Staff Report
Infrastructure and Public Works

Report To: Committee of the Whole
Meeting Date: July 8, 2019
Report Number: CSPW.19.036
Subject: Request for Engineering Services Agreement Increase – Thornbury Wastewater Treatment Headworks Upgrade
Prepared by: Allison Kershaw, Manager of Water and Wastewater Services

A. Recommendations

THAT Council receive Staff Report CSPW.19.036 entitled “Request for Engineering Services Agreement Increase – Thornbury Wastewater Treatment Headworks Upgrade”;

AND THAT Council approve increasing the Engineering Services Agreement to J. L. Richards & Associates Ltd. for the Thornbury Wastewater Treatment Plant Headworks Expansion by an upset limit of $140,000 from $211,755.75 to $351,755.75 for the expansion of the Headworks Building to house the headworks equipment per the terms and conditions outlined in Staff Report CSPW.19.036.

B. Overview

The purpose of this report is to consider expanding the scope of the engineering assignment for the design of the Thornbury Wastewater Treatment Plant Headworks Upgrades to include an addition to the Headworks Building.

C. Background

The Town is undertaking upgrades to the Thornbury Wastewater Treatment Plant (TWWTP) Headworks (the “Project”) to ensure grit and detritus debris is removed from the influent sewage before it reaches the treatment process. The current headworks equipment is at the end of its life and failing which has caused operation problems in the plant. During high flow periods the headworks equipment surcharges which poses a health and safety concern for the wastewater operators. Excessive inflow is diverted to the lagoon system which can exasperate operational challenges. It is noted that the most recent operational challenge at the plant was an overflow of the lagoon system which occurred in part due to the lack of a fully functional headworks. Other challenges include the deposition of grit in the aeration basins and debris collecting on the UV disinfection lamps. Increased operator time is needed to manage the plant. The TWWTP continues to achieve regulatory effluent criteria but it will be increasing difficult to do so as inflow rates increase while the headworks are not functioning well.
The Town retained J.L. Richards & Associates Ltd (JLR) to complete the preliminary design for the project. The report dated July 2017 proposed a new screening system, new vortex grit removal system and modifications to the existing headworks building. The grit removal system would be installed outside within a weather-proof enclosure. A schematic of the options is provided in Attachment #1, Option 2 was preferred. Attachment #2 is an image of a Grit Removal System. The estimated construction cost was $1,150,000. JLR proposed the concept as a cost saving measure albeit Staff had reservations about housing this type of equipment outside. Staff accepted the concept since JLR had wider experience in plant design.

In July 2018, the Town retained JLR through a competitive procurement process to prepare the final design and undertake the contract administration for the project based on the concepts proposed within the Preliminary Design Report. The upset cost limit for the engineering services was $211,755.75 which represented 18.3% of the estimated construction cost. Given the scope of work and the complex nature of the project, the percentage of fees to the estimated construction cost is reasonable for high quality design work.

At the 30% design meeting in September 2018, JLR project staff proposed that the grit removal equipment be installed in a building for operational and other reasons instead of outside. While it is feasible to install the grit removal system outside in a weather-proof enclosure, it was felt upon further review that constructing a building addition would provide better value to the Town in the long term. Although the initial costs of installing the equipment outside are lower, it will result in more maintenance over the life of the equipment and facility. It would also complicate the operation and potentially present a risk of shutdown, especially during inclement weather events. In addition, the lack of electrical expansion space within the existing building was complicating the design which would result in additional construction costs to house electrical equipment outside. Town project staff generally endorsed the concept of housing the equipment inside as opposed to out in the elements given their previous concerns raised during the preliminary design phase.

Unfortunately, senior staff from neither JLR nor the Town were in attendance at the 30% design meeting to recognize that a building addition was a significant departure from the original scope of work and would require a change in the fee proposal. Project team meetings and correspondence between JLR and Town Staff have been reviewed in depth and there was no instruction given by Town project staff to proceed with a building expansion beyond the concept discussions during the 30% project team meeting. JLR concurs that explicit direction was not provided by the Town to undertake a building expansion.

