



Staff Report

Operations – Water & Wastewater Services

Report To: Committee of the Whole Meeting
Meeting Date: June 21, 2022
Report Number: CSOPS.22.056
Title: 2021 Year End Water and Wastewater Capacity Assessment
Prepared by: Allison Kershaw, Manager of Water & Wastewater Services

A. Recommendations

THAT Council receive Staff Report CSOPS.22.056, entitled “2021 Year End Water and Wastewater Capacity Assessment for their information”.

B. Overview

The Town’s Year End Water and Wastewater Capacity Assessment 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 & Craigeith 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 Water and Wastewater Capacity Assessment is prepared by Town Staff.

D. Analysis

An overview of the 2021 Year End Water and Wastewater Capacity Assessment is provided below, the Executive Summary is provided in Attachment #1.

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 unserved 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 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 2020 to 2021 the number of connected water units in the Town increased by 362 units for a total of 9,719 connected units. See Figure 1 below.

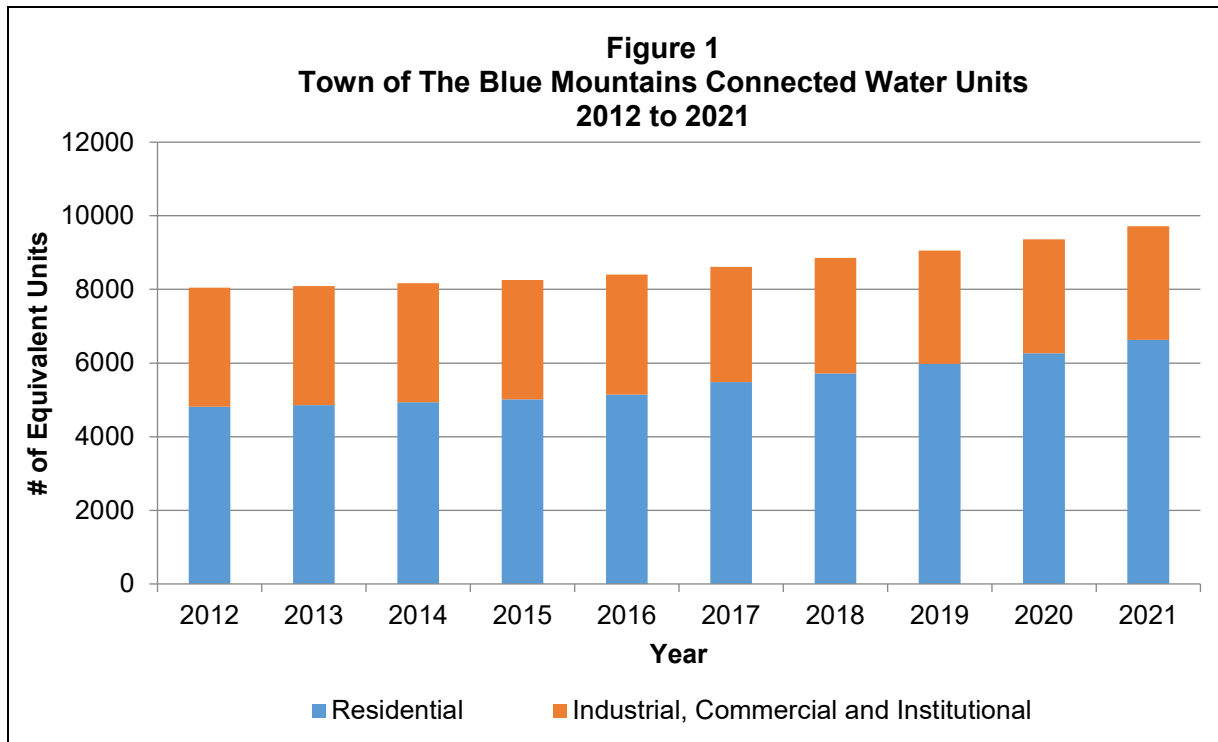
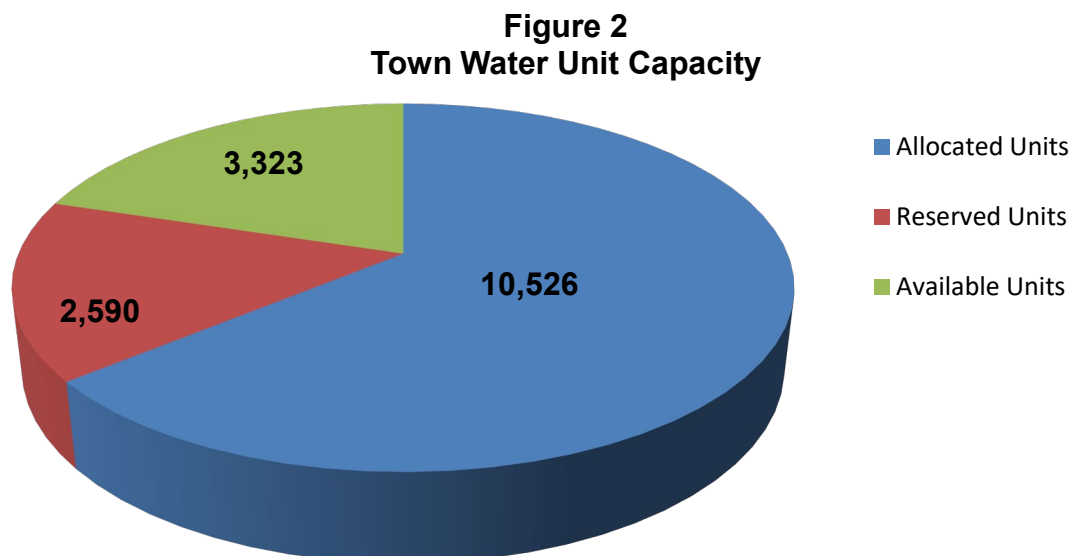
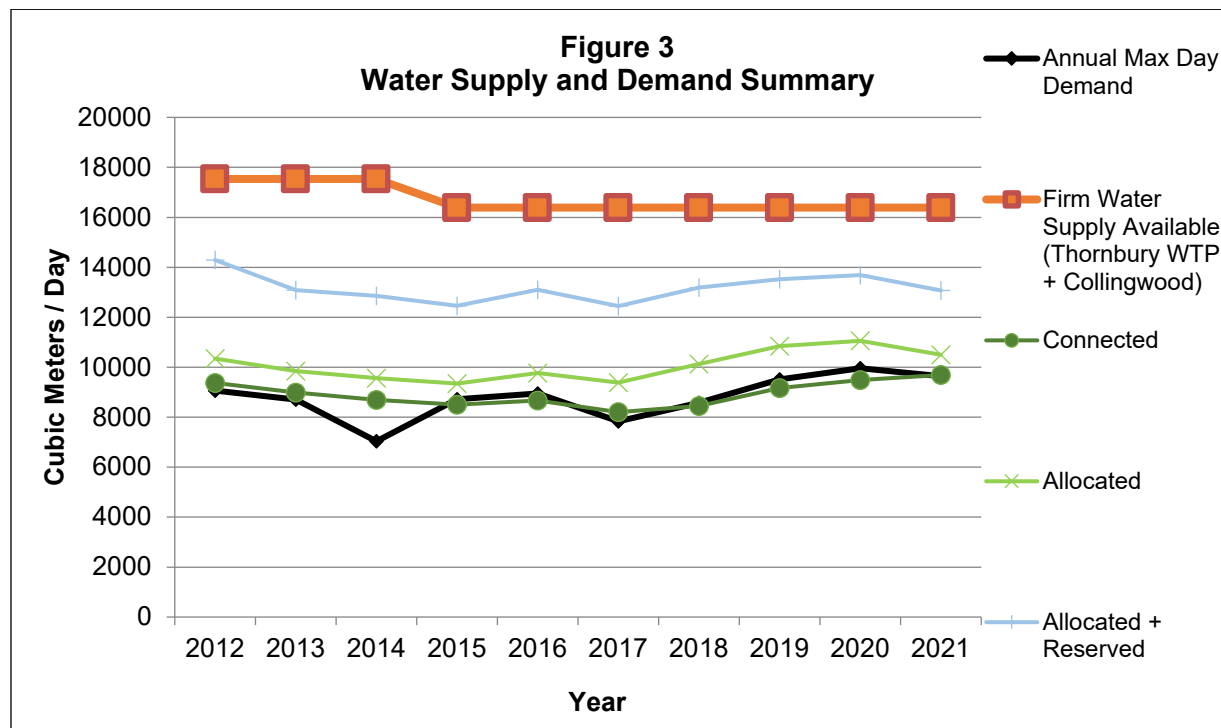


