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Staff Report

Operations – Water & Wastewater Services

Report To: **Special Committee of the Whole**
Meeting Date: June 21, 2021
Report Number: CSOPS.21.038
Title: 2020 Year End Water & Wastewater Capacity Assessment
Prepared by: Allison Kershaw, Manager of Water & Wastewater Services

A. Recommendations

THAT Council receive Staff Report CSOPS.21.038, entitled "2020 Year End Water & Wastewater Capacity Assessment for their information."

B. Overview

The Town's year end Water and Wastewater Capacity Assessment Report is submitted to Grey County to provide status of the connections to the Town's Water Distribution System and Wastewater Collection Systems. The report also provides information on the capacity status of the Water Treatment Plant, the Thornbury & Craigleith Wastewater Treatment Plants and related critical infrastructure.

C. Background

The Town is required to provide an annual year end Water & Wastewater Capacity Assessment Report to the upper tier government, being the Grey County Planning Department. This report is used as a monitoring tool for the provision of allocation and reservation of water and wastewater capacity for new development. It also provides current information on flows from existing system users.

The Year End Reports are prepared by Town Staff.

D. Analysis

An overview of the 2020 Year End Water & Wastewater Capacity Assessment (2020 Year End Report) is provided below, and the Executive Summary is appended as Attachment #1.

The Town's Official Plan outlines the Town's servicing policies. It identifies the preference for municipal water and wastewater servicing requirements for each service area within the Town, establishes policies for the provision of private or municipal water and wastewater servicing,

defines requirements for servicing of existing residents, as well as reservation and allocation limitation and requirements for new development.

Section D1.4 of the Official Plan describes five development-staging categories based on development approval status and the corresponding level of commitment of water system or the wastewater system capacity. The process makes commitment of capacity for existing unserviced development. Attachment #2 provides an overview of the development staging process and requirements for moving through the process for both new and existing unserviced development. Development is identified as having "No Capacity", "Reservation", or "Allocation" depending on the stage.

Development Categories

The Town's Year End Reports have historically identified 7 categories of connection status within the Town. See Attachment #2.

1. Connected – includes all connected units
2. Can connect – includes all existing units and vacant lots fronting servicing that are not connected
3. Committed – includes all new units that are identified in an executed development agreement
4. Not Fronting, Not Serviced – includes existing units and vacant lots within a service area that do not front servicing
5. Designated active lands – includes units in areas with draft plan approval
6. Other lands designated – includes units in areas that are designated but do not have draft plan approval
7. Other lands not designated – includes units in areas that require Official Plan Amendments and have no approval

Allocated = Categories 1 to 4

Reserved = Category 5

No Capacity = Categories 6 and 7

To determine units available for allocation, built capacity (i.e. servicing capacity of the existing built Town water and wastewater infrastructure) will be used. To determine units available for reservation, planned and approved capacity (e.g. facility design complete, Environmental Compliance Approval obtained) will be used. If no planned or approved capacity is available, the total capacity for reservation and allocation is the built capacity.

Water

From 2019 to 2020 the number of connected water units in the Town increased by 304 units for a total of 8,951 connected units. See Figure 1 below.

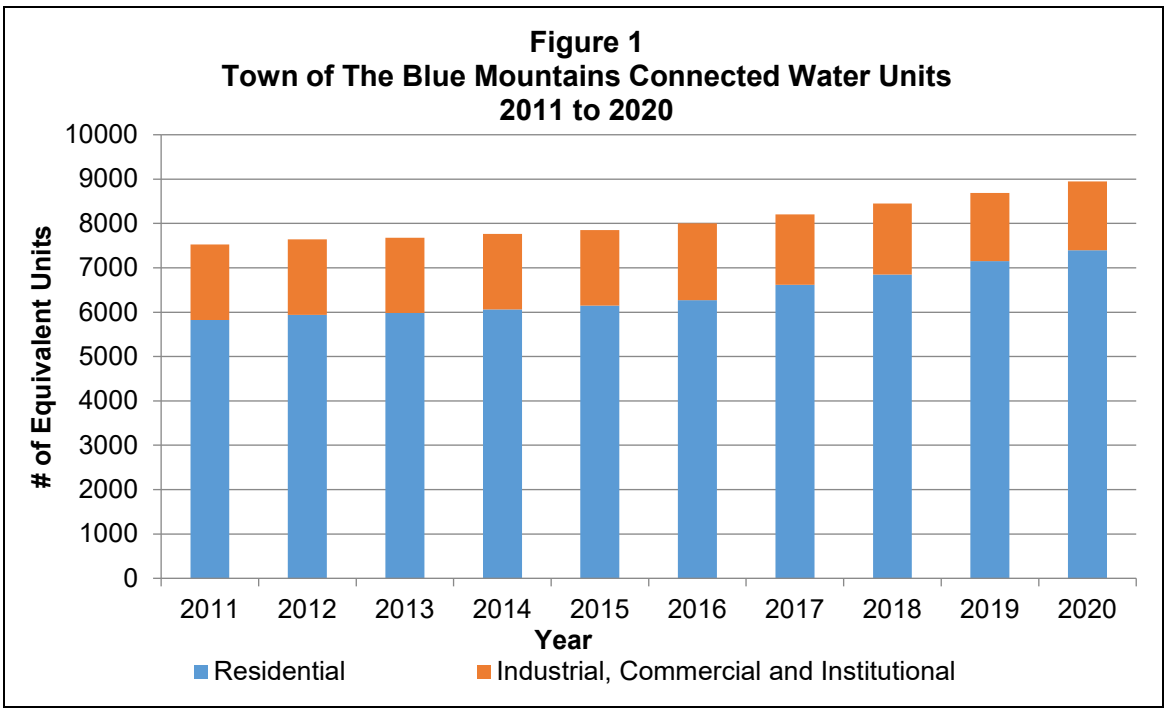
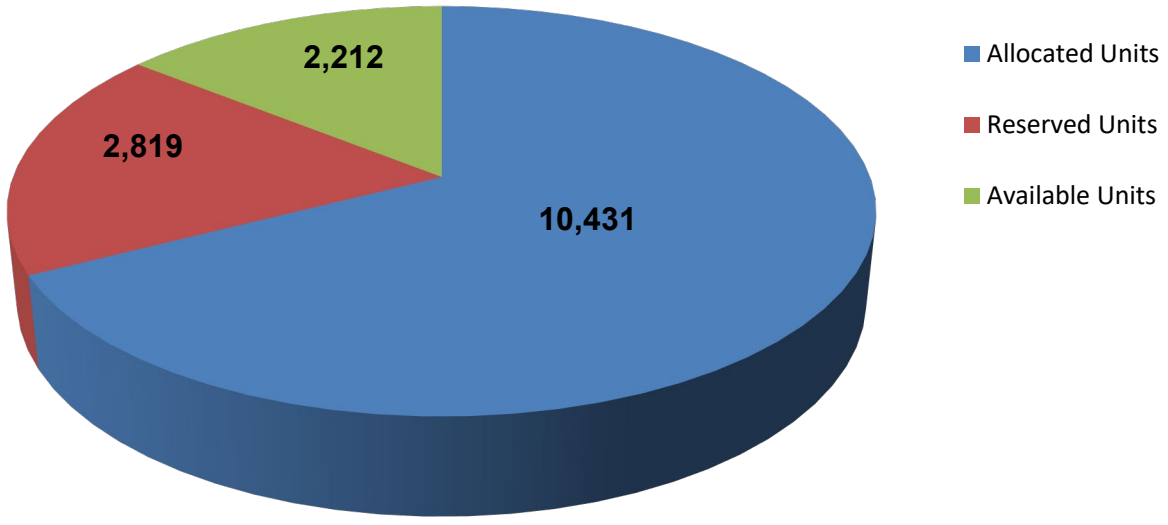