It was during the 60% design meeting in November 2018 where JLR project staff presented a matured building design and where senior Town Staff were present that it was recognized that a significant amount of design effort was completed that was outside of the original scope of work. Instruction was given to Town and JLR project staff to come to terms with the scope of work and prepare a plan forward. Unknown to Town Staff, JLR’s design engineers continued to actively advance the building design. In December 2018, the Director of Infrastructure and Public Works instructed that all work cease until the project scope and fees could be agreed upon. A site plan of the proposed Headworks Building addition is provided as Attachment #3 depicting the existing and additional building.
Since the project was ready to be submitted to the Ministry of Environment, Conservation and Parks (MECP), it was agreed that JLR would proceed with the submission to the MECP for their review and approval of the works while the Town considered the options of a building addition. Town Staff and JLR commenced discussions regarding revising the fee schedule to be able to consider the building addition.

The MECP approval was received May 24, 2019. The Town is now in the position to proceed to tendering for construction of the works as submitted.

The current construction estimate for this project, including the addition of the new building, the electrical room expansion and incorporating required yard piping for current and future needs into the design and construction is $2,947,500. The costs for the building addition and other cost escalations from the original proposal represents a $925,955 increase in the construction cost. The expected costs for a building addition were included within the approved 2019 Capital Budget with expenditure subject to negotiations with JLR and direction from Council.

D. Analysis

The main options available to the Town to address that the original scope of work didn’t include a building addition are:

1. Proceed with the project as per the Preliminary Design Report which doesn’t include a building addition.

2. Cancel the Engineering Services Agreement and prepare a Request for Proposal to resume the project where it stands including the addition of a building.

3. Negotiate a fee with JLR to complete the project with the inclusion of a building addition.

Option 1: Proceed without Building Addition

In this option, the Town will return to the concept outlined in the Preliminary Design Report such that the grit removal equipment will be housed outside. With the grit removal equipment exposed to the elements, the Town will likely experience more service interruptions due to inclement weather. Services interruptions have the potential to adversely affect the operation of equipment downstream of the headworks and perhaps place the Town in non-compliance with environmental approvals in extreme events since grit removal is a vital step in the treatment of wastewater. In addition, there are inherent health and safety risks for operators working in inclement weather repairing process critical equipment.

Without a building addition, the housing of the required electrical control equipment is more complicated and will require weather proof enclosures and heating.

The Town will expend less capital to construct the headworks upgrades, but the additional operational costs, which are inherently difficult to quantify, will be much higher than within a building. The risks to treatment compliance are higher as well.
The overall project will be delayed because the current design will need to be re-vamped and perhaps re-submitted to the MECP for approval. Staff expect a project delay of 10 – 12 months and moreover the likely loss of a construction season. At this point, there is no assurance that JLR will commit to complete the project.

**Option 2: Cancel the Engineering Services Agreement and Re-Issue**

The Engineering Services Agreement enables the Town to cancel the contract without costs provided the Town pays for all work completed. The Town becomes the owner of the design completed to date. The Town can then use the design completed to date to issue a Request for Proposal to retain an engineering firm to complete the project. The complicating issue is that the Town will not be able to utilize the building drawings prepared since the Town will not be paying for that effort.

The time to re-issue a Request for Proposal and get a design prepared by another engineering firm and approved by the MECP is in the range of 16 – 18 months. Although the expected cost to complete the project should be within a reasonable range, there is a risk the fees could be higher than anticipated.

**Option 3: Fee Negotiation with JL Richards**

Under this option the Town comes to a negotiated agreement with JLR to fairly compensate them for the design efforts to date, complete the building addition design and oversee its construction.

