of Peel
Neil Harvey, Consultant Project Manager, Stantec Consulting Ltd.

Attachments: Areas of Interest
A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities

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.

- 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 with 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 the Source Protection Information Atlas, which is an online mapping tool available to the public. 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.

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.

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.

- Additional 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

- If this project is a Master Plan: there are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. **The Master Plan should clearly indicate the selected approach for conducting the plan**, by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to Part II Order Requests under the Environmental Assessment Act, although the plan itself would not be. **Please**

include a description of the approach being undertaken (use Appendix 4 as a reference).

- If this project is a Master Plan: Any identified projects should also include information on the MCEA schedule associated with the project.

- 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).

The public can 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 Section 16 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, Section 16 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

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
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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 mitigates 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.

From:	Kilis, Jakub
To:	LeDrew, Lyle
Cc:	Hohner, Paula; Harvey, Neil; Abreu, David
Subject:	RE: [External] Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion
Date:	Wednesday, December 22, 2021 12:41:17 PM

Hi Lyle,

We took a quick look at the PIC presentation and note that the proposed preferred location for the new pumping station at Jack Darling is located within the floodplain of Brichwood Creek. As you know CVC policies generally do not support locating new infrastructure within the floodplain. I think it would be a good idea to have a quick meeting and discuss your addendum in the New Year. Note I'll be off the first week in January.

Happy Holidays and a safe New Year,
Jakub

From: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Sent: Monday, December 13, 2021 10:09:50 PM
To: LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Cc: 'Hohner, Paula' <Paula.Hohner@stantec.com>; Neil Harvey (neil.harvey@stantec.com) <neil.harvey@stantec.com>; Abreu, David <david.abreu@peelregion.ca>
Subject: [External] Notice of Addendum and Online PIC - Front Street Wastewater Pumping Station and Wastewater Diversion

Please find attached the Notice of Virtual Public Consultation Centre for the Addendum to the Front Street Wastewater Pumping Station and Wastewater Diversion EA project. The focus of the Addendum is the construction of a new pumping station at Jack Darling Memorial Park and the elimination of a new pumping station identified at Richard's Memorial Park. An online Public Information Centre is planned to present a summary of the changes to the 2019 Class EA recommendations and preferred solution. The presentation boards will be available on the Region's website at Front Street Wastewater Pumping Station and Wastewater Diversion - Region of Peel (peelregion.ca) **for review from December 13, 2021 to January 10, 2022.**

Please contact a member of the project team listed below if you have any questions, comments, or concerns:

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Project Manager, Engineering Wastewater Collection
Region of Peel
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Neil Harvey, P.Eng., PMP
Consultant Project Manager
Stantec Consulting Ltd.
905-381-3234
neil.harvey@stantec.com

Meeting Minutes

Meeting Notes

CVC Meeting # 1

Lakeshore Trunk Sewer and Watermain / 165640286

Date/Time:	January 21, 2022 / 1:00 PM
Place:	Microsoft Teams
Next Meeting:	TBD
Attendees:	Lyle LeDrew, David Abreu – Region of Peel Jakub Kilis - CVC Neil Harvey, Jessica Romano, Paula Hohner - Stantec
Absentees:	N/A
Distribution:	All attendees

Item: **Action:**

1. Introductions

Introductions were made. David is a PM with the Region's Water Division, Lyle is a PM with the Region's Wastewater Division. Neil is Stantec' PM, Paula is the Senior Environmental Planner, completing the EA Addendum and Jessica is the Project Coordinator. Jakub is the CVC lead.

2. Project Overview

The trunk sewer will divert flows from east to west (Front Street to Jack Darling Park). Stantec completed a feasibility study that reviewed and evaluated a number of options and expanded the scope of the project. Originally, the project was ending at Richards Memorial Park where a new larger pump station was being built to replace the existing pump station. Feasibility study determined that building a new pump station at Jack Darling Park was a better option from an operational standpoint. With this, the PS at Richards Memorial is no longer required.

The purpose of the EA Addendum is to determine the preferred location for the new PS at Jack Darling Park. Three site layout options were evaluated and include:

Option 1 - Would have the drive shaft for the tunnel located in the grassed area in the north-east corner of the park. This area is open and would provide direct access to Lakeshore Road during construction. This location would also see the need for forcemains to be constructed along the park access road to the maintenance hole in the parking lot next to JD1 so that flows would be conveyed to the station.

Option 2 - Would have the drive shaft for the tunnel located further into the park area, closer to the existing dog park, just south of the entrance road into the park itself. During construction, a portion of the dog park would have to be temporarily closed but not the entire area. A portion of this location has been previously disturbed during the construction of the Lorne Park Water Treatment Plant expansion in 2008. Part of this area is used by the public for off-leash dog walking. This location would also see the need for forcemains to be constructed to the parking lot next to JD1 so that flows would be conveyed to the station.

Item:	Action:
The length of the forcemains would be much shorter than those needed for Option 1.	
Option 3 - This option closely resembles the solution outlined in the 2019 EA already completed. This would see the main drive shaft for the tunnel located right next to Lakeshore Road at the northeast corner of the park. This shaft would allow tunneling to occur to the exit shaft located in the parking lot directly adjacent to JD1. A portion of this location has been previously disturbed during the construction of the Lorne Park Water Treatment Plant expansion in 2008. This location would see very short forcemains discharging into a new manhole located within the existing JD1 parking area. The length of the forcemains would be much shorter than those needed for Option 2.	
For all three options, the majority of the works would be underground, and any surface works would be designed to blend into the surrounding park and water treatment plant. Option 3 was presented as the preferred. Jakub questioned if the evaluation criteria referred to the floodplain as CVC has a policy of not locating new infrastructure within the floodplain/hazard area. Shafts can be dealt with, but pump stations are more difficult (e.g., entrance into pump station during potential flood, flood proofing the station).	
Jakub noted that the biggest issue is that Option 3 is within the floodplain while there are other options that are outside. Jakub prefers Option 1.	
Through discussions with the City, Neil noted that the City is keen on keeping the Tallgrass Prairie Community. The area is ranked as provincially rare (S1) by MNDMNRF and qualifies as Significant Wildlife Habitat under the Rare Vegetation Communities category. Jakub to have a discussion with internal CVC terrestrial team about this area.	JK
Stantec has downloaded the regulation limits from CVC's website. Will send an RFI request to Jakub for the floodplain mapping as this has been updated by the CVC. A portion of Birchwood Creek is underground through a storm sewer that goes through a majority of Option 3.	
Even though there is an existing pump station, the proposed pump station is new infrastructure. CVC has updated their floodplain mapping as well as policies. Jakub noted that it would be a good idea to leverage existing infrastructure as much as possible. For Option 3, the EA report would have to have a good explanation as to why it is the best option over the other's that are outside of the floodplain.	
Stantec to obtain floodplain model and confirm the depth of the pump station.	JR
Lyle noted that a conversation should be had with the City with respect to options.	
Lyle asked if CVC had plans to open Birchwood Creek. Jakub will confirm, but he doesn't think so as it is not on the radar. There is a lot of existing infrastructure and would need time and budget to relocate.	JK
3. Next Steps	
CVC to have a conversation with terrestrial staff regarding Tallgrass Prairie Community.	JK
JR to send RFI to CVC for model and floodplain mapping.	JR

Item:	Action:
Lyle is extending the EA Addendum to at least March for a virtual PIC, per a Councilor's request.	
Jakub will provide formal correspondence for the Addendum Report and would like to review the report prior to the 30-day public review period. This is acceptable.	JK
Region/Stantec and CVC to have another call once the model has been reviewed.	

The meeting adjourned at 1:30 PM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Ltd.

Jessica Romano, B.Sc
Project Coordinator

Phone: 289-921-1749
Email: jess.romano@stantec.com

Attachment:

c.

Meeting Notes

Meeting with the City of Mississauga

Lakeshore Trunk Sewer and Sub-Transmission Watermain / 165640286

Date/Time:	April 22, 2022 / 9:00 AM
Place:	Microsoft Teams
Next Meeting:	TBD
Attendees:	Region of Peel: Lyle LeDrew City of Mississauga: Auryn Soares, Jacqueline Elias, John Dunlop, Michael Hynes, Nigel Robinson, Sangeeta Pasma, Raozia Zahra, Sam, George Varghese, Bill Moffat, Brandon Williams, Evelyn Krolicka Stantec: Neil Harvey, Paula Hohner, Jessica Romano
Absentees:	N/A
Distribution:	All attendees

Item:	Action:
Safety Moment & Introductions • A safety moment was given about women having strokes and the specific signs/symptoms to watch out for. • Introductions were made.	
Project Overview • The project entails the detailed design of a new sanitary trunk sewer from Jack Darling Memorial Park to the Credit River. • Stantec is currently undertaking an EA Addendum to the original 2019 Class EA completed by WSP. • The EA Addendum is for a new sewage pumping station at Jack Darling Memorial Park and the elimination of the proposed pump station in Richard's Memorial Park. • The new pump station in Jack Darling Memorial Park will allow for the elimination of four (4) pump stations along Lakeshore (existing Richard's Memorial, Ben Machree, Indian Road and Front Street). • The sanitary trunk sewer and sub-transmission watermain is currently in the 30% design phase. • Subsurface Utility Engineering (SUE) and geotechnical/hydrogeological field work is being completed right now. • The sub-transmission watermain will service the Lakeshore Road area (Zone 1). • Construction compounds are proposed at the following locations: o Lakeshore Road and Jack Darling Memorial Park. This will be the drive shaft for the tunnel from Jack Darling Park to the Credit River) as well as under the park to the existing Jack Darling pump station. o Pine Avenue South and Lakeshore Road. o Ben Machree Drive near the pump station. o Wesley Avenue/Lakeshore Road for the connection from Indian Road to the main tunnel. o Temporary compound at Front Street for connection to the Front Street pump station and exit shaft for the tunnel.	
EA Addendum • The EA Addendum is active and ongoing.	

Item:	Action:
• The PIC slides will be posted on the Region's website on May 9th, 2022, with audio (will be a YouTube type of video). • The EA Addendum study area focuses on Jack Darling Memorial Park and Richard's Memorial Park. • The EA Addendum will include filing an EA Addendum Report for a 30-day public review period. Only items in the EA Addendum will be open for review (2019 Class EA will not be open for review). • Three (3) site options at Jack Darling Memorial Park were reviewed and evaluated. The 3 sites were evaluated against criteria that include technical, socio-economic, financial, natural environment and cultural. • The 3 site options include: o Option 1: New pump station in the northeast corner of Jack Darling Memorial Park. o Option 2: Further into the park, closer to the dog park (would require temporary closure of the dog park during construction). o Option 3: New pump station next to the existing Jack Darling pump station. This option was recommended and closely resembles the 2019 Class EA solution. • As the project is currently in the preliminary design phase, the amount of parking spaces to be lost during construction will be confirmed as the design progresses. • The whole Jack Darling Park will not be closed during construction and the dog park will remain open. Access will need to be shifted to the main parking lot. • For work within Jack Darling Memorial Park, the City prefers a license agreement. • Work at Jack Darling Memorial Park is anticipated to last at least 2 years. • Park impacts at Front Street – this was part of the original EA, but not part of this project. The project team will be keeping the City engaged and will consider City requirements as the project progresses. The project team has met with Dillon Consulting about the projects. • Does the project team anticipate impacts to Birchwood Creek? The team has met with the CVC and the creek is buried. The team is reviewing ways to minimize impacts to the buried creek, and opportunities to make improvements. The project will not be disturbing the area on the west side of the park road. • There are 2 compounds proposed at Jack Darling Memorial Park; one at Lakeshore Road and the other at the pump station. The tunnel through the park is anticipated to be approximately 100 feet (30m) deep. There won't be any impacts along the tunnel path as it will be underground. Only impacted areas will be where the compounds are located. • A Stage 1 Archaeological Assessment study was undertaken during the 2019 Class EA. We will be doing a Stage 2 Archaeological Assessment study. Currently waiting for the park access permit from the City. Paula also noted that we will be doing breeding bird and natural environment investigations. • John Dunlop requested that the Stage 2 Archaeological Assessment study be filed with the City. Can be sent to John and copy Evelyn. • There will be a connection of the sub-transmission watermain to the Lorne Park Water Treatment Plant. • The Region and Stantec met with Brightwater developers to discuss opportunities to leverage the area for connection at Ben Machree pump station. The team is potentially looking at a new plan for an option on the western limits	Stantec

Item:	Action:
of the Brightwater development. Development on the east is restricting access. Lyle asked who from the City would be interested in participating in that discussion.	
• Project team is looking to leverage the park block. The tunnel would be in the park block under the multiuse trail (would need an easement for this). It was noted that the City might not go for this. Lyle/Neil to provide a scope of work to Sangeeta and Dave Martin (City development engineer working on the Brightwater project) and then a separate conversation can be had.	LL/NH
• Paula to send the meeting slides to Evelyn with the meeting minutes.	PH

The meeting adjourned at 10:00 AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Entity

Stantec

Meeting Notes

CVC Meeting

Lakeshore Trunk Sewer and Watermain / 165640286

Date/Time:	November 9, 2022 / 3:00 PM
Place:	Microsoft Teams
Next Meeting:	TBD
Attendees:	Lyle LeDrew – Region of Peel Jakub Kilis, Matteo De Stephano, Saleh Sebti - CVC Neil Harvey, Colin Goodwin, Paula Hohner - Stantec
Absentees:	N/A
Distribution:	All attendees

Item: **Action:**

1. Introductions

The purpose of this meeting is to discuss the comments received from CVC on the draft Front Street SPS EA Addendum Report and the project team's responses. A copy of the comments and responses are attached.

2. Review of CVC comments on draft EA Addendum Report

JK noted that the key review comment from CVC is to complete some of the floodplain hydraulic analysis and impact assessment of the proposed works now before proceeding to next stages of design. SS noted that this could be completed now using the CVC's 2D model to review what the potential impacts of the above grade infrastructure would be on the depth and flow path during the regional event.

1. CG and NH explained that the design team is still in the process of completing conceptual layouts for exact location of the underground infrastructure (sewage pumping station (SPS) wet well and valve chamber) and above grade infrastructure (control building).
2. CG noted that the intent is that some underground infrastructure may be located within the floodplain, with limited access structures extending to ground surface. The design goal will be to locate as much above grade infrastructure outside of the floodplain where possible (e.g., building an extension to the existing Jack Darling 1 SPS to house the Jack Darling 3 SPS electrical/mechanical controls).
3. CG, NH, and LL noted that since the conceptual location options are still in development, the Region's preference is to defer hydraulic modelling and associated floodplain impact assessment to the preliminary or detailed design stage, where CVC approval would be needed at that time.

Item:	Action:
JK noted that the CVC's recommendation to resolve the EA comments is as follows: 1. Add a statement to the commitments table in the EA Addendum Report that clarifies 1) the design intent is to ensure that if any above ground access points are required within the flood plain they will be designed to minimize impacts to the existing above ground flows during flood events and mitigation measures to further reduce impacts will be reviewed with the CVC prior to implementation., and 2) that the design team commits to completing detailed hydraulic analysis and impact assessment during the preliminary or detailed design stages, where CVC review and approval would be obtained at that time.	Stantec/Region
CG noted that access to existing facilities (Jack Darling 1 SPS) is currently not flood free. JK noted that in these scenarios, existing works can be grandfathered without the need for providing new flood free access.	
3. Next Steps	
Stantec will provide meeting minutes to CVC following this meeting and CVC will provide concurrence following its review. Stantec will include meeting minutes in the EA Addendum Report appendices as part of the consultation record. Following CVC input, the Region will proceed with posting the Notice of Completion to start the 30-day public period. Stantec and the Region will re-engage CVC when the building location and further details have been established.	Stantec

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Ltd.

Paula Hohner, M.Sc.Pl., MCIP, RPP
Senior Environmental Planner

Phone: 519 675 6666
Paula.Hohner@stantec.com

Appendix D
Proposed Site Layouts for Pumping Station (Options 1 to 3)

REVISIONS		
DATE	DETAILS	INIT.

LAKESHORE ROAD WEST

JACK DARLING MEMORIAL PARK

TEMPORARY DRIVEWAY INTO SHAFT CONSTRUCTION

TEMPORARY DRIVEWAY OUT OF SHAFT CONSTRUCTION

45m DIA. STARTER SHAFT & MCWELL

VALVE VAULT & CONTROL BUILDING

TEMPORARY EASEMENT

PERMANENT EASEMENT

PROPOSED 600 mm DIA. TWIN FORCEMAINS

TIE FORCEMAINS INTO NEW MH

SITE LAYOUT SHOWN IS FOR ILLUSTRATION AND EVALUATION PURPOSES. EXACT LAYOUT AND SITE CONFIGURATION TO BE REFINED AND CONFIRMED DURING DETAIL DESIGN.

0 10 15m

HORIZONTAL SCALE

Stantec

Region of Peel
working with you

LAKESHORE ROAD WEST

JACK DARLING SEWAGE PUMPING STATION No. 3
OPTION 1

CAD Area		Area	
Checked by	J.R.	Drawn by	S.B.
Date	OCTOBER 02, 2020	Sheet	1 of 3

Project No. 19-2215

Plan No. **SK001-D**

REVISIONS		
DATE	DETAILS	INIT.

LAKESHORE ROAD WEST

JACK DARLING
MEMORIAL PARK

TEMPORARY DRIVEWAY FOR SHAFT CONSTRUCTION

16m DIA. STARTER SHAFT & MH/WELL

TEMPORARY EASEMENT

PERMANENT EASEMENT

VALVE VAULT & CONTROL BUILDING

PROPOSED 600 mm DIA. TWIN FORCEMAINS

TIE FORCEMAINS INTO NEW MH

SITE LAYOUT SHOWN IS FOR ILLUSTRATION AND EVALUATION PURPOSES. EXACT LAYOUT AND SITE CONFIGURATION TO BE REFINED AND CONFIRMED DURING DETAIL DESIGN.

0 10 15m
HORIZONTAL SCALE

Stantec

Region of Peel
working with you

LAKESHORE ROAD WEST

JACK DARLING SEWAGE PUMPING STATION No. 3
OPTION 2

CAD Area		Area	
Checked by	J.R.	Drawn by	S.B.
Date	OCTOBER 02, 2020	Sheet	2 of 3

Project No. 19-2215

Plan No. **SK002-D**

REVISIONS		
DATE	DETAILS	INIT.

LAKESHORE ROAD WEST

JACK DARLING MEMORIAL PARK

TEMPORARY DRIVEWAY INTO SHAFT CONSTRUCTION

TEMPORARY DRIVEWAY OUT OF SHAFT CONSTRUCTION

10m DIA. STARTER SHAFT

TEMPORARY EASEMENT

TEMPORARY EASEMENT

PERMANENT EASEMENT

10m DIA. WETWELL & DRYPIT

TIE FORCEMAINS INTO NEW MH

VALVE VAULT & CONTROL BUILDING

SITE LAYOUT SHOWN IS FOR ILLUSTRATION AND EVALUATION PURPOSES. EXACT LAYOUT AND SITE CONFIGURATION TO BE REFINED AND CONFIRMED DURING DETAIL DESIGN.

0 10 15m

HORIZONTAL SCALE

Stantec

Region of Peel
working with you

LAKESHORE ROAD WEST

JACK DARLING SEWAGE PUMPING STATION No. 3
OPTION 3

CAD Area		Area	
Checked by	J.R.	Drawn by	S.B.
Date	OCTOBER 02, 2020	Sheet	3 of 3

Project No. 19-2215

Plan No. **SK003-D**

Appendix E
Terrestrial Environment Memo

Stantec

Memo

To:	Neil Harvey and Danielle Hamara	From:	Janice Ball
	London Office		Waterloo Office
File:	165640286	Date:	May 3, 2021

Reference: Schedule B Class Environmental Assessment Addendum, Front Street Station Wastewater Flow Diversion, Mississauga, Ontario. Terrestrial Natural Heritage Assessment to Evaluate Pumping Stations

This memo summarizes the natural heritage background review and site visit that were conducted to evaluate a proposed tunnel construction staging area and three alternative pumping station locations for the *Front Street Station Wastewater Flow Diversion: Schedule B Class Environmental Assessment Addendum*, for Lakeshore Road West in Mississauga, Ontario. This terrestrial natural heritage assessment summarizes the existing conditions, evaluation of relative sensitivities and significance, impact assessment, mitigation recommendations and regulatory requirements for:

- A proposed tunnel construction staging area in the parking lot adjacent to the Port Credit Library (**Figure 1**), and
- Three alternative pumping station locations in Jack Darling Memorial Park (**Figures 2a, 2b and 2c**).

The Study Area extended up to 120 m from the alternative pumping station locations and tunnel construction staging area.

BACKGROUND REVIEW

Natural Heritage Information Center Database

The Natural Heritage Information Center (NHIC) database (MNRF 2020a) was accessed on October 26, 2020 to search for records of terrestrial species at risk (SAR) and provincially rare species that overlap with the Study Area. The following terrestrial species records, presented in **Table 1**, were identified in the 1km x 1km NHIC assessment squares that overlapped with the alternative pumping station locations and pump shaft location.

Table 1: Species at Risk and Rare Species Records from Natural Heritage Information Centre

Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status
Cleland's Evening Primrose	*Oenothera clelandii*	S1		
Fall Crabgrass	*Digitaria cognata*	S1?		
Henslow's Sparrow	*Ammodramus henslowii*	SHB	END	END
Sundial Lupine	*Lupinus perennis*	S2S3		
Eastern Ribbonsnake	*Thamnophis sauritus*	S4	SC	SC
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC
Eastern Wood-pewee	*Contopus virens*	S4B	SC	SC
Wood Thrush	*Hylocichla mustelina*	S4B	SC	THR

S1: Critically Imperiled (often 5 or fewer)	SH: Possibly Extirpated (Historical)
S2: Imperiled (often 20 or fewer)	S#B- Breeding status rank
S3: Vulnerable (often 80 or fewer)	END: Endangered
S4: Apparently Secure (Uncommon but not rare)	THR: Threatened
S? – Rank Uncertain	SC: Special Concern

Additional species that were not listed in the NHIC search that may occur in the Study Area based on available habitat include provincially and federally endangered bats (Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tri-coloured Bat) and Monarch (a provincial and federal special concern species).

There is no aquatic habitat and/or wetland habitat present for Snapping Turtle or Eastern Ribbon Snake in the Study Areas within Jack Darling Memorial Park. Other terrestrial species listed in **Table 1** were assessed for their potential presence/absence within each Study Area.

Designated Natural Heritage Features

There were no designated natural heritage features identified in the Study Areas on MNRF mapping (MNRF 2020b). Jack Darling Memorial Park is designated as “Significant Natural Areas and Natural Green Spaces” and “Linkages” on Schedule 3 of the City of Mississauga Official Plan (City of Mississauga 2019).

SITE VISIT

A terrestrial habitat assessment was completed on October 6, 2020 by a Terrestrial Ecologist at each Study Area. The weather was partly cloudy, windy and 15°C. The assessment included documentation of vegetation communities and potential wildlife habitat. Vegetation communities were identified using Ecological Land Classification (ELC) for southern Ontario (Lee et. al. 1998). The wildlife habitat assessment included identification of potentially suitable habitat for SAR and provincially rare species and candidate significant wildlife habitat (SWH) features. Candidate SWH was assessed in accordance with the SWH Criteria Schedules for EcoRegion 7E (MNRF 2015).

RESULTS

The results of the terrestrial habitat assessment are summarized below for each Study Area. Temporary and permanent impacts are also discussed. ELC communities are shown on **Figures 1, 2a, 2b, and 2c**.

