

Subject: Dain City Sewage Pumping Station Forcemain Emergency Replacement

Report to: Public Works Committee

Report date: Tuesday, July 14, 2020

Recommendations

1. That Report PW 10-2020 **BE RECEIVED** for information on the project status and consultant procurement for emergency replacement of the Dain City Sewage Pump Station Forcemain.

Key Facts

- The purpose of this report is to provide an update on the project status and consultant procurement for contract administration and inspection of the Dain City Sewage Pump Station Forcemain.
- The Dain City Sewage Pump Station Forcemain, which carries flow from the Dain City Sewage Pumping Station to the Ontario Road Sewage Pumping Station was nearing its life expectancy and scheduled to be assessed for replacement by 2030. However, it is now in need of critical replacement (refer to Council Report PW 42-2019 for additional background information).
- Kerry T. Howe Engineering Limited (KTH) is performing design services for all phases of the emergency forcemain replacement (see Appendix 1 for project phasing). The forcemain replacement is being designed and constructed in Phases in order to expedite total replacement.
- Legal implications associated with this report have been included in Confidential PWC-C 21-2020.

Timeline

- **April 16, 2018:** During a rain event, several basements in Dain City experienced flooding.
- **April/May 2018:** City staff investigated the situation and found large quantities of a buildup throughout the local sewage collection system. Niagara Region staff investigated the forcemain in an effort to assess the cause of the issue and maintain and improve flows.
- **May 6, 2018:** Dain city forcemain was found to have a break near Humberstone Road.

- **May 2018:** Niagara Region Staff engaged KTH Engineering to provide services related to assessing a new route for replacement of the forcemain and the associated design work.
- **June 2018:** Staff continued to look for issues and found the internal pump station piping to be full of residue to the point of severe restriction. It was found that the pumps were not the issue and that the forcemain was restricted.
- **Summer 2018:** Local gravity sewers in Dain City were cleaned by the City of Welland.
- **August 2018:** Niagara Region staff received draft report from the City of Welland (Authored by GM Blueplan) identifying Niagara Region as responsible for the Dain City flooding event in April 2018.
- **October 2018:** New alignment for the replacement forcemain was chosen along Canal Bank Street.
- **November 2018:** Niagara Region staff provided Welland staff with evidence that the flooding in Dain City was not Niagara Region's responsibility.
- **January 1, 2019:** The Dain City forcemain was found to be completely plugged. This necessitated contracting tanker trucks to haul sewage directly to the Welland Wastewater Treatment Plant (WWTP). Sewage was hauled by truck during the repair work from January 1 to February 26, 2019.
- **January to February 2019:** Staff hired V. Gibbons Contracting to assist in locating the blockage, perform cleaning of the forcemain (unsuccessful) and make temporary repairs as necessary. Several unsuccessful attempts were made to get the pump station and existing forcemain back in service. Staff decided the most efficient way to reinstate service was to construct a temporary forcemain section to bypass the area where breaks and plugging of forcemain were discovered. A temporary forcemain (Phase 1 in Appendix 1), from the pump station to approximately 150 meters north of Forks Road was installed in an effort to bypass the known blockage. This temporary forcemain included both an inground section and a large section of aboveground forcemain through the local park and treed area. The majority of this work was funded from the 2019 Operating Budget at a cost in excess of \$1.2M.
- **April 25, 2019:** The Dain City forcemain was found to have another break. Staff, with the assistance of V. Gibbons Contracting Ltd. replaced approximately 100 meters of forcemain in order to complete the repair.
- **August 2019 to January 2020: Phase 2** of the permanent Forcemain replacement was completed from the Dain City Sewage Pump Station to the existing main north of Forks Road, eliminating the temporary main constructed during Phase 1.
- **February 2020:** Substantial deposits were found again in the local Dain City gravity sanitary sewer system; **approximately 2 years after the cleaning was completed by the City in 2018** (see attached Appendix 2).

- **March 2020:** Local gravity sewers in Dain City were cleaned again by the City of Welland. Niagara Region staff and City of Welland staff continue to investigate the source of the deposits that are causing the blockage in the forcemain. Both Niagara Region and City staff are continuing to monitor the situation. (Please see Confidential report PWC-C 21-2020)
- **April 2020:** Phase 3 of the forcemain replacement was tendered and is currently being awarded. (See attached Appendix 1 for Phase 3 location). **Phase 3** will install a new forcemain section from Forks Road/Logan Ave north along Canal Bank to the Canal Bank Bridge.

Next Steps:

- **June 2020:** City of Welland is scheduled to re-CCTV the local Dain City sewers.
- **July 2020:** Phase 4 of the forcemain construction crossing Canal Bank Bridge and east along Townline Road is scheduled to be tendered in July 2020 with construction completion by April 2021.
- **September 2020:** Forecast date for tender of **Phase 5**. Construction completion forecast for entire project and commissioning of new forcemain is June, 2021.