Figure 2 below illustrates the unit capacity of the Town's water system. Of the total system capacity of 15,462 units, 10,431 units are allocated, and 2819 units are reserved. This leaves 2,212 available units.

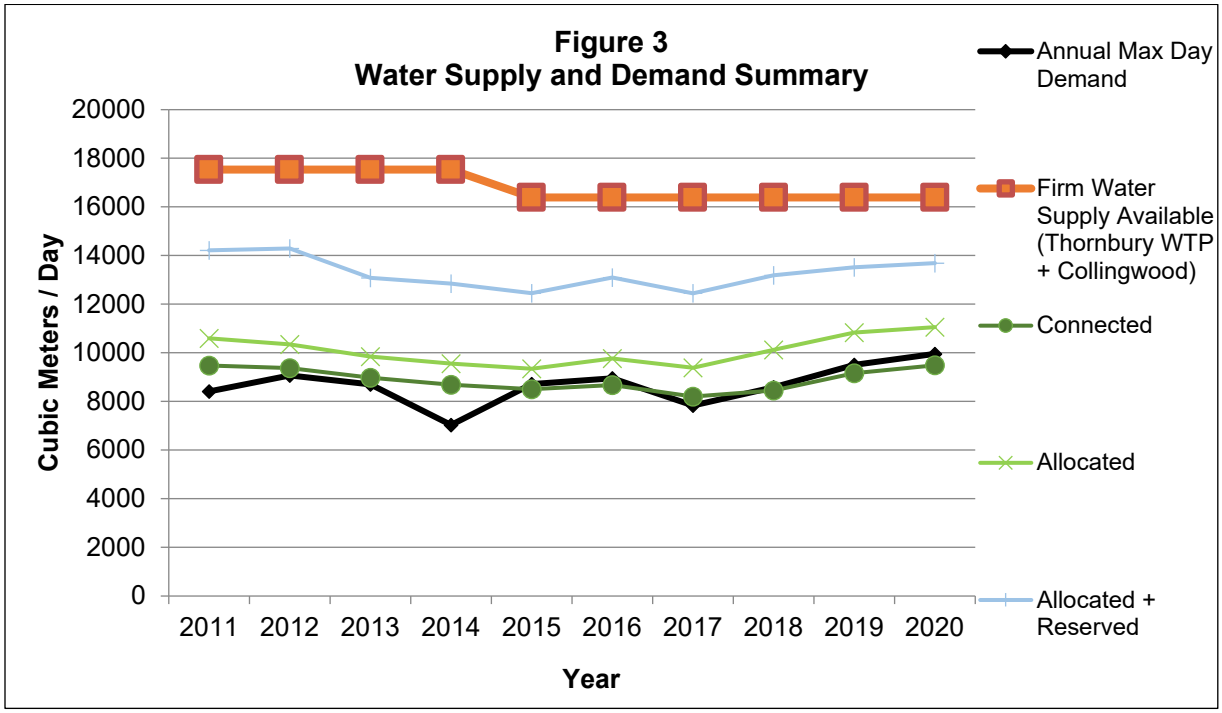
Figure 2
Town Water Unit Capacity



The Town of The Blue Mountains total firm water supply capacity available is 16,390 m^3/day, or 15,462 units based on the five-year rolling Maximum Day Demand (MDD) of 1.060 m^3/unit/day.

The 16,390 m^3/day includes 1,250 m^3/day received from the Town of Collingwood as identified in the Water Supply Agreement.

Figure 3 below illustrates that the Town's water supply is capable of meeting the demands of the existing units as well as those that have been allocated and reserved for future connections.



The Town of The Blue Mountains Water Treatment Plant (WTP) continues to deliver high quality of drinking water and adheres to all Provincial Regulations and stringent testing requirements. There were no significant water quality concerns arising from the 2020 reporting period.

