A. Recommendations

THAT Council receive Staff Report CSOPS.20.046, entitled “2019 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 2019 Year End Water & Wastewater Capacity Assessment (2019 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 limitations 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

To determine units available for allocation, built capacity, meaning 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, ECA 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 2018 to 2019 the number of connected water units in the Town increased by 243 units for a total of 8691 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, 10,226 units are allocated and 2526 units are reserved. This leaves 2,670 available units.

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$^3$/d includes 1,250m$^3$/day received from the Town of Collingwood.

Figure 3 below illustrates that the Town’s water supply is capable of meeting the demands of existing units as well as those that have been allocated and reserved for future connection.
The Blue Mountains Water Treatment Plant (WTP) continues to deliver a 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 2019 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 regards 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. 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 – 2019

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

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Water Produced (TBM) (ML)</td>
<td>575.5</td>
<td>1176.8</td>
<td>1452.9</td>
<td>1618.2</td>
<td>1541.0</td>
<td>1585.3</td>
<td>1793.4</td>
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<tr>
<td>Imported Water (ML)</td>
<td>863.0</td>
<td>312.8</td>
<td>222.9</td>
<td>190.0</td>
<td>171.0</td>
<td>212.7</td>
<td>185.0</td>
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<tr>
<td>Exported Water (ML)</td>
<td>0</td>
<td>2.6</td>
<td>54.8</td>
<td>24.0</td>
<td>25.9</td>
<td>31.5</td>
<td>32.9</td>
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<tr>
<td>Total Water Available (ML)</td>
<td>1438.5</td>
<td>1487.0</td>
<td>1621.0</td>
<td>1784.2</td>
<td>1686.2</td>
<td>1766.5</td>
<td>1945.5</td>
</tr>
<tr>
<td>Billed Authorized Consumption (ML)</td>
<td>996.6</td>
<td>967.9</td>
<td>1054.3</td>
<td>1124.3</td>
<td>1057.0</td>
<td>1164.6</td>
<td>1335.6</td>
</tr>
<tr>
<td>Unbilled Authorized Consumption (ML)</td>
<td>132.3</td>
<td>172.2</td>
<td>208.3</td>
<td>202.1</td>
<td>288.5</td>
<td>202.6</td>
<td>194.9</td>
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<tr>
<td>Apparent Losses* (ML)</td>
<td>100.6</td>
<td>100.7</td>
<td>101.1</td>
<td>101.5</td>
<td>102.2</td>
<td>102.4</td>
<td>102.9</td>
</tr>
<tr>
<td>Real Losses** (ML)</td>
<td>209.0</td>
<td>246.3</td>
<td>257.3</td>
<td>356.3</td>
<td>238.4</td>
<td>296.9</td>
<td>312.1</td>
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<tr>
<td>Real Water Loss (%)</td>
<td>14.5%</td>
<td>16.6%</td>
<td>15.9%</td>
<td>20.0%</td>
<td>14.1%</td>
<td>16.8%</td>
<td>16.0%</td>
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<tr>
<td>Total Water Loss (%)</td>
<td>21.5%</td>
<td>23.3%</td>
<td>22.1%</td>
<td>25.7%</td>
<td>20.2%</td>
<td>22.6%</td>
<td>21.3%</td>
</tr>
</tbody>
</table>

* 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 2019 was 21.3%. This was slightly lower than 2018.

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 water mains entering large developments on private lands. A mass balance with the individual residential meters will assist in identifying leaks on private lands.
Wastewater

Figure 5 provides a historical breakdown of the number of wastewater units from 2010-2019.

From 2018 to 2019 the number of wastewater units in the Thornbury Service Area increased by 125 units for a total of 2,541 connected units while in the Craigleith Service Area, the number of wastewater units increased by 115 units for a total of 4,742 connected units.

Thornbury Wastewater Treatment Plant

The Thornbury Wastewater Treatment Plant (WWTP) firm-built capacity is 3,580 m$^3$/day or 3,436 units based on the historical five year rolling Average Day Flow (ADF) of 1.042 m$^3$/unit/day.

In 2017, the Town completed an Addendum to the 2006 Environmental Assessment (EA) for the Thornbury Wastewater Treatment Plant (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 Phase 4 Environmental Study Report (ESR) from the Comprehensive 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 1A and Phase 1B as one project. This will require reapplying for an ECA for the additional works required for Phase 1B.
Currently, there are 3,258 units (3,395 m³/day) allocated to the Thornbury WWTP and 356 units (370 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 WWTP has a remaining total reservation of 1501 units (1564 m³/day). Figure 6 below illustrates the 2019 unit (design) capacity for the Thornbury WWTP.

The Thornbury WWTP’s 5 year rolling ADF is 2,475 m³/day which means that the flows are utilizing 69% of the Thornbury WWTP current built capacity.

Figure 7 below illustrates that the Thornbury WWTP has capacity based on the number of allocated and reserved units. The annual 5 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 11,311 units based on the historical five year rolling ADF of 0.719 m³/unit/day.

Figure 8 below illustrates the 2019 built unit capacity for the Craigleith WWTP. Of the total built capacity (11,311 units), 5,670 units are allocated and 3,119 units are reserved. This leaves 2,522 available units.
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 allocated and reserved future units. The Town currently has enough capacity to service an additional 2,522 units with wastewater in the Craigleith collection area.

