To Mayor and Members of City Council

From E (Beth) Goodger
General Manager, Public Works Commission

1.0 Type of Report

<table>
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2.0 Topic Wastewater Treatment Plant Digester Gas Line Repair
[Financial Impact - $150,000]

3.0 Recommendation

A. THAT Report 2019-322 “Wastewater Treatment Plant Digester Gas Line Repair” BE RECEIVED; and

B. THAT Council APPROVE the Wastewater Treatment Plant Digester Gas Line Repair works outlined in Report 2019-322 and the estimated cost not to exceed $150,000 for the work BE FUNDED from the Wastewater and Related Reserve Fund (RF0540).

4.0 Purpose and Overview

The purpose of this Report is to seek Council approval to undertake repairs to the Digester Gas Line at the City’s Wastewater Treatment Plant (WWTP). A technical review determined that it is necessary to undertake a full replacement of the digester gas pipe insulation and install a heat tracing controller to prevent gas leaks during cold weather. Subject to Council approval of the necessary funds, the work will be completed by Q4 2019. This will ensure that the operation of the City’s WWTP will be in regulatory compliance for winter 2019/20
and avoid future possible orders from the Ministry of Environment, Conservation and Parks to correct.

5.0 Background

The Brantford Wastewater Treatment Plant (WWTP) is equipped with two anaerobic digesters that stabilize co-thickened sludge from the primary clarifiers. Sludge is heated and circulated through a heat exchanger system by sludge recirculation pumps located in the basement of each digester. Heat is supplied by three (3) hot water boilers normally operating on digester gas produced through the digestion process. Digested sludge is directed to a secondary digester for supernating prior to pumping to the biosolids storage facility on the opposite side of Mohawk Street.

Gas lines from the two (2) primary digesters (P3 and P5) and one (1) secondary digester (S3) connect to a common main pipeline where biogas is sent to a condensate sediment trap prior to being used as fuel for three hot water boilers. Excess gas not used in the boilers is flared through a waste gas burner. The digester gas pipe lines are externally mounted, exposed to the elements, running between the various digesters and buildings as required, and are currently insulated with a 38mm (1-1/2") fiberglass and aluminum jacket. The pipes were insulated in conjunction with construction of P5 in 1999 and are currently 20 years old.

As regulated by the Environmental Protection Act (EPA) and within the Environmental Compliance Approval (ECA) with the Ministry of the Environment, Conservation and Parks (MECP), the City is required to report and provide summary of all by-pass, spill or abnormal discharge events. The WWTP experienced three (3) abnormal gas discharge events that were reported to the MECP in 2018. Two (2) of the events were related to gas leaks from the digester roof hatches which were subsequently repaired. The other event was due to the ineffectiveness of the gas piping insulation.

During the 2018/2019 winter season the City experienced and reported two (2) additional gas discharge events due to the inadequacy of the gas piping insulation.

After the final discharge event was reported to the MECP in February 2019, the City retained CIMA Canada Inc. to complete a Technical Memorandum detailing the events and provide an expert recommendation and estimate for repairs to remedy this issue going forward. The Technical Memorandum, attached as Appendix A, was completed in March 2019. It has been confirmed that when
outside temperatures were negative 20 degrees Celsius and lower the digester gas lines experienced freezing, which caused blockage in the piping and resulted in the release of digester gas from the digester roof relief valves until temperatures increased and the blockages thawed. If the back-up roof relief valves on the digesters were to fail, the safety of WWTP staff and facility itself would be compromised due to gas pressure build up. The required routine checks and maintenance of any components in and around the roof of the digesters would pose a health and safety risk.

The majority of digester gas is comprised of methane, which is a potent greenhouse gas that when released to the atmosphere damages our climate. While it does not linger as long in the atmosphere as carbon dioxide, it absorbs heat more effectively, making it more detrimental. As regulated by the Environmental Protection Act (EPA), Section 93, the City must take all necessary actions to mitigate, restore and eliminate the release of digester gas, and thus methane, to the environment.