All municipal drinking water systems experience some water loss. The items listed below can contribute to water loss in the water Distribution system:

1. Watermain breaks;
2. Service line breaks;
3. Aging watermains;
4. Flushing required to maintain water quality;
5. Testing, such as online analyzers;
6. Water theft;
7. Inaccuracy of metering;
8. Acceptable leakage at bell and spigot joints;
9. Pump cooling water; and,
10. Others

The Town has a challenging water system in regard to leakage. Within the Town's water system, there are 14 different pressure zones. The system is long and narrow and runs along

the shoreline. The shale provides an excellent opportunity for water that has leaked out of the system to get to the bay, without surfacing. Many of the lots serviced by the water system are estate type lots, meaning they are much larger than city lots, and fewer users per length of pipe. Water tends to leak between joints and fittings, when there are few users between each pipe length or joint, the percent of water loss is increased, because the amount of water being accounted for by users is less, however still experiencing the same volume of water loss. For the relative length of the system, 120kms, there are few users.

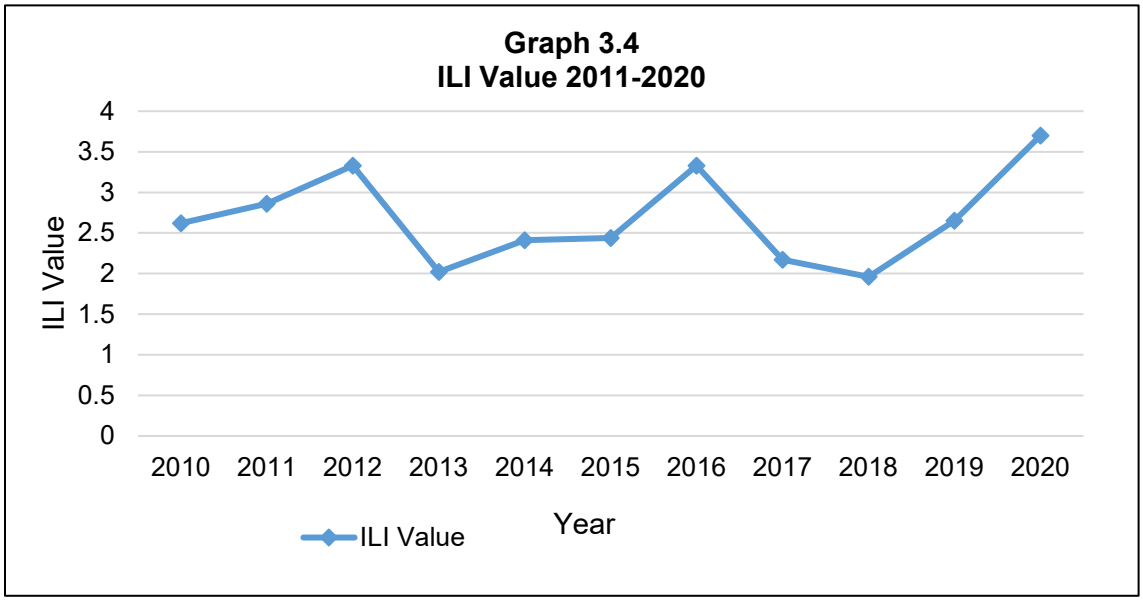
Infrastructure Leak Index

The Infrastructure Leakage Index (ILI) is a performance indicator of a system's water loss. ILI was developed by the International Water Association. The ILI is the ratio of current annual real losses to unavoidable annual real losses. It is derived from the structural and operational characteristics of the distribution system and is considered by the industry as a better indicator of a system's condition. The ILI calculation considers the length of service connections, the operating pressures, the length of the system and the number of users on the system.

There are four technical performance categories utilized for ILI values by the International Water Association Water Loss Task Force:

ILI 1 to 2	EXCELLENT	Further loss reduction may be uneconomical unless there are shortages.
ILI 2 to 4	GOOD	Potential for marked improvements, consider pressure management, better active leakage control practices and improved network maintenance.
ILI 4 to 8	POOR	Poor leakage record, tolerable only if water is plentiful and cheap, analyze level and nature of leakage and intensify leakage reduction efforts.
ILI >8	VERY BAD	Very inefficient use of resources; leakage reduction programs imperative and high priority

Figure 4 below illustrates the ILI values for the Town from 2010 – 2020



The Town falls within the "Good" range for managing non-revenue water or real losses. However, this category also identifies room for improvement and continual monitoring to further reduce the losses. Staff continue to source leaks and repair as soon as possible.

Table 1 summaries the water produced, consumed, and lost.

Year	2013	2014	2015	2016	2017	2018	2019	2020
Water Produced (TBM) (ML)	575.	1177	1453	1618	1541	1585	1793	1900
Imported Water (ML)	863	313	223	190	171	213	185	198
Exported Water (ML)	0	2.6	54.8	24.0	25.9	31.5	32.9	35.5
Total Water Available (ML)	1438	1487	1621	1784	1686	1766	1945	2063
Billed Authorized Consumption (ML)	997	968	1054	1124	1057	1165	1336	1282
Unbilled Authorized Consumption (ML)	132	172	208	202	288	203	195	219
Apparent Losses* (ML)	101	101	101	101	102	102	103	103
Real Losses** (ML)	209	246	257	356	238	297	312	562
Real Water Loss (%)	14.5%	16.6%	15.9%	20.0%	14.1%	16.8%	16.0%	27.26%
Total Water Loss (%)	21.5%	23.3%	22.1%	25.7%	20.2%	22.6%	21.3%	32.26%

* Apparent Losses includes unauthorized consumption, customer metering inaccuracies and systematic data handling errors.

** Real Losses includes the total volume of water that cannot be accounted for.

The total percentage of water loss for 2020 was 32.26%. This was significantly higher than 2019.The Town is currently undertaking a Leak Detection Program to identify and repair leaks to reduce the water loss. In addition, the Town has started a program to install flow meters on the watermains entering large developments on private lands. A mass balance with the individual residential meters will assist in identifying leaks on private lands. The Town is undertaking several capital projects to replace watermains that have reached the end of their useful lives or are substandard. This includes replacement of watermains in five areas of Town in 2020, and in seven areas in 2021, as well as the replacement of the watermain through the Tyrolean Village area and Pressure Zone 4C.

