TECHNICAL MEMORANDUM

TO: Region of Peel

FROM: WSP

SUBJECT: List of Alternatives for the Front Street Station Wastewater Flow Diversion Project

DATE: **March 15, 2017, Final**

1 INTRODUCTION

The Region met with WSP February 6th, 2017 to present the proposed list of alternatives for the Class EA. This technical memorandum documents the discussion on the various alternatives identified. The information presented in this document will be incorporated into Phase 2 of the Class Environmental Assessment process.

2 PROBLEM STATEMENT

There are several conditions within the study area that have triggered the need for the Front Street Station Wastewater Flow Diversion project. These conditions include:

- Limited capacity at the G.E. Booth WWTP
- Available capacity at the Clarkson WWTP
- Long-term sustainable Master Plan strategy to divert flows from GE 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
- The existing Richard's Memorial WWPS does not have sufficient capacity to handle the projected flows in its catchment area.
- There is an opportunity to redirect flows from Front Street WWPS to Richard's Memorial WWPS
- Opportunity to decommission the Front Street WWPS

Considering the points listed above, the Problem/Opportunity Statement for the Municipal Class EA is defined as follows:

> *There is a need to address Front Street station and Richard's Memorial station catchment area wastewater flows taking into consideration the condition and capacity of the stations, the site constraints for expansion of the Front Street station to accommodate future growth, and also the environmental risks.*

To address the Problem/Opportunity Statement, the Region has initiated a Municipal Class EA planning process which evaluates alternative solutions to solve the problem identified above.

3 ALTERNATIVE SOLUTIONS

The identification of alternatives fort this study involved of a multi-step process ranging from high level strategies to address the issues defined in the Problem Statement to a more detailed breakdown of alternative concepts reflecting the alternatives identified. Note that this process involves initial screening at the various steps to quickly eliminate those ideas which are obviously not feasible or practical. This approach is similar to that followed for other Class EAs completed by the Region.

The alternative identification process is described below and illustrated in Figure 1.

Step 1: Strategies	This step establishes possible strategies to address the problem statement. This step includes Do Nothing. Strategies that do not fully address the Problem Statement are eliminated at this step.
Step 2: Approaches	Only one of the strategies identified was short-listed: the diversion of flows from the Front Street WWPS west towards the Clarkson WWTP. Three approaches to implement this strategy were identified as part of this step.
Step 3: Alternatives	The approaches deemed feasible were further refined to define combinations of site locations for the Richard's Memorial WWPS and alignments for the sewer/forcemain from the Front Street WWPS.

This technical memorandum focuses on the approach to defining alternatives. The approach for evaluation of alternatives will be discussed in a separate memorandum. Figure 1 below illustrates the progression in the process for identification of alternatives relative to the public consultation stages of the Class EA.

3.1 STRATEGIES

Various high level strategies to address the problem were identified. These strategies include the "Do Nothing" and "Limit Growth" strategies that are typically used as a baseline for comparison in Class EAs. The Strategies considered for this study include:

1. Do Nothing
2. Limit Growth
   - Limit community growth to reduce the need for infrastructure improvements.
3. Upgrade Front Street WWPS and Richard's Memorial WWPS
   - Maintain current wastewater conveyance strategy and upgrade the existing pumping stations to accommodate forecasted flows in their corresponding catchments.
   - No east to west diversion of flows.
4. Redirect flows from Front Street WWPS to the west

- Flows from the Front Street WWPS catchment could be redirected towards the Clarkson WWTP.

A cursory review of the alternatives above relative to the Problem Statement allows to easily screen out alternatives that do not "solve the problem."

Strategies 1 and 2 do not address current condition issues and concerns at the two pumping stations, capacity concerns at G.E. Booth, and do not allow further development in the area. Strategy 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. Strategy 4 fully addresses the concerns related to the condition and capacity of the stations, addresses the need to redirect flows away from the G.E. Booth WWTP, and allows for growth. Therefore, only Strategy 4 is carried forward for further evaluation.

3.2 APPROACHES

Strategy 4 can be further broken down into several approaches.

