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Staff Report

Operations – Water & Wastewater Services

Report To:	**Committee of the Whole Meeting**
Meeting Date:	October 19, 2021
Report Number:	CSOPS.21.074
Title:	Water and Wastewater Capacity Demand Management Options
Prepared by:	Allison Kershaw, Manager of Water & Wastewater Services

A. Recommendations

THAT Council receive Staff Report CSOPS.21.074, entitled "Water and Wastewater Demand Management Options for their information".

B. Overview

On June 28 , 2021, Council requested that staff provide a staff report outlining demand management options for water and wastewater capacity. This report outlines Water and Wastewater Capacity Demand Management measures and programs already in place in the Town of The Blue Mountains.

C. Background

The future economic, social, and environmental costs of meeting the water and wastewater needs of the growing population and supporting economic development in The Town of The Blue Mountains will depend on our ability to understand and manage water and wastewater demands.

The following is a list of current proactive Demand Management Measures and Programs already in place in the Town of The Blue Mountains.

1. Leak Detection and Repair Program
2. Meter Testing and Replacement Program
3. Substandard Watermain Replacement Program
4. Administrative Money Penalties / By-Law Enforcement – Water Theft
5. Water Use Restrictions and Watering Bans – Watering Restrictions are implemented annually from June 1st to September 1st.
6. Public Education – Flyers in Water/Wastewater Billings, Town Website, Newspaper Notices
7. Domestic Use: Toilet Rebate Program
8. Sewer Inspection and Assessment Program
9. Trenchless Sanitary Repair Trial Program

D. Analysis

The Town of the Blue Mountains Drinking Water System reported 27.3% water loss in 2020. This is a significant amount of water loss which is attributed to many factors, including leaking pipes, metering errors and water theft. Staff are employing many strategies to reduce water loss.

Leak Detection and Repair Program

The comprehensive leak detection program is being conducted annually by a contractor specialized in leak detection. The leak detection program utilizes acoustic detection, where a listening device locates leaks by characterizing and differentiating leak sounds. Once a leak is detected, Town Staff proceeds to complete the repair. The contractor can also detect leaks on private lands, such as service connections from the property line to the home. These leaks are much more difficult to be repaired, as it's the homeowner's responsibility to repair the leak. The Town does have the option to shut off the water to the home if the repair isn't completed in a timely manner. In addition to the acoustic monitoring, staff are continuously using a variety of tools to identify leaks, including mass balancing water usage for specific areas, attention to sudden pressure changes within the system, as well as areas of low free chlorine residuals and areas of water pooling.

There were five (5) leaks identified in the 2020 Leak Detection Report, all but one of the leaks have been repaired. The leak at 208537 Hwy 26 wasn't repaired due to delays in receiving locates, and issues with poison ivy. Staff will be repairing this leak during the month of October. There were seven (7) leaks identified in the 2021 Leak Detection Report. Five of the seven leaks have been repaired. One of the leaks was determined not to be a leak but rather a running auto flusher. There is an outstanding leak on a curb stop at 208677 Highway 26. Staff will be further investigating this leak utilitizing the hydrovac unit.

Meter Testing and Replacement Program

The water meter testing and replacement program focuses on replacing the water meters that have reached the end of their useful life. As a water meter ages, the accuracy deteriorates, in favour of the water user, not the water supplier. Staff monitor the bi-monthly water meter readings to identify areas where the usage is lower than expected. The Town initiated metering water in 2005, when meters were installed in private homes, and the water billing since that time has been based on usage. The meters that were installed during the early stages of this program are reaching the end of their useful life. The meters may not be able to catch low flows. Included in the 2022 budget is a plan to replace the meters in this category. The new meters are smart meters, and able to capture low flows that the current meters miss. The new meters and supporting infrastructure will provide actionable data, allowing for leak detection much sooner than our 60 day read cycle. This technology will support district metering areas, and better management of the distribution system. The installation of new meters will help discover unauthorized water usage.

There are areas where staff have been able to do a mass balance of the water in and the water billed. Staff review these volumes every billing cycle to help identify leaks.

Substandard Watermain Replacement Program

The substandard watermain replacement programs identified areas of the community where the watermains have reached the end of their useful life, such as the older sections of Thornbury. The life expectancy of a watermain is determined by what it's made of, how it was installed, the type of soil it sits in, and, in some cases, the road above the watermain.

Currently, staff have replaced four (4) watermain sections, for a total of 800 meters of watermain, this construction season. Staff are planning for phase 2 in 2022. The watermains identified for the replacement program are selected based on age, leak history, water quality, size of main, and opportunities to reduce flushing to keep the water fresh. The reconstruction of Elma, Alice, Victoria, and Louisa Streets will replace a significant number of mains that are in poor condition and help to reduce water loss.

