

Staff Report



To	Committee of the Whole
Service Area	Infrastructure, Development and Enterprise Services
Date	Tuesday, April 4, 2023
Subject	Water and Wastewater Servicing Master Plan Recommendations

Recommendation

1. That the Water and Wastewater Servicing Master Plan be approved, and that staff be directed to file a Municipal Class Environmental Assessment Notice of Completion.
2. That the financial information from the Water and Wastewater Servicing Master Plan be referred to the City's water and wastewater rate models and long-range financial plans through the multi-year budget process.

Executive Summary

Purpose of Report

This report summarizes the [Water and Wastewater Servicing Master Plan](#) (W/WW MP) update. The W/WW MP update has built off the previously completed [W/WW MP in 2008](#), as amended by the supporting water and wastewater studies for the 2018 Development Charges Background study. The water distribution includes a series of watermains, booster pump stations, and storage tanks that ensure that water moves from Guelph's water supply sources (as studied in the [Water Supply Master Plan](#)) to end users throughout the city. The wastewater collection system collects sewage from homes and businesses and carries it through a series of pipes, forcemains, and pump stations to the Water Resource Recovery Centre (as studied in the [Wastewater Treatment and Biosolids Master Plan](#)). The W/WW MP has studied Guelph's existing water distribution and wastewater collection networks, considered the impact of population and employment growth beyond 2051 and recommended a W/WW servicing strategy to mitigate capacity constraints.

Key Findings

The W/WW MP has been undertaken consistent with Ontario Regulations as a Municipal Class Environmental Assessment. The recommended approach of the W/WW MP includes a portfolio of water distribution and wastewater collections projects and programs that aim to:

- Provide the framework, design criteria, and infrastructure requirements to develop resilient water and wastewater networks to support growth in alignment with Official Plan Amendment (OPA) 80;

- Eliminate inefficiencies in the system where possible; and
- Consider the use of innovative technologies for improved water and wastewater level of service.

The W/WW MP has been informed by more than two years of technical work and community engagement and has been coordinated to align with the City's Water Supply Master Plan and Wastewater Treatment and Biosolids Master Plan.

Strategic Plan Alignment

The W/WW MP will allow for advancement of the Building our Future Strategic Plan pillar as it recommends upgrades to existing assets and creation of new assets to support growth in alignment with OPA 80. It aligns with the Working Together for our Future pillar through exploration of increased use of technology and data and digital delivery. It aligns with the Sustaining our Future pillar as it seeks to save energy on treatment costs by recommending the creation of a strategic Inflow and Infiltration reduction strategy, as well as reduce energy requirements in the linear system (sanitary and potable water pump stations) by optimizing the existing system to the maximum extent possible. Reducing energy consumption will result directly in greenhouse gas reductions. Finally, it is tied to Powering our Future through protection of infrastructure assets, promotion of innovative water and wastewater linear servicing, and sustainability – all working together to support a thriving economy and community.

Financial Implications

The plan provides costs for capital works, programs, and new resources to implement the water and wastewater servicing system upgrades required to support future growth to 2051+. The total additional costs above the works already captured in the current 25-year capital budget are \$173.1 million for water and \$7.1 million for wastewater. Project alignments within road corridors will be scheduled in alignment with asset management and other utility works in the corridor. The W/WW MP projects will be incorporated into the 2024-2027 multi-year budget (MYB). If all projects are completed between 2024-2051, as the Master Plan suggests, this would represent an additional \$6.4 million for water and \$0.3 million for wastewater annually; however, projects will be prioritized based on fiscal and human constraints, and in alignment with all organizational priorities, which means the actual budgeting may extend beyond 2051. Increased resources are required to deliver the W/WW MP programs and projects, some of which have been previously identified in the [Capital Program Resourcing Strategy](#) and any new resources would be requested through the multi-year budget.

The majority of the projects recommended in the W/WW MP include a growth-related component and are included in the ongoing Development Charges Background Study to be funded by development charges (DCs). Any shortfall in DC funding for growth projects and non-growth portion of capital projects as well as operating costs would be rate funded through the Water and Wastewater user rates. The rate model is currently being reviewed and once complete, will be used to forecast the long-term rate impact of the W/WW MP and provided to Council ahead of the multi-year budget through the forthcoming long range financial plan for water and wastewater

Report

Project Background

The [W/WW MP](#) builds from the first comprehensive City-wide [Water and Wastewater Servicing Master Plan completed in 2008](#) and the updated modelling work completed in 2015 in support of the 2018 Development Charges Background Study. The previous studies recommended a series of improvements to the water and wastewater networks, some of which have been undertaken including the York Trunk Sewer and Clythe Feedermain. The master plans build on the goals and policies from the Official Plan to integrate existing and future land use plans and define long-term needs. The overarching study objective is to develop a long-range plan for efficient distribution of water and collection of wastewater in the existing condition and to support growth to 2051+, while considering the effects of climate change on system design.

