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Staff Report

Operations

Report To: **Special Committee of the Whole**
Meeting Date: May 3, 2022
Report Number: CSOPS.22.025
Title: Thornbury WWTP Expansion Update
Prepared by: Brent Rolufs, Manager of Capital Projects

A. Recommendations

THAT Council receive Staff Report CSOPS.22.025, entitled "Thornbury WWTP Expansion Update";

AND THAT Council approve increasing the budget by 25% being 4,500,000 from $18,000,000 to a total budget of $22,500,000, to be funded $450,000 from the Wastewater Asset Replacement Reserve Fund and $4,050,000 from Wastewater Development Charges;

AND THAT Council approve the Negotiated procurement of Engineering Services for the Design of a new Outfall Line to IBI Group Professional Services (Canada) Inc. (IBI Group) to an upset cost estimate of $1,600,000, to be 100% funded from Wastewater Development Charges.

B. Overview

This staff report provides an overview of the progress on the Thornbury Wastewater Treatment Plant (TWWTP) Expansion Phase 1A. All project activities must allow for the continued operation of the TWWTP and a requirement to provide quality effluent wastewater treatment in compliance with regulatory requirements.

C. Background

The TWWTP Expansion has been separated into three projects for execution. The first project was an Optimization Study that reviewed existing treatment unit capacities. Optimization strategies that could be implemented into the TWWTP Phase 1A project were also considered including alternate biological treatment options.

The second project was to provide standby generator capacity to the Phase 1A project. It was identified during a previous internal staff study that the standby generator located at the Thornbury Water Reservoir had surplus capacity.

The third project is the capacity increase of the TWWTP Phase 1A expansion. This project will be increasing the plant capacity from average day flow of 3,580 m3/day to 5,330 m3/day. The project is on schedule for full operation in Q4 2024. Commissioning of the plant for Q4 2024 is needed based on the current Town growth projections and available capacity of the TWWTP. In addition, the town currently has an Environmental Compliance Approval (ECA) approval for Phase 1A which did require an 18 month approval process. The ECA approval specifies the equipment type to be used in the plant expansion. To realize Q4 2024 commissioned plant expansion, Town staff are working within the approved ECA which determines what works are to be built (and therefore produce quality effluent).

Currently, the scope of work for Phase 1B would expand the plant capacity beyond Phase 1A of 5,330 m3/day to an average day flow of 7,080 m3/day and at this time there is no ECA approval. The Plant Optimization Study identified that a step change in biological treatment maybe a cost-effective solution for further expansion, but further studies and biological pilot testing would be required. At this time, there will be a requirement for 1 additional aeration/clarifier basins; sand filter building; and air blower to support Phase 1B. Pre-investment in the Inlet Headworks/UV buildings and underground yard piping have been included in Phase 1A. This pre-investment into Phase 1B is cost effective to eliminate future rework. There will be a life cycle cost analysis comparison between the current biological treatment and options as part of the Phase 1B scope. The background of this staff report has been split into five separate topics for clarity. These are:

C1. Phase 1 Budget

The TWWTP Phase 1A project was included as a forecasted project for 2022 in the 2019 budget book. The 2020 Budget included the project with an increased budget amount to account for inflation since 2009.

Stantec Engineering was retained by the Town in 2009 to complete the preliminary 30% engineering design package for the plant expansion. Consideration was given to future annual inflation costs and this resulted in a 2020 Budget of $ 18,000,000. This approach to the budget development would not have included allowances for missed project scope and/or any under estimation of budget components to be properly reflected in the 2020 Budget.

C2. Optimization Study

The intent of this investigation is to complete optimization studies at the TWWTP to achieve the following goals:

- Capacity assessment of the unit processes and optimization strategies that can be implemented at the TWWTP to enhance treatment performance while minimizing operating cost;
- Make recommendations regarding the expansion of the TWWTP which will be incorporated into the Phase 1A detailed engineering process;
- Capacity Enhancement Investigation with use of alternate biological treatment options; and,
- Odour Control Opportunities.

As noted in Table C2-1 below, the current Treatment Unit processes will not adequately

support either the Phase 1A or 1B Requirements based on the provincial 2008 Ontario Sewage Design Guidelines and historical data from the TWWTP.