1. Front Street WWPS upgrade and construction of a forcemain to Richard's Memorial WWPS
   - This involves retrofitting of the Front Street WWPS to pump to Richard's Memorial WWPS and expansion of the Richard's Memorial WWPS.
2. Front Street WWPS upgrade and construction of a forcemain towards the Jack Darling WWPS
   - This involves retrofitting of the Front Street WWPS to pump to a point upstream of the Jack Darling WWPS.
   - Richard's Memorial WWPS would require expansion to accommodate future growth in its current catchment.
3. Decommission Front Street WWPS and construction of a deep sewer to Richard's Memorial WWPS
   - Richard's Memorial WWPS would need to be expanded to accommodate flows from the combined catchment areas.

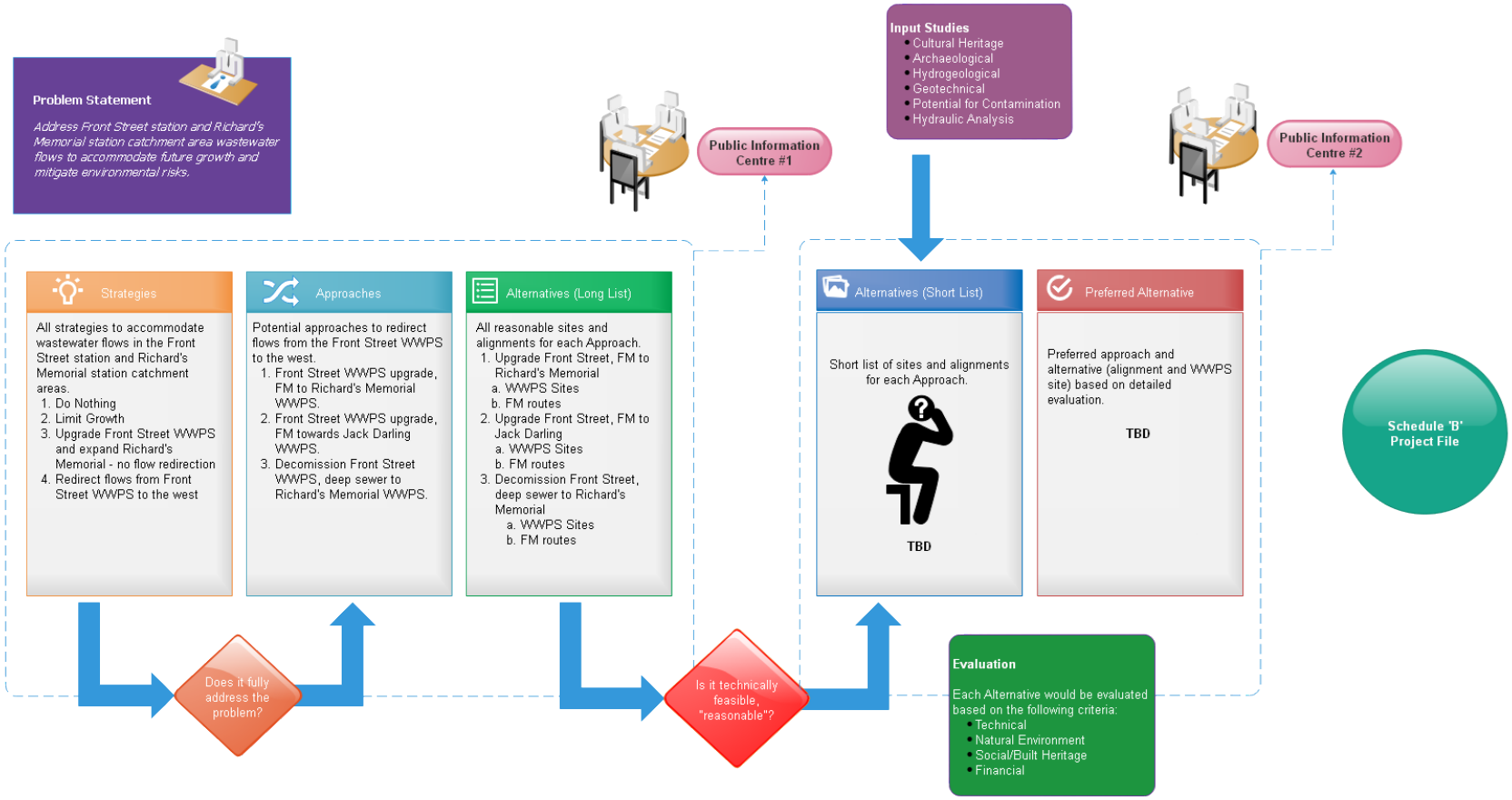
Upon an initial review, all three Approaches to implementing Strategy 4 are deemed feasible and they are carried forward for further evaluation.