Overview of the W/WW MP

The study was initiated in 2020 and was undertaken as a Municipal Class Environmental Assessment (Class EA), fulfilling Schedule B project requirements. The study identified alternative servicing solutions for the linear water and wastewater networks that were evaluated against technical, economic, environmental, and social criteria. The recommended strategies are as follows:

Water Distribution System

Improvements to Existing System – New Facilities and Watermains: The preferred strategy includes a series of new watermains to provide appropriate pressures and fire flows across the city. It recommends improvements to existing pumping infrastructure and replacement of storage elements at the end of their service life.

Of note are the improvements for the water transmission system from the Arkell Spring Grounds supply system. The Arkell Aqueduct (the ~6.5km long pipe connecting the Arkell Spring Grounds to F.M. Woods Water Treatment Plant, see Figure 1) is a key piece of infrastructure that supplies Guelph with most of its water. The recommended approach includes building treatment capacity at the Arkell Spring Grounds property and providing water directly to the south end of the City through a new transmission watermain along Arkell and Victoria or Gordon and Clair. This eliminates the need for additional north-south water transmission from F.M. Woods to the south end and supports maximum day water demand in the future growth conditions. In the event of a failure in the existing Arkell Aqueduct, the new infrastructure would have capacity to maintain a maximum day demand level of service, meaning there would be no requirements for water restrictions, fire flow implications, nor impacts to business operations. This design solution will be subject to further study in the form of a Schedule C EA including more consultation with the public, Wellington County and Puslinch Township.