Table C2-1 – Unit Process Existing and Future Capacity

Treatment Unit	Existing Unit	Capacity (m^3/day)	2008 Design Guidelines		
			Flow Requirement	Phase 1A (m^3/day)	Phase 1B (m^3/day)
Pump Station Capacity [1]	Pumping Capacity	19,180 17,021	Peak Hourly Flow	22,386	28,000
Headworks	Grit Removal	13,996	Peak Hourly Flow	22,386	28,000
Aeration Basin	Hydraulic Retention Time	4,300	Average Daily Flow	5,330	7,080
Oxygenation System	Blower Capacity	5,179	Average Daily Flow	5,330	7,080
Secondary Clarifier	Surface Flow Rate	19,242 4,810	Peak Hourly Flow Average Daily Flow	22,386 5,330	28,000 7,080
UV Disinfection	UV Treatment	7,196	Peak Hourly Flow	22,386	28,000
[1] Pump Station Capacity Upgrades not included in Scope					

Odour issues at the plant are likely to originate at the Headworks Building. To prevent odour complaints, it is recommended that an odour control system be implemented and aligned to the current 2024 completion timeline. Two options for odour control were identified:

- Activated Carbon Filtration.
- Aeration Tank Odour Scrubbing.

A preliminary plant capacity enhancement investigation identified three alternate biological treatment processes that should have further investigation:

- MBBR: Moving Bed Bioreactor
- IFAS: Integrated Fixed-film Activated Sludge
- MBR: Membrane Bioreactor

EPS, the engineering consultant supporting the Optimization Study, had some assistance from a vendor supporting the IFAS biological process. Preliminary review of the IFAS biological treatment could reduce the capital costs for plant expansion beyond Phase 1A. However, a full review of biological treatment options needs to be examined for the best solution for our municipality.

C3. Standby Generator Power

Cost avoidance of the purchase of a standby generator was identified by re-examining the utilities required to support the existing Thornbury Water Reservoir and determining that there

was sufficient electrical capacity in the standby generator to support the TWWTP Phase 1A electrical loading.

The original generator that was installed at the Thornbury Water Reservoir for standby power was oversized and an opportunity was identified for cost avoidance for the Phase 1A project. Engineering services were obtained from Tatham Engineering. This project considered forecasted Phase 1A plant electrical loading when finalizing the scope and the standby generator will be operational in April 2022.

C4. Phase 1A Engineering Status

IBI Group was awarded the final engineering design in November 2021 with the goal of having the Phase 1A expansion constructed and operational by Q4 2024. The 60% engineering milestone was reached as of March 31st, 2022. The General Contractor award date is critical to support the Q4 2024 completion date. Key milestones of the project schedule are outlined below with a plan to support a plant operational expansion by Q4 2024.

Key Schedule Milestones

- Project kickoff Meeting — December 3rd, 2021
- 60% Engineering Package — March 31st, 2022
- Pre-Purchase of Key Equipment — May, 2022
- Pre-Qualification of General Contractor — July 5th, 2022
- 100% Engineering Package — September 7th, 2022
- General Contractor Award — November 30th, 2022
- General Contractor Submission Reviews Start — December 2022
- Phase 1A Substantial Completion — November 30th, 2024

A review of the Stantec 30% engineering work (2009) was undertaken by the IBI Group during their 60% stage. Town Staff and IBI Group approached the detail engineering assignment to challenge both operations and the design team for cost effective solutions to the plant expansion. Pre-Investment into Phase 1B is to be cost effective and minimize plant disruptions beyond Phase 1A. The team has worked together on incorporating value added engineering through all disciplines right from the project start.

The table below identifies both key engineering gaps (between Stantec's Preliminary Design work undertaken in 2009 and IBI's review) and value engineering activities for Phase 1A plant design.

Table C4-1 – Engineering Gaps and Value Engineering Activities

Motor Control Center (MCC) – Scope Gap

30% Engineering Package by Stantec
• Proposed utilizing space in the Maintenance Area
  ○ Spacing inadequate for Phase 1A and no consideration for Phase 1B MCC equipment.
  ○ High risk area for damage.
  ○ Water sources in close proximity to MCC equipment and high risk of

water being spilled on electrical MCC equipment.