Figure 2 below illustrated the unit capacity of the Town's water system. Of the total system capacity of 16,439 units, 10,526 units are allocated, and 2,590 units are reserved. This leaves 3,323 available units.



The Town of The Blue Mountains total firm water supply capacity available is 16,390 m³/day or 16,439 units based on the five-year rolling Maximum Day Demand (MDD) of 0.997 m³/unit/day. The 16,390 m³/day includes 1,250 m³/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 drinking water and adheres to all Provincial Regulations and stringent testing requirements. There were no significant water quality concerns arising from the 2021 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.

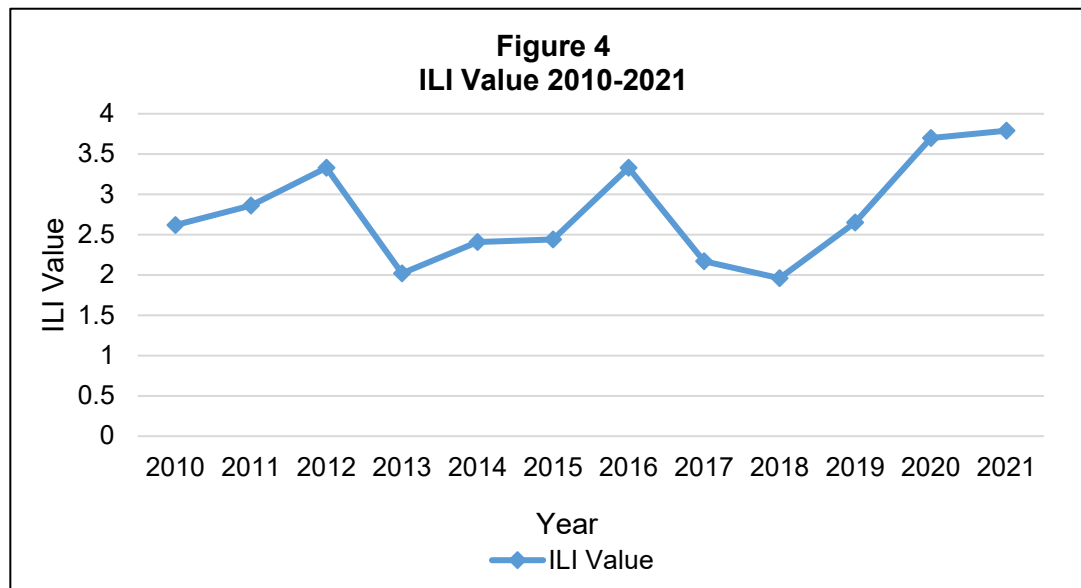
Infrastructure Leak Index

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 illustrated the ILI for the Town from 2010 to 2021