TUNNEL CONSTRUCTION STAGING AREA

There were no natural vegetation communities, SAR habitat or SWH present within the proposed tunnel construction staging area in the library parking lot east of the Credit River (**Figure 1**). There was a mid-aged deciduous hedgerow (FODM11) adjacent to the northeast side of the parking lot. There was a narrow hedgerow of cultivated shrubs adjacent to Lakeshore Road East that was not considered as a natural vegetation community.

The FODM11 hedgerow was dominated by horse chestnut with occasional crabapple, Manitoba maple and green ash. None of the trees were suitable for endangered bats. The hedgerow has the potential to provide habitat for common wildlife species that are adapted to disturbed habitats.

Reference: Schedule B Class Environmental Assessment Addendum, Front Street Station Wastewater Flow Diversion, Mississauga, Ontario. Terrestrial Natural Heritage Assessment to Evaluate Pumping Stations

PUMPING STATION – OPTION 1

Vegetation Communities

The Permanent Easement for Option 1 (**Figure 2a**) consists primarily of a mixed tall grass prairie restoration area (MEMM1). Vegetation within the prairie community was dominated by planted native species including Indian grass, Virginia mountain mint and a variety of sunflowers. Other non-prairie meadow species included heath aster, Kentucky bluegrass and common milkweed. The Permanent Easement also overlaps with a naturalized deciduous hedgerow (FODM11) comprised of crack willow, white elm, hackberry and scot's pine. The Temporary Easement overlaps with the FODM11 hedgerow, the MEMM1 meadow and a WODM5 woodland dominated by weeping willow, black walnut and white elm.

Species at Risk

The MEMM1 meadow may provide habitat for some grassland breeding birds that are accustomed to disturbance and breeding in smaller habitat patches. However, the meadow is unlikely to support bird SAR such as Henslow's Sparrow, Bobolink, Eastern Meadowlark or Grasshopper Sparrow, because these species prefer larger, undisturbed areas of meadow. There was a crack willow (Bat Tree Roost 1) within the Temporary Easement in the MEMM1 meadow that has potential to support SAR bats.

The adjacent WODM5 woodland contained three large weeping willows (Bat Tree Roosts 2, 3 and 4) that have the potential to support SAR bats. One of these willows (Bat Tree Roost 3) overlapped with the Temporary Easement.

Significant Wildlife Habitat and Rare Species

The MEMM3 tallgrass prairie community is ranked as provincially rare (S1) by the NHIC (MNRF 2020c) and qualifies as SWH under the Rare Vegetation Communities category.

Due to the presence of abundant common milkweed (the larval host for Monarch) in the MEMM1 meadow in the Temporary Easement, this area is considered candidate SWH for Monarch breeding. This meadow may also provide foraging habitat for other migratory butterfly species.

Provincially rare cup plant (*Silphium perfoliatum*) was identified in MEMM1 prairie restoration area in the Temporary Easement. Other provincially rare prairie species may also be present (including Cleland's evening primrose, fall crabgrass and sundial lupine), but they could not be identified due to the late season botanical inventory.

PUMPING STATION – OPTION 2

Vegetation Communities

The Permanent Easement for Option 2 (**Figure 2b**) is located partially within a deciduous forest (FODM8-3) and partially within a regenerating meadow (MEMM3). There was also a small overlap with a deciduous woodland (WODM5), a parking lot and a maintained lawn associated with a large off-leash dog area.

The canopy of the deciduous forest was dominated by large diameter eastern cottonwood trees. The understory was comprised of a unique combination of common buckthorn, large-tooth aspen and planted redbud, and the ground layer was comprised of common buckthorn and Canada goldenrod. There were two

sparse patches of highly invasive phragmites in the deciduous forest, including one patch directly adjacent to the proposed building footprint.

The area of regenerating meadow was small and dominated by typical cultural meadow species including Kentucky bluegrass, Canada goldenrod, lamb's quarters, burdock and aster species. Regenerating trees included white pine (planted), white cedar and eastern cottonwood. This area has the potential to provide habitat for common wildlife species that are adapted to disturbed habitats. Provincially rare Cleland's evening primrose, fall crabgrass and sundial lupine were not identified in this area during the site visit, and there is a low potential for these species to occur based on the dominance of non-native, culturally influenced species.

Species at Risk

There was one dead standing tree (Bat Tree Roost 5) in the FODM8-3 community (north of the Pumping Station 2 Footprint) with a large amount of peeling bark that has potential to provide breeding habitat for endangered bats. There were no apparent cavities present on the large diameter eastern cottonwood trees.

Significant Wildlife Habitat

Although the FODM8-3 community has the potential to support woodland breeding birds, it is unlikely to support rare species such as Eastern Wood-Pewee and Wood Thrush, because these species prefer larger tracts of forest. The FODM8-3 community is too small to qualify as candidate SWH for woodland breeding birds.

PUMPING STATION – OPTION 3

Vegetation Communities

The Permanent Easement for Option 3 (**Figure 2c**) was located partially within the FODM8-3 deciduous forest (0.08 ha) and partially within a paved parking lot (0.07 ha). There was a large off-leash dog area adjacent to the Permanent Easement with trails, cultural meadow and sections of maintained lawn. An area of Temporary Easement for Option 3 overlaps with the MEMM1 prairie (0.11 ha) and FODM11 hedgerow (0.08 ha) in the Study Area for Option 1.

Species at Risk

One dead standing tree (Bat Tree Roost 5) occurred in the FODM8-3 forest, north of the proposed building footprint with a large amount of peeling bark that may breeding habitat for endangered bats. There were no apparent cavities present on the large diameter eastern cottonwood trees.

The MEMM1 meadow may provide habitat for some grassland breeding birds that are accustomed to disturbance and breeding in smaller habitat patches. However, the meadow is unlikely to support bird SAR such as Henslow's Sparrow, Bobolink, Eastern Meadowlark or Grasshopper Sparrow, because these species prefer larger, undisturbed areas of meadow.

Significant Wildlife Habitat

Although the FODM8-3 community has the potential to support woodland breeding birds, it is unlikely to support rare species such as Eastern Wood-Pewee and Wood Thrush, because these species prefer larger

tracts of forest. The FODM8-3 community is too small to qualify as candidate SWH for woodland breeding birds.

The MEMM3 tallgrass prairie community is ranked as provincially rare (S1) by the NHIC (MNRF 2020c) and qualifies as SWH under the Rare Vegetation Communities category. Provincially rare cup plant (*Silphium perfoliatum*) was present in the MEMM1 prairie restoration area adjacent to the Pumping Station 3 Temporary Easement. Other provincially rare prairie species may also be present (including Cleland's evening primrose, fall crabgrass and sundial lupine); however, they could not be identified due to the late season botanical inventory.

EVALUATION OF ALTERNATIVE PUMPING STATION LOCATIONS

PUMPING STATION - OPTION 1

There will be a permanent loss of 0.2 ha from the tallgrass prairie restoration area (MEMM1), and an additional 0.3 ha that will be temporarily impacted. This area is designated as “Significant Natural Areas and Natural Green Spaces” and “Linkages in the City of Mississauga Official Plan (City of Mississauga 2019), and may provide habitat for grassland birds, Monarch and other butterflies.

There will also be a small temporary disturbance (~0.1 ha) to the deciduous woodland (WODM5) and deciduous hedgerow (FODM11), both of which are designated as “Linkages” on Schedule 3 of the City of Mississauga Official Plan (City of Mississauga 2019). Two trees (Bat Tree Roosts 1 and 3) that have potential to provide habitat for SAR bats are present within the temporary easement area.

PUMPING STATION – OPTION 2

There will be a permanent loss of 0.1 ha from the cottonwood deciduous forest (FODM8-3) containing large diameter eastern cottonwood trees and 0.1 ha from the regenerating meadow (MEMM3). There will also be an additional 0.1 ha of temporary disturbance to each of the cottonwood deciduous forest (FODM8-3), and the mixed meadow (MEMM3) and small disturbance to the moist deciduous woodland (WODM5). The proposed footprint for this pumping station overlaps with an area designated as “linkages” in the City of Mississauga Official Plan (City of Mississauga 2019).

PUMPING STATION – OPTION 3

There will be a permanent loss of 0.1 ha from the FODM8-3 deciduous forest, containing large diameter eastern cottonwood trees. The remainder of the proposed pumping station falls within a paved parking lot. The Temporary Easement overlaps with the MEMM1 prairie (0.1 ha), the FODM11 hedgerow (0.1 ha) and an additional 0.04 ha of the FODM8-3 deciduous forest.

Table 2: Permanent and Temporary Loss of Vegetation Communities at the Alternative Pumping Station Locations

Alternative	ELC Code	ELC Description	Area (ha)
Pumping Station - Option 1			
Permanent Easement	MEMM1	Dry - Fresh Mixed Tallgrass Prairie Ecosite	0.2

	FODM11	Naturalized Deciduous Hedgerow Ecosite	0.01
Temporary Easement	MEMM1	Dry - Fresh Mixed Tallgrass Prairie Ecosite	0.3
	WODM5 and WODM5-1	Fresh - Moist Deciduous Woodland Ecosite and Fresh - Moist Poplar Deciduous Woodland Type	0.1
	FODM11	Naturalized Deciduous Hedgerow Ecosite	0.1
	FODM8-3	Fresh - Moist Cottonwood Deciduous Forest Type	0.01
Pumping Station – Option 2			
Permanent Easement	FODM8-3	Fresh - Moist Cottonwood Deciduous Forest Type	0.1
	MEMM3	Dry - Fresh Mixed Meadow Ecosite	0.1
Temporary Easement	FODM8-3	Fresh - Moist Cottonwood Deciduous Forest Type	0.1
	MEMM3	Dry - Fresh Mixed Meadow Ecosite	0.1
	WODM5	Fresh - Moist Deciduous Woodland Ecosite	0.05
Pumping Station – Option 3			
Permanent Easement	FODM8-3	Fresh - Moist Cottonwood Deciduous Forest Type	0.1
Temporary Easement	MEMM1	Dry - Fresh Mixed Tallgrass Prairie Ecosite	0.1
	FODM11	Naturalized Deciduous Hedgerow Ecosite	0.1
	FODM8-3	Fresh - Moist Cottonwood Deciduous Forest Type	0.04

An evaluation of the pumping station alternatives is provided in **Table 3** (attached).

RECOMMENDED MITIGATION MEASURES

STANDARD MITIGATION MEASURES

The following standard mitigation measures/best practices are provided to reduce potential impacts to the adjacent natural heritage features during construction:

- Delineate the Project Footprint with tree protection fencing prior to construction to reduce impacts to adjacent natural features.
- Wash, refuel and/or service equipment a minimum of 30 m from watercourses to reduce the risk of deleterious substances from entering surface waters.
- Thoroughly clean construction machinery prior to entering the site to reduce the potential for establishment of highly invasive species such as Phragmites.
- To reduce the potential for spread of insect pests such as the Emerald Ash Borer, trees cut should be disposed of on site (either through spreading of wood chips or trees cut and sawed into logs).

Reference: Schedule B Class Environmental Assessment Addendum, Front Street Station Wastewater Flow Diversion, Mississauga, Ontario. Terrestrial Natural Heritage Assessment to Evaluate Pumping Stations

EROSION AND SEDIMENT CONTROL

- Silt fencing or sediment logs will be used if exposed soils are at risk of eroding.
- In addition to any specified requirements (i.e., documented with design drawings), additional silt fence and/or sediment logs should be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency.
- Erosion and sediment controls should be monitored and maintained, as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected until cover is re-established.
- Materials requiring stockpiling (fill, topsoil, etc.) will be stabilized and kept a safe distance (> 30 m) from watercourses.

WILDLIFE PROTECTION

- Schedule vegetation clearing to occur between September 1 and March 31 to avoid the primary breeding (nesting) period for birds in accordance with the MBCA. If vegetation removal will occur during the primary breeding period (April 1 to August 31), areas to be cleared should be marked and a qualified biologist should conduct nest surveys approximately seven (7) days, or less, in advance of the planned clearing. If nests are found, clearing of the area would cease until the young have naturally fledged.
- Schedule removal of potential suitable bat maternity roost trees outside of the bat roosting period from April 1 to September 30 to avoid direct harm to bats, and to reduce the risk to bat species protected under the ESA.
- Conduct a visual search of the construction area (including machinery) each day to locate and avoid reptiles, amphibians and other wildlife. If wildlife are encountered, they will be given reasonable time to flee the area on their own. If a wildlife species must be moved, a person knowledgeable in handling techniques may relocate it to a location that is both safe and suitable. Handling of a SAR is not permitted without authorization under the ESA.

SITE REHABILITATION

A plan to rehabilitate temporary easement areas upon completion of the work should be prepared to re-naturalize the area and retain the ecological function of the natural heritage features. The plan should be prepared in consultation with Credit Valley Conservation (CVC), and should include a program to monitor the success of the restoration plantings and the presence of invasive species.

ENDANGERED SPECIES ACT AUTHORIZATIONS

With the implementation of mitigation, including timing windows, impacts to SAR or SAR habitat are not anticipated and therefore authorizations under the ESA are not needed.

Reference: Schedule B Class Environmental Assessment Addendum, Front Street Station Wastewater Flow Diversion, Mississauga, Ontario. Terrestrial Natural Heritage Assessment to Evaluate Pumping Stations

CONCLUSIONS

NATURAL HERITAGE FEATURE SUMMARY

- Pumping Stations 1 and 3 overlap with the MEMM1 prairie restoration area.
- All Pumping Station Locations overlap with the “Linkages” designation in the City of Mississauga Official Plan.
- Pumping Station 1 overlaps with two potential bat roost trees (Bat Tree Roosts 1 and 3).
- Pumping Stations 2 and 3 involve the removal of large diameter eastern cottonwoods in the FODM8-3 community.
- There were no natural features proposed for removal in the tunnel construction staging area.

Stantec Consulting Ltd.

Janice Ball B.Sc.
Terrestrial Ecologist

Phone: 519 549-9132
Janice.Ball@stantec.com

Attachments:
Figure 1: Tunnel Construction Staging Area
Figure 2a: Pumping Station Option 1
Figure 2b: Pumping Station Option 2
Figure 2c: Pumping Station Option 3
Table 3: Evaluation of Alternatives

c. Debbie Giesbrecht, Stantec

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City of Mississauga. 2019. Mississauga Official Plan. November 22, 2019 Office Consolidation.

(CVC) Credit Valley Conservation Authority. 2020. CVC Regulation Mapping. Accessed Online on October 26, 2020: https://cvc.ca/planning-permits/regulation-mapping/

Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, S. McMurray. September 1998. Ecological Land Classification for Southern Ontario. North Bay, Ontario. Ontario Ministry of Natural Resources and Forestry.

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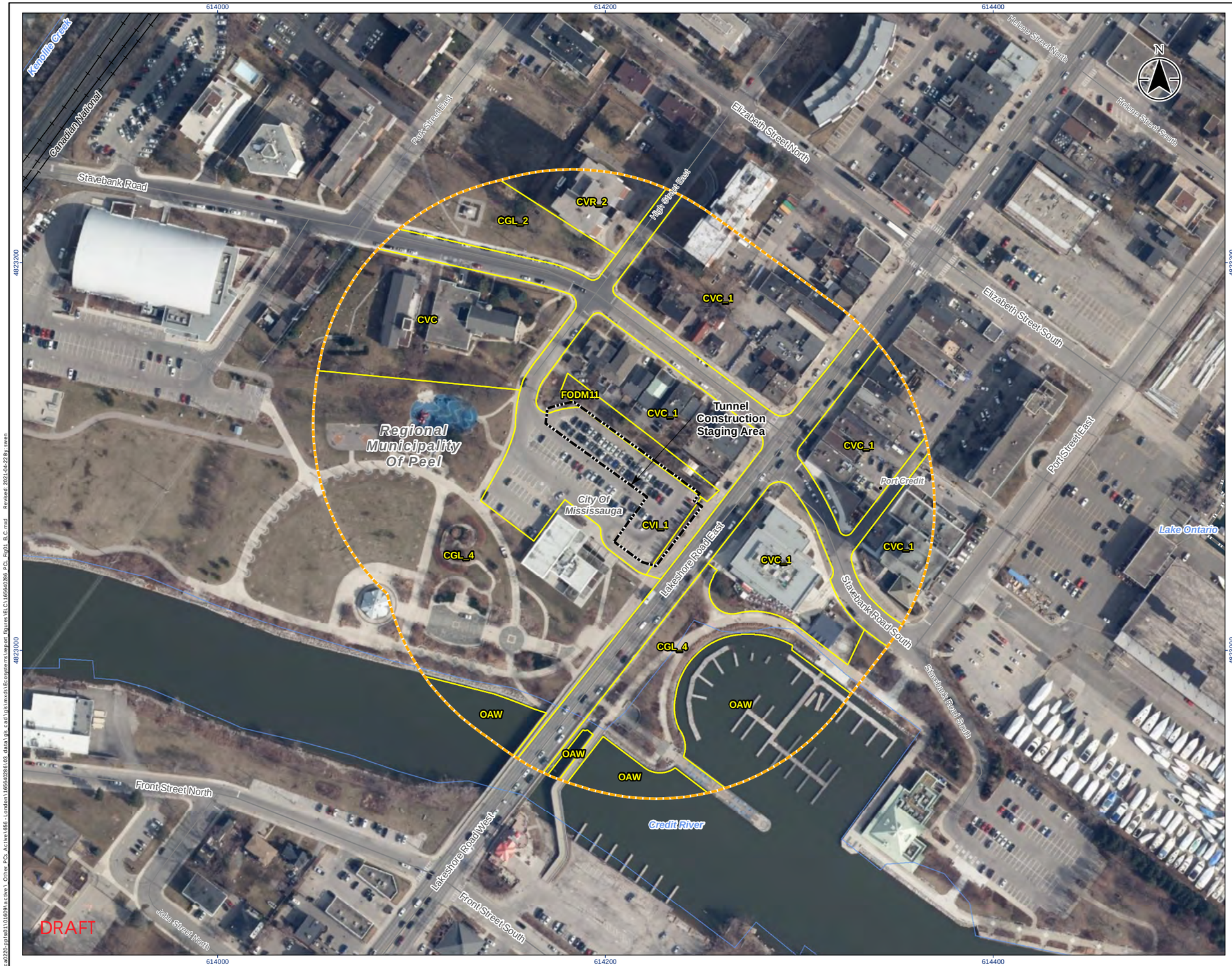
(MNRF) Ontario Ministry of Natural Resources and Forestry. 2020b. Land Information Ontario Digital mapping of natural heritage features, Ontario Ministry of Natural Resources. Available Online: http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US

(MNRF) Ontario Ministry of Natural Resources and Forestry. 2020c. Ontario Plant Community and Vascular Plant Lists. Online at from https://www.ontario.ca/page/get-natural-heritage-information.

(MNRF) Ontario Ministry of Natural Resources and Forestry. 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. January, 2015. Ontario Ministry of Natural Resources and Forestry Regional Operations Division, Peterborough, Ontario. 40 pp.



Stantec

Legend

- Ecological Land Classification Boundary
- Study Area (120 m)
- Railway (MNRF, 2020)
- Watercourse (Permanent) (MNRF, 2020)
- Waterbody (MNRF, 2020)

ELC Legend

- CGL_2 - Parkland
- CGL_4 - Recreational
- CVC - Commercial and Institutional
- CVC_1 - Business Sector
- CVI_1 - Transportation
- CVR_2 - High Density Residential
- FODM11 - Naturalized Deciduous Hedge-row Ecosite
- OAW - Open water

0 50 100 m

1:2,000 (At original document size of 11x17)

Notes

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

Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2021-04-22

Client/Project
REGION OF PEEL
PORT CREDIT LIBRARY

Figure No.
1

DRAFT

Title
Ecological Land Classification

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Stantec

Legend

- Phragmites Location
- Bat Tree Roost Location
- Ecological Land Classification Boundary
- Study Area (120 m)
- Permanent Easement
- Temporary Easement
- Watercourse (Permanent) (MNRF, 2020)
- Wetland, Other Evaluated (MNRF, 2020)

ELC Legend

- CGL_4 - Recreational
- CVI - Transportation and Utilities
- CVI_1 - Transportation
- CVR - Residential
- FOD - Deciduous Forest
- FODM11 - Naturalized Deciduous Hedge-row
- MEMM1 - Dry - Fresh Mixed Tallgrass Prairie
- MEMM3 - Dry - Fresh Mixed Meadow
- WODM5-1 - Fresh - Moist Poplar Deciduous Woodland Type
- WODM5 - Fresh - Moist Deciduous Woodland

0 50 100 m

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Notes

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Prepared by SW on 2020-11-03

Client/Project
REGION OF PEEL
JACK DARLING PARK
OPTION 1

Figure No.
2a

Title
Ecological Land Classification

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Stantec

Legend

- Phragmites Location
- Bat Tree Roost Location
- Study Area (120 m)
- Permanent Easement
- Temporary Easement
- Ecological Land Classification Boundary
- Watercourse (Permanent) (MNRF, 2020)
- Wetland, Other Evaluated (MNRF, 2020)

ELC Legend

- CGL_4 - Recreational
- CVI - Transportation and Utilities
- CVI_1 - Transportation
- CVR - Residential
- FOD - Deciduous Forest
- FODM11 - Naturalized Deciduous Hedge-row
- MEMM1 - Dry - Fresh Mixed Tallgrass Prairie
- MEMM3 - Dry - Fresh Mixed Meadow
- WODM5-1 - Fresh - Moist Poplar Deciduous Woodland Type
- WODM5 - Fresh - Moist Deciduous Woodland

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Notes

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REGION OF PEEL
JACK DARLING PARK
OPTION 2

Figure No.
2b

Title
Ecological Land Classification

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Stantec

Legend

- Phragmites Location
- Bat Tree Roost Location
- Study Area (120 m)
- Permanent Easement
- Temporary Easement
- Ecological Land Classification Boundary
- Watercourse (Permanent) (MNRF, 2020)
- Wetland, Other Evaluated (MNRF, 2020)

ELC Legend

- CGL_4 - Recreational
- CVI - Transportation and Utilities
- CVI_1 - Transportation
- CVR - Residential
- FOD - Deciduous Forest
- FODM11 - Naturalized Deciduous Hedge-row
- MEMM1 - Dry - Fresh Mixed Tallgrass Prairie
- MEMM3 - Dry - Fresh Mixed Meadow
- WODM5-1 - Fresh - Moist Poplar Deciduous Woodland Type
- WODM5 - Fresh - Moist Deciduous Woodland

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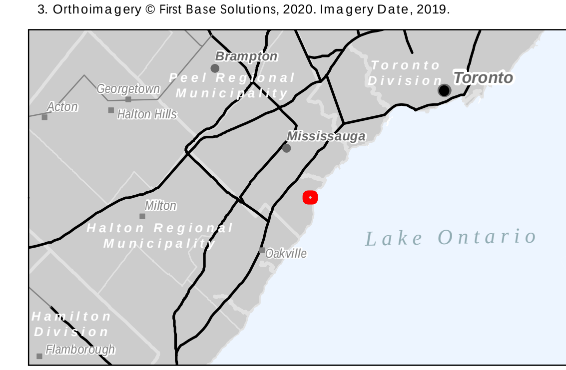

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Prepared by SW on 2020-11-03

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REGION OF PEEL
JACK DARLING PARK
OPTION 3

Figure No.
2c

Title
Ecological Land Classification

Table 3: Natural Heritage Evaluation of Alternative Pumping Station Options

Evaluation Criteria	Description	Pumping Station Option 1	Pumping Station Option 2	Pumping Station Option 3
Potential effects to natural heritage features, including: • Significant woodlands • Significant wetlands • Environmentally sensitive areas • Environmental protection areas • Environmental conservation areas	Removal or disturbance of significant trees and/or ground flora Changes in vegetation composition Reduction or deterioration of habitat Steep slopes	Pumping Station Option 1 is located in a prairie restoration area. Prairie communities and many prairie species are provincially rare. Designated as "Linkages" on Schedule 3 of the City of Mississauga Official Plan.	Designated as "Linkages" on Schedule 3 of the City of Mississauga Official Plan.	Designated as "Linkages" on Schedule 3 of the City of Mississauga Official Plan. Pumping Station Option 3 Temporary Easement is located in the MEMM1 prairie restoration area. Prairie communities and many prairie species are provincially rare.
Terrestrial Species at Risk		Two potential bat maternity roost trees occur in the Pumping Station Option 1 Temporary Easement (Bat Tree Roosts 1 and 3). These trees have the potential to provide breeding habitat for endangered bat species.	No suitable bat tree roost habitat observed in Pumping Station Option 2 Footprint. There was no SAR habitat identified in the Pumping Station Option 2 Permanent and Temporary Easements.	No suitable bat tree roost habitat observed in Pumping Station Option 3 Footprint. There was no SAR habitat identified in the Pumping Station Option 3 Permanent and Temporary Easements.
Significant Wildlife Habitat		The Pumping Station Option 1 Permanent and Temporary Easements are located on a prairie restoration area. Prairie communities and many prairie species are provincially rare. Potential breeding habitat for Monarch occurs in the MEMM1 prairie restoration area (within the temporary easement) due to the abundance of common milkweed (Monarch's larval host).	No significant wildlife habitat features identified in the Option 2 Permanent or Temporary Easements.	The Pumping Station Option 3 Temporary Easement is located on a prairie restoration area. Prairie communities and many prairie species are provincially rare.