60% Engineering by IBI Group

- Completed study with 3 Options
  - Cost effective solution was to re-purpose spacing within the Administration Building and expand existing MCC space into existing office area.
  - Spacing solution resolves both short term Phase 1A requirements and provides long term spacing for Phase 1B and beyond.
- MCC equipment installation to be sequencing to allow for continued operation of the existing facility

UV Building Layout – Scope Gap

30% Engineering Package by Stantec

- Proposed to Utilize existing Channel with minor structural modifications
  - Utilize existing UV channel for Phase 1A flows with minor structural modifications as recommended by Town staff at the time.
  - Mentioned use of effluent water to replace potable water for general use in the plant.

60% Engineering

- In review of the Phase 1A flows and current UV Channel dimensions. The existing channel is not adequate to support the Phase 1A flows. Since the channel must be modified to meet the Phase 1A flows it was recommended by Town staff to increase the UV Channel to handle both Phase 1A and 1B flows so no additional concrete work would be required to meet Phase 1B flows.
- Channel level control has been changed to a serpentine weir design. Improved level control will reduce the UV bulb replacement costs.
- Installation of accurate electromagnetic effluent flow meter will be replacing the open channel ultrasonic flow sensor.
- Phase 1B will only require additional UV bulbs as the flows increase.

Treated Effluent Outlet Piping – Scope Gap

30% Engineering Package by Stantec

- Reviewed Outlet pipe sizing of 450mm diameter and notes outlet piping at the Beaver River Outfall location as 400mm diameter.
- Assumption of outfall changes from 450mm diameter to 400mm diameter over the course of approximately 1.4 kilometers.
- Recommended no pipe capacity issues for Phase 1A flows of 25,600 m^3/day – Peak Hourly Flow requirements as identified by current Ontario Sewage Design Guidelines.

60% Engineering

- Reviewed capacity of the Outlet piping and identified capacity limitations to the existing line.

Aeration / Clarifier Operation

30% Engineering Package by Stantec

- Proposed Aeration/Clarifiers 1 & 2 operate together and Aeration/Clarifier 3 work separately however limited flow control.

60% Engineering

- After discussion with Operations staff, it became important to improve operability to similar abilities to the Craigleith WWTP with independent operation of all 3 Aeration/Clarifier pairs.
- A study was completed that outlined 3 options for Clarifier Skimmers.

Air Supply for Blowers

60% Engineering

- Current Air Blower equipment consumes air within the administration building that has been heated by the natural gas furnace.
- It was identified that dedicated air intakes for the air blower equipment would reduce the natural gas usage for the building.
- Air Blower decision is based on 25-year life cycle costs

Equipment Pre-purchasing

60% Engineering

- 1st Objective was Project Schedule Advancement
  - Create opportunities for the contractor to commence work on mechanical and electrical scopes during the winter of 2022-2023.
  - Create opportunity to level load of skill trades personnel (mechanical & electrical) throughout the project schedule.
- 2nd Objective was Management of Schedule Risk
  - Covid 19 has severely impacted the procurement timelines since many suppliers and manufactures depend on overseas components and raw materials for their equipment.
  - Without pre-purchase of Clarifier Mechanical Component, there is no opportunity to complete the entire plant upgrade before Q4 2024.
- Budget Opportunity
  - General contractor will have limited ability to add profit margins to equipment that is supplied to the project.

Validation of Existing Plant Layout – Lesson Learned from Headworks Project

- Between May and June 2022 Engineering will be completing survey of existing facilities to ensure the Phase 1A plant design is accurate to the existing plant
  - Inspection of Clarifiers and Aeration Basins.
  - Project will work with Operations once spring melt has occurred and all aeration basins and clarifiers will be inspected to ensure contractor scope is accurate.
  - Goal of validating existing plant layout is to eliminate project schedule risk during the construction and extra costs to the general contractor.

Equipment Vendor Risk Management

- Equipment tendering of key components will be aligned with validation of existing plant layout. The goal is to allow the vendors that will be bidding to supply key equipment such as the mechanical components of the clarifiers an opportunity for inspection of the facility. Vendors will have an opportunity to fully understand the condition and take key measurements and photos prior to submission of equipment pricing.

- Risk management of both cost and schedule is the goal of this activity.
- Other Key Equipment for site inspection:
  - Air Blowers;
  - UV Equipment;
  - Headworks Screening Unit.