3.3 LONG LIST OF ALTERNATIVES

The next step involved refining the Approaches and identifying alignments for the linear infrastructure and potential site locations for the pumping station construction.

In general, the possible alignments/routes for linear infrastructure and site locations for the pumping station expansion would be similar regardless of which of the three Approaches is considered.

Sewer and forcemain alignments would ideally minimize the distance between the start and end points (generally, the shorter the distance the lowest the construction cost and in the case of a forcemain, a shorter distance means less headloss and reduced pumping costs). Another consideration for routing would be impact to existing roadways, impact to existing infrastructure, and constraints due to natural, social/cultural and/or archaeological features. Therefore, often a straight-line route will not be feasible.



Abbreviations

FM	Forcemain
O&M	Operation and Maintenance
WWPS	Wastewater Pumping Station

Region Planning Principles

1. **Offset other major infrastructure projects**
2. Minimize capital costs
3. Minimize O&M costs
4. Minimize lifecycle costs
5. Minimize environmental impacts

Figure 1: Alternative Identification Process

The figure below shows some potential alignments for linear infrastructure to convey flows from Front Street WWPS to the west.

Figure 2: Potential Alignments for Linear Infrastructure

The existing Richard's Memorial WWPS does not have sufficient capacity to handle the projected flows in its catchment area. This situation would be aggravated if flows from the Front Street WWPS catchment area are redirected towards Richard's Memorial. Therefore, all alternatives would involve a capacity expansion of the Richard's Memorial WWPS. For constructability reasons, it is not possible to complete the expansion at the same location as the existing facility without compromising its continuing operation. Hence, other sites need to be considered for the construction of the expanded pumping station.

Alternative locations for the Richard's Memorial WWPS may be considered within the Richard's Memorial Park or elsewhere. However, based on a cursory review of the areas between the Front Street WWPS and Richard's Memorial Park, there are very few vacant areas where a wastewater pumping station could be constructed. A possibility is the park east of the Brueckner Rhododendron Gardens.

Within the Richard's Memorial Park there are several potential sites. Four possible sites have been identified in Figure 3 below.

These locations will however need to be refined subject to the determination of the footprint, the findings of various baseline studies (natural environment, archaeological, potential for contamination, etc.) and constraints set by the City of Mississauga and Credit Valley Conservation.

Figure 3: Four Potential Alternative Sites for the Richard's Memorial Wastewater Pumping Station

Based on the above discussion a long list of linear infrastructure routes/alignments and pumping station sites was identified for each Approach. This is discussed in more detail below.

3.3.1 APPROACH 1 – UPGRADE FRONT STREET WWPS AND CONSTRUCT A NEW FORCEMAIN TO RICHARD'S MEMORIAL WWPS

This alternative involves upgrading the Front Street WWPS to address the existing deficiencies and to replace equipment approaching the end of its service life. A new forcemain along Lakeshore Road from Front Street WWPS west towards Richard's Memorial WWPS would be constructed. As the distance to pump from Front Street WWPS to Richard's Memorial WWPS is greater and the discharge conditions are different, the pumps at the Front Street WWPS would have to be replaced. The existing forcemain going across the Credit River would be abandoned.

Richard's Memorial WWPS would be expanded and upgraded to accommodate these additional flows.

This alternative would alleviate the concerns with capacity at G.E. Booth WWTP and would reduce concerns associated with the forcemain crossing the Credit River.