In 2020, Staff repaired 8 watermain breaks, 14 service connection leaks, and 5 leaks identified by the Leak Detection Program. Staff also identified many incidents of water theft, mostly in new developments, with construction companies illegally operating curbstops, leaving curbstops running during winter months to prevent freezing and establishing stations to facilitate water theft. Staff have been working with the Building Department and Development Engineering educating contractors and developers regarding access the Town's water system. In addition, By-law have been enforcing the Town's Water By-law and addressing enforcement actions.

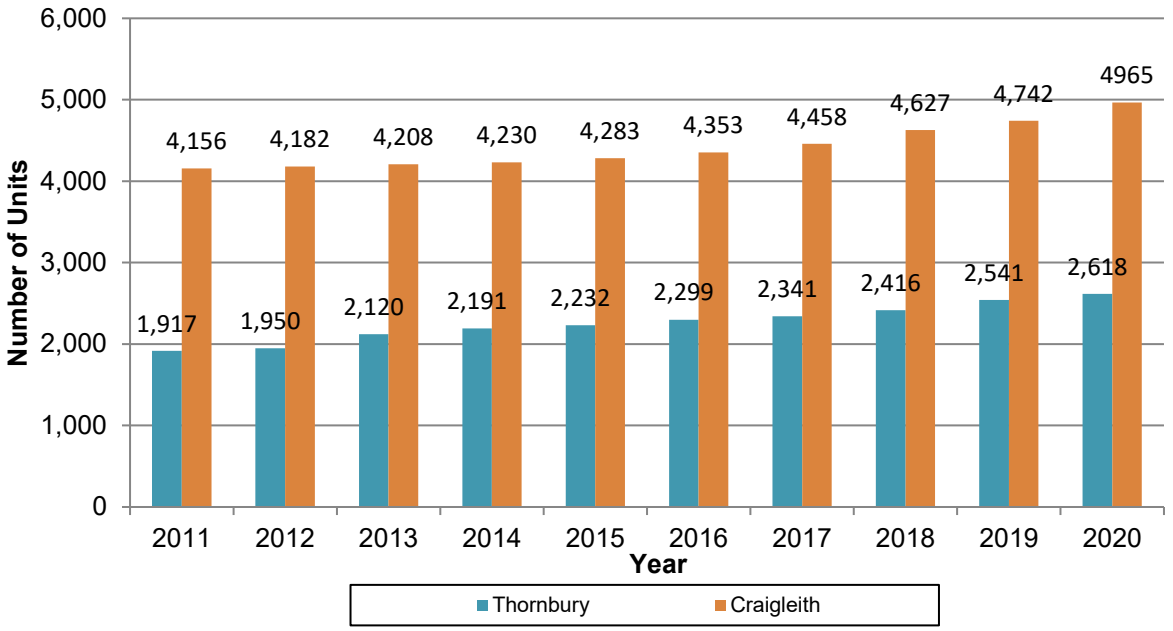
Table 2 Summaries the Watermain and Service Leak Repairs

Year	**Watermain Break Repairs**	**Service Leak Repairs**
2015	5	14
2016	4	9
2017	3	3
2018	7	6
2019	7	6
2020	6	11

Wastewater

Figure 5 provides a historical breakdown of the number of wastewater units from 2011 to 2020.

Figure 5
Town of The Blue Mountains Wastewater Units



From 2019 to 2020 the number of wastewater units in the Thornbury Service Area increased by 77 units for a total of 2,618 connected units while in the Craigleith Service Area, the number of wastewater units increased by 223 units for a total of 4,965 connected units.

Thornbury Wastewater Treatment Plant

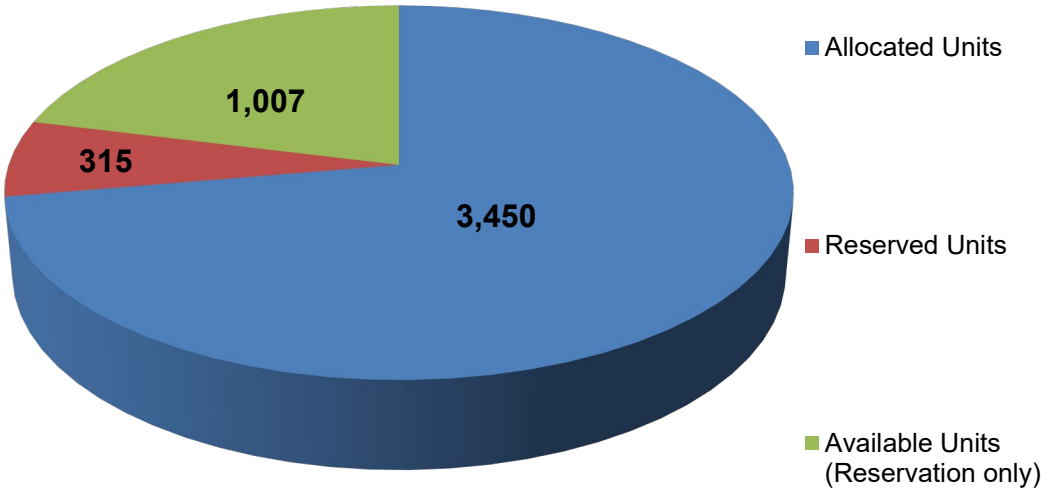
The Thornbury Wastewater Treatment Plant (WWTP) firm-built capacity is 3,580 m^3/day or 3,205 units based on the historical five year rolling Average Day Flow (ADF) of 1.117m^3/unit/day.

In 2017, the Town completed an Addendum to the 2006 Environmental Assessment (EA) for the WWTP. This Addendum looked at what had changed between 2006, when the initial EA was completed, and 2017. Upon completion of the EA, the Town applied for and acquired an Environmental Compliance Approval (ECA) for the construction of Phase 1A of the Thornbury WWTP upgrades to enable the expansion when inflow reaches 80% of built capacity. The Construction of the Proposed Works portion of the new ECA expires October 1, 2023.