Completed Engineering Studies – Ensure "Fit for Purpose" Design

- Plant Effluent Water Study - Final effluent to be used to serve non-potable water demands throughout the TWWTP site. To incorporate effluent water as wash water throughout the plant. Forecasted 14-year payback. Potable water elimination for washing and equipment cleaning.
- Existing Blower Study - To determine the best life cycle cost investment for Aeration Blowers. Anticipated study in 2nd week of April.
- Headworks Investment - To understand the line sizing required for Phase 1A and 1B flow and recommendation for design. Increase piping from 450mm dia. to 550mm dia. to meet the Phase 1B flows.
- Clarifier Skimmers - To understand options available for the installation of skimmers on all Clarifiers. 3 Options presented ranging in cost from $ 20K to $ 60K. Standard Skimmers were selected for incorporation into the design ($20K Option) to control scum & oil buildup on the clarifiers.
- MCC Location Options - To understand options available for MCC equipment also consider requirements for Phase 1B spacing. Stantec did not consider spacing for Phase 1B. Expansion of existing office space was selected.

Material Quantity Reduction – From Stantec 30% Engineering Design

- Review was completed with Town Staff with the focus of quantity reduction will result in reduced costs. The Stantec 30% engineering package plant equipment layout was challenged resulting in the following being incorporated into the current design:
  - Buried pipe be sized for Phase 1B to eliminate future pipe replacement. Consideration into fluid velocity in piping to ensure there will be no buildup of debris in piping
    Example: Piping between Headworks and Aeration Basin increased from 500mm diameter for Phase 1A flows to 550mm diameter for Phase 1B flows.
  - Concrete clarifier flow distribution chamber was modified rather than build new concrete chamber
  - Yard Hydrants – Elimination of 1
  - Maintenance Holes – Elimination of 2
  - Buried Pipe Quantity Reduction
    - 169m – 350mm dia. line
    - 52m – 300mm dia. line
    - 54m – 100mm dia. line
    - 35m – 150mm dia. line

Operability Issues

- The following operability issues were incorporated into the design

○ Allowance to complete WAS and allow for Plant Effluent Discharge at the same time ○ Metering of Lagoon flows and Lagoon Level Control ○ Alum Flow Control, flow based and not demand based resulting in reduced quantity ○ Clarifiers and Aeration Basins to Operate as 3 process Trains for operational flexibility ○ Scum skimming added to Clarifiers - required for improved effluent quality

C5. TWWTP Outfall

As noted in the above Table, the TWWTP Outfall is undersized and will not accommodate the full additional capacity provided by the Phase 1A expansion. During discussions between Town Staff and IBI Group, a capacity check was completed on the Outfall from the TWWTP to the Beaver River. The outfall capacity did not align with historic engineering reports so a comprehensive review of past engineering work was completed and is presented in the table below.

Table C5-1 – Outfall Capacity Summary

Year	Engineering Report Information	Capacity
1975	Outfall designed by Ainley Associates	8,640 m^3/day
1994	Ainley Associates - Outfall and converted to Low Pressure Line • Conversion of Outfall from gravity to low pressure line increase capacity. • Town Staff cannot find as-constructed drawings, however Town staff have confirmed Outfall has been modified to meet low pressure line for increased capacity.	12,010 m^3/day
2006	MacViro complete Phase 4 Environmental Study Report for Thornbury Wastewater Treatment Plant Expansion. • Calculate capacity error on Outfall. • MacViro stated in their report that the current outfall would be adequate till Phase 3 Plant Expansion, and this is incorrect.	22,017 m^3/day
2009	Stantec completed Phase 1 Expansion 30% Engineering Design • Stantec splits Phase 1 plant expansion into Phase 1A and 1B. • Report acknowledges outfall at UV building to be 450mm dia. and outfall entering the Beaver River to be 400mm dia. and size change somewhere over 1.383 kilometers piping length. • Assumes Outfall to be adequate or utilizes MacViro Report Findings.	Adequate Capacity
2017	JL Richards is retained by the Town complete EA addendum. EA addendum was review what had changed from 2006 to 2017. • Based on the 2008 Ontario Sewage Design Guidelines utilized correct Influent flows for the Headworks Project.	No Requirement to Check Outfall Capacity

2021	IBI Group is retained to execute Phase 1A Plant Expansion • Town staff provided IBI Group with Ainley 1975 engineering and completed Outlet Check as part of completing due diligence. • Effluent Outfall adequate for 9,000 m3/day for a gravity outfall piping system.	9,000 m^3/day
Summary 1. Outfall makes 6 size changes from the UV Building to the Beaver River. 2. Summary of Outlet Piping • 2.8% of the length is 450mm diameter (18”) • 63.3% of the length is 406mm diameter (16”) • 17.4% of the length is 356mm diameter (14”) • 7.6% of the length is 305mm diameter (12”) • 8.9% of the length is 254mm diameter (10”). 3. Outfall required for Phase 1B is 28,000 m^3/day or minimum piping size of 500mm diameter (20”).		