6.0 Corporate Policy Context

Goal 3 of the City’s Community Strategic Plan, being Managed Growth & Environmental Leadership, states:

- “Brantford will be supported by well-developed and maintained transportation and servicing infrastructure (including roads, sidewalks, bicycle paths, trails, the airport, water and sewer systems, waste management, electricity distribution and telecommunications)”

This work is required so that the Wastewater Treatment Plant can ensure the City of Brantford is supported by an environmentally responsible digester gas recovery system.

Goal 4 of the City’s Strategic Plan, being Excellence in Governance and Municipal Management includes the Long Term Desired Outcome outlining that Brantford will be recognized as a fiscally responsible and well-managed City that provides efficient and effective government services.

7.0 Input From Other Sources

Finance and Purchasing Departments as well as Public Works Commission staff have been consulted in the development of this report.

8.0 Analysis
Upon detailed inspection, deterioration of the existing gas pipe insulation appears to be occurring on the discharge piping of both primary digesters (P3 and P5).

Pressure data from each digester was supplied to CIMA Canada Inc. by the City to analyze and compare against Environment Canada’s historic temperatures for Brantford. Analysis of this data confirmed in which pipe section the freezing may be occurring. These pipe sections are located on the discharge of both primary digesters. Two options were proposed:

- full or partial replacement of gas pipe insulation
- full or partial replacement of gas pipe insulation and heat tracing

Based on the calculations provided by CIMA Canada Inc., it was determined that full replacement of the gas pipe insulation combined with heat tracing controller to turn on when temperatures dip below 10 degrees Celsius was the appropriate option to correct the issue and ensure gas discharge events will not occur.

Due to Section 93 of the Environmental Protection Act (EPA) and the highly damaging effect to the environment that the release of digester gas poses, immediate action to eliminate any potential release is required. With the City’s release events occurring within the winter months, due to inadequate insulation, the required repairs must be completed before December 2019.

Following Council approval to proceed, Environmental Services will engage Purchasing to issue the Request for Tender to secure a Contractor to begin the repairs. Construction completion is anticipated by November 2019. As per the Purchasing Policy, funding must be secured prior to solicitation and award to the contractor.

9.0 Financial Implications

As identified in the Technical Memorandum (Appendix A), the Total Estimated Costs for Insulation, Heat Tracing and Other Fees is $130,000. To allow for unknown risk, additional work and incidentals that may arise once the existing piping is exposed, a total capital funding requirement of $150,000 is required. Finance has confirmed that the Wastewater and Related Reserve Fund has sufficient funds to fund this project. Any unused funds will be returned back to the Wastewater and Related Reserve Fund account. If funding is approved by Council as outlined in this report, the project will be undertaken in 2019.
Staff recommends that this be funded from the Wastewater and Related Reserve Fund (RF0540).

10.0 Conclusion

To maintain compliance to the EPA Section 93, conformance to our ECA, and protect the environment the City must reduce/eliminate the possibility of digester gas discharge events. This is a proactive step to avoid an official MECP Order and is in line with MECP correspondence regarding the City’s steps to resolve the issue.

Staff is recommending the transfer of $150,000 from the Wastewater and Related Reserve Fund account and the approval to proceed with tendering, award and construction work required to replace the gas pipe insulation and install new heat tracing control.


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Senior Project Manager, Environmental Services

Attachments

Appendix A - Brantford Wastewater Treatment Plant – Digester Gas Pipe Freezing Technical Memorandum

In adopting this report, is a by-law or agreement required? If so, it should be referenced in the recommendation section.

By-law required [ ] yes [ x ] no

Agreement(s) or other documents to be signed by Mayor and/or City Clerk [ ] yes [ x ] no

Is the necessary by-law or agreement being sent concurrently to Council? [ ] yes [ x ] no