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	2015	2016	2017	2018	2019	2020	2021
Water Produced (TBM) (ML)	1452.9	1618.2	1541.0	1585.3	1793.4	1899.8	2033.7
Imported Water (ML)	222.9	190.0	171.0	212.7	185.0	198.4	198.7
Exported Water (ML)	54.8	24.0	25.9	31.5	32.9	35.5	42.9
Total Water Available (ML)	1621.0	1784.2	1686.2	1766.5	1945.5	2062.7	2189.4
Billed Authorized Consumption (ML)	1054.3	1124.3	1057.0	1164.6	1335.6	1281.7	1258.2
Unbilled Authorized Consumption (ML)	208.3	202.1	288.5	202.6	194.9	218.7	331.4
Apparent Losses* (ML)	101.1	101.5	102.2	102.4	102.9	103.2	103.4
Real Losses** (ML)	257.3	356.3	238.4	296.9	312.1	562.4	599.8
Real Water Loss (%)	15.9%	20.0%	14.1%	16.8%	16.0%	27.26%	27.39%
Total Water Loss (%)	22.1%	25.7%	20.2%	22.6%	21.3%	32.26%	32.11%

*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 2021 was 32.11%. This was slightly lower than 2020. 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 watermain entering large developments on private lands. A mass balance with the individual residential meters will assist in identifying leaks on private lands.

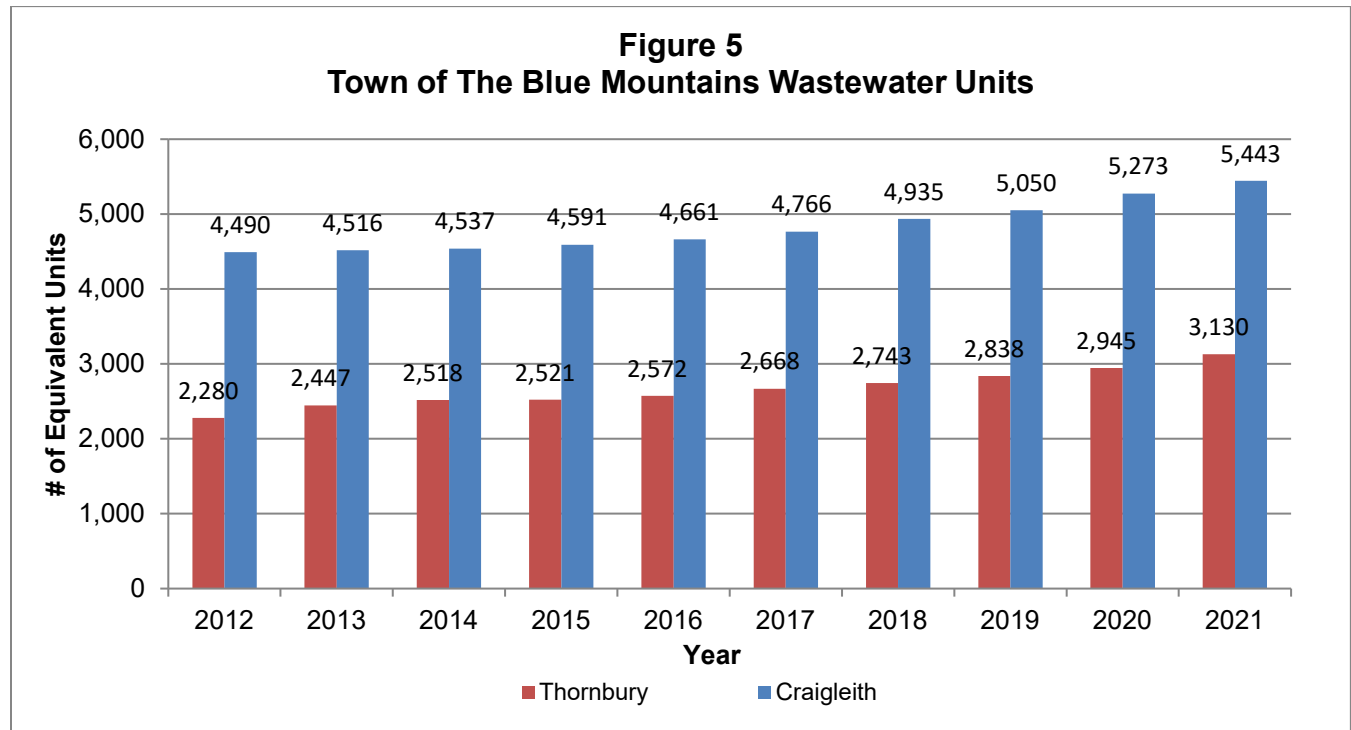
In 2021, Staff repaired three (3) watermain breaks, and thirty-one (31) service connection leaks. Staff also identified many incidents of water theft, mostly in new developments, with Construction Companies illegally operating curbstops, leaving curbstops running during winter months to prevent freezing and establishing stations to facilitate water theft. The Town replaced 670 meters of substandard watermain at four different locations through the Substandard Watermain Replacement Program. Other locations for future replacements have been identified and will be addressed in the coming years. The Pressure Zone 4C project involved the replacement of approximately 500 meters of a substandard watermain, and the installation of two new pressure reducing valves. This improved the pressure and the available fire flow in the Tyrolean Village area, as well as providing additional looping to improve the water quality.