Table C5-2 identifies the studies and assessments that will be necessary to support the outfall design while Table C5-3 presents the permits and approvals that are likely to be needed.

Table C5-2 Studies and Assessments Required to Support Detailed Design

STUDY	STUDY DESCRIPTION
Geotechnical/ Hydrogeological Investigations	Geotechnical and hydrogeological investigations will be necessary for the on-shore section of the outfall sewer and geotechnical investigations will be needed for the off-shore section of the outfall sewer. It is estimated that up to 30 boreholes may be needed to support design.
Lake Bathymetry Assessment	Bathymetric assessment will be needed to assess water depths and lake bottom profiling will be needed to support detailed design. Information on lake currents could be collected in conjunction with this study.
Archaeology	An archaeological assessment of the on-shore section of the outfall sewer will be needed. The Town should plan for Stage 1 and 2 studies. Stages 3 and 4 may be required depending on the outcome of the Stages 1 and 2 studies. A marine archaeological assessment of the off-shore section of the outfall sewer will be needed.
Cultural Heritage	A cultural heritage assessment is likely to be needed for the on-shore section of the outfall sewer.

Habitat and fisheries assessment	An assessment of existing habitat and fisheries will be needed to support selection of construction methods and mitigation measures for the off-shore section of the outfall sewer.
Assimilative capacity	An assimilative capacity assessment and mixing zone analysis will be needed to support the detailed design of the outfall diffuser and confirm the outfall length.

Table C5-3 Permit/ Approval Requirements

STUDY	STUDY DESCRIPTION
Environmental Assessment	Consultation required with MECP to confirm that the 2017 ESR Addendum meets EA requirements for the new outfall sewer.
ECA	The Town will need to amend the existing ECA to reflect the new outfall location.
MNR	An MNRF work permit will be required to meet the requirements of O.Reg 975 under the Public Lands Act for the off-shore section.
Grey Sauble Conservation Authority	NVCA permit will be required for any alterations to the shoreline of Georgian Bay. NVCA may also provide comment on Navigable Waters requirements.
DFO	DFO will require a submission that identifies potential impacts on fish and fish habitat and mitigation measures to minimize any impacts. NVCA may act for DFO.
MTO	An MTO permit will be needed for the crossing of Highway 26.
Transport Canada	A Navigable Waters Permit will be required from Transport Canada. NVCA may also provide comments.
Indigenous Consultation	Engagement with local indigenous communities will be required. Staff will work with MECP/MNRF to assess potential impacts on Aboriginal and treaty rights.

D. Analysis

D1. Analysis of Phase 1A Project Cost

The project just completed the 60% milestone with the current projected project cost estimate to be $22,500,000. Resulting in a budget shortfall of $4,500,000. There are project scope gaps between the 2009 Stantec 30% engineering package and the current design however this would

only account for approximately $2,000,000 and the remaining difference would be incorrect 30% project estimating.

Table D1 Estimate Comparison

Estimate Basis	Probably Cost	Comments
30% Engineering Report – Stantec Engineering completed in June 2009	$ 18,000,000	1. Scope Gaps • UV Building Upgrades, • MCC Space Requirements for 1A, • No reserviced MCC Space for 1B 2. Operability Issues Missed • 3 Separate operation of aeration/clarifiers • Lagoon 3 Effluent Flow Control • Yard piping upgraded
60% Engineering Report – IBI Group completed in March 2022	$ 22,500,000	Value Engineering Incorporated 1. Optimization Plant Layout • Material quantity reduction • 30% Operational Review • Flow Control Management • Air Blower Intake 2. Studies • MCC Location Options • Scum Skimmer Options • Life Cycle Analysis on Air Blowers • Pre-purchasing strategy • Headworks pre-investment • Plant Effluent Water Re-use 3. Pre-Investment for Phase 1B • Buried piping sized for 1B • UV Channel sized for 1B • Phase 1B Plant Layout Allowance o Chemical Pump Layout o Blower Layout o Alum Tank, o Headworks Building o Yard Piping

The project is scheduled to be awarded at a similar timeline to the municipal elections so Town Staff are recommending approval of additional budget at this time so that the project can continue to target the Q4 2024 completion timeline.