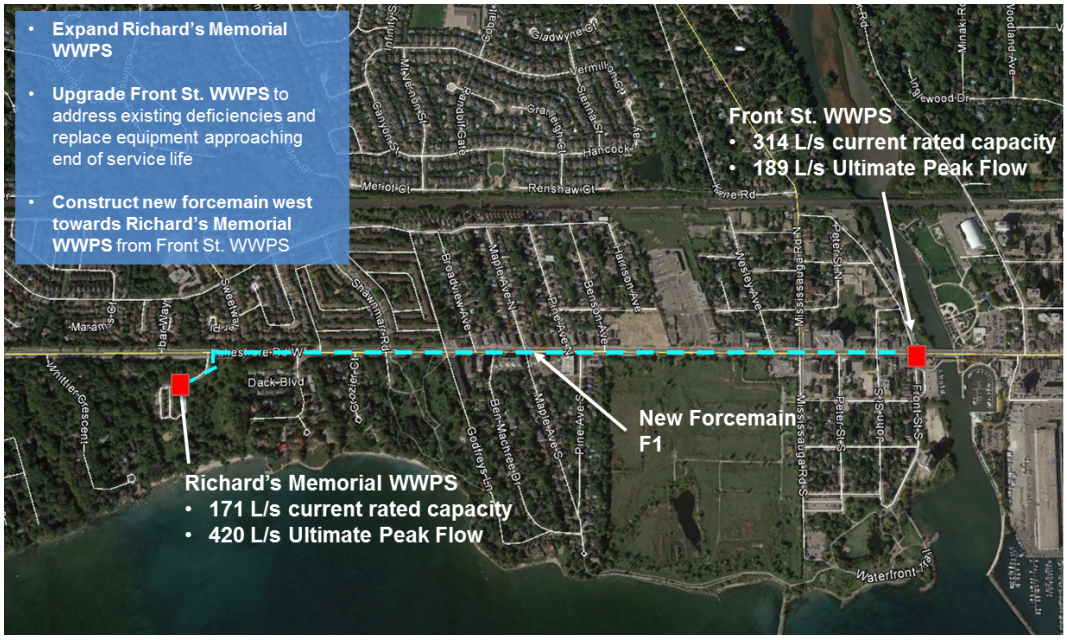


Figure 4: Approach 1 - Upgrade Front Street WWPS and Construct a New Forcemain to Richard's Memorial WWPS

Four sites within Richard's Memorial Park and one within the Brueckner Rhododendron Gardens Park have been identified for the new Richard's Memorial WWPS. However, there are several potential sites within the Richard's Memorial Park and will need to be refined subject to the determination of the footprint, the findings of various baselines studies and constraints by the City of Mississauga and Credit Valley Conservation.

Only one alignment for the forcemain has been considered technically feasible and practical: along Lakeshore Road W.

3.3.2 APPROACH 2 – UPGRADE THE FRONT STREET WWPS AND CONSTRUCT A NEW FORCEMAIN TO JACK DARLING WWPS

This alternative involves upgrading the Front Street WWPS to address the existing deficiencies and to replace equipment approaching the end of its service life. A new forcemain along Lakeshore Road from Front Street WWPS west towards the Jack Darling WWPS would be constructed. As the distance to pump from Front Street WWPS to Jack Darling WWPS is greater and the discharge conditions are different, the pumps at the Front Street WWPS would have to be replaced. The existing forcemain going across the Credit River would be abandoned.

Richard's Memorial WWPS would be expanded and upgraded to accommodate future flows in its existing catchment area.

This alternative would alleviate the concerns with capacity at G.E. Booth WWTP and would reduce concerns associated with the forcemain crossing the Credit River.

Four sites within Richard's Memorial Park and one within the Brueckner Rhododendron Gardens Park have been identified for the new Richard's Memorial WWPS. However, there are several potential sites within the Richard's Memorial Park and will need to be refined subject to the determination of the footprint, the findings of various baselines studies and constraints by the City of Mississauga and Credit Valley Conservation.

Only one alignment for the forcemain has been considered technically feasible and practical: along Lakeshore Road.

Figure 5: Approach 2 – Upgrade the Front Street WWPS and Construct a New Forcemain to Jack Darling WWPS

3.3.3 APPROACH 3 – CONSTRUCT A NEW GRAVITY SEWER TO RICHARD'S MEMORIAL WWPS

This alternative involves the construction of a new gravity sewer along Lakeshore Road from Front Street WWPS to Richard's Memorial WWPS.

The new sewer would be designed to allow the Ben Machree WWPS to be eventually decommissioned and replaced by a gravity sewer.

Richard's Memorial WWPS would be expanded and upgraded to accommodate these additional flows.

The Front Street WWPS would be decommissioned and the forcemain going across the Credit River would be abandoned.

This alternative would alleviate the concerns with capacity at G.E. Booth WWTP and would reduce concerns associated with the forcemain crossing the Credit River.

Four sites within Richard's Memorial Park and one within the Brueckner Rhododendron Gardens Park have been identified for the new Richard's Memorial WWPS. However, there are several potential sites within the Richard's Memorial Park and will need to be refined subject to the determination of the footprint, the findings of various baselines studies and constraints by the City of Mississauga and Credit Valley Conservation.

Five potential alignments for the sewer have been identified as shown in the figure below.