Administrative Money Penalties/ By-Law Enforcement Addressing Water Theft

The Town has been struggling with water theft. Staff have identified and addressed many incidents of theft of water services. This includes illegally operating fire hydrants, home builders accessing and turning on curb stops to new builds and construction sites without water meters installed, as well as by-passing water meters. Water Operations Staff have been working with Development Engineering, Building, By-Law, Capital Project Managers and the Communications Department to tackle these infractions. This portion of water loss is very difficult to detect. The Town has over 900 hydrants, and although the Town has a By-law that prohibits usage of the hydrants, there are definite violators to this By-law. Curb stops are to only be operated by the Town's licensed water operators however, they are still being turned on by plumbers and contractors. These actions are challenging to discover and town staff across departments are working together to both identify and address issues of non-compliance. An outreach letter was provided to contractors in September 2021, clearly defining our expectations in regard to water taking and discharges to the sewers.

Reconstruction of infrastructure helps identify homes that may have a secondary or non-metered connection. One project this construction season included replacement of watermain to 19 homes, and 3 of the 19 homes were identified as having an illegal connections. Staff have been working with the homeowners to address these issues. Offences against municipal By-laws are covered under the Provincial Offences Act and are prosecuted under Part 3 (summons). This process is very slow. Currently, an offence from 2019 still hasn't been resolved. The Town is moving towards an Administrative Money Penalties (AMPs) system, allowing the issuance of civil monetary penalties for violations of the by-laws.

Water Use Restrictions and Watering Bans

The capacity of the water system is calculated based on the maximum daily demand divided by the number of current users. To increase the amount of capacity available to the community, it is necessary to reduce the single highest daily usage. The Town has implemented a tiered

consumption rate for water billing. The higher the usage, the higher the rate per cubic meter. This type of billing is used to drive conservation. Typically, the maximum daily amount of water taking occurs at the end of July or the beginning of August. A significant amount of the demand is used for irrigation. The Town established a Water Restrictions and Water Bans By-law in 2002. These restrictions are in place from June 1st to September 1st every year. The Town of The Blue Mountains has three stages of restrictions; however, we typically remain at stage 1. Residential notifications of the restrictions have been provided in the utility billings, in the newspaper, on social media, as well as through the website and e-blasts. By-law staff support the water department in notifying residents when they are watering outside of the limitations.

Domestic Use: Toilet Rebate Program

The Town has been providing residents a $50.00 rebate to replace the traditional thirteen (13) liter per flush toilets with low flow, six (6) liter per flush toilets. The rebate allows a maximum two (2) toilets per residence and the home must be connected to the municipal water system. This program was initiated in 2009, however in the last few years, the uptake hasn't been strong. This program only is available for the replacement of older toilets and does not apply to toilets installed due to new construction.

Water Distribution Challenges

The Town's Drinking Water System has challenging dynamics in consideration to the number of connections. The system is very long in consideration to the total users. There are fourteen (14) different pressure zones, which is very uncommon for a system the size of ours, due to the elevation changes throughout the system. A significant portion of the watermains run along or close to the shoreline, in an area with mostly shale. The shale provides an excellent route for water to run away from the watermain, which results in the water never surfacing where the leak can be detected. The Town has mostly estate-type lots, with houses sitting further back from the property lines, and the service lines are significantly longer then in areas with higher density living. Longer service connections provide opportunities for leaks on private mains that are difficult to detect and more difficult to have the homeowner repair.

Wastewater Collection System Challenges

The capacity of wastewater treatment plants is based on the average daily flows. Treatment plants are designed and built to accommodate peak flow scenarios. The flows to the Thornbury Wastewater Treatment Plant (WWTP) are much higher than anticipated for the number of users on the system. Theoretically, based on the increase flow per unit, the total number of new users that can be connected to the system has been reduced. The increased flow has resulted in a reduction to the number of connections allowed to connect to the system. There are three major components of the wastewater flows in a system; base sanitary or wastewater, groundwater infiltration and rainfall derived inflow and infiltration, commonly known as inflow. Considering the flows into the Craigleith WWTP, and the volume of water billed through water taking, it is anticipated that the amount of Infiltration and Inflow (I&I) into the Thornbury WWTP accounts for roughly 30% to 60% of the volume, during wet weather events. The Environmental Protection Agency considers infiltration excessive if the system average dry

weather flow is more than 450 liters per capita per day. The average daily flow per capita into Thornbury WWTP is 519L/c/day, where as Craigleith is 340L/c/day.

The collection system feeding the Thornbury WWTP, particularly in the older parts of Thornbury, is at the end of its useful life. Reconstruction of Elma, Alice, Victoria, and Louisa Streets will significantly reduce the amount of I&I. For the most part, the sewers in these areas are in rough shape. Staff have encountered significant root growth within the pipes, many leaks where groundwater can enter, and areas suspect of illegal stormwater and downspout connections to the system.

Public Education

An ongoing issue with additional flows to the treatment plants has been illegal downspout and sump pump connections. The first step to address this issue was the creation of a By-law prohibiting these types of connections. The Sewer Use By-law, 2019-62 was enacted and passed in December 2019. The Town has undertaken many communications blitzes to notify residents of regulations regarding illegal connections. Staff have been working with property owners to address these types of connections, however the cost for the property owners can be extensive and it can be difficult to get the work done.