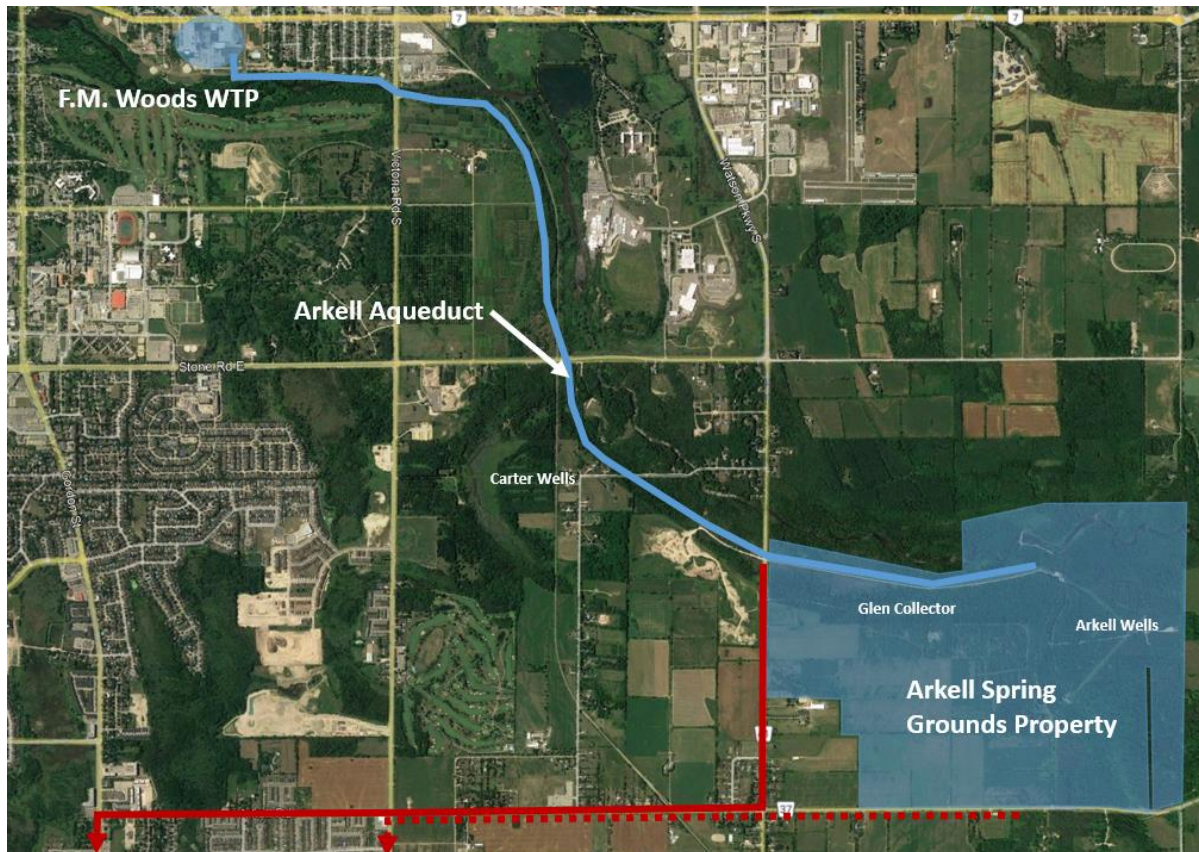


Figure 1 - Arkell Aqueduct Resiliency Solution

Wastewater Collection System

Improvements to Existing System – New Trunk Sewers and Strategic Flow Diversions: New sewers are proposed to alleviate existing capacity issues and create available capacity to support growth focused in seven areas across the City. Prioritization was given, where possible, to divert flow to existing sewers with capacity to minimize new construction work. Most projects will be aligned with other corridor works and asset renewal projects. One series of projects includes the trunk sewers approaching the Water Resource Recovery Centre (WRRRC) that are experiencing capacity constraints in the existing and future conditions which requires further preliminary study to ensure the most efficient, resilient, and cost-effective set of projects is recommended.

The study also included a review of innovative water and wastewater related practices and recommendations for programs to move Guelph forward as a data-driven smart city.

A full summary of the process and projects included as part of the recommended servicing strategy, including mapping, is included in the [Draft Project File Executive Summary](#).

Key Considerations

OPA 80 and Growth to 2051+

OPA 80 provided growth target inputs for the W/WW MP. However, consideration was required due to the discrepancy between the planning horizon (~27 years) and the service life of linear infrastructure (~80-100 years). To align with good

infrastructure planning principles, it was necessary to consider the ultimate population within the service life of the linear infrastructure to ensure sewers and/or watermains installed in 2030 were not undersized in 2052. This was done by maximizing the populations in the Strategic Growth Areas to the top end of the proposed density ranges. This approach supports a future-ready Guelph.

Bill 23 Impacts

The future population used to assess the water and wastewater system, identify capacity constraints, and recommend infrastructure upgrades is based on the growth assumptions from OPA 80. Many upgrades are required based on current capacity issues from existing flows while some projects are entirely driven by growth. The introduction of Bill 23 will require the team to carefully monitor alignment of the master plan priorities and actual growth. The plan will be examined and updated every 5 years.

The projects identified in this study remain valid, especially those prioritized for the next 5 years. Priority is given to projects where existing capacity issues are present, and further exacerbated by growth. The W/WW MP is still valid considering Bill 23 and that modification to the technical work is not required in advance of the next 5-year master planning cycle. Bill 23, however, does suggest a faster pace to implement projects (the 2023-2041 horizon is accelerated to 2031). This impact will be addressed through the Development Charges Background Study and multi-year budget for 2024-2027 where resource and budgetary requirements from the Master Plans will be incorporated.

Inflow and Infiltration

Inflow and infiltration, or I&I, is ground and surface water that enters the wastewater collection system. This “clean” water uses space in the collection system and energy and capacity at the treatment plant. The City has initiated I&I studies in the past, specifically targeting the Downtown and Clair-Gordon areas. The W/WW MP recommends developing a City-wide strategy to manage and eliminate sources of I&I to gain capacity and save energy in our wastewater collection and treatment system. The I&I strategy will include annual reduction programs through capital works as well as the continuation of the flow monitoring program, which helps identify areas of the collection system that are more vulnerable to I&I. This is a key program to save energy at the WRRC and to gain capacity back into the system and supports a future-ready Guelph.

Climate Change

Climate resiliency is supported through this master plan through a focus on inflow and infiltration reduction programming to lower the wet weather response in the sanitary collection system. As well, the water component of this study has sought to optimize water supply sources and distribution projects to have more efficient movement of water throughout the system, reducing energy costs for pumping. Finally, the Arkell Spring Grounds & Transmission main project is a major component of creating a climate resilient water distribution network – it offers a redundant water supply should the existing aqueduct experience failure, for which the risk may be increased due to future climate conditions. Finally, the plan recommends continuation of the water conservation and integrated water management plan programming that is ongoing at the City.

Equity

Water and wastewater projects have been identified across the entire City. As part of the study, the capacity deficiencies in the existing system were identified. Areas of the City experiencing capacity deficiencies in the existing system have been prioritized for upgrade in the short-term to provide the same level of water and wastewater servicing across the City. Where other corridor works overlap with proposed works in the W/WW MP, the projects will be aligned to realize efficiencies. The Transportation Master Plan (TMP) prioritized corridors based on a number of criteria, including equity. By aligning works identified in this W/WW MP with corridor works driven by the TMP, the same corridors are being equitably prioritized for water and wastewater service upgrades, where applicable.

Next Steps

Most of the projects in the W/WW MP have been aligned with planned corridor works from the TMP or the Corporate Asset Management Plan.