Given the significant scope change and expected fee implications, Town Staff felt that establishing an upset fee limit outside of a competitive process was not appropriate. Instead of setting a fixed upset fee amount, Town Staff negotiated a fee scale based on a percentage of the construction costs up to a cap. The percentage has been set at 15% of the cost of the building expansion and the necessary yard piping to be relocated. This amount is considered reasonable and just given the complexity of the proposed works. It is typical that engineering fees for treatment plants are on the upper end of normal engineering fees. Staff had used 20% of the expected construction costs from the Preliminary Design Report to estimate the engineering fees for the 2018 capital budget of this project and JLR’s current fees are 18.3% of the Preliminary Design cost estimate.

The revised and current estimated construction cost of the building addition and piping relocation is $925,955, which at 15% of construction cost gives an expected engineering fee of $138,894. To limit the Town’s liability, a fee cap of $140,000 was agreed upon while there is no lower limit on the fees should the building and related works be lower than expected. Once approved, the Town would pay 50% of $138,894 ($69,447) for the design efforts to date. The remaining fees would be paid as the project progresses through construction. An interim upset fee limit will be established using the awarded tender amount for the relevant works and the final amount will be calculated upon the completion of the project to account for related Change Orders. A scope change letter from JLR outlining the proposal in more detail is provided as Attachment #4.
Discussion and Recommendation

Town Staff have considered the costs and benefits of a building addition. Although there are higher upfront capital costs, Staff feel that on balance, the value in a building addition at this time is a good investment of Town resources over the expected life of the TWWTP.

In addition to the operational and health and safety concerns outlined above with process equipment being exposed to inclement weather, a building addition will also provide the required space for the additional electrical control panels that the Town requires for the current headworks upgrades as well as the future space required for the electrical panels for the Phase 1A plant expansion planned to commence within the next five years. By incorporating the building at this stage of construction, it will allow for a more logical location of the control panels and reduce the costs of the Phase 1A plant expansion.

A future expansion of the Headworks Building is expected during Phase 2 (20-year timeframe) as part of the overall plant expansion strategy to provide additional treatment capacity. The increase in capital cost for the present project, rebuilding the headworks and including an additional building to house some of the equipment, will reduce the cost of future expansions required in Phase 2 since less equipment would have to be accommodated in a new building at that time. As well, the work to redesign and relocate the yard piping at this time will allow for a smoother transition to Phase 2 of the treatment plant expansion. Included in the building addition is an isolated electrical room. The ability to add onto an isolated electrical room will assist with further expansion of the TWWTP during Phase 2.

It is unfortunate that the JLR project staff undertook the design of a building addition without authorization from Town staff, however it is reasonable that the firm be fairly compensated for their work since in the long term, a headworks building addition is the right decision for the Thornbury WWTP. Had the preliminary design fully recognized the implications of not expanding the building, the Town would not be this situation because the scope of work would have included an appropriate building expansion. Good decisions and direction were set within the Preliminary Design Report regarding equipment sizing, selection and configuration but failed to recognize the importance of a Headworks Building addition and the relevant yard piping reconfiguration. Regardless, Staff feel that a building addition is the correct solution to advance the project.

Staff therefore recommend that Council approve increasing the Engineering Services Agreement to J. L. Richards & Associates Ltd for the Thornbury Wastewater Treatment Plant Headworks Expansion by an upset limit of $140,000 from $211,755.75 to $351,755.75 for the expansion of the Headworks Building to house the headworks equipment per the terms and conditions outlined in Report CSPW.19.036.

Should Council not wish to accept the above recommendation, Staff feel the next best option is to cancel the Engineering Services Agreement (Option 2).
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

Proceeding with the additional building for the grit removal equipment will better assist the Town to achieve the TWWTP’s effluent criteria. Control of grit and debris into the plant is critical to maintaining an effect treatment system to protect the natural environment.