Table 2 Summarizes 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
2021	3	31

Wastewater

Figure 5 provides a historical breakdown of the number of wastewater units from 2012 to 2021



From 2020 to 2021 the number of wastewater units in the Thornbury Service Area increased by 185 units for a total of 3,130 connected units while in the Craigleith Service Area, the number of wastewater units increased by 170 units for a total of 5,443 connected units.

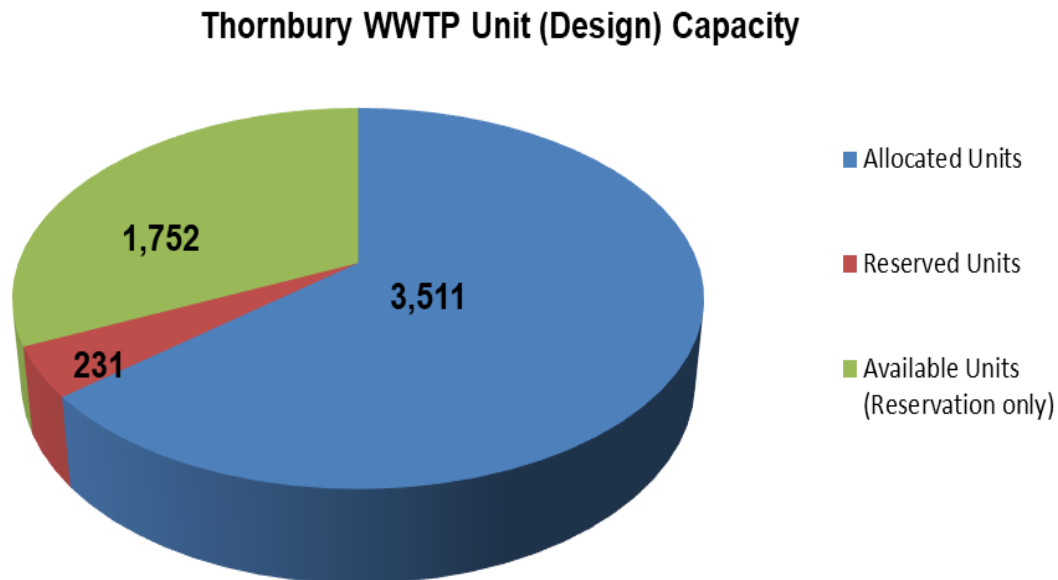
Thornbury Wastewater Treatment Plant

The Thornbury Wastewater Treatment Plants (WWTP) firm-built capacity is 3,580 m³/day or 3,687 units based on the historical five year rolling Average Day Flow (ADF) of 0.971 m³/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 in May, 2024.

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 m³/day for a total average day capacity of 7,080 m³/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 m³/day. Phase 1B will expand Thornbury WWTP ADF capacity to 7,080 m³/day and a Peak Daily Flow (PDF) capacity of 16,187 m³/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 3,511 units (3,409 m³/day) allocated to the Thornbury WWTP and 231 units (224 m³/day) reserved. As the Town is able to reserve units based on the Phase 1A design expansion of 5,330 m³/day the Thornbury has a remaining total reservation of 1,752 units (1,701 m³/day). Figure 6 below illustrates the 2021-unit (design) capacity for the Thornbury WWTP.