Evaluation Criteria	Description	Pumping Station Option 1	Pumping Station Option 2	Pumping Station Option 3
Potential impacts to wildlife/migratory birds	Reduction or deterioration of habitat Effects of timing of construction on nesting periods Effects of construction timing on breeding periods Changes in vegetation composition	Tree removal in the FODM11, WODM5 and WODM5-1 communities. Potential habitat for common grassland breeding birds. Potential migration foraging area for Monarch. Avoid vegetation removal during breeding bird window (April 1-August 31), if possible. Avoid vegetation removal during the monarch breeding window and butterfly migration window (June 1 to October 30).	Tree removal in the FODM8-3 deciduous forest including several very large diameter cottonwoods. Potential habitat for breeding birds in the deciduous forest. Avoid removal of large diameter trees where possible. Avoid vegetation removal during breeding bird window (April 1-August 31), if possible.	Tree removal in the FODM8-3 deciduous forest including several very large diameter cottonwoods. Potential habitat for breeding birds in the deciduous forest. Avoid removal of large diameter trees where possible. Avoid vegetation removal during breeding bird window (April 1-August 31), if possible.

Appendix F
Aquatic Habitat Memo

Stantec

Memo

To:	Neil Harvey and Danielle Hamara London Office	From:	Taco Den Haas Markham Office
File:	165640286	Date:	December 3, 2020

Reference: Lakeshore West Sanitary Trunk Sewer Extension - Phase 1 Option 1 Aquatic Environment Impact Assessment for the Schedule B Class Environmental Assessment Addendum

This memo summarizes the aquatic environment impact completed for selected components of the Phase 1 - Option 1 for the Lakeshore Road West Sanitary Trunk in Mississauga, Ontario as described in the Feasibility Study prepared by Stantec (April 24, 2020). This study is part of the *Front Street Station Wastewater Flow Diversion: Schedule B Class Environmental Assessment Addendum*, for Lakeshore Road West in Mississauga, Ontario.

The following project components are assessed in this aquatic environment impact assessment:

- A sanitary trunk sewer and a watermain along Lakeshore Avenue from Front Street South to Elmwood Avenue South
- A pumping station within Jack Darling Park (three options)

For the purpose of the aquatic environment impact , the Study Area is defined as all lands within 30 m of the footprint of the proposed tunnel construction staging area, the proposed tunnel, and each of the three options for a pumping station in Jack Darling Park. The Study Area is shown in Figure 1 to Figure 4.

BACKGROUND REVIEW

Background data regarding fish and fish habitat in the Study Area were obtained from the following sources:

- MNRF's LIO database (MNRF 2020a) - to determine the location of watercourses in the Study Area and, where available, flow regime, thermal regime, and fish community data.
- Natural Heritage Information Centre's (NHIC) Biodiversity Explorer database (MNRF 2020b) - to determine if provincially regulated fish or freshwater mussel SAR have been documented in the Study Area.
- MNRF's Constructed Drains digital dataset (MNRF 2020c) - to determine if there are constructed drains in the Study Area and, if applicable, the corresponding Drain Class as per Fisheries and Oceans Canada (DFO) (DFO 2014).
- DFO mapping of aquatic SAR (DFO 2020a) - to determine if federally regulated fish or freshwater mussel SAR have been documented in the Study Area.
- Natural Environment Assessment - Front Street Station Wastewater Flow Diversion (WSP 2019) - to obtain additional background data and detailed descriptions of watercourses
- Lake Ontario Integrated Shoreline Strategy Characterization Report (CVC 2018) - to obtain additional background data regarding watercourses and records of fish communities.

Due to the availability of information in the above databases and reports, field investigations were not completed as part of this study.

Reference: **Lakeshore West Sanitary Trunk Sewer Extension - Phase 1 Option 1 Aquatic Environment Impact Assessment for the Schedule B Class Environmental Assessment Addendum**

FISH HABITAT

Credit River

The Study Area includes a reach of the Credit River in close proximity to its confluence with Lake Ontario (Figure 1). The reach of the Credit River in the Study Area (Figure 1) is described in the Shoreline Characterization Report (CVC 2018) as follows:

> *"The banks of the Credit River are armoured (e.g., armour stone, steel seawall) up to and slightly beyond Lakeshore Road, reducing riparian habitats, functions and access (for fish as well as floodwaters) to the floodplain. Upstream of Lakeshore Road to the CN Rail tracks, the banks are predominantly natural with the exception of a few private docks and minor riprap bank stabilization.*
>
> *Interactions between lake and river are evident in this area. River depth becomes shallower towards the mouth, as sediment transported from upstream meets slower moving waters from the lake and begins to settle out. Ice formation in the river provides some protection from wave propagation from the lake into the river in the winter. Deposition of materials at the mouth of the Credit River means a regular need for navigation dredging to maintain boat access to the marina. The Credit River Harbour Sediment Study (Geomorphic Solutions 2012b) classified sediment in the mouth of the Credit as sand and silt, although dominant underlying substrate at the mouth of the Credit River is predominantly shale."*

Birchwood Creek

The watercourse layer by MNRF (2020a) depicts a tributary of Birchwood Creek in the eastern portion of the Study Area (Figure 1, Figure 2, Figure 3). This tributary is crosses Lakeshore road through a 350 mm diameter concrete pipe. During WSPs November 2017 field investigation, standing water but no flow was observed in this tributary south of Lakeshore Road (WSP 2019). No fish were observed in this tributary at that time (WSP 2019).

The main channel of Birchwood Creek crosses Lakeshore Road west of Study Area (MNRF 2020a) (Figure 1). The channel is visible west of Lakeshore Road where it is located in Fudger's Marsh. An approximately 450 m section of the Birchwood Creek is piped under Jack Darling Park. The pipe ends at a headwall structure east of Jack Darling Park Road. The confluence with the tributary of Birchwood Creek is approximately 5 m downstream of the headwall structure. The creek continues as an open straight constructed channel that is between 2.5 m and 3.0 m wide. The confluence of Birchwood Creek with Lake Ontario is located approximately 250 m downstream of the headwall structure. The mouth of the creek at Lake Ontario is described by CVC (2018) as follows:

> *"Birchwood Creek discharges over a sand beach into Lake Ontario. Access from the lake to this stream is open but low flows may limit fish access. Use of this stream by lake species is presumably further limited by the barrier resulting from the enclosure in Jack Darling Park."*

The Credit Valley Conservation Authority's (CVC) Regulation Mapping (CVC 2020) shows the alignment of Birchwood Creek through the northeast corner of Jack Darling Park; however, this creek alignment was not observed during the site visit as it is piped under the park as discussed above.

Reference: **Lakeshore West Sanitary Trunk Sewer Extension - Phase 1 Option 1 Aquatic Environment Impact Assessment for the Schedule B Class Environmental Assessment Addendum**

The 450 m piped section under Jack Darling Park has been identified by CVC as an opportunity to remove the first barrier that limits movement of fish from Lake Ontario (CVC 2018). Birchwood Creek has a moderate potential for barrier mitigation according to CVC (2018).

FISH COMMUNITY

Fish records are available for both the Credit River and Birchwood Creek (CVC 2018). Western Blacknose Dace and Creek Chub are the only fish species recorded in Birchwood Creek by CVC (2018). Both of these species are native, common and widespread in Southern Ontario and have a preference for a coolwater thermal regime.

As many as 48 species of fish have been recorded in the Credit River in recent years (CVC 2018; MNRF 2020a). Most fishes recorded in the Credit River are warmwater and coolwater species; however, Chinook Salmon, Rainbow Trout and Sea Lamprey, all coldwater species, were also captured. Table 1 summarizes the fish species recorded in the Credit River, with the species thermal regime preference and the origin.

Table 1: Fish Species Recorded in the Credit River (Source: CVC 2018, MNRF 2020a)

Common Name	*Scientific Name*	Thermal Class[1]	Origin/Status
Alewife	*Alosa pseudoharengus*	Cool	Non-Native
American Eel	*Anguilla rostrata*	Cool	Native / Endangered /Protected in Ontario under the ESA
Black Crappie	*Pomoxis nigromaculatus*	Cool	Native
Bluntnose Minnow	*Pimephales notatus*	Warm	Native
Brown Bullhead	*Ameiurus nebulosus*	Warm	Native
Brown Trout	*Salmo trutta*	Cool	Non-Native
Chinook Salmon	*Oncorhynchus tshawytscha*	Cold	Native
Coho Salmon	*Oncorhynchus kisutch*	Cold	Non-Native
Common Carp	*Cyprinus carpio*	Warm	Non-Native
Creek Chub	*Semotilus atromaculatus*	Cool	Native
Emerald Shiner	*Notropis atherinoides*	Cool	Native
Fantail Darter	*Etheostoma flabellare*	Cool	Native
Fathead Minnow	*Pimephales promelas*	Warm	Native
Freshwater Drum	*Aplodinotus grunniens*	Warm	Native
Gizzard Shad	*Dorosoma cepedianum*	Warm	Native
Golden Shiner	*Notemigonus crysoleucas*	Cool	Native
Goldfish	*Carassius Auratus*	Warm	Non-Native
Greater Redhorse	*Moxostoma valenciennes*	Warm	Native
Hornyhead Chub	*Nocomis biguttatus*	Cool	Native
Johnny Darter	*Etheostoma nigrum*	Cool	Native
Lake Chub	*Couesius plumbeus*	Cold	Native

Reference: **Lakeshore West Sanitary Trunk Sewer Extension - Phase 1 Option 1 Aquatic Environment Impact Assessment for the Schedule B Class Environmental Assessment Addendum**

Table 1: Fish Species Recorded in the Credit River (Source: CVC 2018, MNRF 2020a)

Common Name	*Scientific Name*	Thermal Class[1]	Origin/Status
Largemouth Bass	*Micropterus salmoides*	Warm	Native
Logperch	*Percina caprodes*	Warm	Native
Longnose Dace	*Rhinichthys cataractae*	Cool	Native
Longnose Sucker	*Catostomus catostomus*	Cold	Native
Northern Hog Sucker	*Hypentelium nigricans*	Warm	Native
Northern Pike	*Esox lucius*	Cool	Native
Pumpkinseed	*Lepomis gibbosus*	Warm	Native
Rainbow Darter	*Etheostoma caeruleum*	Cool	Native
Rainbow Smelt	*Osmerus mordax*	Cool	Non-Native
Rainbow Trout	*Oncorhynchus mykiss*	Cold	Non-Native
River Chub	*Nocomis micropogon*	Cool	Native
Rock Bass	*Ambloplites rupestris*	Warm	Native
Rosyface Shiner	*Notropis rubellus*	Warm	Native
Round Goby	*Neogobius melanostomus*	Cool	Non-Native
Sea Lamprey	*Petromyzon marinus*	Cold	Non-Native
Shorthead Redhorse	*Moxostoma macrolepidotum*	Warm	Native
Smallmouth Bass	*Micropterus Salmoides*	Cool	Native
Spotfin Shiner	*Cyprinella spiloptera*	Warm	Native
Spottail Shiner	*Notropis hudsonius*	Cool	Native
Stonecat	*Noturus flavus*	Warm	Native
Tessellated Darter	*Etheostoma olmstedi*	Cool	Native
Trout-perch	*Percopsis omiscomaycus*	Cold	Native
Western Blacknose Dace	*Rhinichthys obtusus*	Cool	Native
White Bass	*Morone chrysops*	Warm	Native
White Perch	*Morone Americana*	Warm	Non-Native
White Sucker	*Catostomus commersonii*	Cool	Native
Yellow Perch	*Perca flavescens*	Cool	Native

[1]source Coker et al, 2001

Aquatic Species at Risk

There are records of the following aquatic species at risk in or near the Study Area:

- American Eel (*Anguilla rostrata*): American Eel may occur at the mouth of the Credit River (DFO 2020a; MNRF 2020b; CVC 2018) and the Credit River is a migratory corridor for the species (McGregor et al 2013). American Eel is listed as Endangered in the Species at Risk in Ontario (SARO) list and is protected by the *Endangered Species Act, 2007 (*ESA). American Eel is not protected by the federal *Species at Risk Act, 2002* (SARA).

- Shortnose Cisco (*Coregonus reighardi*): Shortnose Cisco may occur at the mouth of the Credit River (DFO 2012; DFO 2020a, MECP 2019). The Shortnose Cisco is found only in the Great Lakes of North America. It was last seen in Lake Ontario in 1964 (COSSARO 2017). Shortnose Cisco are a deep water species; however, their life history and habitat requirements are not known. In Ontario, the Shortnose Cisco lives in the deep, cold water of the Great Lakes, usually at depths between 22 to 110 m (COSSARO 2017). Shortnose Cisco is listed as Endangered in the SARO list and is protected by the ESA. Shortnose Cisco is also listed as Endangered under the SARA and is protected by the SARA.

PROPOSED ACTIVITIES

The following activities are proposed as part of Phase 1, Option 1 of the Lakeshore West Sanitary Trunk Sewer and Watermain Extension:

- A sanitary trunk sewer and a watermain along Lakeshore Avenue from Front Street South to Elmwood Avenue South

- A pumping station within Jack Darling Park

The impacts associated with each activity are discussed below.

IMPACT ASSESMENT

The potential for impacts on fish habitat associated with the proposed activities is discussed below.

SANITARY TRUNK SEWER AND WATERMAIN

A sanitary trunk sewer and a watermain will be installed from Lakeshore Avenue from Front Street South to Elmwood Avenue South. Installation of these utilities will be completed using a trenchless method, i.e., Microtunnel construction method and will be in rock. Microtunnelling is an underground tunnel construction technique used to construct utility tunnels. Figure 1 shows the alignment of the trunk sewer and the watermain and the staging area for the microtunnelling construction activities.

Two staging areas are proposed for the microtunnelling east and west of the Credit River as shown on Figure 1. Both are outside the active channel of the Credit River, nearshore habitats, and riparian areas.

The alignment of the utilities requires microtunnelling underneath the Credit River. Microtunnelling is intended to be a less intrusive construction method than traditional open cut crossing of a watercourse or wetland with a pipe, cable or other underground service. Due to the location of the entry and exit pits for the tunnel (i.e., outside of the floodplain), the potential for sediment laden water or other deleterious substances to enter the Credit River (as the result of grading, drilling excavations, equipment washing, or other construction related activities during microtunnelling) is low.

Mitigation measures and a contingency plan (described in the next section) are required to limit impact to fish habitat in the event of spill.

Provided that all mitigation measures discussed in this report are implemented the installation of the sanitary trunk sewer and watermain under the Credit River using microtunnelling construction methods are not expected to impact fish or fish habitat. The proposed activities are also not expected to impact fish species at risk or their habitat.

JACK DARLING PARK PUMPING STATION

Three options for the pumping station have been developed and their impacts are discussed below.

Option 1

Disturbance associated with the construction of proposed pumping station - option 1 is at least 50 m from the tributary of Birchwood Creek (Figure 2). The temporary easement encroaches on the CVC Regulated Area associated with the piped section of Birchwood Creek under Jack Darling Park.

Construction and operation of pumping station - option 1 will not affect the unnamed tributary of Birchwood Creek or the piped section of Birchwood Creek; therefore, pumping station - option 1 is not expected to result in impacts to fish or fish habitat.

Option 2

The temporary and permanent easements for pumping station - option 2 are at least 100 m from the unnamed tributary of Birchwood Creek (Figure 3). Most of the temporary and permanent easements for pumping station - option 2 are within the CVC Regulated Area associated with the piped section of Birchwood Creek under Jack Darling Park.

Construction and operation of pumping station - option 2 will not affect the unnamed tributary of Birchwood Creek, the piped section of Birchwood Creek; therefore, pumping station - 2 is not expected to result in impacts to fish or fish habitat.

Option 3

The temporary and permanent easements for pumping station - option 3 are at least 50 m from the unnamed tributary of Birchwood Creek (Figure 4). The temporary easements for Option 3 are for a large part within the CVC Regulated Area associated with the piped section of Birchwood Creek under Jack Darling Park. The permanent easement for pumping station - option 3 is almost entirely in the CVC Regulated Area and it crosses the piped portion of Birchwood Creek.

Construction and operation of pumping station - option 3 will not affect the unnamed tributary of Birchwood Creek or the piped section of Birchwood Creek. Pumping station - option 3 is not expected to result in impacts to fish or fish habitat.

MITIGATION MEASURES AND CONTINGENCY PLAN

Mitigation measures have been developed specific for the construction of a pumping station in Jack Darling Park and the installation of utilities under the Credit River using microtunnelling methods. We have also described contingency measures.

GENERAL CONSTRUCTION MITIGATION MEASURES

The following general mitigation measures apply to the construction of the tunnel construction staging area and the pumping stations:

- Prior to construction, the limits of vegetation clearing should be staked in the field so that disturbance does not occur outside of a pre-determined area required for construction of the pumping station.
- Design and implement an Erosion and Sediment Control (ESC) plan that identifies erosion control measures that should be installed, monitored and maintained throughout all phases of the Project until the site has been stabilized.
- Designated areas for equipment refueling should be located a minimum 30 m from watercourses, waterbodies or regulated areas.
- Construction dewatering, associated with excavation (if applicable), should be pumped through a filter system (i.e., filter bags and/or sediment filter tank) before being discharged to a watercourse .
- Machinery shall arrive on site in a clean condition and maintained free of fluid leaks, invasive species and noxious weeds.
- Develop and implement a containment and spill management plan (or equivalent) that reduces the risk of accidental spills or releases (including construction materials) from entering a watercourse.
- Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to reduce the risk of the entry of deleterious substances to surface water features.
- Remove all construction materials from site upon project completion.
- If dewatering associated with excavation will be discharged to any watercourse, design and implement measures for managing water should be established such that sediment is filtered out prior to the water entering the river or other surface water features (i.e., use of filter bags and/or sediment filter tank).
- If construction of the pumping station requires disturbance to the piped portion of Birchwood Creek, construction shall be phased such that downstream flow to Birchwood Creek is maintained during construction.

Reference: **Lakeshore West Sanitary Trunk Sewer Extension - Phase 1 Option 1 Aquatic Environment Impact Assessment for the Schedule B Class Environmental Assessment Addendum**

MICROTUNNELLING MITIGATION MEASURES

The following general environmental mitigation measures are recommended to protect fish and fish habitat during microtunnelling construction activities:

- A restricted activity period applies to in-water work (i.e., activities below the top of bank) and will protect spring and fall spawning species. No microtunnelling construction activities under the Credit River between October 1 and July 15. This window is based on the 'Timing windows to conduct projects in or around water' recommendations on the Fisheries and Oceans website (DFO 2020b).
- An experienced and certified environmental monitor (i.e., a Certified Inspector of Sediment and Erosion Control [CISEC]) shall be on site when microtunnelling construction activities are taking place underneath the Credit River.
- Prior to removal of the vegetation cover, effective mitigation techniques for erosion and sedimentation should be in place to protect water quality. Disturbance to the area during construction should be limited and grubbing activities should be delayed until immediately prior to grading operations.
- Soil exposure should be reduced prior to commencing construction, and the period that soil remains exposed for grading should be reduced to the extent possible. Exposed soils surrounding watercourses should be seeded immediately following construction.
- Install appropriate berms, silt fencing and secondary containment measures (i.e., plastic tarp) around drilling and drilling mud management equipment at both bore entry and bore exit locations to contain operational spills.
- Temporary erosion and sediment control measures should be maintained and kept in place until work within or near a watercourse has been completed and stabilized. Temporary sediment control measures should be removed at the completion of the work but not until permanent erosion control measures have been established.
- Construction material, excess material, construction debris and empty containers should be stored a minimum of 30 m from watercourses and watercourse banks, where practical.
- Equipment maintenance and refueling should be controlled to prevent entry of petroleum products or other deleterious substances, including any debris, waste, rubble, or concrete material, into a watercourse, unless otherwise specified in the contract.
- Deleterious substances (fuel, oil, spoil) should be stored a minimum of 30 m from the watercourse. Any such material that inadvertently enters a watercourse should be removed in a manner satisfactory to the environmental inspector.
- Clean up operational spills daily to prevent mobilization of drilling mud off site during rain events.
- Drilling mud should be disposed in accordance with the appropriate regulatory authority requirements.
- Following construction, disturbed vegetation should be restored to pre-construction conditions to the extent possible in accordance with environmental permits.

Reference: Lakeshore West Sanitary Trunk Sewer Extension - Phase 1 Option 1 Aquatic Environment Impact Assessment for the Schedule B Class Environmental Assessment Addendum

CONTINGENCY PLAN

A contingency plan should be prepared and kept on-site. Spills containment and clean-up procedures shall be implemented immediately in the unlikely event of a spill. The proponent shall immediately contact the Ministry of Environment and Conservation and Parks (MECP) Spills Action Centre. The MECP Spills Action Centre is the first point of contact for spills at the provincial and federal level. In addition, the following agencies will be contacted:

- Fisheries and Oceans Canada (Toll-free: 1-855-852-8320)
- Ministry of Natural Resources and Forestry (Toll-free:1-866-517-0571)
- Credit Valley Conservation (Call: 1-905-670-1615 extension 0)

A contingency plan will be in place to effectively address inadvertent releases of sediment laden water or other deleterious substances from the project site. The contingency plan shall outline the steps that the contractor is to take in the event of a sediment release or other type of spill.

PERMITTING REQUIREMENTS

Fish and Fish Habitat

The federal *Fisheries Act* prohibits causing harmful alteration disruption and destruction (HADD) of fish habitat unless authorized by the DFO. It protects all fish and fish habitat and prohibits causing the death of fish by means other than fishing.

Construction activities required to prepare a staging area for tunnel installation at the Port Credit Library does not encroach into fish habitat; therefore, impacts on fish and fish habitat are not expected to occur.

With the implementation of measures to avoid causing the death of fish or HADD of fish habitat, impacts to fish and fish habitat are not expected to occur as a result of the microtunnelling activities under the Credit River; therefore, the crossing does not require review or Authorization under the *Fisheries Act.*

The pumping station at Jack Darling Park (all three options) do not directly affect fish or fish habitat; therefore, this component of the project is not expected to result in impacts to fish or fish habitat.

Aquatic Species at Risk

Shortnsose Cisco prefers deep water in lake habitats and has not been recorded in Lake Ontario since 1964; therefore, it is not expected to occur in the Study Area. Agency reviews for ESA or SARA Permits for this species are not required.