G. Financial Impact

Included in the 2019 Approved Capital Budget was an additional $100,000 for engineering services. Upon further review, Staff are requesting that this be increased to $140,000. This cost will be funded by the Wastewater Asset Replacement Reserve Fund (25%) and Wastewater Development Charges (75%).

In addition to the required $140,000 in engineering costs the 2019 Approved Capital Budget had $2,947,500 for construction and contingency. To date the Town has committed $231,755 which brings the project total to $3,319,255. This project will require $829,800 in funding from the Wastewater Asset Replacement Reserve Fund and $2,489,455 from Wastewater Development Charges. The Thornbury Sewer Capacity Development Charge Reserve Fund has a balance of over $6,000,000 and therefore can fully fund this capital project.

H. In Consultation With

Maurice Dempster, Wastewater Supervisor
Sam Dinsmore, Deputy Treasurer/Manager of Accounting and Budgets
Ruth Prince, Director of Finance and 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

2. Image of Grit Removal System
3. Drawings of Proposed Headworks 95% Design, JL Richards
4. Scope Change, Letter from JL Richards to Reg Russwurm, April 8, 2019

Respectfully submitted,

_Allison Kershaw_
Allison Kershaw,
Manager of Water and Wastewater Services

_Reg Russwurm_
Reg Russwurm, MBA, P.Eng
Director of Infrastructure and Public Works

For more information, please contact:
Allison Kershaw,
managerwww@thebluemountains.ca
519-599-3131 extension 226
NOTE:
PRELIMINARY, NOT FOR CONSTRUCTION
"LANDFILL LEACHATE DISCHARGE LOCATION ASSUMED;"
EXACT LOCATION TO BE DETERMINED BY DESIGNER OF
THE LANDFILL LEACHATE PUMP STATION AND
FORCE MAIN PROJECT.

LANDFILL LEACHATE *

RAW SEWAGE FROM MILL ST AND LAKESHORE PS

MANUAL BYPASS BAR SCREEN

SERVICE WATER

SCREENING

GRIT REMOVAL

FE/FT

GRIT CLASSIFIER

GRIT

GRIT PUMP

SREENINGS

PROPOSED NEW HEADWORKS EQUIPMENT

BYPASS TO LAGOON

AERATION TANK INFLUENT

This drawing is copyright protected and may not be reproduced or used for
purposes other than execution of the described work without the express written consent of
JL Richards & Associates Ltd.
EXISTING 500MM FORCEMAIN WITH LANDFILL LEACHATE CONTRIBUTION

NEW MANUAL BAR SCREEN

NEW SCREEN

NEW SCREEN/GRIT COLLECTION BIN

EXISTING GRIT TRASHHANDLER

EXISTING EXCHANGE ROOM HEATING PLANT/FLASH

NEW GRIT TANK

NEW GRIT PUMP

NEW GRIT CLASSIFIER

350MM INFLUENT LINE

NOTE: PRELIMINARY. NOT FOR CONSTRUCTION

SCALE: 1 mm = 2m

TRONSBURY WASTEWATER TREATMENT PLANT ENVIRONMENTAL STUDY REPORT ADDENDUM

TOWN OF THE BLUE MOUNTAINS

INLET BUILDING OPTION 1 PLAN VIEW

PLOT DATE: July 13, 2017 8:41 PM

J.L.Richards

DESIGN: SJS
DRAWN: TA
CHECKED: MST
REV. ZT433
Attachment #2 – Grit Removal System
Attachment #3 – Proposed Headworks 95% Design, Preliminary Drawing #1

Additional Building

Existing Building
April 8, 2019
Our File: 27433-000

VIA: Email

Reg Russwurm,
Director of Infrastructure and Public Works
Town of The Blue Mountains
32 Mill Street, P.O. Box 310
Thornbury, ON M0H 2P0

Dear Mr. Russwurm:

Re: Changes in Scope and Fee for Engineering Services for Addendum to the Environmental Study Report For the Thornbury WWTP Expansion

The purpose of this letter is to summarize our discussions regarding the preferred means of adjusting our fee budget to incorporate changes to our scope for the above-noted project. This letter supersedes and replaces the one JLR submitted on November 13, 2018.