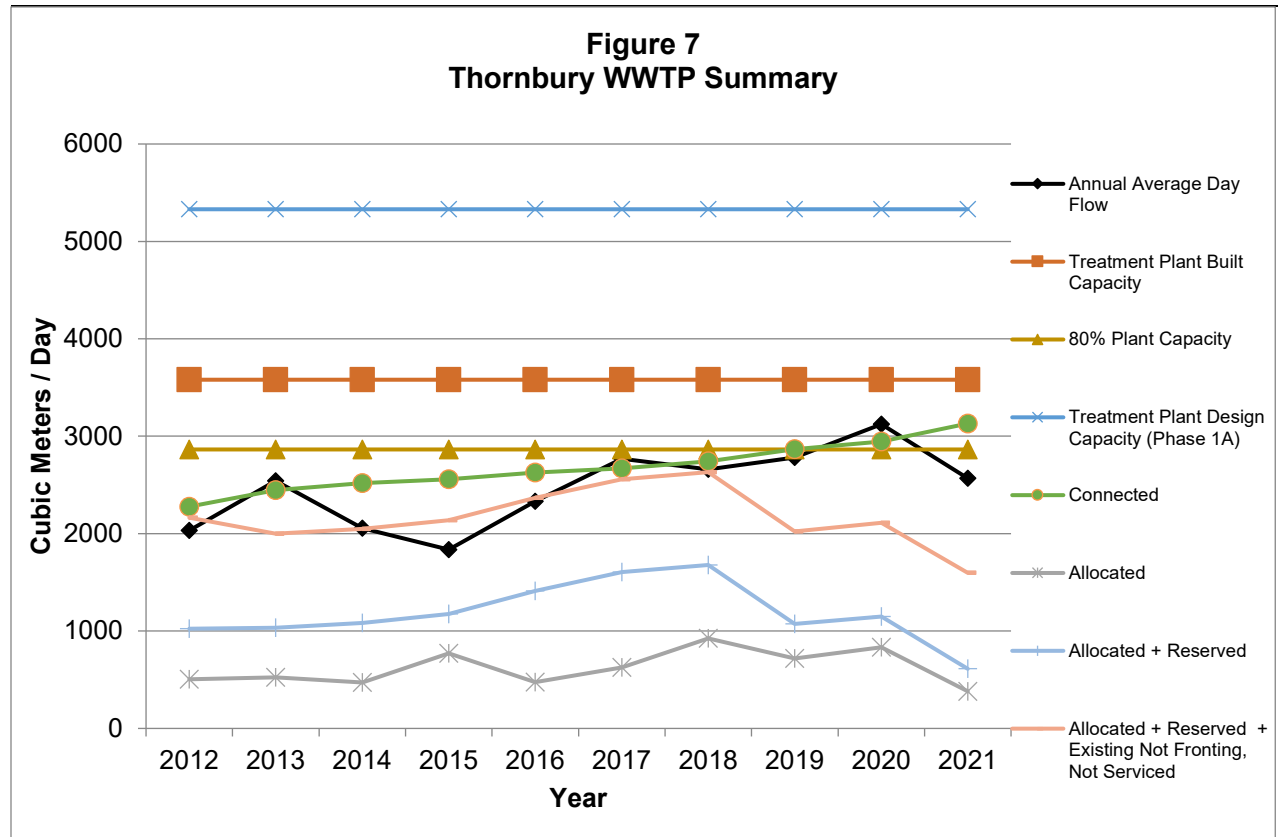
The Thornbury WWTP's five-year rolling Average Daily Flow (ADF) is 2,779 m³/day which means that the flows are utilizing 78% of the Thornbury WWTP current built capacity. A five-year average flow is utilized to smooth out the noise of random outliers and emphasize long-term trends. The influent flows to the treatment plant have significantly increase in the last 3 years, due to the rapid increase in the number of connections since 2019.

Of the 3,511 units that could connect to the Thornbury WWTP, only 3,130 units 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 and maintenance hole inspections. 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 significant improvement to inflow and infiltration once the aging sanitary lines are replaced and new stormwater laterals are connected to each residence.

As part of the Inflow and Infiltration program, the Town identified and repaired 12 leaking sewers with an in-situ repair method, as well installed weather stations to better understand the effects of rain events on the system.

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 reservations in the Thornbury Collection System are monitored closely.



Craigleith Wastewater Treatment Plant

The Craigleith Wastewater Treatment Plant (WWTP) firm-built capacity is 8,133 m³/day or 12,138 units based on the five-year rolling ADF of 0.670 m³/unit/day.

Figure 8 below illustrated the 2021 built capacity for the Craigleith WWTP. Of the total built capacity (12,138 units), 5,735 are allocated and 2,648 units are reserved. This leaves 3,755 available units.

