Clause 7 in Report No. 1 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on January 26, 2017.

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Pre-selection of a Membrane Filtration System for the Upper York Water Reclamation Centre

Committee of the Whole recommends adoption of the following recommendations contained in the report dated December 14, 2016 from the Commissioner of Environmental Services:

1. Council approve the award of the pre-selection of a membrane filtration system supply contract and performance demonstration to GE Water and Process Technologies Canada for the Upper York Water Reclamation Centre, pursuant to Request for Proposal P-16-105, at a contract price of $5,050,000, excluding HST.

2. The Commissioner of Environmental Services be authorized to execute the agreement on behalf of the Region.

Report dated December 14, 2016 from the Commissioner of Environmental Services now follows:

1. Recommendations

It is recommended that:

1. Council approve the award of the pre-selection of a membrane filtration system supply contract and performance demonstration to GE Water and Process Technologies Canada for the Upper York Water Reclamation. Centre, pursuant to Request for Proposal P-16-105, at a contract price of $5,050,000, excluding HST.

2. The Commissioner of Environmental Services be authorized to execute the agreement on behalf of the Region.

2. Purpose

This report seeks Council approval to enter into a contract with GE Water and Process Technologies Canada for the supply of a membrane filtration system for the Upper York Water Reclamation Centre. GE Water and Process Technologies Canada is required to conduct a one-year performance demonstration at the Keswick Water Resource Recovery Facility to prove it can meet design criteria.

The Region's Purchasing Bylaw requires Council authorization to award Request for Proposals over $2,000,000 or when the recommended proponent is not the lowest cost. In this case, the recommended proponent has submitted a bid that is greater than $2,000,000.

3. Background and Previous Council Direction

Upper York Sewage Solutions project will provide sustainable sewage servicing for planned growth in the Towns of Aurora, East Gwillimbury and Newmarket

The purpose of the Upper York Sewage Solutions project is to provide local sustainable sewage servicing to accommodate planned growth of approximately 150,000 residents and employees in the Towns of Aurora, East Gwillimbury and Newmarket. All of these municipalities are located within the Lake Simcoe watershed.

A water reclamation centre was proposed through an extensive Individual Environmental Assessment process

Through an Individual Environmental Assessment, a water reclamation centre has been proposed as part of the servicing solution to treat wastewater in the service area. Proposing a water reclamation centre was chosen in collaboration and consultation with the Ministry of the Environment and Climate Change and stakeholder groups to comply with effluent criteria stipulated in the Lake Simcoe Protection Plan and regulations.

On May 16, 2013 Council received a report regarding mitigation of impacts of recommended design elements.

To accomplish provisions of the Lake Simcoe Protection Plan, the water reclamation centre will use a membrane filtration system. This is comprised of advanced treatment processes of low-pressure membranes and reverse osmosis membranes along with a disinfection system to produce clean treated effluent to be discharged to the East Holland River.

The project is awaiting approval of its Individual Environmental Assessment; however, on June 26, 2014, Council approved progression of the detailed design of the project. Pre-selection of the membrane filtration system is now required to move forward with plant design and provide schedule certainty in manufacturing and delivery of the membrane equipment.

A pilot study confirmed reverse osmosis system can achieve expected performance

The Upper York Water Reclamation Centre is being designed to use a membrane filtration system in advance of the reverse osmosis system as tertiary and quaternary treatment, respectively. Widely recognized as the technology of choice for advanced wastewater treatment, membrane filtration systems have thin layers of semi-permeable material that effectively remove solids and particulate. Membrane filtration is commonly used in advance of reverse osmosis treatment. The combination of microfiltration and reverse osmosis technology proved highly effective during the one-year proof of concept pilot study conducted at the Mount Albert Water Resource Recovery Facility as part of the Individual Environmental Assessment. The proof of concept pilot study was required to prove reverse osmosis, generally used for water applications, is also suitable for wastewater.

Unlike reverse osmosis systems that have industry standards for system design and size, membrane systems have a variation of design types and sizing options (e.g., skid layout dimensions and membrane rack configurations vary depending on manufacturer) for consideration. Pre-selecting a membrane system will inform plant design for efficiency and compliance with stringent effluent criteria established by the Ministry of the Environment and Climate Change.

Water reclamation centre must be designed based on one membrane filtration system

The project team is progressing through design of the Upper York Water Reclamation Centre and required selection of a membrane filtration system for the following reasons:

- All membrane suppliers have their own proprietary system design and configuration, and the membrane industry has not established a technical standard. The selected membrane filtration system will directly affect the overall design of the water reclamation centre.

- Pre-purchasing a membrane filtration system provides design engineers with shop drawings and technical information required to complete the overall process design of the water reclamation centre.

- Pre-selecting a membrane filtration system will ensure that equipment is available prior to construction without delaying the general contractor and allow for any technology enhancements to be incorporated into the design prior to construction.

- Operating cost, life-cycle cost and membrane replacement cost will be evaluated in addition to the capital cost of the equipment. Pre-selection allows the Region to evaluate these criteria through the Request for Proposal process.

- While the Region performed a one-year proof of concept pilot study on reverse osmosis that included microfiltration to establish viability of the system and technologies proposed for the Upper York Water Reclamation Centre, membrane pre-selection is still required along with performance demonstration to establish and confirm specific performance guarantees and design details for the entire facility. A performance demonstration will confirm the membrane filtration system can meet design flux requirements (the water passing through the membrane per unit area of membrane), and meet phosphorus and solids removal requirements over a one-year period. Provisions in the contract allow the supplier to work with the design team to reconfigure their system to meet stipulated performance criteria.