Two major projects require further study:

1. The Wastewater Area 5 preliminary design assignment, which will look at the trunk sewers near the WRRRC; and,
2. The Arkell Spring Grounds project, which is subject to further study under the Class EA process.

All of the works will be captured, scheduled, and resourced through the development of the 2024-2027 multi-year budget. The financial information from this project will also be referred to the ongoing Development Charges Background Study and rate study. The W/WW MP is required to be updated at 5-year intervals.

Financial Implications

The plan provides costs for capital works, programs and new resources to implement the water and wastewater servicing system upgrades required to support future growth to 2051+. It includes timelines to complete the works between 2024 and 2051 (the vision), however it is acknowledged that that other organizational priorities must be considered when adding these projects to the rest of the ongoing and proposed works across the city.

The current 25-yr capital budget includes \$117.6 million for water and \$93.0 million for wastewater projects relevant to the W/WW MP (not inclusive of water supply and wastewater treatment projects). The total additional costs above the works already captured in the current 25-year capital budget are \$173.1 million and \$7.1 million for water and wastewater, respectively. Project alignments within road corridors will be scheduled in alignment with asset management and other utility works in the corridor. The W/WW MP projects will be incorporated into the 2024-2027 multi-year budget (MYB). If all projects are completed between 2024-2051, as the MP suggests, this would be an additional \$6.4 million and \$0.3 million for water and wastewater annually. However, the number of projects (and associated costs) forecasted for each year will be established through the multi-year budget process with consideration for impact to user rates and affordability. The MYB focuses on balancing all priorities throughout the City with a focus affordability, equity, and ability to deliver.

To implement the capital projects across the 2024–2051-time horizon, an annual operating budget impact of \$293 thousand is anticipated beyond resource requirements previously forecast in the [Capital Program Resource Strategy](#). New resource requests will be included in future multi-year budgets.

With respect to maintenance/operational financial and staff resourcing needs, most of the recommendations in the W/WW MP include replacement/upsizing of infrastructure in existing alignments, with similar anticipated operational needs to the current condition, and as captured in the current operating budget. The Arkell Spring Grounds program of works will result in a new facility that will have operational needs. The magnitude will be assessed as part of the Schedule C Class EA to be completed.

Funding Sources

The majority of the projects recommended in the W/WW MP include a growth-related component and are included in the ongoing Development Charges Background Study to be funded by development charges (DCs).

Any shortfall in DC funding for growth projects and non-growth portion of capital projects as well as operating costs would be rate funded through the Water and Wastewater user rates. The rate model is currently being reviewed and once complete, will be used to forecast the long-term rate impact of the W/WW MP and provided to Council ahead of the multi-year budget through the forthcoming long range financial plan for water and wastewater. All projected financial impacts would be prioritized and reviewed in the multi-year budget with the lens of affordability and equity while balancing the need to complete regulated works.

There are potential federal and provincial funding opportunities that could be leveraged to fund water and wastewater related projects. Staff are committed to exploring these opportunities.

Consultations

Internal Consultation

Environmental Services, Planning and Building Services, Finance, Legal, Realty, and Court Services, and Engineering and Transportation Services have been engaged on technical deliverables and policies throughout the process.

Indigenous Consultation

Project notification has been provided to Mississaugas of the Credit First Nation (MCFN), Six Nations of the Grand River (SN), Metis, and the Haudenosaunee Confederacy Chiefs Council (through Haudenosaunee Development Institute) at the project onset and in November 2022 in advance of the Public Open House. Notification will be provided for the study completion following direction from Council to finish the study.

Further, the City has met with MCFN and SN on water-related master plans (W/WW MP, Stormwater Management MP) in the fall of 2021. Commitments to engage during future preliminary and detailed design, particularly during archaeological investigations, were made.

Public Consultation

Public Open House #1 was held virtually from October 28, 2020 to November 30, 2020. Participants were invited to complete a survey and mapping exercise that

provided early inputs about stormwater management across the City. Feedback indicated minimal water and wastewater service issues across the City.

Public Open House #2 was held virtually and in person on November 28, 2022 with the commenting period extending to December 20, 2022 on Have Your Say. Correspondence was largely around timing of proposed works and inflow and infiltration.

Intergovernmental Consultation

The W/WW MP proposes works on the Arkell Spring Grounds, which is property owned by the City but within the Township of Puslinch. The preliminary alignment of the watermain to connect the Arkell Spring Grounds is on County Roads 37 and 41 (pending location of facilities). Preliminary consultation has occurred with the Township of Puslinch through a meeting on November 22, 2022. The County of Wellington offered preliminary support through e-mail correspondence on December 12, 2022. Both governments will be engaged further in the Schedule C Class EA process.

Attachments

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