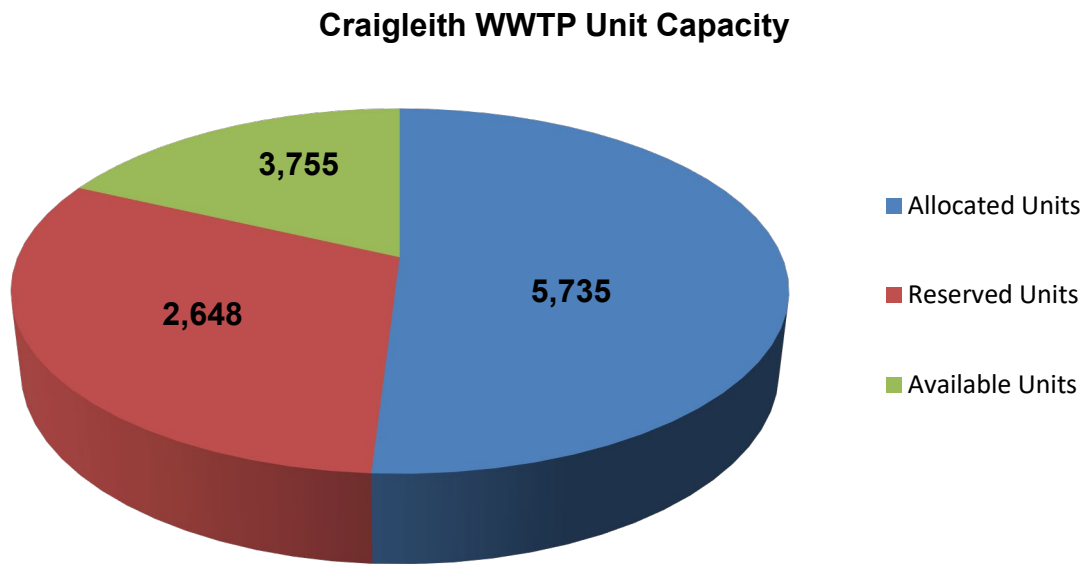
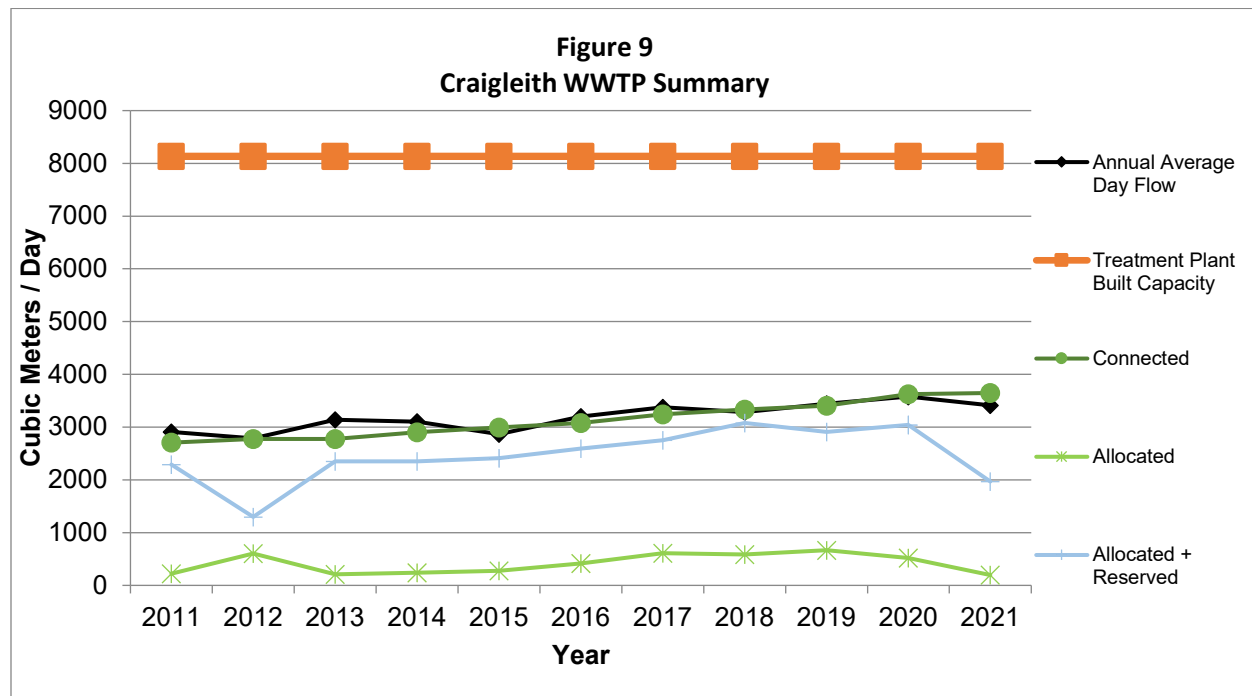


Figure 9 below illustrates that the Craigleith WWTP has available capacity and is able to treat the wastewater being received from the existing wastewater units in the Craigleith collection area as well as from the allocated and reserved future units. The Town currently has enough capacity to service an additional 3,755 units with wastewater in the Craigleith collection area.



The 2021 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 2021 Year End Water and Wastewater Assessment provides the baseline data required for reporting and forecasting. It is integral to the development of water and wastewater services within the Town. The 2021 Year End Water and Wastewater Capacity Assessment is instrumental in environmental compliance reporting and for monitoring the Municipality's impact on the ecology of Georgian Bay.

G. Financial Impacts

The 2021 Year End Water and Wastewater Capacity Assessment 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

Ruth Prince, Director of Finance & IT Services/Treasurer

Trevor Houghton, Manager of Community Planning

Shawn Postma, Senior Policy Planner

Aaron Roninen, GIS/Planning Technician

Meg Boyd, Compliance & Efficiency Coordinator

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. Executive Summary - 2021 Water and Wastewater Capacity Assessment
2. Development Staging Process

Respectfully submitted,

Allison Kershaw,
Manager of Water & Wastewater Services

Shawn Carey
Director Operations

For more information, please contact:
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Report Approval Details

Document Title:	CSOPS.22.056 2021 Year End Water and Wastewater Capacity Assessment.docx
Attachments:	- Att 1 Executive Summary.pdf - Att 2 Development Staging Process.pdf
Final Approval Date:	May 20, 2022

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

Allison Kershaw - May 20, 2022 - 1:30 PM

Shawn Carey - May 20, 2022 - 2:08 PM

Water and Wastewater Capacity Assessment Report 2021 Year End Report

Executive Summary

This report provides an assessment of water and wastewater treatment systems capacity within the Town for 2021. 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
- Craigeleith 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 m³/day. The Town receives up to 1,250 m³/day supplemental supply from the Town of Collingwood.

Therefore, the total firm water capacity available is 16,390 m³/day or 15,462 units based on the 5-year rolling MDD of 1.060 m³/unit/day.