American Eel and its habitat are protected by the ESA. The microtunnelling activities under the Credit River will not directly affect American Eel habitat or the species since in-water work is not required; therefore, review by the MECP under the ESA are not required.

Reference: **Lakeshore West Sanitary Trunk Sewer Extension - Phase 1 Option 1 Aquatic Environment Impact Assessment for the Schedule B Class Environmental Assessment Addendum**

SUMMARY

With the implementation of mitigation measures described in this report, the risk of the death of fish or HADD of fish habitat as a result of the project is low and the project can proceed without DFO review under the *Fisheries Act* .

American Eel may occur in the Credit River, however, the project can proceed without MECP review under the ESA since in-water work is not required for the installation of utilities under the Credit River using microtunnelling methods.

Stantec Consulting Ltd.

Taco Den Haas M.Sc.
Senior Fisheries Biologist
Phone: 647-205-5738
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Attachments: Figure 1: Tunnel Construction Staging Area
Figure 2: Pumping Station Option 1
Figure 3: Pumping Station Option 2
Figure 4: Pumping Station Option 3

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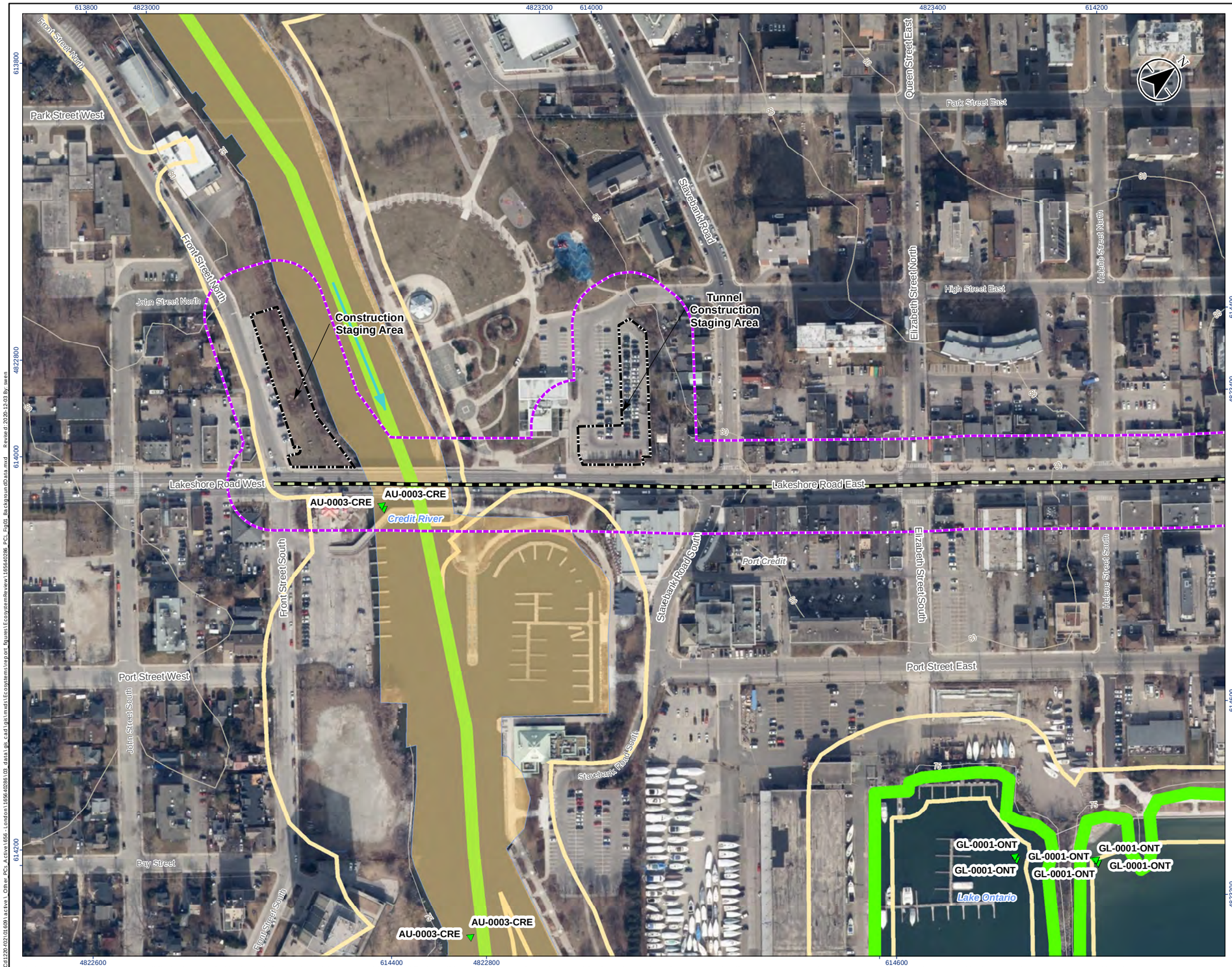


Stantec

Legend

- Flow Arrow
- Sanitary Trunk Sewer and Watermain Alignment
- Study Area (30 m)
- Construction Staging Area
- Generic Regulation Limit 2013 (CVC, 2020)
- Fish Survey Point (ARA)
- Thermal Regime, Warm
- Aquatic Species at Risk Distribution
- Waterbody
- Lot

0 50 100 m

1:2,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.
3. Orthoimagery © First Base Solutions, 2020. Imagery Date, 2019.
4. Generic Regulation Limit 2013 from CVC, Generic Regulations Mapping (latest update on data was 2013), date published Aug 27th, 2019.

Greenbelt Natural Heritage System

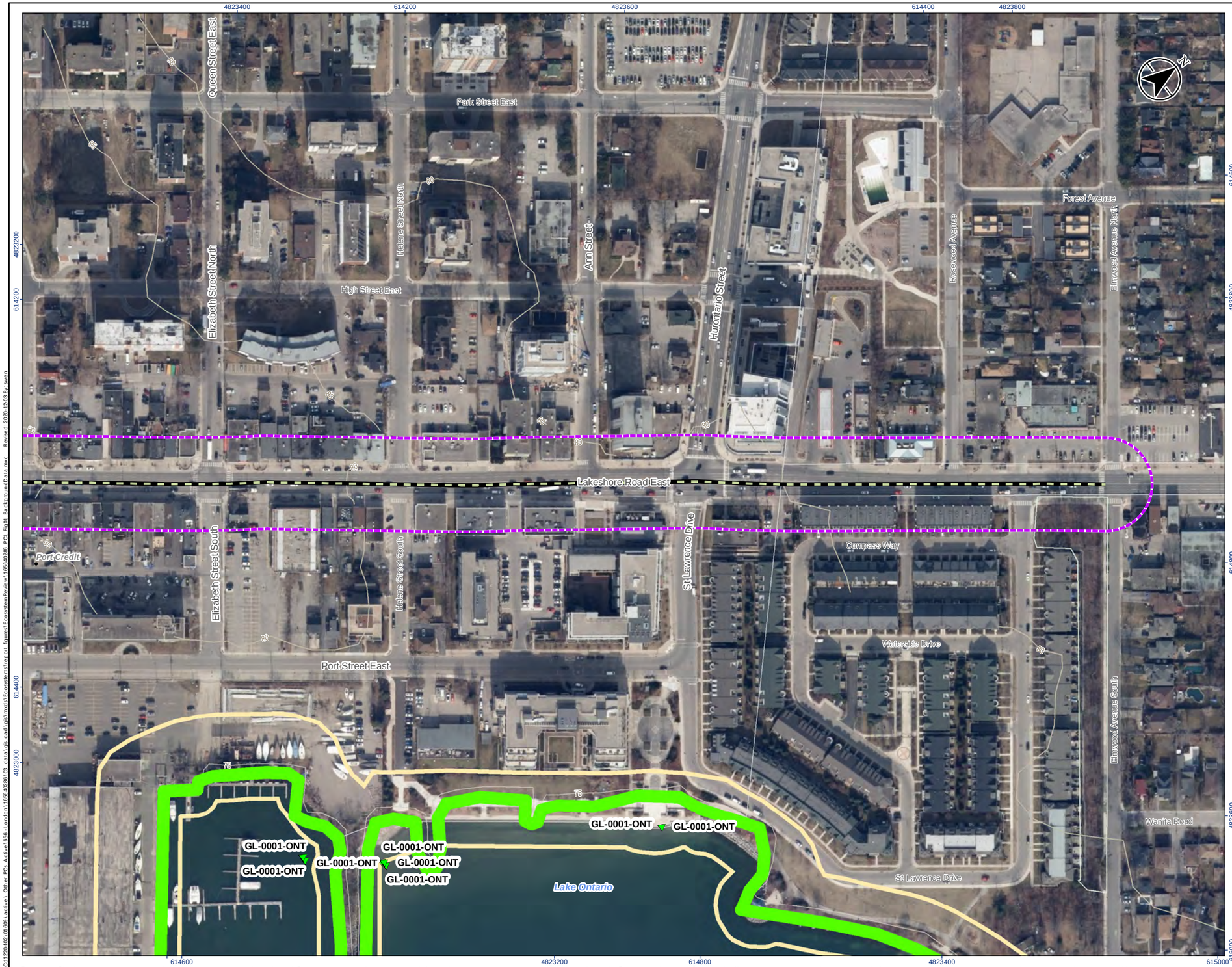
Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2020-12-03

Client/Project
REGION OF PEEL
LIBRARY PARKING LOT AND TUNNEL ALIGNMENT

Figure No.
1 - 1

Title
Existing Conditions and Proposed Development



Stantec

Legend

- Sanitary Trunk Sewer and Watermain Alignment
- Study Area (30 m)
- Generic Regulation Limit 2013 (CVC, 2020)
- Fish Survey Point (ARA)
- Aquatic Species at Risk Distribution
- Waterbody
- Wooded Area
- Lot

0 50 100 m

1:2,500 (At original document size of 11x17)

Notes

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Greenbelt Natural Heritage System

Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2020-12-03

Client/Project
REGION OF PEEL
LIBRARY PARKING LOT AND TUNNEL ALIGNMENT

Figure No.
1 - 2

Title
Existing Conditions and Proposed Development

612200 612400 612600 612800

4820800 4820600 4820400

Lorne Park Road
Tennyson Avenue
Veroli Court
Macdonnell Avenue
Roper Avenue
Tributary of Birchwood Creek
Lakeshore Road West
Jack Darling Park Road
Albertson Crescent
Esliv Drive
Fudger's Marsh
Birchwood Creek

Driveways EA Option1 - Into

Permanent Easement - Option 1

Temporary Easement - Option 1

Blacknose Dace, Creek Chub

N

Stantec

Legend

- Study Area (30 m)
- Temporary Driveway into Construction (from Lakeshore West)
- Permanent Easement
- Temporary Easement
- Generic Regulation Limit 2013 (CVC, 2020)
- Watercourse Piped Underground
- Watercourse Permanent, Warmwater Thermal Regime
- Wetland, Other Evaluated
- Greenbelt Natural Heritage System

0 50 100 m

1:2,000 (At original document size of 11x17)

Notes

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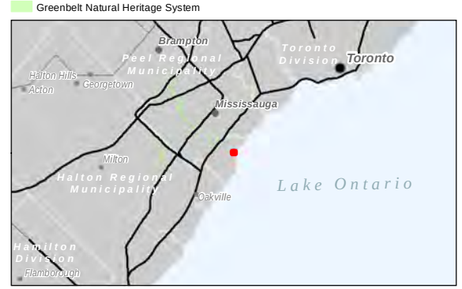

Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2020-12-03

Client/Project
REGION OF PEEL
JACK DARLING PARK
OPTION 1

Figure No.
2

Title
Existing Conditions and Proposed Development

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612200 612400 612600 612800

4820800 4820600 4820400

Lorne Park Road
Tennyson Avenue
Veroli Court
Macdonnell Avenue
Tributary of Birchwood Creek
Rupert Avenue
Lakeshore Road West
Permanent Easement - Option 2
Temporary Easement - Option 2
Alberton Crescent
Jack Darling Park Road
Blacknose Dace, Creek Chub
Fudger's Marsh
Birchwood Creek
Edu Drive

N

Stantec

Legend

- Study Area (30 m)
- Permanent Easement
- Temporary Easement
- Generic Regulation Limit 2013 (CVC, 2020)
- Watercourse Piped Underground
- Watercourse Permanent, Warmwater Thermal Regime
- Wetland, Other Evaluated

0 50 100 m

1:2,000 (At original document size of 11x17)

Notes

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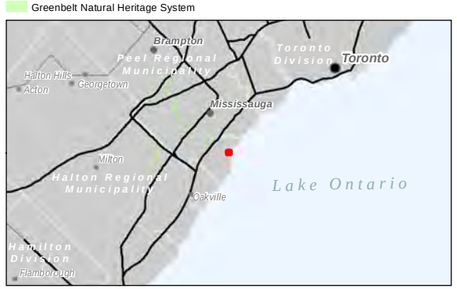
4. Generic Regulation Limit 2013 from CVC, Generic Regulations Mapping (latest update on data was 2013), date published Aug 27th, 2019.

Greenbelt Natural Heritage System



Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2020-12-03

Client/Project
REGION OF PEEL
JACK DARLING PARK
OPTION 2

Figure No.
3

Title
Existing Conditions and Proposed Development

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612200 612400 612600 612800

4820800 4820600 4820400

Lorne Park Road
Tennyson Avenue
Veroli Court
Macdonnell Avenue
Tributary of Birchwood Creek
Roper Avenue
Lakeshore Road West
Albertson Crescent
Jack Darling Park Road
Eddy Drive
Fudger's Marsh
Birchwood Creek

Temporary Easement - Option 3

Temporary Easement - Option 3

Permanent Easement - Option 3

Blacknose Dace, Creek Chub

N

Stantec

Legend

- Study Area (30 m)
- Permanent Easement
- Temporary Easement
- Generic Regulation Limit 2013 (CVC, 2020)
- Watercourse Piped Underground
- Watercourse Permanent, Warmwater Thermal Regime
- Wetland, Other Evaluated

0 50 100 m

1:2,000 (At original document size of 11x17)

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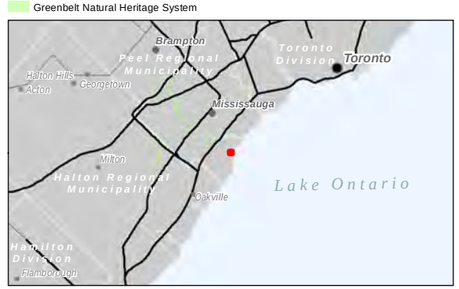
Greenbelt Natural Heritage System



Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2020-12-03

Client/Project
REGION OF PEEL
JACK DARLING PARK
OPTION 3

Figure No.
4

Title
Existing Conditions and Proposed Development

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Appendix G
Cultural Heritage Assessment

To:	Paula Hohner	From:	Lashia Jones
	Stantec		Stantec
File:	165640286	Date:	January 13, 2021

Reference: Lakeshore Road Municipal Class Environmental Assessment Addendum – Cultural Heritage Assessment

PROJECT CONTEXT

In 2019, the Region of Peel (the Region) completed a Municipal Class Environmental Assessment (Class EA) study to address the current wastewater flows from the Front Street Sewage Pumping Station (SPS) catchment area to align with the Region's long-term sustainable plan to provide wastewater services. As part of the preliminary design process, additional opportunities were identified to consolidate infrastructure elements and provide greater flexibility within the system to divert flows from the G.E. Booth Wastewater Treatment Plant (WWTP) sewershed to the Clarkson WWTP to meet long term servicing goals.

The 2019 Class EA recommended the construction of a new gravity sewer along Lakeshore Road between Jack Darling Park and Front Street. Based on the opportunities identified during preliminary design, the sanitary sewer is now proposed to cross the Credit River via trenchless technology eastward to the Port Credit Library parking lot. The 2019 Class EA also recommended the construction of a new sewage pumping station within Richard's Memorial Park. However, based on the revised strategy, the new pumping station at Richard's Memorial Park is no longer required and is now being proposed within Jack Darling Park. All other recommendations of the 2019 Class EA are applicable, including the decommissioning of the existing Richard's Memorial SPS, the Front Street SPS, and the Ben Machree SPS.

As such, the Region of Peel has initiated an EA Addendum to address the extension of the new sanitary sewer across the Credit River via trenchless construction methods and the new location of the proposed SPS at Jack Darling Park. The Region will be installing a new 600 millimetre water subtransmission main across the Credit River to provide additional capacity to the Zone 1 system. The EA addendum expands the study area along Lakeshore Road to the east to Stavebank Road South, with the consideration of a tunnel shaft and compound in the parking lot of the Port Credit Public Library (located at 20 Lakeshore Road East),and three alternatives within Jack Darling Park for the proposed SPS.

As part of the 2019 EA, a Cultural Heritage Resource Assessment (CHRA) was prepared by WSP Consultants to identify cultural heritage resources within the study area, identify potential impacts resulting from the proposed alternatives of the EA, and recommend mitigation measures where impacts were anticipated. The CHRA study area consisted of Lakeshore Road between Jack Darling Memorial Park and Front Street, as well as Godfrey's :Line, Ben Machree Drive, Pine Ave, and Ben Machree Park. The CHRA identified seven Cultural Heritage Landscapes (CHL) and 16 Built Heritage Resources. Jack Darling Park was identified as a CHL.

The purpose of this memo is to identify cultural heritage resources in the extension of the study area along Lakeshore Road to Stavebank Road, determine the potential impacts to newly identified resources, identify potential impacts of the proposed SPS locations on the CHL of Jack Darling Park, and recommend mitigation measures where impacts are anticipated. The Study Area is shown in Appendix A.

METHODOLOGY

REQUIREMENTS

The requirement to consider cultural heritage in Municipal Class EAs (MCEAs) is discussed in the *Municipal Class Environmental Assessment Manual* (MCEA Manual) and the revised 2020 *Provincial Policy Statement* (PPS) (Municipal Engineers Association 2015; Government of Ontario 2020). The MCEA Manual considers cultural heritage, including built heritage resources and cultural heritage landscapes as well as archaeological resources, as one in a series of environmental factors to be considered when undertaking an MCEA, particularly when describing existing and future conditions, development alternatives, and determination of the preferred alternative.

The MCEA Manual further suggests that cultural heritage resources that retain heritage attributes should be identified early in the EA process and avoided where possible. Where avoidance is not possible, potential effects to these attributes should be identified and minimized. Adverse impacts should be mitigated according to provincial and municipal guidelines. It is suggested that this happen early in the process so that potential impacts to significant features can be included in an understanding of project impacts and plans established to mitigate these impacts.

In addition to requirements outlined in the MCEA Manual, provisions made under the PPS were also considered in the preparation of the study. Section 2.6 of the PPS addresses cultural heritage in the land use planning process and as such was considered. The applicable provisions include:

> *2.6.1 - Significant built heritage resources and significant cultural heritage landscapes shall be conserved.*
>
> *2.6.3 - Planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property except where the proposed development and site alteration has been evaluated and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved.*
>
> (Government of Ontario 2020)

FIELD PROGRAM

A pedestrian survey was conducted on October 30, 2020 from the public right-of-way (RoW) by Ruth Dickau, Material Culture Analyst, with Stantec. The Study Area surrounding the proposed alternatives for the tunnel shaft and compound was surveyed for potential heritage resources, including both built heritage resources and cultural heritage landscapes. Where identified, these were photographed and their locations recorded. Characteristics of each potential heritage resource were noted while in the field and recorded. Properties within 50 metres of the proposed tunnel shaft and compound were included in the field program. The pedestrian survey also assessed the locations of the proposed SPS in Jack Darling Park.

In general, heritage resources of more than 40 years of age were evaluated during the survey for their potential to satisfy Ontario Regulation (O. Reg.) 9/06 criteria. The use of the 40-year threshold is generally accepted by both the federal and provincial authorities as a preliminary screening measure for cultural heritage value or interest (CHVI). This practice does not imply that all properties more than 40 years of age are inherently of significant heritage value, nor does it exclude exceptional examples constructed within the past 40 years of being of cultural heritage value.

HISTORICAL REVIEW

This assessment relies on the previously completed CHAR for the 2019 EA. Additional historical background research was not completed for Lakeshore Road or Jack Darling Park. Where required, additional research of

the properties within 50 metres of the proposed tunnel shaft and compound was conducted in order to determine CHVI, but additional research was not completed for Jack Darling Park or the wider Lakeshore Road study area. A summary of the research contained in the 2019 CHAR is included below.

Summary of 2019 Historical Review

The Study Area is part of Toronto Township, which was surveyed in 1805, following a series of treaties between the British government and the Mississauga of the Credit. Euro-Canadian settlement of the township began soon after by Euro-Canadian settlers and United Empire Loyalists (WSP 2019).

The Study Area was part of Old Port Credit Village, surveyed in 1834. By the mid-1850s the area had become a busy shipping centre, though the arrival of the Great Western Railway in 1855 linked Port Credit to Toronto and Hamilton and decreased some harbour activity. A fire at the harbour in 1855 also affected shipping activity, though the harbour was still used for "stonehooking" in the 1860s, where schooners would collect stones from the bottom of Lake Ontario be to sold as building materials in Toronto. The harbour became a destination for fishing. In the latter half of the 19th century the village developed with residences and businesses and became the largest village in the Township. Port Credit became a Police Village in 1909 and was incorporated into a Village in 1914. The arrival of improved transportation in the area, including the Lakeshore Highway (Lakeshore Road) in 1915, and the Queen Elizabeth Way (QEW) in 1939, linked the area to Toronto and other nearby major centres, facilitating population growth and the transition of the village to a commuter village for residents working in Toronto. By 1961 Port Credit became recognized as a Town. In the latter half of the 20th century, the town continued to develop alongside the rest of Toronto Township, and in 1974, Port Credit was amalgamated with other parts of the Township into the City of Mississauga. Mississauga had been established as a city in 1968 (WSP 2019).

SITE DESCRIPTION

SEWER EXTENSION, TUNNEL SHAFT AND COMPOUND SITE AND VICINITY

The location of the proposed tunnel shaft and compound is within the existing parking lot of the Port Credit Public Library, located at 20 Lakeshore Road East. The parking lot consists of a paved asphalt area, spanning between the library on the southwest and structures located along Stavebank Road South on the northeast (Plate 1). A grassed and treed berm separates the parking lot from the structures fronting on Stavebank Road South. The library building was constructed in 1961 and is a one storey T-shaped structure with flat roof and wrap-around open porch-like structure (Plate 2). A park and playground area are located northeast of the parking lot (Plate 3).

Northeast of the parking lot are commercial and residential low-rise apartment buildings fronting on Lakeshore Road East and Stavebank Road. The buildings range from one to three storeys in height, with a variety of roof types (flat, hip, front gable) and cladding types (siding, red brick, yellow brick, fabricated stone) (Plate 4). Northwest of the parking lot, to the north of the park, is a two storey stone church with front gable roof (24 Stavebank Road) (Plate 5).

The Study Area is located on the northeast side of Lakeshore Road East, a four-lane asphalt paved road with concrete and interlocking brick sidewalks and traffic "bump outs" on each side of the road. Stavebank Road South consists of a two-lane paved asphalt road with concrete curbs and sidewalks on both sides of the road (Plate 6).

The former post office and customs house for Port Credit is located east of the study area and is a two-storey red brick building with flat roof (Plate 7). Northeast of the parking lot, across Lakeshore Road East, is the Credit Village Marina, located off the Credit River near the mouth of the harbour (Plate 8). The marina and Lakeshore Road East, west of the Credit River crossing, are located within the Old Port Credit Heritage Conservation District.