The EA identified that the first phase of the works to expand the facility would provide an additional average day capacity of approximately 3,500 m^3/day for a total average day capacity of 7,080 m^3/day. A Design Report was prepared which identified that Phase 1 will be split into two (2) sub-phases with Phase 1A having an ADF capacity of 5,330 m^3/day. Phase 1B will expand Thornbury WWTP ADF capacity to 7,080 m^3/day and a Peak Daily Flow (PDF) capacity of 16,187 m^3/day. The Town has since decided to proceed with Phase 1B expansion immediately after the completion of Phase 1A. Phase 1B will require a new application for an ECA for the additional works. This can be completed while constructing the Phase 1A expansion.

Currently, there are 3,450 units (3,854 m^3/day) allocated to the Thornbury WWTP and 315 units (352 m^3/day) reserved. As the Town is able to reserve units based on the Phase 1A design expansion of 5,330 m^3/day the Thornbury has a remaining total reservation of 1,007 units (1,125 m^3/day). Figure 6 below illustrates the 2020-unit (design) capacity for the Thornbury WWTP.

Figure 6
Thornbury WWTP Unit (Design) Capacity



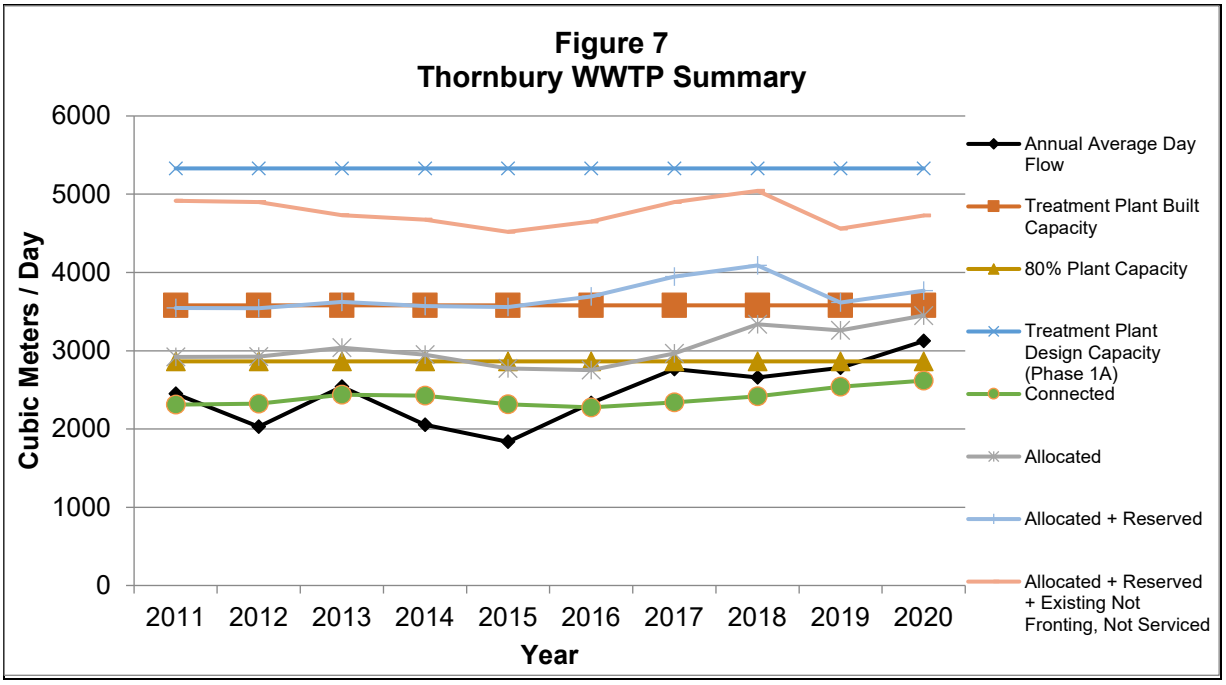
The Thornbury WWTP's five-year rolling Average Daily Flow (ADF) is 2,732 m^3/day which means that the flows are utilizing 76% of the Thornbury WWTP current built capacity. A five-year average flow is utilized to smooth out the noise of random outliers and emphasize long-term trends. Considering the 2020 flow data independently, the influent flow is 87% of the rated capacity.

Of the 3,405 units that could connect to the Thornbury WWTP, only 2,618 are currently connected.

The Thornbury WWTP receives a significant number of extraneous flows. The extra flows are pushing the treatment plant facility to upgrades sooner than should be needed. Staff have been conducting an evaluation of the sanitary collection system throughout the entire municipality. This assessment includes closed caption videoing and assessment of the sanitary mains. This work identifies areas where the sewers are failing or requiring repair. In addition to the assessment, Staff have initiated an Inflow and Infiltration Strategy beginning with a communication plan to inform the public of the Town By-law and/or regulations regarding illegal connections to the system, such a roof leaders or sump pump connections. The first phase of the Strategy will primarily focus on the Thornbury WWTP collection area to reduce inflow issues. Ongoing capital projects such as the Thornbury West Reconstruction Project will

result in a significant improvement to inflow and infiltration once the aging sanitary lines are replaced and new stormwater laterals are connected to each residence.

Figure 7 below illustrates that the Thornbury WWTP has capacity based on the number of allocated and reserved units. The annual five-year rolling ADF remains below the 80% WWTP capacity threshold. Wastewater allocations and reservation in the Thornbury Collection System are monitored closely.



Craigleith Wastewater Treatment Plant

The Craigleith Wastewater Treatment Plant (WWTP) firm built capacity is 8,133 m^3/day or 11,141 units based on the historical five-year ADF of 0.730 m^3/unit/day.

Figure 8 below illustrates the 2020 built unit capacity for the Craigleith WWTP. Of the total built capacity (11,141 units), 5,678 units are allocated, and 3,455 units are reserved. This leaves 2,009 available units.