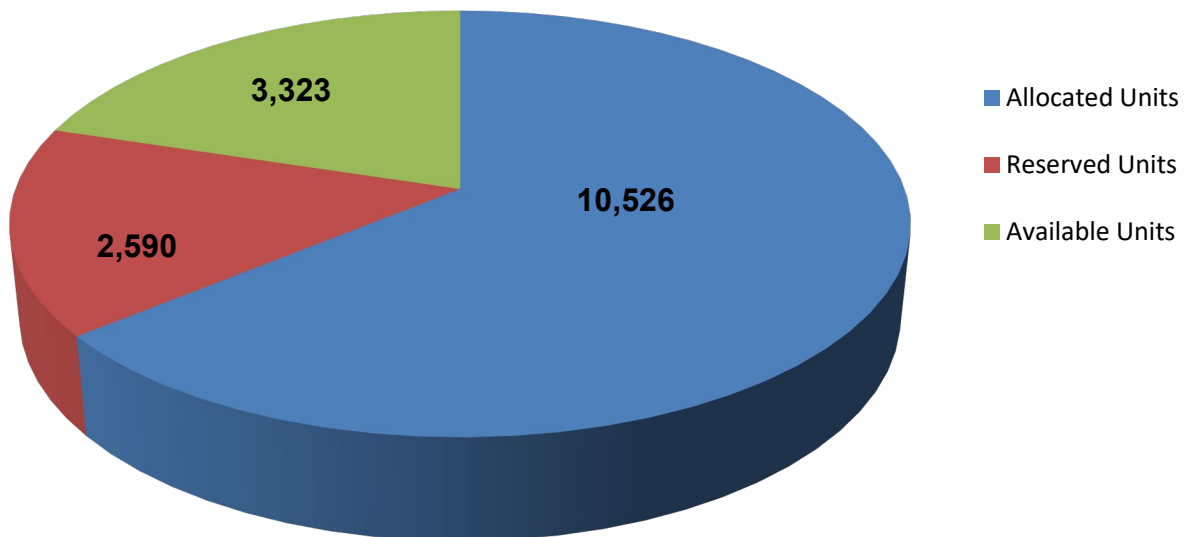
2. Available Water Capacity

A total demand of 10,494 m³/day (10,526 units) is currently connected or allocated to the water system based on a 5-year rolling average maximum daily demand of 0.997 m³/unit/day.

A total flow of 2,582 m³/day (2,590 units) is currently reserved at 0.997 m³/unit/day.

Of the 16,439 total units of water supply available, there are currently 13,116 units allocated and reserved. Therefore, the current available capacity of the Town's water supply is 3,323 units.

Town Water Unit Capacity



Thornbury Wastewater Treatment Plant

1. Total Thornbury WWTP Capacity

The total firm ADF built capacity available at the Thornbury WWTP is 3,580 m³/day or 3,687 units based on the 5-year rolling ADF of 0.971 m³/unit/day.

2. Available Wastewater Capacity Based on Planning Projections

A total flow of 3,409 m³/day (3,511 units) is currently connected or allocated to the Thornbury WWTP based on a 5-year rolling ADF. There are currently 3,511 units allocated and 231 reserved. Therefore, using planning projections the current available uncommitted reserve capacity based on built capacity is 1,752 units. However, as shown below not all units are physically connected.

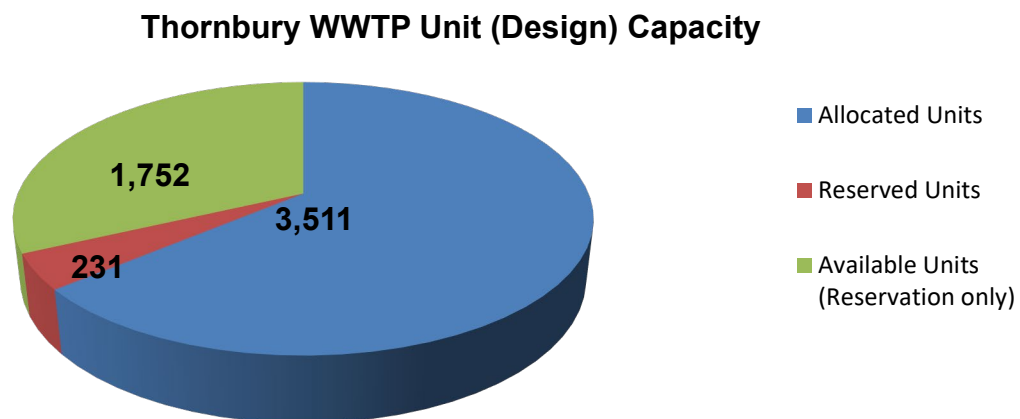
The Thornbury WWTP is quickly approaching capacity based on allocated and reserved units. However, there are 612 units (231 reserved + 381 can connect) which are not physically connected to the Thornbury WWTP.

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 m³/d or 5,489 units based on an ECA received in 2019. Therefore, the current available uncommitted reserve capacity based on design capacity is 1,752 units.

The PDF flow at the Thornbury WWTP in 2021 was 9,118 m³/day. The design PDF for the Thornbury WWTP is 7,196 m³/d. The PDF typically occurs during a period of snow melt or a significant wet weather event. The peak day occurred on September 22, 2021, during an unprecedented rain event. The peak flow event did exceed the peak capacity of the treatment plant.

3. Thornbury WWTP Estimated Expansion Timeline

The Town has commenced with the expansion of the Thornbury WWTP. It is anticipated that the work will be completed in the fourth quarter of 2024. The Thornbury WWTP is operating at 78% 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 m³/day or 12,138 units based on the five-year rolling ADF of 0.670 m³/unit/day.