The 2019 Year End Water & 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. The Blue Mountains Strategic Plan**

Goal #5: Ensure Our Infrastructure is Sustainable
Objective #1 Develop a Long-Term Asset Management Plan for the Maintenance, Renewal and Replacement of Existing Infrastructure
Objective #2 Avoid Unexpected Infrastructure Failure and Associated Costs and Liability
Objective #3 Implement Best Practices in Sustainable Infrastructure
Objective #4 Ensure that Infrastructure is Available to Support Development

**F. Environmental Impacts**

The 2019 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 2019 Year End Report is instrumental in environmental compliance reporting and for monitoring the Municipality’s impact on the ecology of Georgian Bay.
G. Financial Impact

The 2019 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

Shawn Everitt, CAO

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 subject to a Public Meeting and/or a Public Information Centre as neither a Public Meeting nor a Public Information Centre are required. Comments regarding this report should be submitted to Allison Kershaw, managerwww@thebluemountains.ca.

J. Attached

1. Attachment 1 - 2019 Water & Wastewater Capacity Assessment Executive Summary
2. Attachment 2 – Development Staging Process

Respectfully submitted,

________________________
Allison Kershaw
Manager of Water and Wastewater Services

________________________
Shawn Carey
Director of Operations

For more information, please contact:
Allison Kershaw
managerwww@thebluemountains.ca
519-599-3131 extension 226
Executive Summary
This report provides an assessment of water and wastewater treatment systems capacity within the Town for 2019. 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. In order 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.

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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 10,840 m³/day (10,226 units) is currently connected or allocated to the water system based on a 5-year rolling average maximum daily demand of 1.060 m³/unit/day.

A total flow of 2,677 m³/day (2,526 units) is currently reserved at 1.060 m³/unit/day.

Of the 15,462 total units of water supply available, there are currently 12,792 units allocated and reserved. Therefore, the current available capacity of the Town’s water supply is 2,670 units.

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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 3,436 units based on the 5 year rolling ADF of 1.042 m³/unit/day.

2. Available Wastewater Capacity Based on Planning Projections
A total flow of 3,395 m³/day (3,258 units) is currently connected or allocated to the Thornbury WWTP based on a 5 year rolling ADF. There are currently 3,258 units allocated and 356 reserved. Therefore, using planning projections the current available uncommitted reserve capacity based on built capacity is -178 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 actually 1,073 units (356 reserved + 717 can connect) which are not physically connected to the Thornbury WWTP.

The MECP Guidelines for Year End Reporting has been modified through discussions 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 5,115 units based on an ECA received in 2018. Therefore, the current available uncommitted reserve capacity based on design capacity is 1,501 units.

The PDF flow at the Thornbury WWTP in 2019 was 6,696 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 April 26, 2019, this was the Friday. The Town of Thornbury had a significant amount of total precipitation for month of April 2019. During the month, there were 18 days of rainfall, with a total precipitation of 168.9 mm during the month. Although the peak flow didn’t exceed the peak capacity of the mechanical plant capacity, flows approached the peak capacity for many days in a row and significantly exceeded the rated capacity of the mechanical plant. During this period the flows were redirected to the lagoon system to prevent a washout of the plant. Due to heavy rains and consistently high flows, the lagoon system did breach the berm on Monday April 29, 2019.

3. Thornbury WWTP Estimated Expansion Timeline
The Town is required to expand the Thornbury WWTP when the ADF reaches 80% of the built capacity. The Thornbury WWTP is operating at 69% of the built capacity. The Town updates future connection projections annually based on the number of annual connections using a five (5) year rolling average. Based on these estimates, the ADF will reach 80% in approximately five (5) years.
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 11,311 units based on the five year rolling ADF of 0.719 m³/unit/day.

2. Available Wastewater Capacity
A total flow of 4,077 m³/day (5,670 units) is currently connected or allocated to the Craigleith WWTP, based on a five year rolling ADF. There are currently 5,670 units allocated and 3,119 units reserved. Therefore, the current uncommitted reserve capacity on built capacity is 2,522 units.

The PDF flow at the Craigleith WWTP in 2019 was 8,931 m³/day. This was on April 20, 2019. The design PDF for the Craigleith WWTP is 19,640 m³/d. The PDF typically occurs during a period of snow melt or a significant wet weather event. April 2019 experienced significant rainfall.

3. Craigleith WWTP Estimated Expansion Timeline
Based on the 2019 five year rolling ADF of 3,440 m³/day, the Craigleith WWTP is operating at 40% of the built capacity and as such, there is no immediate need to expand the Craigleith WWTP.
Craigleith WWTP Unit Capacity

- Allocated Units: 5,670
- Reserved Units: 3,119
- Available Units: 2,522
Development Staging Process

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:

Stages:
- Stage 1: Development Approved (Allocation)
- Stage 2: Development Approved (Reservation)
- Stage 3: Development Approved (Future Development)
- Stage 4: Development Approved (Designated)
- Stage 5: Development Approved (Net Designated)

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

Abbreviations:
- NO CAPACITY: Long term capacity identified in Master Plan
- RESERVATION: Commitment of Design Capacity
- ALLOCATION: Commitment of Built Capacity