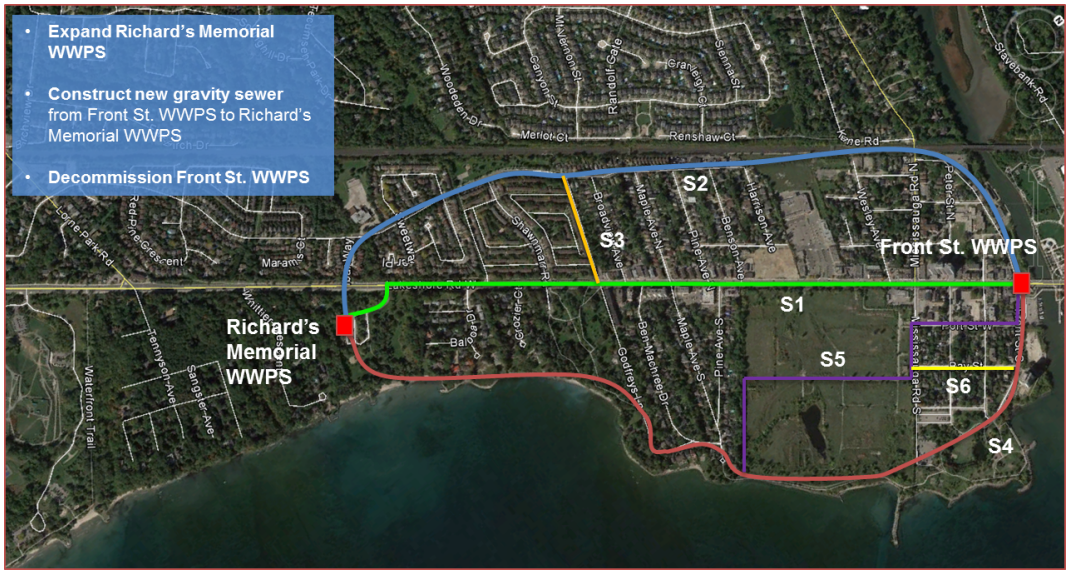


Figure 6: Approach 3 – Construct a New Gravity Sewer to Richard's Memorial WWPS

4 NEXT STEPS

In total, 42 distinct alternatives (combinations of sites and linear infrastructure routes) were identified.

Table 1 Long List of Alternatives – WWPS Sites

WWPS SITE NUMBER	DESCRIPTION
PS1	Within the Brueckner Rhododendron Gardens
PS2	West of existing Richard's Memorial WWPS
PS3	Southwest of existing Richard's Memorial WWPS within the Park.
PS4	South of existing Richard's Memorial WWPS within the Park.
PS5	Southeast of existing Richard's Memorial WWPS within the Park.

Table 2 Long List of Alternatives – Linear Infrastructure

ROUTE NUMBER	DESCRIPTION
F1	Forcemain from Front Street WWPS to Richard's Memorial WWPS along Lakeshore Road W.
F2	Forcemain from Front Street WWPS to Jack Darling WWPS along Lakeshore Road W.
S1	Sewer along Lakeshore Road
S2	Sewer along Front Street North, Queen Street West and Ibar Way to Richard's Memorial Park.
S3	Sewer along Front Street North, Queen Street West and Godfrey Lane to Brueckner Rhododendron Gardens Park.

S4	Sewer along Front Street South, Waterfront Trail, Ben Machree Drive, Godfrey Lane, and Waterfront Trail to Richard's Memorial Park.
S5	Sewer along Front Street South, Bay Street, unopened road allowance, Waterfront Trail, Ben Machree Drive, Godfrey Lane, and Waterfront Trail to Richard's Memorial Park.
S6	Sewer along Front Street South, Port Street West, Mississauga Road South, unopened road allowance, Waterfront Trail, Ben Machree Drive, Godfrey Lane, and Waterfront Trail to Richard's Memorial Park.

The defined strategies, approaches and alternatives (long list) will be presented to the public in a Public Information Centre (PIC) to present the problem statement, initiate discussions and receive initial feedback. It is currently scheduled for March 28, 2017.

Following the PIC, the alternatives (long list) will be further refined based on evaluation criteria to short-list feasible routes and sites. After this, a detailed evaluation will be carried out to identify the preferred solution. The preferred solution will identify the approach to addressing flows in the catchment areas for the Front Street WWPS and Richard's Memorial WWPS as well as to define the preferred linear infrastructure alignment and site for the new expanded Richard's Memorial WWPS.