D2. Analysis of Biological Process Investigation

Town staff have been proactive in examining the opportunities for a biological process change at the TWWTP. As identified in the Optimization Study, preliminary work has been completed to understand what alternate processes need to be examined in detail.

The benefit of the process change from the current extended aeration process to the use of membrane technology would be for an increased treatment capacity in a smaller footprint.

- Current Footprint of 2 Aeration Basins and 2 Clarifiers could result in biological treatment capacity in the order of magnitude of 6,000 m^3/day to 7,000 m^3/day.
- Biological process change after completion of Phase 1A (3 each Aeration Basins and Clarifiers) could result in biological treatment capacity in the order of magnitude 9,000 m^3/day to 10,000 m^3/day or well beyond the Phase 1B requirement.
- Elimination of the sand filters currently required as a part of Phase 1B expansion.
- Required utilization of lagoons for equalization storage and possible aeration of lagoons to support the membrane technology.

Biological Process Study would be as follows.

1. Influent Study

- Examining the influent characteristics for both chemical constituents and potential products that could cause irreversible fouling of membrane technologies. Products that could cause irreversible fouling of membranes would be some types of oils and greases as well as chemical constituents.
- Three known treatment technologies were identified in the Optimization Study that need to be reviewed and either pilot testing of all the technologies or further investigation to eliminate one or two of the technologies before pilot testing.
- Pilot testing should consider both summer and winter conditions.
- The Town is developing a focused effort on Inflow and Infiltration into the sewage collection systems. The result of reducing the inflow and infiltration into the sewage collection system will increase the influent biological strength that will have to be evaluated in the study.

Town Staff were also involved in meetings with Susheel Arora of Halifax Water on April 7th and 8th who has extensive membrane technology experience. There was alignment on the importance of examination of biological treatment processes. There is no concern that a change in biological treatment will work; the questions for the Town to resolve are as follows:

- Biological selection and technology testing.
- Process requirements upfront of the membrane technology for treatment of Fat, Oil and Grease (FOG) to eliminate irreversible fouling of membrane.
- Consideration for primary clarification to manage FOG treatment and impact of primary biosolids.
- Processing of biosolids from the membrane technology.

- Need for equalization tanks to accommodate the fluctuating influent flows over the year. Solution will be re-purposing of lagoon operation but potential there will be a need for aeration of the lagoons. Change in lagoon process may require additional odour control requirements.
- Shelter requirements for cleaning of biological membranes during winter months.
- Complete inspections of various membrane installations in Southern Ontario and gain experience from other Ontario municipalities.

2. Regulatory Approval Timelines

There will be a requirement for regulatory approvals for a change in the current biological process of extended air to a membrane technology. This approval process requires submission of engineering design that is a minimum 90% engineered complete for the regulatory submission. Duration of the regulatory submission is a minimum of 12 months, but historic experience is a more realistic timeline is 18 months.

3. Public Consultation with Town Residences

It is anticipated that public consultation will be able to occur with residents in parallel with Influent Study and Engineering phases.

4. Procurement and Construction Timelines

It is anticipated that construction and procurement of long lead items would result in a construction timeline of 14-18 months.

5. High Level Schedule for Biological Process Change, see tables below.

Table D2-1 – Immediate Process Change Aggressive Schedule

Activities	Task Duration	Timeline
Influent Study		
Procurement of Engineering Support	2 Months	Jun 2022 to Jul 2022
Influent Characteristics	2 Months	Aug 2022 to Sep 2022
Biological Process Options	2 Months	Oct 2022 to Nov 2022
Pilot Biological Process	12 Months	Dec 2022 to Dec 2023
Project Cost Estimate		
Engineering		
90% Engineering Package	8 Months	Sep 2023 to Apr 2024
Regulatory Approval	12-18 Months	Apr 2024 to Jun 2025
Procurement & Construction	16 Months	Jun 2025 to Oct 2026

Biological Process Change Recommendation

1. TWWTP Upgrade Timeline

- Current Phase 1A expansion of extended aeration biological treatment will be operational for Q4 2024 with a capacity of 5,330 m^3/day.
- A change to the current extended air biological treatment process will result in the TWWTP remaining at the current average daily flow capacity limit of 3,580 m^3/day until Q4 2026 to Q1 2027.