Financial Considerations

The total project capital budget for the forcemain replacement is \$11,524,999 with \$5,086,779 expended and committed as at May 28, 2020. Appendix 3 provides the financial forecast of the project.

Currently, KTH is performing the design work for all phases of the project for a total amount of \$357,073 (including 1.76% non-recoverable HST). KTH was engaged to perform the design work in accordance with the provisions in Sections 17 and 18 of the Procurement By-law 02-2016 in July of 2018. KTH was also engaged to perform contract administration and inspection (CA&I) and soil remediation for Phases 1 and 2 of the project in the amount of \$162,898 (including 1.76% non-recoverable HST) in accordance with Section 18 of the Procurement By-law 02-2016, as amended February 28, 2019. Having the design engineer also perform the CA&I results in less risk and duplication of efforts due to the familiarity with the design (discussed further in the Analysis section).

As requested by staff, KTH provided a proposal for providing CA&I services for the remaining three construction phases at an estimated cost of \$316,957 (including 1.76% non-recoverable HST). In accordance with Section 18, "Single Source" of the Procurement By-law 02-2016, as amended February 28, 2019, staff has authority to

engage a vendor with an estimated cost under \$1,000,000 if reasoning is justified. Accordingly, KTH has been engaged to provide CA&I services for the remaining three construction phases. This cost can be accommodated within the project budget and would bring the total amount of work on this project for KTH to \$836,928 (including 1.76% non-recoverable HST).

Analysis

Staff are proceeding with tendering of the remaining construction phases and have engaged the design engineer to provide CA&I services through these phases.

The remaining forcemain replacement, being designed by KTH, was identified to have complex and differing approval processes, requiring different sets of approvals:

- i. a rail crossing;
- ii. crossing of local area municipality water, sewer and storm infrastructure;
- iii. a bridge crossing;
- iv. a trenchless crossing of MTO property; and
- v. a trenchless component in the Humberstone Road right-of-way .

Given the varying approval requirements expected for the forcemain replacement and the size of the overall project, staff chose to split the replacement into four separate Phases (Phases 2 to 5). This allows for construction of the replacement to start when the design of each phase is completed, while working toward completion of subsequent design phases and approval processes. This will result in the overall forcemain being in operation months earlier than if it was tendered as one construction project.

The forcemain replacement is being designed and constructed in the following Phases (see attached Appendix 1):

- i. Phase 1: Temporary overland Forcemain (FM) - **Completed**
- ii. Phase 2: Logan Avenue (eliminating the temporary FM section) – **Completed**
- iii. Phase 3: Canal Bank Road– **Awarded**
- iv. Phase 4: Canal Bank Road Bridge and intersection. - **Design Completion Scheduled for June/2020 with Tender in July/2020.**
- v. Phase 5: Humberstone Road and Southworth Street - **Design Completion Scheduled for Sept/2020 with Tender in late September/2020.**

The City of Welland has recently made a request for Cost Sharing with Phase 5 of the replacement with the intention of replacing their infrastructure on Southworth Street. Staff will work with the City to progress the necessary agreements.

It is advantageous to Niagara Region to have the design engineer, KTH, also perform CA&I services during construction. The following points relate to the specific project considerations when choosing a consultant for the remaining CA&I :

- The project complexities, require the CA&I consultant to have detailed technical knowledge of the design in order to make appropriate decisions during construction:
 - Phase 3 has a rail crossing and crosses local area municipality water, sewer and storm infrastructure.
 - Phase 4 has a bridge crossing and a trenchless crossing of MTO property.
 - Phase 5 has a trenchless component and a large gravity main section through the local street, which contains many other utilities.
- A CA&I consultant needs to be completely familiar with the project requirements, the design documents, the local infrastructure and the stakeholders involved.
- Given the complexity of the projects, the design consultant and their structural subconsultant, in addition to the CA&I consultant, would need to answer Requests for Information (RFIs), review shop drawings and to deal with any unforeseen issues requiring changes to the design.
- Niagara Region staff would require significantly more time to coordinate two (2) consultants working on the same project.
- There would be an increase in cost to create as-built drawings for the work with 2 consultants.
- Overall commissioning and start-up of the completed forcemain will occur after Phase 5 is completed. This commissioning process needs to have a common Contact Administrator involved in each of the Phases.

KTH has extensive knowledge of not only the Dain City Sewage Pumping Station and Forcemain, and also other related Niagara Region facilities in the area such as the Ontario Road Sewage Pumping and the local gravity sewer system feeding it. The Dain City forcemain outlets to that gravity sewer system. KTH provided CA&I services for Phase 1 and 2 of construction.