Figure 8
Craigleith WWTP Unit Capacity

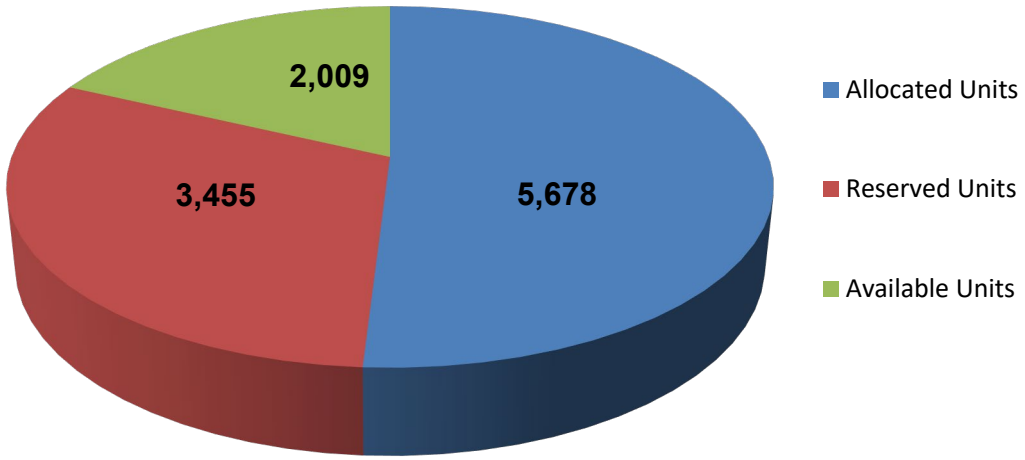
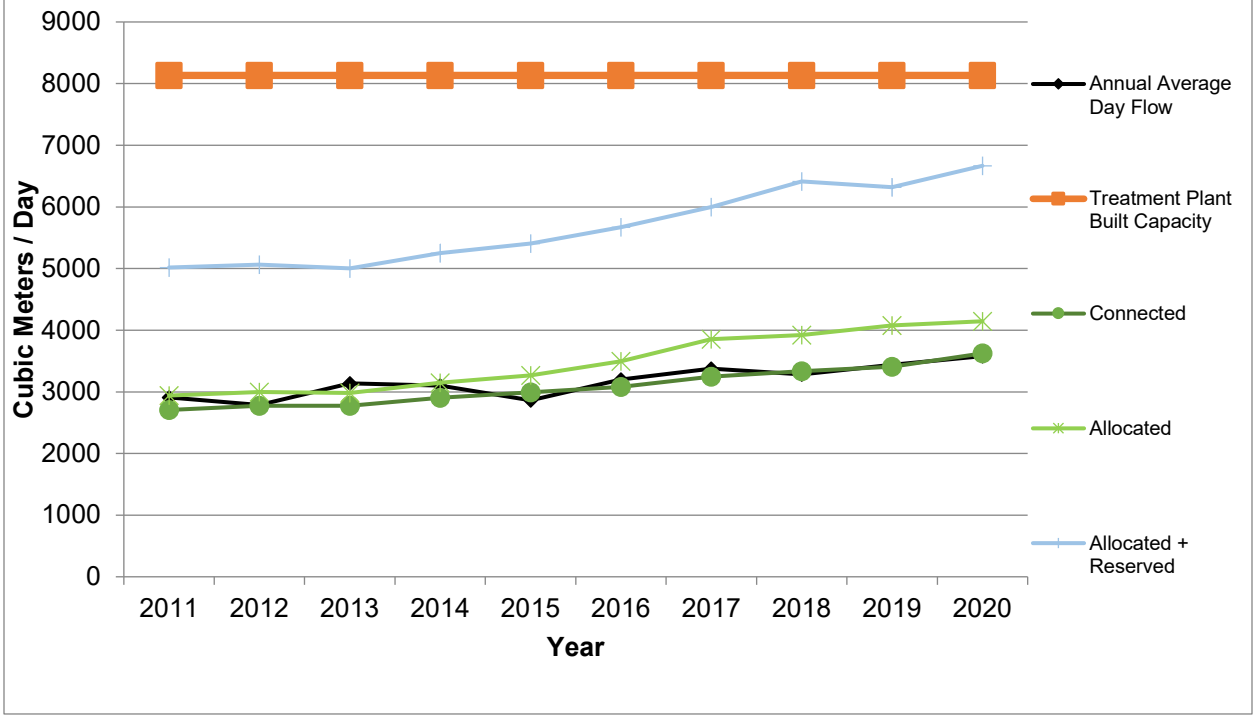


Figure 9 below illustrates that the Craigleith WWTP has available capacity and is able to treat waste being received from the existing wastewater units in the Craigleith collection area as well as from the allocated and reserved future units. The Town currently has enough capacity to service an additional 2,009 units with wastewater in the Craigleith collection area.

Figure 9
Craigleith WWTP Summary



The 2020 Year End Water and Wastewater Capacity Assessment Report Executive Summary is provided as Attachment #1 to provide an overview of the Report. The document in its entirety is available upon request.

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.

4. Quality of Life

We will foster a high quality of life for full-time and part-time residents of all ages and stages, while welcoming visitors.

F. Environmental Impacts

The 2020 Year End Report provides the baseline data required for reporting and forecasting. It is integral to the development of water and wastewater services within the Town. The 2020 Year End Report is instrumental in environmental compliance reporting and for monitoring the Municipality's impact on the ecology of Georgian Bay.

G. Financial Impacts

The 2020 Year End Report does not have a direct financial impact however it forecasts the need for future capital expansions in both water and wastewater.