Plate 1: Parking area at the Port Credit Public Library

Plate 2: Port Credit Public Library

Plate 3: Park behind the Port Credit Public Library

Plate 4: Commercial properties to the east of the study area

Plate 5: St. Andrew's Memorial Presbyterian Church

Plate 6: Lakeshore Road East at Stavebank Road (looking west)

Plate 7: Former Post Office and Custom's House

Plate 8: Port Credit Marina

JACK DARLING MEMORIAL PARK

Jack Darling Memorial Park is located at 1180 Lakeshore Road West. The park consists of more than 70 acres of parkland, including lawn, picnic areas, mature and young trees, park trails, dog park, tennis courts, and a 1,500 square foot prairie wildflower garden established in 2013, inspired by natural tallgrass prairie ecosystems (Plate 9 to Plate 13). The park also contains the Lorne Park Water Treatment Plant (Plate 14). The proposed location of the new pumping station is within an existing paved parking area and small bank of trees (Plate 15, Plate 16).

Plate 9: Entrance to Jack Darling Park

Plate 10: Park pathways and vegetation

Plate 11: Tallgrass Prairie feature

Plate 12: Tallgrass Prairie area

Plate 13: Dog park

Plate 14: Lorne Park Water Treatment Plant

Plate 15: Parking area for proposed pumping station location

Plate 16: Wooded area at the proposed location of the pumping station

AGENCY AND MUNICIPAL CONSULTATION

In order to identify heritage resources, the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), the Ontario Heritage Trust (OHT), and the City of Mississauga were consulted.

At the provincial level, Karla Barboza, Team Lead, Heritage, with the MHSTCI reported that there are no provincial heritage properties within or adjacent to the Study Area. Kevin De Mille, Heritage Planner with the OHT, reported that there are no OHT conservation easement sites or owned properties within or adjacent to the Study Area.

At the municipal level, staff were consulted to determine the presence of municipally protected heritage properties. Paula Wubbenhorst, Heritage Planner with the City of Mississauga, confirmed that the following listed and designated properties are located within the Study Area:

- 20 Lakeshore Road (Port Credit Public Library), Listed on the Heritage Register
- 31 Lakeshore Road, Designated under Part IV of the *Ontario Heritage Act*
- 30-36 Lakeshore Road, Listed on the Heritage Register
- 40-42 Lakeshore Road, Listed on the Heritage Register
- 24 Stavebank Road, Listed on the Heritage Register
- 12 Stavebank Road, Designated under Part V of the *Ontario Heritage Act*

IDENTIFIED CULTURAL HERITAGE RESOURCES

As previously noted, a pedestrian survey was undertaken to identify potential heritage resources situated within the Study Area and confirm the presence of previously identified protected properties. Where identified, the potential heritage resource was photographically documented from the public RoW.

Where potential CHVI was identified through field work, historical research, and evaluation following the MHSTCI's *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes*, a structure or landscape was assigned a Cultural Heritage Resource (CHR) number and deemed to contain a potential built heritage resource or cultural heritage landscape (Appendix B). A summary table of CHVI is contained in Appendix C.

Following evaluation, nine resources were identified. This includes:

- Three institutional properties (place of worship, library, former post office/customs house)
- Two commercial properties
- One harbour/marina
- One streetscape
- One residential property
- One park

DESCRIPTION OF PROPOSED UNDERTAKING

Through the EA Addendum, three revisions are being made to the 2019 Class EA preferred solutions. These include:

- Extension of the proposed sanitary sewer across the Credit River to approximately Stavebank Road South using trenchless technology, including a tunnel shaft and compound in the parking lot of the Port Credit Public Library. The proposed tunnel shaft and compound will be located below ground with pavement flush lids at the surface for access, with no above-ground structures.
- Elimination of the new WWPS identified at Richard's Memorial Park
- Construction of a WWPS at Jack Darling Memorial Park

The preliminary layout of the site requirements for the tunnel shaft and compound associated with the extension of the proposed sanitary sewer across the Credit River is illustrated in Appendix D.

The EA Addendum also identified the preferred location for the location of the WWPS site at Jack Darling Memoria Park. The preferred alternative, known as Option 3 (shown in Appendix D), closely resembles the solution outlined in the 2019 EA already completed. This would see the main drive shaft for the tunnel located right next to Lakeshore Road at the northeast corner of the park.

A portion of this location has been previously disturbed during the construction of the Lorne Park Water Treatment Plant expansion in 2008, however, some trees would need to be removed. Parking would be temporarily impacted during the construction phase and depending on the final building site some parking may be lost in the long term.

The exit shaft for the tunnel, would be converted to a wet/dry well for the new sewage pumping station and valve chamber along with a permanent building housing electrical, odour, and HVAC units. This location would see very short forcemains discharging into a new manhole located within an existing parking area. The majority of the works would be underground, and any surface works would be designed to blend into the surrounding park and water treatment plant.

The potential impacts of the proposed option for the pumping station on the heritage attributes of Jack Darling Park will be considered below, as well as potential impacts of the extension of the sanitary sewer across the Credit River, of the tunnel shaft, and of the compound in the Port Credit Public Library Parking Lot.

EVALUATION OF ANTICIPATED IMACTS AND MITIGATION MEASURES

Where a component of a cultural heritage resource was situated within the study area, the impacts of the proposed undertaking were evaluated (Table 2). The impacts, both direct and indirect, were evaluated according to *InfoSheet #5: Heritage Impact Assessments and Conservation Plans from the Heritage Resources in the Land Use Planning Process Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (Government of Ontario 2006b).

Following assessment, direct impacts are identified at CHR 9, 1180 Lakeshore Road West (Jack Darling Park), as the existing configuration of the park is anticipated to be altered with the construction of the proposed pumping station. The location of the pumping station also appears to result in the removal of a small section of trees where part of the structure is proposed. Mature trees were identified as one of the heritage attributes of the park in the 2019 EA. The construction of the pumping station is not anticipated to cause permanent shadows that would affect heritage attributes of the park. Its proposed location, at an existing parking area, will remain partially screened by the remaining trees and is not anticipated to result in isolation

of heritage attributes of the park, nor it is anticipated to obstruct views of Lake Ontario. There are no other structures within the park within 50 metres of the preferred alternative for the pumping station that would experience vibrations resulting from land disturbance during construction.

Direct impacts are not anticipated to the remaining CHRs, as the proposed sewer extension does not result in the destruction or alteration of any properties adjacent to the proposed extension. No above-ground components are proposed as part of the sewer extension, and as such no shadows, isolation of resources, or obstruction of views are anticipated. The proposed sewer extension does not result in a change in land use at any of the identified CHRs. Potential for indirect resources was identified for CHRs 1, 4, 5, 6, 7, and 8 as the structures are located within 50 metres of the proposed sanitary sewer extension, tunnel shaft, and compound, and these structures may be within a range where land disturbance during construction may be perceived.

Table 1: Evaluation of Potential Impacts

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
31 Lakeshore Road East (CHR 1)	N	N	N	N	N	N	Y	The proposed sewer extension does not result in the destruction or alteration of the heritage resource. The proposed alternative is a below-ground sanitary sewer installed by horizontal directional drilling, and as such will not produce shadows, isolate, or obstruct the resource. The proposed sewer extension will not result in a change in land use of the property. The structure on the property is located within 50 metres of the proposed sewer extension, and therefore there may be potential for vibrations resulting from the construction activity that could affect the structure. **Therefore, mitigation measures are required.**
Lakeshore Road East Streetscape (CHR 2)	N	N	N	N	N	N	N	The proposed sewer extension does not result in the destruction or alteration of the heritage resource. The proposed alternative is a below-ground sanitary sewer installed by horizontal directional drilling, and as such will not produce shadows, isolate, or obstruct the resource. The streetscape contains contemporary asphalt paved road surface and concrete sidewalks and curbs that are not anticipated to be affected by the horizontal directional drilling. **Therefore, no mitigation measures are required.**
12 Stavebank Road South (CHR 3)	N	N	N	N	N	N	N	The proposed sewer extension does not result in the destruction or alteration of the heritage resource. The proposed alternative is a below-ground sanitary sewer installed by horizontal directional drilling, and as such will not produce shadows, isolate, or obstruct the resource. The proposed sewer extension will not result in a change in land use of the property. The section of

Table 1: Evaluation of Potential Impacts

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
								the marina lands within the study area do not contain heritage structures. **Therefore, no mitigation measures are required.**
20 Lakeshore Road East (CHR 4)	N	N	N	N	N	N	Y	The proposed sewer extension does not result in the destruction or alteration of the heritage resource. The proposed alternative is a below-ground sanitary sewer installed by horizontal directional drilling, and as such will not produce shadows, isolate, or obstruct the resource. The proposed sewer extension will not result in a change in land use of the property. The structure on the property is located within 50 metres of the proposed sewer extension, and therefore there may be potential for vibrations resulting from the construction activity that could affect the structure. **Therefore, mitigation measures are required.**
34-36 Lakeshore Road East (CHR 5)	N	N	N	N	N	N	Y	The proposed sewer extension does not result in the destruction or alteration of the heritage resource. The proposed alternative is a below-ground sanitary sewer installed by horizontal directional drilling, and as such will not produce shadows, isolate, or obstruct the resource. The proposed sewer extension will not result in a change in land use of the property. The structure on the property is located within 50 metres of the proposed sewer extension, and therefore there may be potential for vibrations resulting from the construction activity that could affect the structure. **Therefore, mitigation measures are required.**
40-42 Lakeshore Road East (2 Stavebank Road) (CHR 6)	N	N	N	N	N	N	Y	The proposed sewer extension does not result in the destruction or alteration of the heritage resource. The proposed alternative is a below-ground sanitary sewer installed by horizontal directional drilling, and as such will not produce shadows, isolate, or obstruct the resource. The proposed sewer extension will not result in a change in land use of the property. The structure on the property is located within 50 metres of the proposed sewer extension, and therefore there may be potential for vibrations resulting from the construction activity that could affect the structure. **Therefore, mitigation measures are required.**
6 Stavebank Road (CHR 7)	N	N	N	N	N	N	Y	The proposed sewer extension does not result in the destruction or alteration of the heritage resource. The proposed alternative is a below-ground sanitary sewer installed by horizontal

Table 1: Evaluation of Potential Impacts

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
								directional drilling, and as such will not produce shadows, isolate, or obstruct the resource. The proposed sewer extension will not result in a change in land use of the property. The structure on the property is located within 50 metres of the proposed sewer extension, and therefore there may be potential for vibrations resulting from the construction activity that could affect the structure. **Therefore, mitigation measures are required.**
24 Stavebank Road (CHR 8)	N	N	N	N	N	N	Y	The proposed sewer extension does not result in the destruction or alteration of the heritage resource. The proposed alternative is a below-ground sanitary sewer installed by horizontal directional drilling, and as such will not produce shadows, isolate, or obstruct the resource. The proposed sewer extension will not result in a change in land use of the property. The structure on the property is located within 50 metres of the proposed sewer extension, and therefore there may be potential for vibrations resulting from the construction activity that could affect the structure. **Therefore, mitigation measures are required.**
1180 Lakeshore Road West (CHR 9)	N	Y	N	N	N	N	N	The proposed pumping station will not result in destruction of the park but will result in the alteration of the park from its existing condition. The proposed pumping station is a single storey structure that is not anticipated to produce shadows that would affect the heritage attributes of the park, isolate the park from its surroundings, or result in the obstruction of views. The proposed pumping station will not result in a change in land use of the park as a whole. There are no other heritage structures within the park within 50 metres of the preferred alternative for the pumping station that would experience vibrations resulting from land disturbance. Given the introduction of a new structure that alters the existing configuration of the park, and results in the removal of a section of woods with mature trees, **mitigation measures are required.**

MITIGATION MEASURES

For most potential impacts, a preventive approach to mitigation measures serves to reduce the risk of indirect impacts. As identified in the previous section, direct impacts are identified to CHR 9 and there may be

potential for temporary indirect impacts to seven cultural heritage resources (CHR 1, 4, 5, 6, 7 and 8) as they are located within 50 metres of the proposed sewer extension, compound, or tunnel shaft which is to be constructed via horizontal directional drilling. Table 2 contains a summary of the evaluation of mitigation options and their applicability to this project.

Table 2: Evaluation of Mitigation and Avoidance Options

Methods	Discussion
Alternative Development	The proposed sewer extension avoids direct impacts to all CHRs and may have potential indirect impacts to seven CHRs. All impacts related to the sewer extension are anticipated to be temporary, limited to the construction period. As such, alternative development is not required for the proposed sewer extension. The proposed alternative for the pumping station at Jack Darling Park results in the alteration of a small section of woods that includes mature trees, which are a heritage attribute. Given that the proposed alternative does not impact all of the trees in the park, but only a small section, alternative development approaches are not warranted.
Isolation of Development	The proposed sewer extension will not introduce above ground development. Therefore, isolating development from heritage resources is not required. The proposed alternative for the pumping station isolates development from many other heritage attributes of the park, by shielding it beside an existing wooded area, and isolating it from other attributes of the park, including the park trails, rare tallgrass area, dog park, tennis courts, picnic area, and views of Lake Ontario.
Harmonization of Design Guidelines	The proposed sewer extension is not anticipated to introduce above ground features that would adversely impact the heritage resource. Therefore, no design guidelines are currently required. The detailed design of the proposed pumping station has not yet been determined. However, it has been noted that the structure will be approximately one storey in height and may be clad in stone to reflect the existing Lorne Park water treatment plant, also located within the park. Design guidelines can be a useful mitigation measure to create harmony between new and existing structures and reflect the heritage character or attributes of a heritage resource.
Limitation of Construction	The proposed sewer extension is not anticipated to introduce above ground features that would adversely impact the heritage resource. Therefore, no limitations on height or density of construction are required. The proposed pumping station will consist of a small one storey structure located within a large public park. As such, limiting height or density of the proposed pumping station is not an applicable mitigation measure.
Compatible Additions	The proposed sewer extension is not anticipated to introduce above ground features that would adversely impact the heritage resource. Therefore, compatible additions are not required. The use of design guidelines for the proposed pumping station can provide a framework such that the station is a compatible addition to the park.
Reversible Alterations	The proposed sewer extension is not anticipated to introduce alterations that would adversely impact the heritage resource. Therefore, no mitigations for alterations are required. The proposed pumping station and removal of some mature trees is not a reversible alteration, but can be mitigated through the addition of planting additional trees to replace those that are removed due to its construction.
Planning Mechanisms	The proposed alternative may result in the potential for land disturbance during the construction phase of the project. As such, planning mechanisms may be considered at this phase of study to avoid the heritage resource by identifying appropriate thresholds for vibration or zones of influence related to construction activity and planning construction activities to minimize vibrations on heritage resources.

RECOMMENDATIONS

DESIGN GUIDELINES

To mitigate the construction of a new structure within Jack Darling Park, that has been identified as a cultural heritage resource, design guidelines can be helpful to help blend the new structure into its surroundings and provide a continuous language of design within the park. The following design guidelines are recommended for consideration in detailed design of the pumping station:

- Use natural cladding materials to reflect the natural character of the park and the existing water treatment plant, including stone as a primary material, with accents of wood, metal or glass
- Maintain a low-profile, single storey design to avoid overwhelming the character of the park and nearby trees
- Where possible, include design elements such as windows (frosted glass if privacy is a concern) or faux windows to give the building a more traditional façade appearance rather than a purely utilitarian structure

TREE REPLACEMENT

Mature trees were identified as a heritage attributes of the park. It is recommended that an inventory of mature trees to be removed for the construction of the pumping station be conducted. Replacement species of the same type, or similar appropriate species, in consultation with the City's urban forestry department, should be planted in a nearby area following completion of construction.

CONDITION SURVEYS AND VIBRATION MONITORING

Seven identified cultural heritage resources are located within 50 metres of project construction for the proposed sewer extension. Depending on the approaches that may be identified through planning and detailed design, these resources may be at risk for indirect impacts resulting from construction-related ground vibration. It is recommended that the Region consult with a qualified building conditions specialist or geotechnical engineer with previous experience working with heritage structures to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration may include developing an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.

DEPOSIT COPIES

To assist in the retention of historic information, copies of this report should be deposited with local repositories of historic material as well as with municipal and regional planning staff. Therefore, it is recommended that this report be deposited at the following locations:

Port Credit Public Library
20 Lakeshore Road East
Mississauga, ON L5G 1C8

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We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Yours truly,

STANTEC CONSULTING LTD.

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WSP. 2019. Front Street Wastewater Pumping Station Wastewater Diversion Schedule B Municipal Class Environmental Assessment (Class EA)

Appendix A:
Study Area Mapping

Stantec

Legend

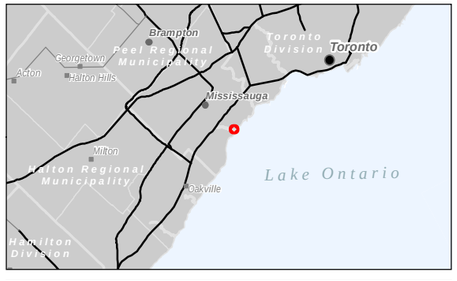
- Site Location
- Study Area (50 m)
- Waterbody

0 25 50 m

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

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.
3. Orthoimagery © First Base Solutions, 2020. Imagery Date, 2019.
4. Parcels That Touch Regulation Limit from CVC, Generic Regulations Mapping (latest update on data was 2013), date published Aug 27th, 2019.



Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2021-01-13

Client/Project
REGION OF PEEL
PORT CREDIT LIBRARY
CULTURAL HERITAGE

Figure No.
1 - 1

DRAFT

Title
Study Area

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Stantec

Legend

- Study Area
- Railway
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody
- Wetland, Provincially Significant
- Wetland, Other Evaluated

0 125 250 m

1:4,203 (At original document size of 11x17)

Notes

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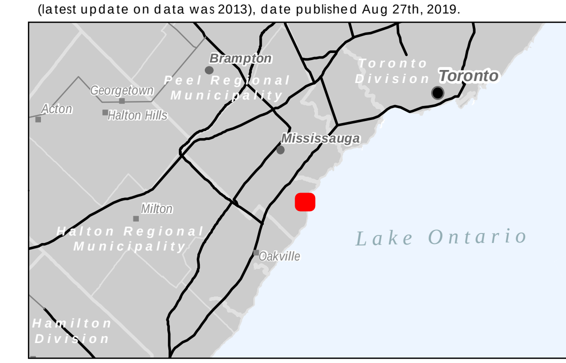

Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2021-01-13

Client/Project
REGION OF PEEL
JACK DARLING PARK
CULTURAL HERITAGE

Figure No.
1 - 2

DRAFT

Title
Study Area

Appendix B:
Map of Identified Cultural Heritage Resources

Stantec

Legend

- Identified Cultural Heritage Resources
- Site Location
- Study Area (50 m)
- Waterbody

0 25 50 m

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

Notes

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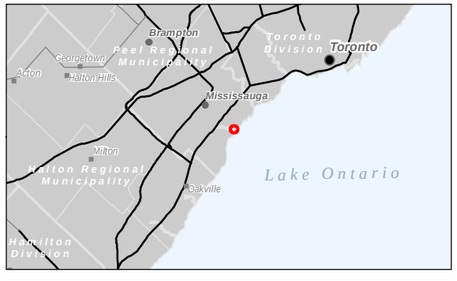
4. Parcels That Touch Regulation Limit from CVC, Generic Regulations Mapping (latest update on data was 2013), date published Aug 27th, 2019.



Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2021-01-13

Client/Project
REGION OF PEEL
PORT CREDIT LIBRARY
CULTURAL HERITAGE

Figure No.
2 - 1

DRAFT

Title
Identified Cultural Heritage Resources

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Stantec

Legend

- Identified Cultural Heritage Resources
- Study Area
- Railway
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody
- Wetland, Provincially Significant
- Wetland, Other Evaluated

0 125 250 m

1:4,203 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2020.
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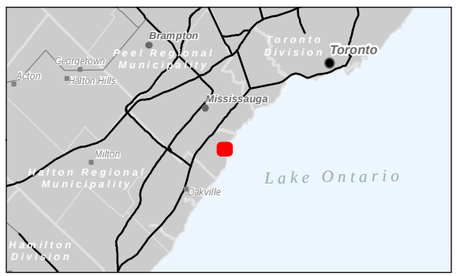

Project Location
City of Mississauga

165640286 REV4
Prepared by SW on 2021-01-13

Client/Project
REGION OF PEEL
PORT CREDIT LIBRARY
CULTURAL HERITAGE

Figure No.
2 - 2

DRAFT

Title
Identified Cultural Heritage Resources

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Appendix C:
Identified Built Heritage Resources and Cultural Heritage Landscapes

Table 3: Identified Built Heritage Resources and Cultural Heritage Landscapes

CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
CHR 1	Institutional	31 Lakeshore Road East	Yes – Part IV	This property contains the former Port Credit Post Office, Customs House, and Armoury. It was built in 1931, designed by Chapman & Oxley under the direction of Thomas Fuller III. It is an example of Edwardian Classicism. The property contains a two-storey structure with a flat roof and red brick exterior. The structure has a decorative concrete band and a concrete rectangle that has “Port Credit” written into it between the decorative band and the roofline. The building has a symmetrical front façade with a concrete frontispiece and the Canadian coat of arms above the doorway and the words “Post Office”	
CHR 2	Streetscape	Lakeshore Road East	Yes - Part V	Lakeshore Road was opened in 1804 along the approximate route of an Indigenous trail along Lake Ontario. The opening of the road facilitated the settlement of the Township of Toronto (present-day City of Mississauga). Lakeshore Road was the first roadway in Canada to be designated a paved highway. Within the Study Area Lakeshore Road is a four lane asphalt paved road and is landscaped with wide interlocking brick paver sidewalks, municipal streetlighting, street trees, and various street furniture.	

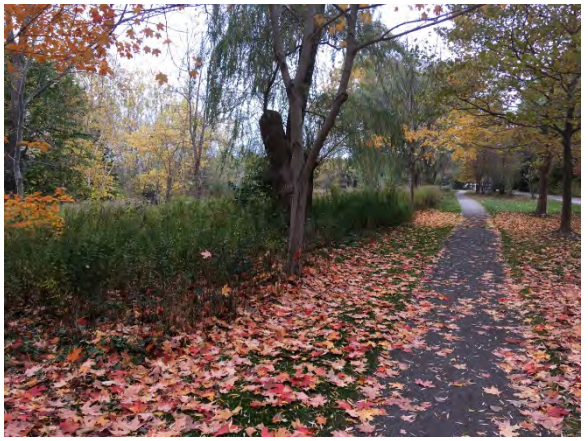
CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
CHR 3	Marina	12 Stavebank Road South	Yes – Part V	The Port Credit Harbour Company was founded in 1834 and two wharves and a warehouse were built for the export of goods. The harbour was an important shipping destination on Lake Ontario in the late 19th century and today the harbour primarily serves recreational boaters. The section of the marina property within the study area contains sloped grassed embankments, trees, landscaped vegetation and part of the city's Waterfront Trail.	
CHR 4	Institutional	20 Lakeshore Road East	Listed	This property contains the Port Credit Public Library. The purpose-built building was completed in 1962. It was designed by architect Philip R. Brook.The building is an example of the International style of architecture popular in the post-Second World War period. The building is a one storey structure with an exterior consisting of large panels and large glass windows and glass doors. The east, south, and west elevations contain a large overhang with a series of horizontal and vertical columns. The library is part of the Credit River corridor, which is noted by the City in the Register Listing as a Cultural Heritage Landscape for its historical, ecological, and archaeological history. The corridor yields information about Indigenous and pioneer history, as well as serving as a link to the historic community development along the corridor.	

CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
N/A	Commercial	26 Lakeshore Road East	None	This property contains a commercial building built between 1955 and 1966, determined through aerial photography. It was built during a period of growth in Port Credit following the Second World War. The building is a one storey structure with a symmetrical front (south) façade clad in faux stone. The building contains fixed windows and a glass entrance door.	
CHR 5	Commercial	34-36 Lakeshore Road East	Listed (property parcel appears to be part of 40-42 Lakeshore Road East)	This property contains a commercial building built between 1955 and 1966, determined through aerial photography. It was built during a period of growth in Port Credit following the Second World War. The building is a two-storey semidetached structure and contains elements of the International Style, popular in the post-Second World War period. The front (south) façade is clad in a glass curtain wall surrounded by red brick.	

CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
CHR 6	Commercial	40-42 Lakeshore Road East (2 Stavebank Road)	Listed	This property contains a commercial building constructed between approximately 1910 and 1930 based on architectural style. The building is a two-storey structure with a flat roof and is located on the corner of Lakeshore Road and Stavebank Road. The exterior is clad in red brick and contains modern windows with brick lintels.	
CHR 7	Residence	6 Stavebank Road	None	This property contains a residential building constructed approximately between 1910 and 1930 based on architectural style. The building is a two-storey structure with a raised basement. The structure has a flat roof, red brick exterior, red brick corbels, and red brick voussoirs.	

CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
N/A	Commercial	8 Stavebank Road	None	This property contains a residential building constructed approximately between approximately 1910 and 1930 based on architectural details of the north elevation, which contains rusticated concrete block and brick voussoirs. In the mid-20th century, the building was heavily modified with the inclusion of a modern addition to the front (east) façade. The building is a three-storey structure with a raised basement and is clad in red brick and a glass curtainwall. The building contains modern windows and a poured concrete and rusticated concrete block foundation.	
N/A	Commercial	10 Stavebank Road	None	This property contains a commercial building constructed approximately between approximately 1910 and 1930 based on architectural details of the north elevation, including a brick chimney and brick voussoirs. The building was heavily modified in the mid-20th century with the inclusion of a modern addition to the front (east) façade. The front façade is clad in buff brick and faux stone and contains modern horizontal sliding windows and a sign for "Stavebank Medical Group." The main entrance is on the west elevation.	

CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
N/A	Residence	12 Stavebank Road	None	This property contains a residence built between approximately 1880 and 1909, determined by architectural style and topographic mapping. The building is a two-storey structure with a medium-pitched front facing gable roof with low-pitched shed roof extension to accommodate additional entrances. The exterior is clad in modern siding and contains modern windows and modern doors.	
N/A	Commercial	14 Stavebank Road	None	This property contains a residence converted into a commercial building and was built between approximately 1942 and 1966 based on topographic mapping and aerial photography. The building is a two-storey structure with a low-pitched hip roof. The exterior is clad in modern siding and contains modern horizontal sliding windows, fixed windows, and glass entrance door.	

CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
CHR 8	Institutional	24 Stavebank Road	Listed	This property contains St. Andrew's Memorial Presbyterian Church. The church was built in 1927, designed by architect Charles Brammall. An addition was added in 1956. The church is a two-storey structure with a steeply pitched gable roof in the Neo-Gothic style. The church is clad in limestone and contains stained glass windows, leaded windows, and wood doors. It is located on a prominent site overlooking the Credit River.	
CHR 9	Park	1180 Lakeshore Road West	Identified as CHL in 2019 EA – no municipal heritage recognition	This property contains Jack Darling Memorial Park. The park was established in 1887 and was originally known as Thompson's Wood. It was renamed Jack Darling Memorial Park in 1970. The park was identified in the 2019 EA as a Cultural Heritage Landscape identified during the field review for the EA. Identified heritage attributes of the park include: • Association with the establishment of Lorne Park Estates • Previously known as Thompson's Woods • Park Trails • Mature Trees • Rare tallgrass area • Off-leash dog park • Tennis courts • Picnic area • Location adjacent to Lorne Park Estates • 'Views of Lake Ontario	 East pathway

CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
					 Tallgrass prairie area  Parking lot and service structure

CHR Reference Number	Type of Resource	Location	Previous Heritage Recognition	Description of Known or Potential CHVI	Photograph
					 Off-leash dog park and toboggan hill

Appendix D: Proposed Locations of Sewer Extension, Tunnel Compound and Preferred Alternative of Proposed Pumping Station

REVISIONS		
DATE	DETAILS	INIT.

0 10 15m
HORIZONTAL SCALE

Stantec

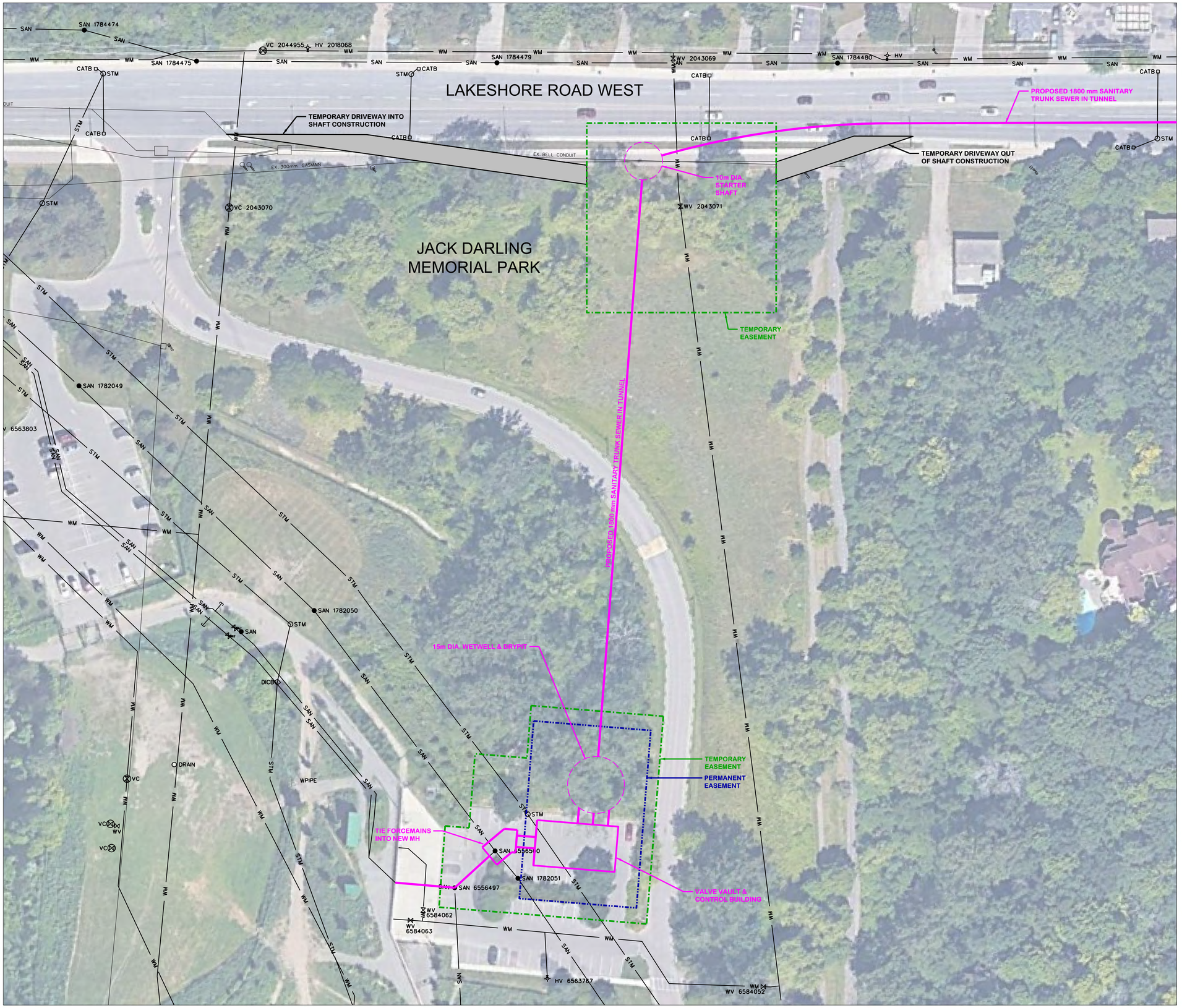
Region of Peel
working with you

LAKESHORE ROAD WEST

PORT CREDIT LIBRARY
TUNNEL SHAFT AND COMPOUND - DRAFT

CAD Area		Area	
Checked by	N.H.	Drawn by	S.B.
Date	JULY 21, 2020	Sheet	3 of 3
Project No.	19-2215		
Plan No.	CMP003-D		

REVISIONS		
DATE	DETAILS	INIT.



0 10 15m

HORIZONTAL SCALE

Stantec

Region of Peel
working with you

LAKESHORE ROAD WEST

JACK DARLING SEWAGE PUMPING STATION No. 3
OPTION 3

CAD Area		Area	
Checked by	J.R.	Drawn by	S.B.
Date	OCTOBER 02, 2020	Sheet	3 of 3

Project No. 19-2215

Plan No. **SK003-D**

Appendix H
Archaeological Assessments

STAGE 2 ARCHAEOLOGICAL ASSESSMENT: JACK DARLING MEMORIAL PARK, LAKESHORE ENVIRONMENTAL ASSESSMENT ADDENDUM

Part of Lot 24, Concession 3 South of Dundas Street, Geographic Township of Toronto, former Peel County, now City of Mississauga, Regional Municipality of Peel, Ontario

November 14, 2022

Prepared for:
Regional Municipality of Peel
10 Peel Centre Drive
Suite A and B,
Brampton, Ontario L6T 4B9

Prepared by:
Stantec Consulting Ltd.
600 – 171 Queens Avenue
London, Ontario N6A 5J7
Telephone: 519-645-2007

Licensee: Arthur Figura
Licence Number: P083
Project Information Form Number:
P083-0399-2022

Project Number:
165640286

ORIGINAL REPORT

Table of Contents

LIST OF TABLES

LIST OF FIGURES

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by the Region of Peel (the Region) to complete Stage 2 archaeological assessment as part of an Addendum to a Municipal Class Environmental Assessment (Class EA) study on wastewater flows in the Front Street Sewage Pumping Station (SPS) catchment area (the Project). The Stage 2 archaeological assessment was undertaken as part of the detailed design for the Class EA requirements for a Schedule "C" project under the *Ontario Environmental Assessment Act* (Government of Ontario 1990a) and follows from a Stage 1 archaeological assessment completed by Stantec (Stantec 2022). The Project includes the construction of a new SPS at Jack Darling Memorial Park (JDMP) and approximately 185 metres of tunneled trunk sewer connecting it to a shaft at Lakeshore Boulevard. The study area at JDMP is approximately 4.85 hectares and located in part of Lot 24, Concession 3 South of Dundas Street, Geographic Township of Toronto, former Peel County, now City of Mississauga, Regional Municipality of Peel, Ontario.

The Stage 2 archaeological assessment was conducted in accordance with the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) under archaeological consulting license P083 issued to Arthur Figura, MA, by the MTCS. The Stage 2 field work was completed on June 8, 2022 under Project Information Form number P083-0399-2022.

No archaeological resources were identified during the Stage 2 archaeological assessment of the study area. Thus, in accordance with Section 2.2 and Section 7.8.4 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **no further archaeological assessment of the study area is recommended**.

The MTCS is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports*.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

Project Personnel

Project Manager:	Neil Harvey, P Eng., PMP
Licensed Archaeologist:	Arthur Figura, MA (P083)
Task Manager:	Jeffrey Muir, BA, CAHP (R304)
Licensed Field Director:	Hillary Schwering, BA (R1064)
Field Crew:	John Coble, Tim Koch, Mitchell Serenko, Julia Szczesniak, Eric Tincombe, Rebecca Tough, Anne Marie Warden
Mapping:	Stephanie Wen, GIS Specialist
Report Writer:	Jeffrey Muir, BA, CAHP (R304)
Licensee Review:	Arthur Figura, MA (P083)
Quality Review:	Colin Varley, MA, RPA (P002)
Independent Review:	Parker Dickson, MA (P256)

Acknowledgements

The Region of Peel:	Lyle LeDrew, CET
Ministry of Tourism, Culture and Sport:	Robert von Bitter – Archaeological Data Coordinator

1 Project Context

1.1 Development Context

Stantec Consulting Ltd. (Stantec) was retained by the Region of Peel (the Region) to complete Stage 2 archaeological assessment as part of an Addendum to the Municipal Class Environmental Assessment (Class EA) study on wastewater flows in the Front Street Sewage Pumping Station (SPS) catchment area (the Project). The Stage 2 archaeological assessment was undertaken by Stantec on behalf of the Region as part of the detailed design for the Class EA requirements for a Schedule "C" project under the *Ontario Environmental Assessment Act* (Government of Ontario 1990a). Previously, Stage 1 archaeological assessment was completed to support the Class EA – see Section 1.3.3 of this report.

In 2019, the Region completed a Municipal Class EA to align with the Region's long-term sustainable plan to provide wastewater services. The 2019 Class EA recommended the construction of a new gravity sewer along Lakeshore Road between Jack Darling Memorial Park (JDMP) and Front Street (WSP 2019). As part of the preliminary design process, additional opportunities were identified to consolidate infrastructure elements and provide greater flexibility within the system to meet long term servicing goals. The revised strategy recommended that the new pumping station be constructed at JDMP, rather than at Richard's Memorial Park as originally proposed.

Because of the recommended alterations to the original strategy, the Region initiated an EA Addendum to address the construction of the new SPS at JDMP. The Region will be installing a new 600-millimetre water sub-transmission main across the Credit River to provide additional capacity to the Zone 1 system. The EA Addendum expands the study area to include three alternatives within a single study area within JDMP for the proposed SPS, and approximately 185 metres of tunneled trunk sewer connecting it to a shaft at Lakeshore Boulevard (Figure 1 and Figure 2). The study area at JDMP is approximately 4.85 hectares and located in part of Lot 24, Concession 3 South of Dundas Street (SDS), Geographic Township of Toronto, former Peel County, now City of Mississauga, Regional Municipality of Peel, Ontario.

1.1.1 OBJECTIVES

In compliance with the provincial standards and guidelines set out in the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 2 archaeological assessment are as follows:

- To document archaeological resources within the study area.
- To determine whether the study area contains archaeological resources requiring further assessment.
- To recommend appropriate Stage 3 assessment strategies for archaeological resources identified.

Permission for Stantec to access the study area and conduct the required archaeological fieldwork activities was provided by the Region.

1.2 Historical Context

1.2.1 POST-CONTACT INDIGENOUS RESOURCES

"Contact" is typically used as a chronological benchmark when discussing Indigenous archaeology in Canada and describes the contact between Indigenous and European cultures. The precise moment of contact is a constant matter of discussion. Contact in what is now the province of Ontario is broadly assigned to the 16th century (Loewen and Chapdelaine 2016). The post-contact Indigenous occupation of southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking communities by the New York State Iroquois and the subsequent arrival of Algonkian speaking groups from northern Ontario at the end of the 17th century and the beginning of the 18th century (Konrad 1981; Schmalz 1991).

During the early post-contact period, the north shore of Lake Ontario was occupied by two distinct peoples with different cultural traditions: the Michi Saagiig Nishnaabeg (Mississauga Anishinaabeg) and the ancestral Iroquoian peoples who gave rise to the historically documented Huron-Wendat and Neutral. Both Huron and Mississauga traditional history indicate that the Huron-Wendat and Mississauga cohabited the region (Kapyrka 2018).

The Mississauga traditional homeland stretched along the north shore of Lake Ontario and its tributary rivers from present-day Gananoque in the east to Long Point on Lake Erie in the west. In the winter, the communities dispersed into smaller groups and travelled in-land to the north, to the area around present-day Bancroft and the Haliburton Highlands. Mississauga oral history relates that their ancestors occupied this part of southern Ontario from the time of the last deglaciation and continued to occupy it up to the start of the Contact period (Kapyrka 2018).

At the turn of the 17th century, the region of the study area was occupied by Iroquoian populations who are historically described as the *Neutre* (by the French) or the *Atawandaron* (by the Huron-Wendat) and generally as the Neutral in English; their autonym is not conclusively known (Birch 2015). In the 1640s, the Five Nations began an aggressive campaign of territorial expansion, in particular between the north shore of Lake Ontario and what is now central Ontario. In 1649, raiding by the Seneca and Mohawk north of Lake Ontario, coinciding with wide-spread occurrence of infectious disease and famine among the Huron-Wendat, Tionontati (Petun), and Atawandaron, resulted in the latter groups' dispersal from the region, and the Seneca establishing regional dominance (Heidenreich 1978).

By the 1680s, the Mississauga had begun to re-enter the lower Great Lakes basin (Curve Lake First Nation n.d.; Konrad 1981). Mississauga oral traditions, as told by Chief Robert Paudash and recorded in 1905, indicate that after the Mississauga defeat of the Mohawk, who retreated to their homeland south of Lake Ontario, a peace treaty was negotiated between those groups. Upon the Mississaugas' return they decided to settle permanently in southern Ontario. These events occurred around 1695 (Praxis Research Associates n.d.).

By the end of the 17th century, the Ojibwa speaking Mississauga had gained dominance in the lower Great Lakes basin, around western Lake Ontario, and eastern Lake Erie (Konrad 1981; Rogers 1978). The Mississauga economy from the turn of the 18th century focused on fishing and the fur trade, supplemented by agriculture and hunting.

Despite the differentiation among these groups in Euro-Canadian sources, there was a considerably different view by Indigenous groups concerning their self-identification during the first few centuries of European contact. These peoples relied upon kinship ties that cut across European notions of nation identity (Bohaker 2006:277-283). Many of the British-imposed nation names such as Chippewa, Ottawa, Potawatomi, or Mississauga artificially separated how self-identified Indigenous peoples' classified themselves; these groups were culturally and socially more alike than contemporary European documentation might indicate (Bohaker 2006:1-8).

The expansion of the fur trade led to increased interaction between European and Indigenous people, and ultimately intermarriage between European men and Indigenous women. During the 18th century the progeny of these marriages began to identify as Métis, and no longer identified directly with either their paternal or maternal cultures. The ethnogenesis of the Métis progressed with the establishment of distinct Métis communities along the major waterways in the Great Lakes of Ontario (Métis Nation of Ontario 2022). Métis communities were primarily focused around the upper Great Lakes and along Georgian Bay, however Métis people have historically lived throughout Ontario (Stone and Chaput 1978:607-608).

Since contact with European explorers and immigrants, and, later, with the establishment of provincial and federal governments (the Crown), the lands within Ontario have been included in various treaties, land claims, and land cessions. In 1794, Lieutenant-Governor John Graves Simcoe released a statement regarding land on the northern edge of Lake Ontario stating, "Between York and Burlington Bay there intervenes a space of Ground of thirty or forty miles in extent, unpurchased of the Indians; and such I wish it to remain, both for their comfort and as an ample Magazine for Ship Timber" (Ontario Department of Planning and Development 1956:34). However, with increasing settlement of York (Toronto), this decision was soon reversed and by 1796, Simcoe writes:

> *It may also be very proper at this period to conclude the purchase which has formerly been ordered of the lands laying between the head of the Lake Ontario and Burlington and the Tobicoke, and so far into the Country as to form Townships 12 miles in depth….These lands should be purchased so as to leave the Mississaugas in full possession of their rivers and fishing grounds nor do I think it by any means advisable to grant them universally but only in such detached lots as might tend to facilitate the communication between this place and Burlington Bay.*
>
> (Ontario Department of Planning and Development 1956:34-35).

Simcoe resigned as Lieutenant-Governor late in 1797, with Lieutenant-General Peter Hunter taking his place in August 1799. The purchase of these lands was not discussed again until 1804, when Hunter issued orders that part of the tract should be purchased for the Crown as soon as possible. As a result, Treaty Number 13A, also known as the Toronto Purchase, was signed in 1805.

Morris (1943) provides a general outline of some of the treaties within the Province of Ontario from 1783 to 1923. Figure 3 provides an approximate outline of the treaty lands described by Morris (1943) with the study area situated within Treaty Number 13A (indicated by "M" on Figure 3). A description of Treaty 13A is as follows:

> *Conveyed by the Principal Chiefs of the Mississauga Nation to William Claus, Esquire, Deputy Superintendent General and Deputy Inspector General of Indians and their Affairs, for One Thousand Pounds on behalf of His Majesty, King George the Third on the 2nd Day of August, 1805, and described as follows:*
>
> *Commencing at the eastern bank of the mouth of the River Etobicoke, being in the limit of the western boundary line of the Toronto Purchase, in the year 1787; then north twenty-two degrees west, six miles; thence south 38 degrees west, twenty-six miles more or less, until it intersects a line on the course north 45 degrees west, produced from the outlet of Burlington Bay; then along the said produced line, one mile more or less to the lands granted to Captain Brant; then north 45 degrees east, one mile and a half; then south 45 degrees east, three miles and a half more or less to Lake Ontario; then north easterly along the waters edge of Lake Ontario to the eastern bank of the River Etobicoke being the place of beginning.*
>
> *Reserving to Ourselves and Mississague Nation the sole right of the Fisheries in the Twelve Mile Creek, the Sixteen Mile Creek, the Etobicoke River, together with the flats or low grounds on said creeks and river which we have heretofore, cultivated and where we have our camps and also the sole right of the Fishery in the River Credit with one mile on each side of said river.*
>
> *This treaty comprises the fronts of the townships of Toronto, Trafalgar, and Nelson, except the 3,450 acres granted to Chief Brant in 1797.*
>
> (Morris 1943:22)

Survey records obtained from the Ontario Ministry of Natural Resources and Forestry were examined for evidence of Indigenous and early Euro-Canadian settlements. The original survey map of the Township of Toronto (Old Survey) was completed in 1806 by Samuel Wilmot (Wilmot 1806) and identifies the "Mississ[auga] Indian Reserve, One Mile on each side of the River Credit" (Figure 4).

The social and cultural upheavals of the late 18th century to the Mississaugas' way of life were compounded by disease, and the population had decreased significantly by the early 19th century (Wybenga and Dalton 2018). The Crown successfully pressured the Mississaugas, weakened by population loss, to sell most of the remaining portion of the Mississauga tract in 1818, known as Treaty 19 or the Ajetance Purchase, leaving only three small reserves at the mouths of the Credit River, Twelve Mile Creek, and Sixteen Mile Creek (Duric 2017). The lands of these reserves were sold to the Crown in 1820 (Treaty 22 and Treaty 23) with the promise that the proceeds would be used to provide Christian instruction and education for the Mississaugas' children (Duric 2017). The Mississaugas' territory was reduced to 200 acres (approximately 81 hectares) on the west bank of the Credit River at the first rapids.

In the early 1800s, the Mississaugas enjoyed a period of prosperity with the construction of a village on the Credit River and investment in the Credit River Harbour Company. This "Indian Village" on the west bank of the Credit River, approximately 2.5 kilometres north of the study area, is depicted on several mid-19th century maps and surveys of the Credit River Indian Reserve lands by John Stoughton Dennis (including Dennis [1845] and Dennis [1847] which also depict the current study area) (Figures 5 and 6) and Tremaine's 1859 *Map of the County of Peel, Canada West* (Figure 7). This village was founded in 1826 and, by 1830, it had about 40 log or frame houses, a school, a Methodist church and mission house,

and various commercial enterprises including a blacksmith's shop, a carpenter's shop, several stores, two sawmills, and facilities for the Credit River Harbour Company (Plummer 2015).

The Mississaugas, however, were unable to secure clear title to their village lands from the Crown. This, coupled with the threat of European encroachment surrounding the village and depletion of resources, prompted the Mississaugas to seek a new place to live (Wybenga and Dalton 2018). After several potential locations were deemed unsatisfactory, the Six Nations of the Grand River offered land in their territory in Brant and Haldimand counties, and the Mississaugas moved to their new home, named New Credit, in 1847. A historical plaque titled "Credit Indian Village 1826" was erected by the Ontario Heritage Trust at the former "Indian Village" location on the Credit River. The plaque reads:

> *Between 1826 and 1847 a band of Mississauga who had converted to Christianity formed a settlement on the Credit River. With government assistance, they constructed log houses, a sawmill, a school and a chapel. By 1840, some 500 acres were under cultivation and the village contained about 50 houses.*
>
> (Ontario Heritage Trust n.d.)