The Thornbury WWTP collection system runs along the shoreline within the Town of Thornbury. As the lake levels of Georgian Bay increase, the groundwater is higher immediately off the shoreline. Staff have seen a sizeable increase in the amount of I&I in years when the Bay level is higher and a reduction when the Bay level drops. Some of the reasons staff associate I&I with this observation is that the collection mains may be lower than the groundwater level allowing for a natural seeping of water into the mains. Basements along the shoreline may be lower than the groundwater level, requiring sump pumps to keep the homes dry. Many of the sump pumps may be illegally connected to the sanitary system, as there is no other discharge available to the homeowner.

Sewer Inspection and Assessment Program

The Town has undertaken a 7-year sewer inspection and assessment program. This has been underway since 2018 and is very helpful in identifying areas requiring repairs and suspected illegal connections. This program will help staff estimate the current condition of the system and assist with the estimation of the expected remaining life as part of the Town's asset management program. This asset management information is then used to identify priority projects and assist with the development of the capital plan for replacement.

As part of the Inflow and Infiltration Strategy, Staff have recently undertaken a Trenchless Sanitary Rehabilitation Program. This program is a trial to see how effective chemical grout is at repairing deficiencies within the mains, without having to reconstruct the roads above. Leaks in both the mains as well as the wet wells at pumping stations are being addressed through this trial program. In 2021, this program has repaired leaks in eleven manholes and one wet well at a pumping station where water was leaking into the collection system.

Manhole inspection program is another tool that staff have been utilizing to identify areas with higher-than-normal flows. This program was able to identify a watermain, leaking into the sanitary system. Staff have since repaired the leaks.

In the 2022 Budget, the Town will be undertaking a smoke testing program, to identify homes with illegal connections, such as downspout and sump pump connections to the system. The smoke testing will also identify leaks within the mains.

Moving forward, increasing the capacity within both the water and the wastewater systems requires a multifaceted approach, involving many departments, including the Town's Planning Department for allocating servicing, the Communications Department to open the dialog with residents, the Building Department to monitor construction habits and ensure the protection of services, the Operations Department to keep a close eye on the systems and making the necessary repairs and the By-law Department to follow up with violators. Staff also request that Councilors and Committee members engage with the residents about the importance of water conservation practices, illegal connections and an awareness of I&I discharge.

E. Strategic Priorities

1. Communication and Engagement

We will enhance communications and engagement between Town Staff, Town residents and stakeholders

2. Organizational Excellence

We will continually seek out ways to improve the internal organization of Town Staff and the management of Town assets.

3. Community

We will protect and enhance the community feel and the character of the Town, while ensuring the responsible use of resources and restoration of nature.

F. Environmental Impacts

Producing water and treating wastewater are the most energy intensive processes undertaken by the Town and thus among the highest contributors to the Town's total Greenhouse Gas emissions. Promoting the efficient use of water reduces the amount of energy required to treat and distribute water. Repairing infrastructure to improve the performance of both the water and wastewater systems will result in reduction in energy usage.

G. Financial Impacts

Reducing water loss and addressing the inflow and infiltration will increase the capacity of the water and wastewater systems and delay costly expansions of not only the treatment systems but also the distribution and collections systems.

H. In Consultation With

Nathan Westendorp, Director of Planning and Development

Wayne Dewitt, Municipal Prosecutor Supervisor By-Law Services

Scott Hill, Water Supervisor

Mark Service, Wastewater Supervisor

Meg Boyd, Compliance & Efficiency Coordinator, Water and Wastewater Services

Sam Dinsmore, Deputy Treasurer/Manager of Accounting and Budgets

Brent Rolufs, Senior Project Coordinator

Mike Humphries, Senior Project Coordinator

Kevin Verkindt, Senior Project Coordinator

Tim Hendry, Manager Communications and Economic Development

I. Public Engagement

The topic of this Staff Report has not been the subject of a Public Meeting and/or a Public Information Centre as neither a Public Meeting nor a Public Information Centre are required. However, any comments regarding this report should be submitted to Allison Kershaw, Manager of Water & Wastewater Services managerwww@thebluemountains.ca.

J. Attached

1. CSOPS.21.038 2020 Year End Water & Wastewater Capacity Assessment
2. PDS.21.070 Servicing Future Development – Update Report

Respectfully submitted,

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Shawn Carey
Director Operations

For more information, please contact:
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Report Approval Details

Document Title:	CSOPS.21.074 Water and Wastewater Capacity Demand Management Options.docx
Attachments:	- Att 1 - CSOPS.21.038-2020-Year-End-Water-and-Wastewater-Capacity-Assessment.pdf - Att 2 - PDS.21.070.Servicing-Future-Development-Update-Report.pdf
Final Approval Date:	Oct 8, 2021

This report and all of its attachments were approved and signed as outlined below:

Allison Kershaw - Oct 7, 2021 - 9:44 AM

Shawn Carey - Oct 8, 2021 - 7:53 AM