H. In Consultation With

Meg Boyd, Compliance & Efficiency Coordinator

Nathen Westendorp, Director of Planning and Development

Trevor Houghton, Manager of Community Planning

Shawn Postma, Senior Policy Planner

Aaron Roninen, GIS/Planning Technician

Ruth Prince, Director of Finance & IT Services/Treasurer

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. 2020 Water & Wastewater Capacity Assessment Executive Summary
2. Development Staging Process

Respectfully submitted,

Allison Kershaw,
Manager of Water & Wastewater Services

Shawn Carey
Director Operations

For more information, please contact:
Allison Kershaw, Manager of Water & Wastewater Services
managerwww@thebluemountains.ca
519-599-3131 extension 226

Report Approval Details

Document Title:	CSOPS.21.038 2020 Year End Water and Wastewater Capacity Assessment.docx
Attachments:	- Att 1 Executive Summary.pdf - Att 2 Development Staging Process.pdf
Final Approval Date:	Jun 11, 2021

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

Allison Kershaw - Jun 9, 2021 - 1:35 PM

Shawn Carey - Jun 11, 2021 - 9:57 AM

Shawn Everitt - Jun 11, 2021 - 11:25 AM

Water and Wastewater Capacity Assessment Report 2020 Year End Report

Executive Summary

This report provides an assessment of water and wastewater treatment systems capacity within the Town for 2020. Current Town water supply and wastewater treatment infrastructure includes:

- The Blue Mountains Water Treatment Plant & Distribution System
- Supplemental water supply from the Town of Collingwood
- Thornbury Wastewater Treatment Plant & Collection System
- Craigleith Wastewater Treatment Plant & Collection System

According to Ministry of the Environment Conservation and Parks (MECP) Guideline D-5-1 entitled "Calculating and Reporting Uncommitted Reserve Capacity at Sewage and WTPs", "The number of lots in approved plans of subdivisions, developments committed by virtue of approved zoning, new official plans or site-specific official plan amendments, should not exceed the design capacity of the sewage and/or water system. To ensure that capacity is not exceeded it is necessary to determine what uncommitted reserve capacity is available. This procedure provides a means for determining uncommitted reserve capacity."[1] *** See note in TWWTP for modified calculation method.

Key Definitions: Allocations versus Reservations

Built capacity	Servicing capacity of existing built Town WTP and WWTP facilities and associated infrastructure (e.g. distribution and collections systems).
Design capacity	Servicing capacity of planned Town water supply and wastewater treatment facilities and associated infrastructure based on designed and approved capacity, typically available when an ECA is obtained.

Allocation* Commitment of built plant capacity; and "allocation of servicing capacity" or "allocated servicing capacity" shall have a corresponding meaning.

Reservation* Commitment of approved design capacity, available when design is completed, and approvals are obtained and "reservation of servicing capacity" or "reserved servicing capacity" shall have a corresponding meaning.

* To determine units available for allocation, built capacity will be used. To determine units available for reservation, planned and approved capacity (e.g. facility design complete, ECA obtained) will be used. If no planned or approved capacity is available, the total capacity for reservation and allocation is the built capacity.

[1] MECP guideline D-5-1 entitled, "Calculating and Reporting Uncommitted Reserve Capacity at Sewage and WTPs", updated March 1995.

Water Supply

1. Total Blue Mountains WTP Capacity

The firm capacity available from the Blue Mountains WTP is 15,140 m^3/day. The Town receives up to 1,250 m^3/day supplemental supply from the Town of Collingwood.

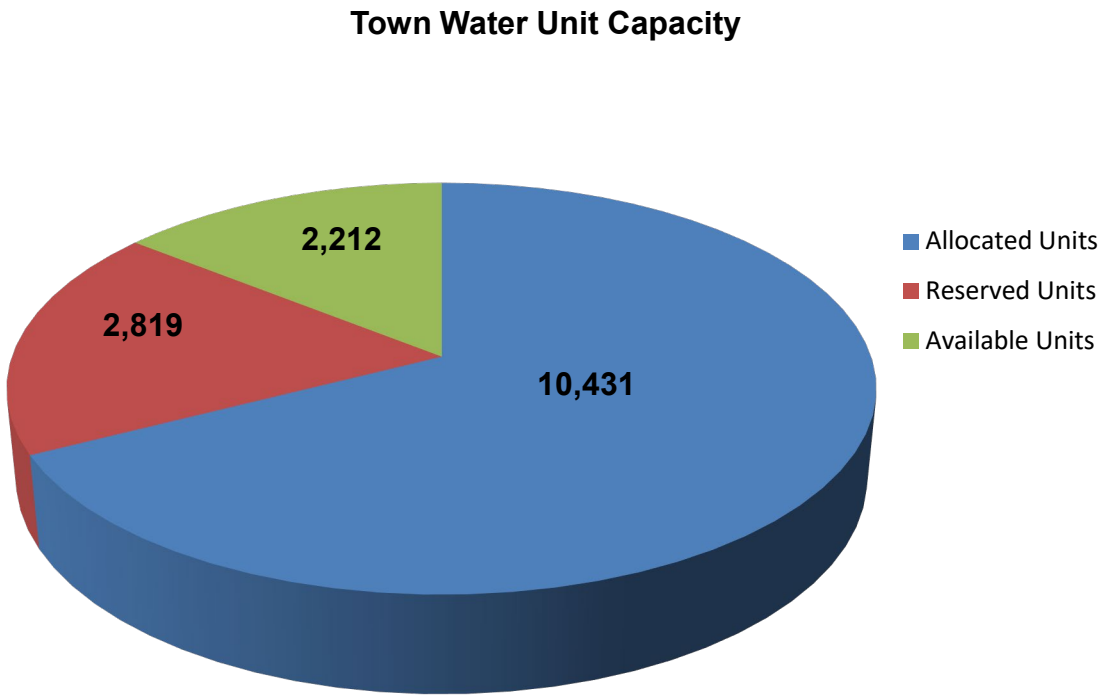
Therefore, the total firm water capacity available is 16,390 m^3/day or 15,462 units based on the 5-year rolling MDD of 1.060 m^3/unit/day.

2. Available Water Capacity

A total demand of 11,057 m^3/day (10,431 units) is currently connected or allocated to the water system based on a 5-year rolling average maximum daily demand of 1.060 m^3/unit/day.