As demonstrated above, the nature of Indigenous settlement size, population distribution, and material culture shifted as European settlers encroached upon Indigenous territory. However, despite this shift, "written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to…systems of ideology and thought" (Ferris 2009:114). As a result, Indigenous peoples of southern Ontario have left behind archaeological resources throughout the region which show continuity with past peoples, even if they have not been explicitly recorded in Euro-Canadian documentation.

1.2.2 EURO-CANADIAN RESOURCES

The study area is located within the Geographic Township of Toronto, former Peel County, now City of Mississauga, Regional Municipality of Peel, Ontario.

1.2.2.1 Peel County

Before the creation of Peel County, Toronto Township, along with 17 other townships, formed what was called the Home District (Dieterman 2002:xi). Peel County was named for a 19th century Prime Minister of Great Britain, Sir Robert Peel. Although organized in 1849, the County of Peel was not officially formed until 1851 following separation from York County, and included the townships of Albion, Caledon, Chinguacousy, Toronto, and Toronto Gore (Middleton and Landon 1927). After several years of political debate, Brampton was chosen as the county seat in 1867, over Malton, Port Credit, and Streetsville (Dieterman 2002:xi). Peel County became the Regional Municipality of Peel in 1974.

1.2.2.2 Geographic Township of Toronto

Toronto Township was originally formed as part of York County in 1805 but separated in 1851 to become part of Peel County. Samuel Wilmot completed the survey of the southern half of the township (known as the Old Survey) in 1806 from Lake Ontario north to Second Concession, North of Dundas Street and the area was made available for Euro-Canadian settlement at the same time. Weaver (1913:65) notes that "[A] strip of land one mile wide on each side of the Credit [River] was then reserved for the Mississauga Indians, with special privilege as to fishing." After the purchase of the remaining Mississauga lands in 1818 and 1820, these were opened to Euro-Canadian settlement (known as the New Survey). Many of the earliest European settlers were descendants of previously immigrated United Empire Loyalists, or new immigrants from the United States, derisively called "Late Loyalists" because they were lured more by cheap land than by political allegiance (Riendeau 2002:124). These settlers were followed by waves of immigrants from the British Isles.

1.2.2.3 Port Credit

The town plot of Port Credit was surveyed in 1805 and established at the mouth of the Credit River on the shore of Lake Ontario. By 1844, the settlement had a population of 150, with a school, Methodist church, post office, blacksmith, and other businesses. By the mid-1850s the area became a busy shipping centre, although shipping business was diminished slightly with the arrival of the Great Western Railway, in 1855, which linked Port Credit to Toronto and Hamilton (Riendeau 1985). A fire at the harbour in 1855 also affected shipping activity, though the harbour was still used for "stonehooking" in the 1860s, where schooners would collect stones from the bottom of Lake Ontario to be sold as building materials in Toronto (Riendeau 1985). The harbour became a destination for fishing and summer recreation. In the latter half of the 19th century, Port Credit developed with residences and businesses and became the largest settlement in the township (Riendeau 1985). Port Credit was incorporated into a village in 1914, then a town in 1961, and in 1974 was amalgamated with other parts of the Township into the City of Mississauga.

1.2.2.4 Historical Mapping and Landowner Information

The 1845 and 1847 maps by John Stoughton Dennis (Figures 5 and 6) illustrate the early Euro-Canadian settlement of the Credit River Indian Reserve lands, including the Port Credit town plot. They depict the clearing of land ("Settler's Improvements"), the Credit River and some tributaries, and some landowners and structures, but nothing in the current study area. Tremaine's 1859 *Map of the County of Peel* (Figure 7) and the map of Toronto Township in the 1877 *Historical Atlas of the County of Peel, Ont*. by Walker & Miles (Figure 8) depict a rural and agricultural landscape with numerous homesteads and farmsteads, orchards, a local road and railway system, and several villages and hamlets. The Port Credit town plot is laid out in a grid pattern of streets on either side of the Credit River. Relevant landowner information and features depicted on these maps for the study areas are shown in Table 1.

Table 1: Applicable Landowner Information from Historical Maps of Toronto Township

Map Date	Figure	Landowner	Comment
1845	5	None	No structures depicted but not necessarily because there was nothing there. This lot is not the focus of this map which concentrates on the Credit River more.
1847	6	None	No structures depicted but not necessarily because there was nothing there. This lot is not the focus of this map which concentrates on the Credit River more.
1859	7	"Non-Resident"	No structures depicted. A stream (now Birchwood Creek) crosses lot and flows into marsh land on edge of Lake Ontario.
1877	8	J. & W. Orr	No structures depicted. A stream (now Birchwood Creek) crosses lot and flows into marsh land on edge of Lake Ontario.

The study area is located in Lot 24, Concession 3 SDS. On Tremaine's 1859 map, Lot 24, Concession 3 SDS was part of a property labeled as owned by a "non-resident", and no structures or features are depicted, other than Birchwood Creek (unnamed on the 1859 map) which crosses the property from northwest to southeast, flowing into a marshy area on the shore of Lake Ontario. In 1877, the property was owned by J. and W. Orr. No structures are depicted, but Birchwood Creek is again illustrated.

In discussing 19th century mapping it must be remembered that historical county atlases were produced primarily to identify factories, offices, residences, and landholdings of subscribers and were funded by subscription fees. Landowners who did not subscribe were not always listed on the maps (Caston 1997:100). As such, structures were not necessarily depicted or placed accurately (Gentilcore and Head 1984). Review of historical mapping also has inherent accuracy difficulties due to potential error in geo-referencing. Geo-referencing is conducted by assigning spatial coordinates to fixed locations and using these points to spatially reference the remainder of the map. Due to changes in fixed locations over time (e.g., road intersections, road alignments, watercourses, etc.), errors / difficulties of scale and the relative idealism of the historical cartography, historical maps may not translate accurately into real space points. This may provide inconsistencies during historical map review.

1.2.2.5 20th Century Aerial Photography

Based on 20th century aerial photography, the study area was undeveloped as of 1954. Lot 24, Concession 3 SDS (Jack Darling Memorial Park) was partially forested (Figure 9).

1.3 Archaeological Context

1.3.1 THE NATURAL ENVIRONMENT

The study area is situated within the Iroquois Plain physiographic region (Chapman and Putnam 1986:190-196). This region is described as:

> *The lowland bordering Lake Ontario, when the last glacier was receding but still occupied the St. Lawrence Valley, was inundated with by a body of water known as Lake Iroquois which emptied eastward at Rome, New York State. Its old shorelines, including cliffs, bars, beaches,*

> *and boulder pavements are easily identifiable features…. The Iroquois plain extends around the western part of Lake Ontario, from the Niagara River to the Trent River…, its width varying from a few hundred meters to about eight miles [13 kilometres].*
>
> (Chapman and Putnam 1984:190)

The soils within most of the study area are classified as Fox series sand and are characterized by good drainage (Hoffman and Richards 1953). However, because of the porosity of the soil, some nutrients, such as phosphorus and nitrogen, are easily leached away and fertility can be low (Hoffman and Richards 1953:48). Fox sand is also susceptible to drought and wind erosion if left exposed. With the addition of fertilizers and organic matter, it can be productive for agriculture, especially early maturing specialty crops (Hoffman and Richards 1953:48). Today, however, the majority of this soil type in the region had been extensively impacted and altered due to extensive urban development in the southern part of Peel Region. This soil type would have been adequate for Indigenous and Euro-Canadian agriculture. The other soil present in the study area is classified as Bottom Land soils or alluvial deposits formed along watercourses.

Birchwood Creek once flowed through the study area, although the creek is now diverted to the east of the study area, and partly underground. The study area is approximately 460 metres northwest of the Lake Ontario shoreline.

1.3.2 PRE-CONTACT INDIGENOUS RESOURCES

It has been demonstrated that Indigenous people began occupying southern Ontario as the Laurentide glacier receded, as early as 11,000 years ago (Ellis and Ferris 1990:13). Much of what is understood about the lifeways of these Indigenous peoples is derived from archaeological evidence and ethnographic analogy. In Ontario, Indigenous culture prior to the period of contact with European peoples has been distinguished into cultural periods based on observed changes in material culture. These cultural periods are largely based on observed changes to formal lithic tools, and separated into the Early Paleo, Late Paleo, Early Archaic, Middle Archaic, Late Archaic and Terminal Archaic periods. Following the advent of ceramic technology in the Indigenous archaeological record, cultural periods are separated into the Early Woodland, Middle Woodland, and Late Woodland periods, based primarily on observed changes in formal ceramic decoration. It should be noted that these cultural periods do not necessarily represent specific cultural identities but are a useful paradigm for understanding changes in Indigenous culture through time. The current understanding of Indigenous archaeological culture is summarized in Table 2, based on Ellis and Ferris (1990). The provided time periods are based on the “Common Era” calendar notation system, i.e., Before Common Era (BCE) and Common Era (CE).

Table 2: Generalized Cultural Chronology of the Study Area

Period	Characteristics	Time Period	Comments
Early Paleo	Fluted Projectiles	9000 – 8400 BCE	Spruce parkland/caribou hunters
Late Paleo	Hi-Lo Projectiles	8400 – 8000 BCE	Smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 – 6000 BCE	Slow population growth
Middle Archaic	Brewerton-like points	6000 – 2500 BCE	Environment similar to present

Period	Characteristics	Time Period	Comments
Late Archaic	Narrow Points	2500 – 1800 BCE	Increasing site size
	Broad Points	1800 – 1500 BCE	Large chipped lithic tools
	Small Points	1500 – 1100 BCE	Introduction of bow hunting
Terminal Archaic	Hind Points	1100 – 950 BCE	Emergence of true cemeteries
Early Woodland	Meadowood Points	950 – 400 BCE	Introduction of pottery
Middle Woodland	Dentate/Pseudo-Scallop Pottery	400 BCE – 500 CE	Increased sedentism
	Princess Point	550 – 900 CE	Introduction of corn
Late Woodland	Early Late Woodland pottery	900 – 1300 CE	Emergence of agricultural villages
	Middle Late Woodland pottery	1300 – 1400 CE	Long longhouses (100+ metres)
	Late Late Woodland pottery	1400 – 1650 CE	Tribal warfare and displacement
Contact Indigenous	Various Algonkian Groups	1650 – 1875 CE	Early written records and treaties
Late Historic	Euro-Canadian	1796 CE – present	European settlement

Between 9000 and 8000 BCE, Indigenous populations were sustained by hunting, fishing, and foraging and lived a relatively mobile existence across an extensive geographic territory. Despite these wide territories, social ties were maintained between groups. One method of maintaining social ties was through gift exchange, evident through exotic lithic material documented on many sites (Ellis 2013:35-40).

By approximately 8000 BCE, evidence exists and becomes more common for the production of ground-stone tools such as axes, chisels, and adzes. These tools themselves are believed to be indicative specifically of woodworking. This evidence can be extended to indicate an increase in craft production and arguably craft specialization. This latter statement is also supported by evidence, dating to approximately 7000 BCE of ornately carved stone objects which would be laborious to produce and have explicit aesthetic qualities (Ellis 2013:41). This is indirectly indicative of changes in social organization which permitted individuals to devote time and effort to craft specialization. Since 8000 BCE, the Great Lakes basin experienced a low-water phase, with shorelines significantly below modern lake levels (Stewart 2013: Figure1.1.C). It is presumed that the majority of human settlements would have been focused along these former shorelines. At approximately 6500 BCE the climate had warmed considerably since the recession of the glaciers and the environment had grown more similar to the present day. By approximately 4500 BCE, evidence exists from southern Ontario for the utilization of native copper (naturally occurring pure copper metal) (Ellis 2013:42). The known origin of this material along the north shore of Lake Superior indicates the existence of extensive exchange networks across the Great Lakes basin.

At approximately 3500 BCE, the isostatic rebound of the North American plate following the melt of the Laurentide glacier had reached a point which significantly affected the watershed of the Great Lakes basin. Prior to this, the Upper Great Lakes had drained down the Ottawa Valley via the French-Mattawa river valleys. Following this shift in the watershed, the drainage course of the Great Lakes basin had changed to its present course. This also prompted a significant increase in water-level to approximately modern levels (with a brief high-water period); this change in water levels is believed to have occurred catastrophically (Stewart 2013:28-30). This change in geography coincides with the earliest evidence for

cemeteries (Ellis 2013:46). By 2900 BCE, the earliest evidence exists for the construction of fishing weirs (Stevens 2004). Construction of these weirs would have required a large amount of communal labour and are indicative of the continued development of social organization and communal identity. The large-scale procurement of food at a single location also has significant implications for permanence of settlement within the landscape. This period is also marked by further population increase and by 1500 BCE evidence exists for substantial permanent structures (Ellis 2013:45-46).

By approximately 950 BCE, the earliest evidence exists for populations using ceramics. Populations are understood to have continued to seasonally exploit natural resources. This advent of ceramic technology correlated, however, with the intensive exploitation of seed foods such as goosefoot and knotweed as well as mast such as nuts (Williamson 2013:48). The use of ceramics implies changes in the social organization of food storage as well as in the cooking of food and changes in diet. Fish also continued to be an important facet of the economy at this time. Evidence continues to exist for the expansion of social organization (including hierarchy), group identity, ceremonialism (particularly in burial), interregional exchange throughout the Great Lakes basin and beyond, and craft production (Williamson 2013:48-54).

By approximately 550 CE, evidence emergences for the introduction of maize into southern Ontario. This crop would have initially only supplemented Indigenous people's diet and economy (Birch and Williamson 2013:13-14). Maize-based agriculture gradually became more important to societies and by approximately 900 CE permanent communities emerge which are primarily focused on agriculture and the storage of crops, with satellite locations oriented toward the procurement of other resources such as hunting, fishing, and foraging. By approximately 1250 CE, evidence exists for the common cultivation of historic Indigenous cultigens, including maize, beans, squash, sunflower, and tobacco. The extant archaeological record demonstrates many cultural traits similar to historical Indigenous nations (Williamson 2013:55).

1.3.3 REGISTERED ARCHAEOLOGICAL SITES AND SURVEYS

In Canada, archaeological sites are registered within the Borden system, a national grid system designed by Charles Borden in 1952 (Borden 1952). The grid covers the entire surface area of Canada and is divided into major units containing an area that is two degrees in latitude by four degrees in longitude. Major units are designated by upper case letters. Each major unit is subdivided into 288 basic unit areas, each containing an area of 10 minutes in latitude by 10 minutes in longitude. The width of basic units reduces as one moves north due to the curvature of the earth. In southern Ontario, each basic unit measures approximately 13.5 kilometres east-west by 18.5 kilometres north-south. In northern Ontario, adjacent to Hudson Bay, each basic unit measures approximately 10.2 kilometres east-west by 18.5 kilometres north-south. Basic units are designated by lower case letters. Individual sites are assigned a unique, sequential number as they are registered. These sequential numbers are issued by the MTCS who maintain the *Ontario Archaeological Sites Database*. The study area is located within Borden block AjGv.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information and Protection of Privacy Act* (Government of Ontario 1990b). The release of such information in the past has led to looting or various forms of illegally conducted site destruction.

Confidentiality extends to media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MTCS will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

An examination of the *Ontario Archaeological Sites Database* has shown that there is one registered archaeological site within one kilometre of the study area (Government of Ontario 2022a), the Rattray Marsh Site (AjGv-82). The archaeological site is located to the west of the current study area and is an Indigenous site that was possibly a Woodland site, according to documentation from the 1950s. When relocated in 2012, the site was only confirmed as being an Indigenous site based upon the seven artifacts found: two netsinkers, one calcined bone, and four chipped lithic flakes. The site retains cultural heritage value or interest and is still recommended for Stage 3 archaeological assessment.

An examination of the *Ontario Public Register of Archaeological Reports* identified three previous archaeological assessments within 50 metres of the study area (Government of Ontario 2022b). Table 3 provides a summary of the relevant reports. Three of these archaeological assessments (WSP 2017 and WSP 2018) are directly related to the current Class EA.

Table 3: Previous Archaeological Assessments

Year	Report	Author	Project Information Form (PIF) Number
2007	*Stage 1 Archaeological Assessment; Bexhill Forcemains and Sanitary Sewers Class Environmental Assessment, Regional Municipality of Peel, Ontario*	Archaeological Services Inc. (ASI)	P057-355-2007
2017	*Stage 1 Archaeological Assessment: Front Street Catchment Area Diversion Sewer: Lakeshore Road from Front Street to 50 m West of Ibar Way, Regional Municipality of Peel, Former Geographic Township of Toronto, Historic Peel County, Province of Ontario*	WSP	P474-0021-2017
2018	*Stage 2 Archaeological Assessment: Front Street Catchment Area Diversion Sewer, Region of Peel: Lots 21, 22 & 24, Concession 3, South of Dundas, and the Port Credit Town Plot within Port Credit, Township of Toronto, County of Peel, in the Province of Ontario*	WSP	P1078-0009-2018
2022	*Stage 1 Archaeological Assessment: Lakeshore Environmental Assessment Addendum*.	Stantec	P083-0364-2021

ASI undertook Stage 1 archaeological assessment for upgrades to the Bexhill Forcemains and Sanitary Sewers that feed into the Lorne Park Water Treatment Plant, located underground in the southern portion of JDMP (ASI 2007). ASI determined that those portions of their study area overlapping or within 50 metres of Stantec's current study area were deeply disturbed and had low archaeological potential. These portions were taken into account in Stantec's Stage 1 archaeological assessment for the study area (Stantec 2022).

WSP undertook Stage 1 archaeological assessment as part of the original 2019 Class EA for the current project. WSP determined that portions of the original study area, including a portion of JDMP, retained

archaeological potential and recommended Stage 2 archaeological assessment for that portion of JDMP (WSP 2017). WSP (2018) conducted Stage 2 archaeological assessment of a narrow corridor in the north part of JDMP in 2019 as part of the original Class EA. Test pit survey within the study area did not identify any archaeological resources but did indicate that this area of JDMP appeared to have natural stratigraphy (WSP 2018). These assessments were taken into account in Stantec's Stage 1 archaeological assessment for the study area (Stantec 2022).

The Stage 1 archaeological assessment for the current study area was included in a Stage 1 archaeological assessment report for the Lakeshore EA Addendum; it also included an additional study area surrounding the Port Credit Public Library (Stantec 2022). The report provided background research which is summarized in Sections 1.2 and 1.3 above. The archaeological potential was determined based on that background research and is summarized here.

The study area is located approximately 460 metres northwest of the Lake Ontario shoreline. Lake Ontario represents a significant potential source of fish and other lacustrine resources, and access to transportation and trade networks. The north shore of Lake Ontario was used by both Indigenous and Euro-Canadian groups for the movement of goods and migration of people. According to historical mapping, Birchwood Creek crossed the study area prior to being diverted and partly buried underground. Soil conditions within the study area would have been adequate for Indigenous and Euro-Canadian agriculture, although the sandy soils may have lacked certain nutrients or have been prone to drought.

An examination of the Ontario Archaeological Sites Database identified one registered Indigenous archaeological site within one kilometre of the JDMP study area.

Historical mapping does not indicate settlement in the study area during the 19th century. In fact, aerial photography from the 20th century suggests the study area remained undeveloped until the late 20th century (Figure 9). However, historical mapping does show that much of the nearby road and rail networks established in the 19th century are still visible today.

The Stage 1 archaeological assessment (Stantec 2022) concludes that the study area is considered to demonstrate characteristics that identify archaeological potential. However, the Stage 1 archaeological assessment then indicates that parts of the study area had been previously disturbed with no low to no archaeological potential or had been previously assessed and therefore do not require Stage 2 archaeological assessment. The undisturbed portion of the study area, consisting of meadow, naturalized area, wooded area, and manicured lawn, is considered to retain potential for Indigenous and Euro-Canadian archaeological resources. In accordance with Section 1.3.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), Stage 2 archaeological assessment is required according to the Stage 1 archaeological assessment (Stantec 2022) and is the subject of this report.

1.3.4 EXISTING CONDITIONS

The study area for the Project is located in part of Lot 24, Concession 3 SDS, Geographic Township of Toronto, Peel County, now City of Mississauga, Regional Municipality of Peel, Ontario. The study area

comprises approximately 4.85 hectares and includes managed meadow or naturalized areas, wooded areas, and manicured lawn.

2 Field Methods

The Stage 2 assessment of the study area was conducted on June 8, 2022, under PIF number P083-0399-2022 issued to Arthur Figura, MA, of Stantec by the MTCS. The study area comprises approximately 4.85 hectares in part of Lot 24, Concession 3 SDS, Geographic Township of Toronto, former Peel County, now City of Mississauga, Regional Municipality of Peel, Ontario. Mapping was provided by the Region. This mapping was then geo-referenced by Stantec's Geographical Information Services (GIS) team and a digital file (i.e., a shape file) was created of the study area. The digital file was uploaded to handheld Global Positioning Service (GPS) devices for use in the field.

During the Stage 2 field work assessment, conducted by Hillary Schwering (R1064) as field director, conditions were excellent and at no time were the field, weather, or lighting conditions detrimental to the recovery of archaeological material. The weather during Stage 2 assessment was sunny with cloud and warm. Photos 1 to 9 confirm that field conditions met the requirements for Stage 2 archaeological assessment, as per the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Section 7.8.6 Standard 1a; Government of Ontario 2011). Figure 10 provides an illustration of the Stage 2 assessment methods, as well as photograph locations and directions.

A portion of the study area, approximately 33.7%, was identified during the Stage 1 archaeological assessment of the Project (Stantec 2022) as previously disturbed or as previously assessed. These areas retain low to no potential for the identification of archaeological resources. As a result, this portion of the study area was not subject to Stage 2 assessment and no additional photo documentation of this area was obtained.

The remaining portion of the study area, approximately 66.3%, comprises meadow and naturalized areas, wooded areas, and manicured lawn that was inaccessible for ploughing. This area was subject to test pit survey at a five-metre interval in accordance with Section 2.1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Photos 1 to 9 illustrate the test pit survey of the study area. Each test pit was at least 30 centimetres in diameter and excavated five centimetres into sterile subsoil. Test pits ranged from 20 to 25 centimetres in depth. The soils and test pits were then examined for stratigraphy, cultural features, or evidence of fill. Soil was screened through six-millimetre mesh hardware cloth to facilitate the recovery of small artifacts and then used to backfill the pit. Generally, soil from the test pits was dry, sandy, and friable and screened well. Stratigraphy typically consisted of dark brown sandy loam topsoil and light tan sandy subsoil. Several test pits, particularly those closer to the artificial hill covering the sewage plant infrastructure at the south end of JDMP showed evidence of disturbance (Photo 8). However, despite the evidence of disturbance, test pit survey was maintained at a five-metre interval. No further archaeological methods were employed during the test pit survey as no archaeological resources were identified.

3 Record of Finds

The Stage 2 archaeological assessment was conducted employing the methods described in Section 2.0. An inventory of the documentary record generated by fieldwork is provided in Table 4.

Table 4: Inventory of Documentary Record

Document Type	Current Location of Document Type	Additional Comments
Three pages of field notes	Stantec office, Hamilton, Ontario	In original field book and digitized on server
One hand drawn map	Stantec office, Hamilton, Ontario	In original field book and digitized on server
One map provided by the Region	Stantec office, Hamilton, Ontario	Hard and digital copies in project file
19 digital photographs	Stantec office, Hamilton, Ontario	Stored digitally in project file

No archaeological resources were identified within the study area and so no material culture was collected. As a result, no artifact storage arrangements were required.