2. Proceed with current extended air biological treatment process expansion of Phase 1A to meet the timeline of additional plant capacity by Q4 2024.

3. Based on Town growth timelines, commence the change in biological influent studies to align with further TWWTP expansion beyond Phase 1A.

4. Town Staff to engage municipalities that have other types of biological treatments and understand opportunities.

D3. Analysis of TWWTP Outfall Capacity

As noted in the Background section of the report, the existing outfall is inadequate to accommodate the effluent flows of the Phase 1A. Outfall is a major concern since the upgrade of the Outfall project would have to be complete at the same timeline or soon after the Phase 1A plant expansion. The Outfall capacity will have to be increased so that the TWWTP is not re-rated based on the current capacity of the existing Outfall. It should be noted that the TWWTP is operating at approximately 87% of current capacity.

The following is a preliminary Project Scope, some of the tasks below can overlap:

- Studies 16 Months
- Detail Engineering 9 Months
    - 90% Engineering Package required for Regulatory Submission
- Regulatory Approval 12-18 Months
- Procurement and Construction 12-18 Months

Timeline Summary – Some of the above tasks can overlap reducing the overall schedule:

- From Start to Construction Completion 48- 60 Months
- Commence June 2022 – Outlet Piping Operational Early Finish **July 2025**
- Commence June 2022 – Outlet Piping Operational Late Finish **Aug 2026**

The recommendation for engineering execution is to negotiate with the current engineering firm completing the Phase 1A expansion since they have the resource capacity, historic understanding of this project and could dedicate resources immediately.

Since the current schedule is for Outfall upgrades to be completed beyond the plant expansion date, there will be a requirement to ensure influent flows to the TWWTP are managed by the Lagoon system and ability to process excess influent through the plant during low influent flow.

Town Staff and IBI Group has provided a cost range for the Outfall scope of $6,000,000 to $7,700,000. The $1,700,000 variance in pricing is due to the uncertainty of the required Outfall

piping length required to extend into Georgian Bay and this will be determined during the study phase of the project.

The Outfall project has an engineering component upset cost estimate of $1,600,000, since there are considerable studies and approvals required for this type of project. It is recommended at this time only funding to support engineering be approved. As part of the 2023 Budget, a detailed procurement and construction estimate will be developed for Council approval.

The Town's Purchasing Policy (POL.COR.07.05) permits Negotiation when competitive procurement may be found to be impractical.

In this instance, due to the significant work already completed by IBI Group for the TWWTP Expansion project, staff recommends negotiation with IBI Group to complete the project within the timeline outlined within this Report.

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 advancement of the Outlet Piping into Georgian Bay will require extensive studies and input and communication with Town residents.

G. Financial Impacts

TWWTP Expansion Phase 1A

The current Phase 1A budget is $18,027,000 with funding being $1,800,000 from the Wastewater Asset Replacement Reserve Fund and $16,227,000 from Wastewater Development Charges. The additional $4,500,000 will be funded using the same funding sources and splits, $450,000 from the Wastewater Asset Replacement Reserve Fund and $4,050,000 from Wastewater Development Charges.

Outfall

The required work for the Outfall is also included in the Town's Development Charges Background Study with 100% being funded from Wastewater Development Charges. If Council approves the $1,600,000 requested engineering budget for this work the full cost will funded from Wastewater Development Charges.

H. In Consultation With

Allison Kershaw, Manager of Water & Wastewater Services

Mark Service, Wastewater Supervisor

Sam Dinsmore, Deputy Treasurer / Manager of Accounting and Budgets

Serena Wilgress, Manager of Purchasing & Risk Management Finance & IT Services

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 Brent Rolufs, Manager of Capital Projects managercapitalprojects@thebluemountains.ca.

J. Attached

None

Respectfully submitted,

Brent Rolufs
Manager of Capital Projects

Shawn Carey
Director of Operations

For more information, please contact:
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Report Approval Details

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Attachments:	
Final Approval Date:	Apr 21, 2022

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

Brent Rolufs - Apr 20, 2022 - 4:29 PM

Shawn Carey - Apr 20, 2022 - 7:13 PM

No Signature found

Shawn Everitt - Apr 21, 2022 - 7:55 AM