A total flow of 2,988 m^3/day (2,819 units) is currently reserved at 1.060 m^3/unit/day.

Of the 15,462 total units of water supply available, there are currently 13,250 units allocated and reserved. Therefore, the current available capacity of the Town's water supply is 2,212 units.



Thornbury Wastewater Treatment Plant

1. Total Thornbury WWTP Capacity

The total firm ADF built capacity available at the Thornbury WWTP is 3,580 m^3/day or 3,205 units based on the 5-year rolling ADF of 1.117 m^3/unit/day.

2. Available Wastewater Capacity Based on Planning Projections

A total flow of 3,854 m^3/day (3,450 units) is currently connected or allocated to the Thornbury WWTP based on a 5-year rolling ADF. There are currently 3,450 units allocated and 315 reserved. Therefore, using planning projections the current available uncommitted reserve capacity based on built capacity is -560 units. However, as shown below not all units are physically connected.

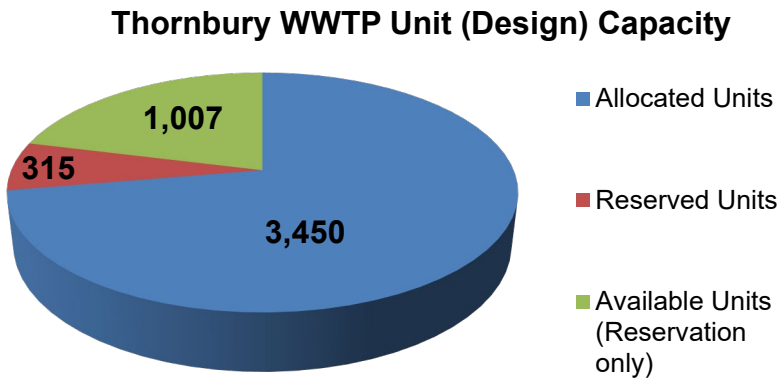
The Thornbury WWTP appears to be at capacity based on allocated and reserved units. However, there are 1,174 units (315 reserved + 832 can connect) which are not physically connected to the Thornbury WWTP.

The MECP guideline for Year End reporting has been modified through discussion between the Town, Grey County and the MECP. The purpose of the modified method is to optimize the use of the Thornbury WWTP built capacity prior to commencing construction of additional capacity. Upon completion of construction of all proposed Phase 1A works, for which the Town has approval to construct, the ADF Design Capacity available will be 5,330 m^3/d or 4,772 units based on an ECA received in 2018. Therefore, the current available uncommitted reserve capacity based on design capacity is 1,007 units.

The PDF flow at the Thornbury WWTP in 2020 was 8,397 m^3/day. The design PDF for the Thornbury WWTP is 7,196 m^3/d. The PDF typically occurs during a period of snow melt or a significant wet weather event. The peak day occurred on July 13, 2020. The peak flow occurred after a 3-day rain event. The peak flow event did exceed the peak capacity of the treatment plant.

3. Thornbury WWTP Estimated Expansion Timeline

The Town will be commencing the expansion of the Thornbury WWTP during 2021. The Thornbury WWTP is operating at 76% of the built capacity based on a five (5) year rolling average.



Craigleith Wastewater Treatment Plant

1. Total Craigleith WWTP Capacity

The total firm ADF built capacity available at the Craigleith WWTP is 8,133 m^3/day or 11,141 units based on the five-year rolling ADF of 0.730 m^3/unit/day.

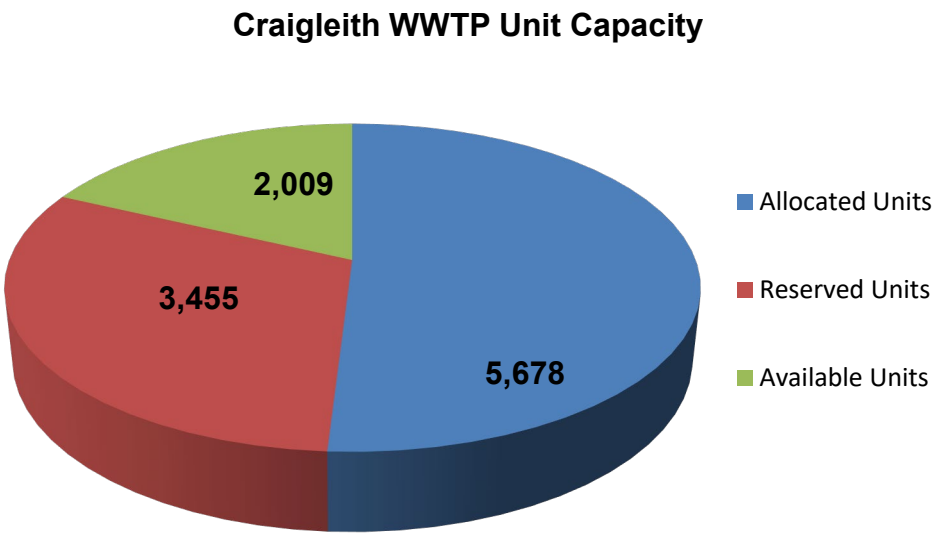
2. Available Wastewater Capacity

A total flow of 4,145 m^3/day (5,678 units) is currently connected or allocated to the Craigleith WWTP, based on a five-year rolling ADF. There are currently 5,678 units allocated and 3,455 units reserved. Therefore, the current uncommitted reserve capacity on built capacity is 2,009 units.

The PDF flow at the Craigleith WWTP in 2020 was 10,558 m^3/day. This was on January 11, 2020. The design PDF for the Craigleith WWTP is 19,640 m^3/d. The PDF typically occurs during a period of snow melt or a significant wet weather event. There was an early January thaw during 2020, that contributed to the peak flow event.

3. Craigleith WWTP Estimated Expansion Timeline

Based on the 2020 five year rolling ADF of 3,376 m^3/day, the Craigleith WWTP is operating at 42% of the built capacity and as such, there is no immediate need to expand the Craigleith WWTP.



Development Staging Process