The project stakeholders include the Ministry of Environment, Conservation and Parks (MECP), the Ministry of Transportation (MTO), the Niagara Peninsula Conservation Authority (NPCA), the City of Welland and the local Dain City residents. Continued

communication and collaboration amongst these stakeholders will be essential throughout the remainder of the project including construction and commissioning of the entire forcemain resulting from the individual project phases. KTH is already working with the MECP, the MTO, the NPCA, the City of Welland and the local Dain City residents regarding portions of the work and these communications and contacts will prove paramount during construction.

KTH's familiarity with the entire service area, the stakeholders involved and the emergency work completed to date will allow them to expedite this assignment without having to expend additional time acquiring the knowledge of Niagara Region and City of Welland's systems. KTH is familiar with the criticality and associated risks of this overall project.

The nature and complexity of the CA&I services required meet two of the requirements for single source purchases as defined in Niagara Region's Procurement By-law, namely:

(i) Compatibility of a Purchase with existing equipment, product standards, facilities or service is a paramount consideration;

(iii) An absence of competition for technical reasons and the Goods and/or Services can only be supplied by a particular Supplier;

In order to increase efficiency and reduce risks and costs, staff is proceeding with KTH providing CA&I services for all phases of the construction.

Alternatives Reviewed

Given the imminent need to effectively address the significant risks associated with the potential for reoccurrence of basement flooding for residential areas tributary to the pump station and the potential for future spills, this procurement method was selected. Staff weighed the schedule impacts associated with alternative procurement methods versus the potential liability to Niagara Region of the likelihood and consequence of failure of this critical piece of infrastructure and chose to expedite the project through sole source assignment. The costs presented are considered to be reasonable in view of current market prices and in view of the considerable liabilities associated with future potential failures. This procurement demonstrated to area stakeholders that Niagara Region acted quickly and efficiently to mitigate the issues with respect to this forcemain.

Relationship to Council Strategic Priorities

This information is related to the Responsible Growth and Infrastructure Planning strategic priority since the forcemain replacement will ensure reliable operations of the infrastructure within the Niagara region.

Other Pertinent Reports

PW 42-2019 Construction Contract: Dain City Sewage Pumping Forcemain Replacement (July 9, 2019)

PWC-C 21-2020 Update Regarding Investigation of Source Material causing Flooding in Dain City Sewer System (July 14, 2020)

Prepared by:

Richard Gabel, P.Eng.
Senior Project Manager
Public Works

Recommended by:

Bruce Zvaniga, P.Eng.
Commissioner of Public Works (Interim)
Public Works Department

Submitted by:

Ron Tripp, P.Eng.
Acting Chief Administrative Officer

This report was prepared in consultation with Tony Cimino, C.E.T., AD W-WW Engineering; Jason Oatley, Manager, WW Quality & Compliance; Pamela Hamilton, Program Financial Specialist W-WW, and reviewed by Joseph Tonellato, P.Eng., Director W-WW Services.

Appendices

Appendix 1	Phases for Dain City Forcemain Replacement
Appendix 2	Dain City Gravity Sewers
Appendix 3	Total Estimated Project Cost



Legend

- SPS Sewage Pumping Station
- Phase 1 - Temporary Forcemain
- Phase 2 - Forcemain
- Phase 3 - Forcemain
- Phase 4 - Forcemain
- Phase 5 - Gravity
- Existing Force Main
- Existing Sanitary Gravity Pipe

1:7,500

0 125 250 500 m

PW 10-2020

Appendix 2 - Dain City Gravity Sewers



Picture 1: Huron Street Sewer after Cleaning – mid 2018



Picture 2: Huron Street Sewer - February 2020

PW 10-2020

Appendix 2 - Dain City Gravity Sewers



Picture 3: Michigan Street sewer in February 2020

PW 10-2020

Appendix 2 - Dain City Gravity Sewers



Picture 4: Dain City Sewage Pump Station – Piping replaced during Phase 2 of Forcemain replacement

**PW10-2020 APPENDIX 3
Total Estimated Project Cost
Contract Award**

Dain City Forcemain Replacement

	Council Approved Budget	Budget Increase/ Reallocation	Revised Council Approved Budget	Expended & Committed as of 5/28/20	Forecast	Budget Remaining
	(A)	(B)	(C) = (A) + (B)	(D)	(E)	(F) = (C)-(D)-(E)
<u>Total Estimated Project Cost (20000881)*</u>						
(a) Construction	9,854,999	(716,768)	9,138,231	4,418,107	4,720,124	-
(b) Project Contingency	1,100,000		1,100,000	-	1,100,000	-
(c) Consulting Engineering Services (Design, Contract Administration, & Inspection)**	220,000	716,768	936,768	619,811	316,957	-
(d) Project Management & Internal Costs	350,000		350,000	48,861	301,139	-
Total Estimated Project Cost	11,524,999	(0)	11,524,999	5,086,779	6,438,219	-

*All costs include 1.76% non-refundable HST

** Total services for the Dain City Forcemain Replacement project provided by Kerry T Howe will total \$836,928 including non-recoverable HST