As discussed, the design of proposed improvements to the headworks facility at the Thornbury WWTP has progressed to incorporate elements that were not included in either the 2017 ESR addendum or the RFP, or our proposal for the design and contract administration of the works. The changes include a new building addition to house some of the grit removal equipment (which was originally planned to be installed outside) as well as improvements to the yard piping to the west of the headworks building (including incorporating future additional piping from existing pumping stations). These changes also include space for required electrical equipment.

The original scope (as described in the 2017 ESR addendum) called for some of the grit removal equipment to be constructed outside with weather-proof enclosures. While it is feasible to install this equipment as proposed, it represents a trade-off between capital costs and long-term operational and maintenance costs. Installing the grit vortex and associated equipment outside may be a lower initial cost, but it will result in more maintenance over the life of the equipment. It will also complicate operation and potentially present a risk of shutdown, particularly during inclement weather.

Constructing a building addition to house this equipment will cost more up-front, but will lead to savings over time by protecting the equipment and enabling easier operation. The original intent was to install the equipment outside, but this decision was changed during the design stage and a new building was incorporated into the design.

The proposed improvements to the headworks facility represent the first phase of improvements for the overall facility which tentatively include future expansion of the building. The increase in capital cost for the present project would subsequently lessen the cost of future expansions.

Our proposal for engineering services currently has an approved upset limit of $211,755.75 excluding taxes. As discussed (and as per our letter dated November 13, 2018), we would like to increase our upset limit to account for the expanded scope outlined above. We tentatively agreed that a reasonable assessment of our costs for the design and construction assistance for this new work would be 15% of the eventual tender cost for the additional areas of the facility.
Mr. Reg Russwurm, Town of The Blue Mountains

In our November 23, 2018 OPC, we identified an overall construction cost of $2.4M. We have separated the portions related to the new building addition, as well as yard piping and the electrical room expansion, and have identified that these elements represent a cost of $925,955.

At a 15% valuation for our services, we recommend an increase to our upset limit of $138,893.25. Once the tender closes, we have tentatively agreed to adjust this figure based on the amount carried by the successful contractor for the work represented by the additional scope.

In addition, we have tentatively agreed that JLR may invoice up to 50% of the fee budget increase for work done to date and would invoice against the remainder progressively as construction proceeds.

Finally, we have tentatively agreed that we can combine the $5,000 carried in our proposal for geotechnical works and the $5,000 for daylighting services to be used for either geotechnical and/or daylighting. In essence, this would enable us to claim our actual geotechnical costs (which exceed $10,000) against the combined amounts, since the geotechnical work did incorporate some of the intent of daylighting, and additional daylighting has not been found to be required as part of the design assignment. This would leave the $5,000 for materials testing and the $20,000 contingency untouched through these changes.

In summary, we propose the following:

1. Increase JLR’s upset limit from $211,755.75 by $138,893.25 to a total of $350,649.00. Once the tender closes, we will adjust our upset limit by an amount equal to the difference between $138,893.25 and 15% of the successful contractor’s cost for the work represented by the change in scope outlined above.

2. JLR may invoice up to $10,000 for combined geotechnical and daylighting services to date.

3. JLR may invoice up to 50% of the $138,893.25 increase now and the remainder (as adjusted in Item 1 above) progressively through the construction phase.

We trust the foregoing is consistent with our discussion on this matter and look forward to moving forward with the Town of the Blue Mountains on this project.

Yours very truly,

J.L. RICHARDS & ASSOCIATES LIMITED

Michael S. Troop, P.Eng., M.Eng.
Associate, Senior Environmental Engineer
Manager, Guelph Office

MT:kb