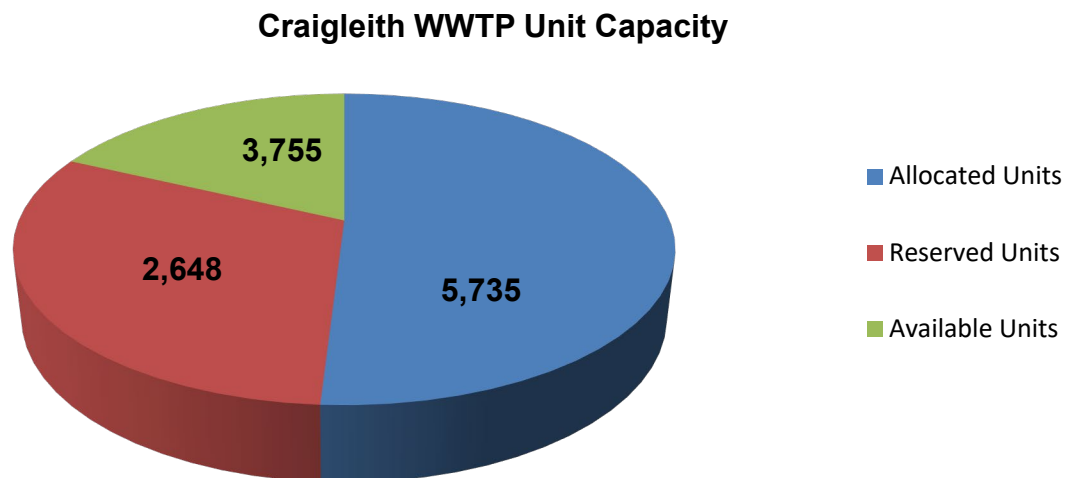
2. Available Wastewater Capacity

A total flow of 3,842 m³/day (5,735 units) is currently connected or allocated to the Craigleith WWTP, based on a five-year rolling ADF. There are currently 5,735 units allocated and 2,648 units reserved. Therefore, the current uncommitted reserve capacity on built capacity is 3,755 units.

The PDF flow at the Craigleith WWTP in 2021 was 14,461 m³/day. This was on September 22, 2021. The design PDF for the Craigleith WWTP is 19,640 m³/d. The PDF typically occurs during a period of significant wet weather or a snow melt event. There was in the fall during an unprecedented rain event. It was estimated that 133mm of rain fell during a two-day period in the Craigleith WWTP sewer shed.

3. Craigleith WWTP Estimated Expansion Timeline

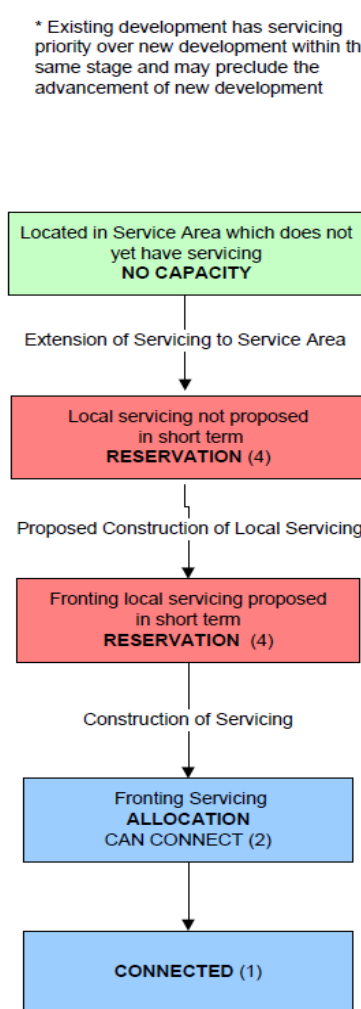
Based on the 2021 five year rolling ADF of 3,411 m³/day, the Craigleith WWTP is operating at 42% of the built capacity and as such, there is no immediate need to expand the Craigleith WWTP.



EXISTING UNSERVICED DEVELOPMENT *

* Includes vacant lots which can be developed without further development approval

* Existing development has servicing priority over new development within the same stage and may preclude the advancement of new development



NEW DEVELOPMENT

Not Designated (DD) (7)
Lands within identified service area, but with no Official Plan Policies for development

Designation through OPA or Secondary Plan

Designated (6)
No Development Approval

Draft Plan Approval

Future Development (5)
Partial Development Approval (-h) further Draft Plan Approval required

Further Draft Plan Approval

Development Approved (-h)
RESERVATION (5)

Final Zoning (remove -h), Site Plan Approval, Development Agreement, Development Charge Payment

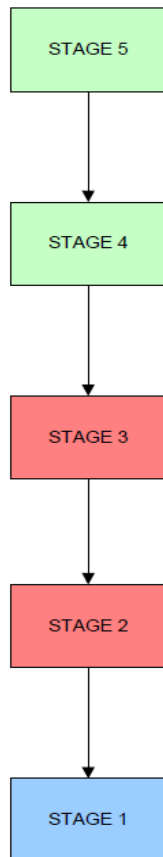
Development Approved
ALLOCATION (3)

Register Plans, Obtain Building Permits, Construction

Development Approved
ALLOCATION CAN CONNECT (2)

CONNECTED (1)

Development that does not contain future development blocks can move from Stage 4 to Stage 2 upon receipt of DPA



NO CAPACITY: Long term capacity identified in Master Plan

RESERVATION: Commitment of Design Capacity

ALLOCATION: Commitment of Built Capacity

Notes:

1. Number in () in each stage corresponds to development categories identified in the Town's Year End Report.
2. DD = Deferred Development
3. -h = denotes that development is in a "holding zone" because further approvals are required such as allocation of capacity or development agreement



Figure 1: Development Staging Process