4 Analysis and Conclusions

Portions of the study area were identified as retaining potential for the identification of archaeological resources (Stantec 2022). Stage 2 archaeological assessment of the study area was conducted on June 8, 2022, under PIF number P083-0399-2022 issued to Arthur Figura, MA, of Stantec. No archaeological resources were identified during the Stage 2 test pit survey of the study area.

5 Recommendations

No archaeological resources were identified during the Stage 2 archaeological assessment of the study area. Thus, in accordance with Section 2.2 and Section 7.8.4 of the MTCS' 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011), **no further archaeological assessment of the study area is recommended**.

The MTCS is asked to review the results presented and to accept this report into the *Ontario Public Register of Archaeological Reports.*

6 Advice on Compliance with Legislation

In accordance with Section 7.5.9 of the MTCS' 2011 Standards and Guidelines for Consultant Archaeologists *(Government of Ontario 2011), the following standard statements are a required component of archaeological reporting and are provided verbatim from the MTCS' 2011* Standards and Guidelines for Consultant Archaeologists *(Government of Ontario 2011).*

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c. O.18 (Government of Ontario 1990c). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the study area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* (Government of Ontario 1990c) 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 fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990c).

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* (Government of Ontario 1990c). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990c).

The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c. 33 (Government of Ontario 2002) requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery.

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8 Images

8.1 Photographs

Photo 1: Stage 2 test pit survey at five metre intervals, facing south

Photo 2: Stage 2 test pit survey at five metre intervals, facing southeast

Photo 3: Stage 2 test pit survey at five metre intervals, facing northwest

Photo 4: Stage 2 test pit survey at five metre intervals, facing north

Photo 5: Stage 2 test pit survey at five metre intervals, facing southeast

Photo 6: Stage 2 test pit survey at five metre intervals, facing north

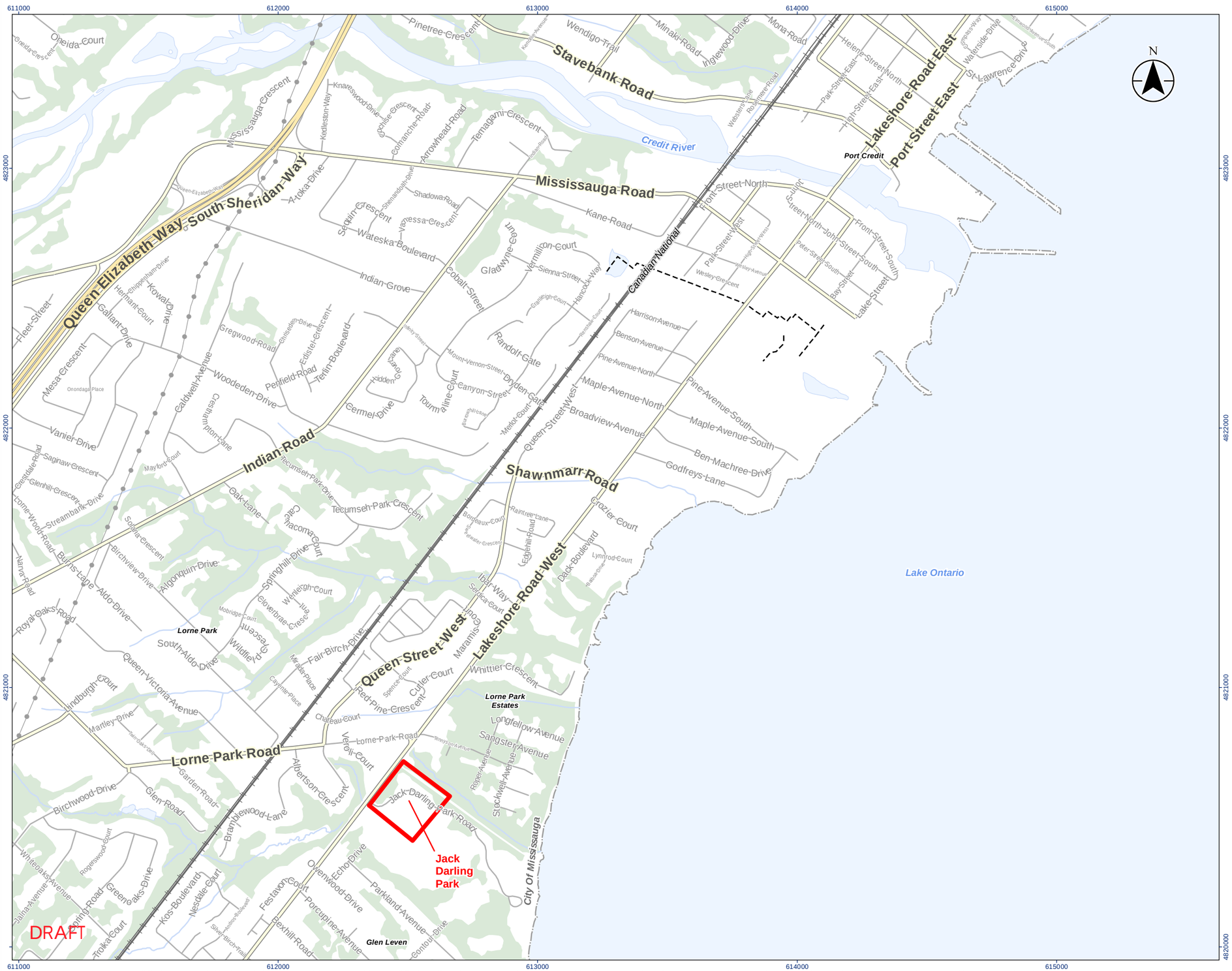
Photo 7: Stage 2 test pit survey at five metre intervals, facing east

Photo 8: Example of disturbed stratigraphy from Stage 2 test pit survey, facing south

Photo 9: Example of stratigraphy from Stage 2 test pit, facing north

9 Maps

Maps of the study area follow on succeeding pages.



Legend

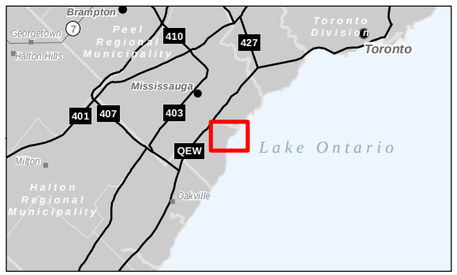
- Study Area
- Highway
- Major Road
- Minor Road
- Hydro Line
- Unknown Pipeline
- Railway
- Watercourse
- Municipal Boundary, Lower
- Waterbody
- Wooded Area

0 0.5 1 km

1:15,000 (At original document size of 11x17)

Notes

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



Project Location
City of Mississauga

165640286 REVA

Client/Project
REGION OF PEEL
LAKESHORE EA ADDENDUM
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
1

DRAFT

Title
Location of Project

Stantec

Legend

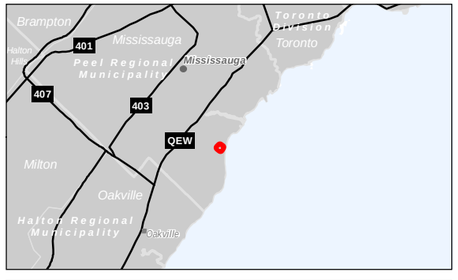
Study Area

0 25 50 m

1:1,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Orthoimagery © First Base Solutions, 2020. Imagery Date, 2019.



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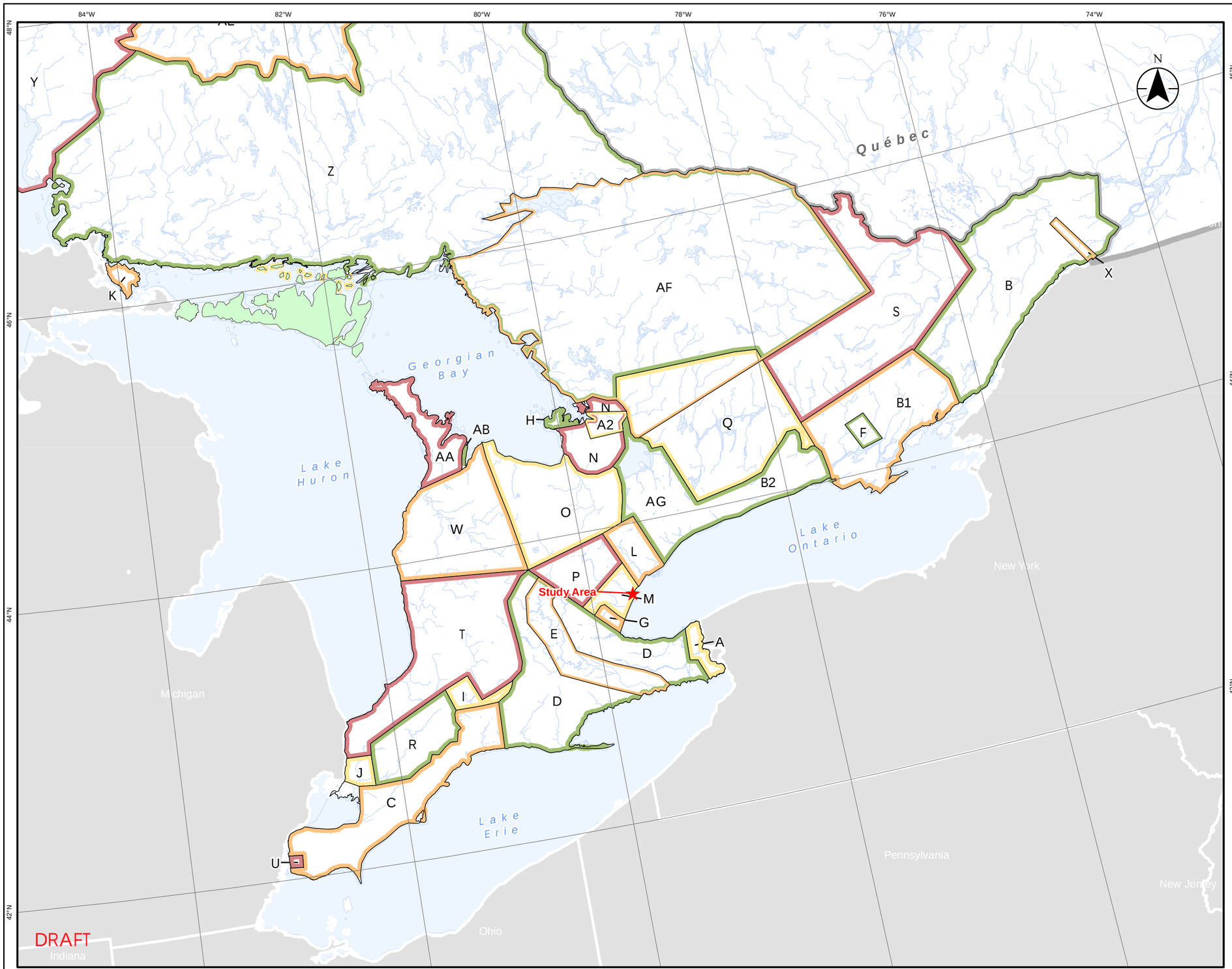
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
2

DRAFT

Title
Location of the Study Area



Stantec

Legend

- Study Area
- Waterbody

A	Treaty No. 381, May 9th, 1781 (Mississauga and
AA	Treaty No. 72, October 30th, 1854 (Chippewa)
AB	Treaty No. 82, February 9th, 1857 (Chippewa)
AE	Treaty No. 9, James Bay 1905, 1906 (Ojibway and
AF	Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
AG	Williams Treaty, October 31st, 1923
A2	John Collins' Purchase, 1785 (Chippewa)
B	Crawford's Purchase, October 9th, 1783 (Algonquin and
B1	Crawford's Purchase, October 9th, 1783
B2	Crawford's Purchase, 1783, 1787, 1788
C	Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and
D	Treaty No. 3, December 2nd, 1792 (Mississauga)
E	Haldimand Tract: from the Crown to the Mohawk,
F	Tyendinaga: from the Crown to the Mohawk, 1793
G	Treaty No. 3 3/4: from the Crown to Joseph Brant, October 24th,
H	Treaty No. 5, May 22nd, 1798 (Chippewa)
I	Treaty No. 6, September 7th, 1796 (Chippewa)
J	Treaty No. 7, September 7th, 1796 (Chippewa)
K	Treaty No. 11, June 30th, 1798 (Chippewa)
L	Treaty No. 13, August 1st, 1805
M	Treaty No. 13A, August 2nd, 1805
N	Treaty No. 16, November 18th, 1815 (Chippewa)
O	Treaty No. 18, October 17th, 1818 (Chippewa)
P	Treaty No. 19, October 28th 1818 (Chippewa)
Q	Treaty No. 20, November 5th, 1818 (Chippewa)
R	Treaty No. 21, March 9th, 1819 (Chippewa)
S	Treaty No. 27, May 31st, 1819 (Mississauga)
T	Treaty No. 27½, April 25th, 1825 (Ojibwa and
U	Treaty No. 35, August 13th, 1833 (Wyandot or
V	Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians To Reside Thereon")
W	Treaty No. 45½, August 9th, 1836
X	Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Y	Treaty No. 60, Robinson, Superior, September 7th, 1850
Z	Treaty No. 61, Robinson, Huron, September 9th, 1850

0 50 100 Km

1:3,000,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint). For cartographic representation only.

Project Location
City of Mississauga

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LAKESHORE EA ADDENDUM
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
3

DRAFT

Title
Treaties and Purchases (Adapted from Morris 1943)

Stantec

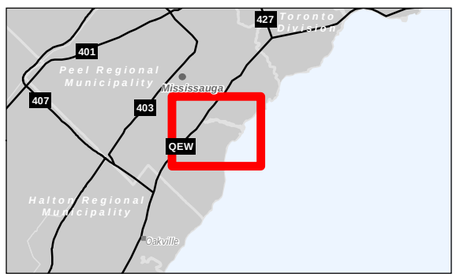
Legend

Approximate Location of Study Area

Figure Not to Scale

Notes

1. Reference: Wilmot, Samuel. 1806. *Plan of the First, or East, Township in the Tract of Land lately Purchased from the Mississauga Indians.* Toronto & Etobicoke, Home District. Map No. A35. Map on file at Ministry of Natural Resources and Forestry, Crown Land Survey Records, Peterborough.



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REGION OF PEEL
LAKESHORE EA ADDENDUM
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
4

DRAFT

Title
Portion of the 1806 Survey Plan of Toronto Township

Stantec

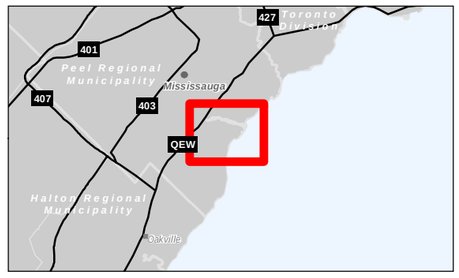
Legend

Approximate Location of Study Area

Figure Not to Scale

Notes

1. Reference: Dennis, John Stoughton. 1845. Sketch of the Indian Tract, Port Credit. Map on file at Ministry of Natural Resources and Forestry, Crown Land Survey Records, Peterborough.



Project Location City of Mississauga	165640286 REVA Prepared by SW on 2021-07-20 Technical Review by DH on 2021-01-21

Client/Project

REGION OF PEEL
LAKESHORE EA ADDENDUM
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.

5

DRAFT

Title

Portion of the Sketch Map of the Indian Tract, Port Credit (Dennis 1845)

Stantec

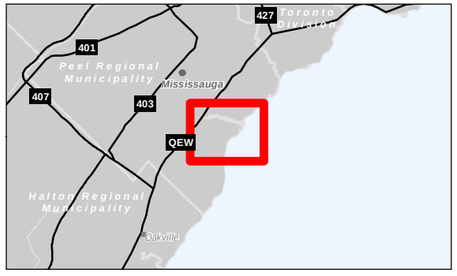
Legend

Approximate Location of Study Area

Figure Not to Scale

Notes

1. Reference: Dennis, John Stoughton. 1847. Sketch of the Mill Block, River Credit, Canada. Map on file at Ministry of Natural Resources and Forestry, Crown Land Survey Records, Peterborough.



Project Location
City of Mississauga

165640286 REVA

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REGION OF PEEL
LAKESHORE EA ADDENDUM
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
6

DRAFT

Title
Portion of the Map of The Mississauga Indian Reserve (Dennis 1847)

Stantec

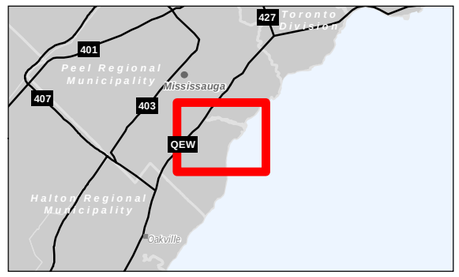
Legend

Approximate Location of Study Area

Figure Not to Scale

Notes

1. Reference: Tremaine, George. 1859. Tremaine's Map of the County of Peel, Canada West. Oakville: George C. Tremaine.



Project Location
City of Mississauga

165640286 EVA

Client/Project
REGION OF PEEL
LAKESHORE EA ADDENDUM
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
7

DRAFT

Title
Portion of the 1859 Tremaine Map of Peel County

Stantec

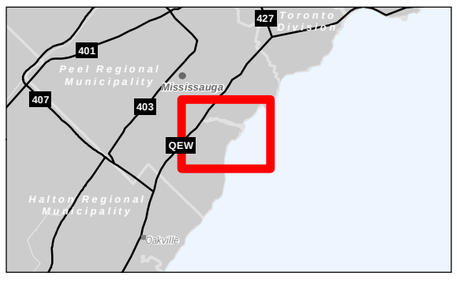
Legend

Approximate Location of Study Area

Figure Not to Scale

Notes

1. Reference: Walker & Miles. 1877. Illustrated Historical Atlas of the County of Peel, Ont. Walker & Miles, Toronto.



Project Location
City of Mississauga

165640286 REVA

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REGION OF PEEL
LAKESHORE EA ADDENDUM
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
8

DRAFT

Title
Portion of the 1877 Map of Toronto Township

Stantec

Legend

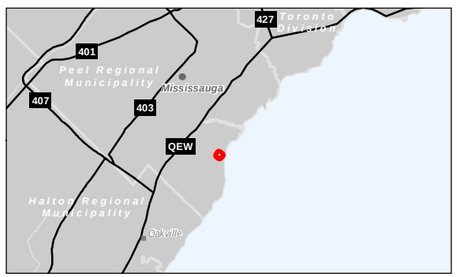
Study Area

0 150 300 m

1:7,000 (At original document size of 11x17)

Notes

1. Reference: 1954 Air Photos of Southern Ontario | Map and Data Library (utoronto.ca), https://mdl.library.utoronto.ca/collections/air-photos/1954-air-photos-southern-ontario/index



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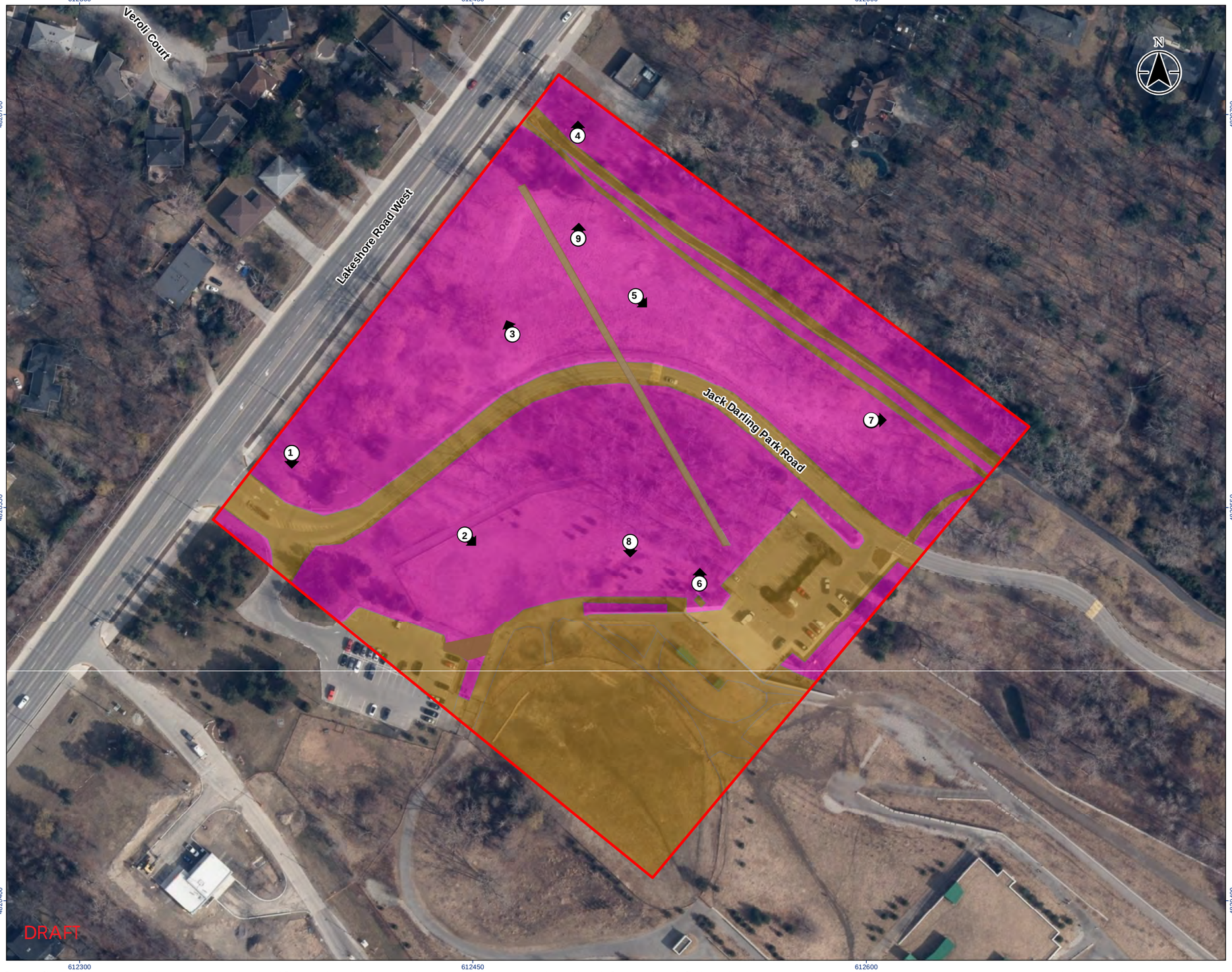
LAKESHORE EA ADDENDUM
STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
9

DRAFT

Title
1954 Aerial Photography for Jack Darling Park



Stantec

Legend

- Study Area
- Archaeology Photo Log

Assessment Method

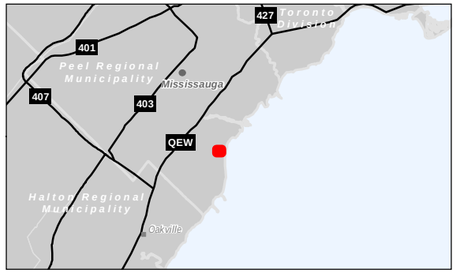
- Stage 2 Test Pit Survey at Five Metre Intervals, No Archaeological Finds
- Previously Assessed, Stantec 2022

0 25 50 m

1:1,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery Date, 2019.



Project Location
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STAGE 2 ARCHAEOLOGICAL ASSESSMENT

Figure No.
10

DRAFT

Title
Stage 2 Survey Methods and Results

10 Closure

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential archaeological resources associated with the identified property.

All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. The conclusions are based on the conditions encountered by Stantec at the time the work was performed. Due to the nature of archaeological assessment, which consists of systematic sampling, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire property.

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Quality Review _____

(signature)

Colin Varley – Senior Associate, Senior Archaeologist

Independent Review _____

(signature)

Parker Dickson – Senior Associate, Senior Archaeologist