Successful supplier will provide engineering, design, supply, installation, commissioning and warranty services

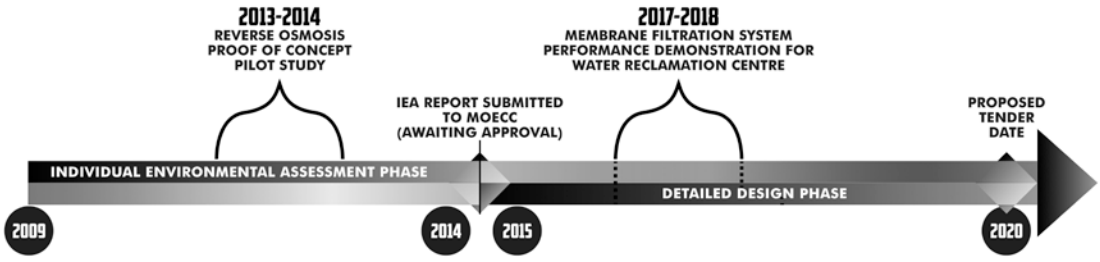
On June 26, 2014, Council received a report regarding proceeding with detailed design prior to the approval of the Individual Environmental Assessment.

The successful supplier will be retained during the detailed design phase to assist with design of the water reclamation centre to ensure compatibility of the membrane filtration process with all components of the plant. The successful supplier will provide design engineers with technical drawings and specifications required to create a tender package for contractors to bid on for construction. Warranty services will be provided after substantial performance to assist York Region Operations, Maintenance and Monitoring staff with operation and optimization of the membrane filtration system.

The supply contract will be assigned to the general contractor when construction begins to supply the membrane filtration system and supervise the general contractor during installation and commissioning.

Timeline of the proof of concept pilot and performance demonstration is shown in Figure 1.

Figure 1
Timeline of membrane filtration system activities during Individual Environmental Assessment and Detailed Design phases



4. Analysis and Implications

Pre-qualification process completed to select qualified membrane filtration system suppliers with three submissions received

Request for Pre-qualification (RFPQ) P-16-84 for the membrane filtration system supplier was issued on May 26, 2016. The RFPQ was advertised in the *Daily Commercial News* and through the Region's Bids and Tenders notification system. The RFPQ closed on June 9, 2016 and three submissions were received from the following pre-qualified suppliers:

- GE Water & Process Technologies Canada
- Pall Corporation
- Evoqua Water Technologies

Request for Proposal issued to three pre-qualified membrane filtration system suppliers

In accordance with the Region's Purchasing Bylaw, Request for Proposal P-16-105 for the Pre-selection of a Membrane Filtration System for the Upper York Water Reclamation Centre was issued to three pre-qualified suppliers on September 20, 2016.

Request for Proposal P-16-105 detailed scope of work required, that included the following criteria:

- Qualifications and experience on similar projects
- Serviceability and technical support during construction, commissioning and operation
- Equipment performance, system information, and design criteria
- Design services and quality of shop drawing submittals
- Membrane Filtration System performance demonstration study plan and services
- Quality of supervision of installation, testing and commissioning
- Adherence to warranty services
- Project management, implementation and approach
- Quality assurance and quality control plan

The following financial criteria were evaluated to form the total financial score:

- Total contract price for equipment supply and service cost
- Operating and life-cycle cost
- Membrane replacement cost

Pall Corporation did not submit a proposal and Evoqua Water Technologies' proposal was deemed non-compliant and rejected

Request for Proposal P-16-105 Pre-selection of a Membrane Filtration System for the Upper York Water Reclamation Centre closed on November 1, 2016. Supplies and Services received proposals from Evoqua Water Technologies and GE Water and Process Technologies Canada.

After release of the Request for Proposal, Pall Corporation disclosed their intent not to submit a proposal as they were not in a position to dedicate resources to this project for the extended duration of the assignment.

A Bid Review Committee was conducted for Evoqua Water Technologies' proposal and concluded the proposal was non-compliant for failure to submit an Undertaking to Bond. Although the proposal was deemed non-compliant, the Region accommodated Evoqua Water Technologies' request for additional extensions to allow them the opportunity to resolve bonding issues to meet the Region's requirements. Despite the Region's attempt to accommodate their request by extending the closing date multiple times, Evoqua Water Technologies did not meet the Region's requirements for bonding.

Proposal from GE Water and Process Technologies Canada was evaluated using two-envelope system

The proposal from GE Water and Process Technologies Canada was evaluated using the two-envelope system with technical and financial information submitted in separate envelopes. Overall score was evaluated based on a weighting of 80 points for the technical proposal and 20 points for the financial proposal. The technical proposal was evaluated prior to any knowledge of financial information.

Technical components of the proposal must achieve a minimum score of 60 per cent (48 points out of a potential 80 points) to have the financial portion of the proposal considered. If a proponent does not achieve this minimum score, their financial proposal is returned unopened.

GE Water and Process Technologies submitted a thorough technical proposal highlighting their commitment to the project with a detailed project implementation plan and provided a dedicated project design and support team based in Ontario. GE Water and Process Technologies provided a list of over 30 existing projects of their membrane filtration system being installed around the world and was the only supplier with installations in Ontario. GE Water and Process Technologies is proposing their ZeeWeed Ultra Filtration Membrane Filtration System which was developed in the early 1990's. GE Water and Process Technologies scored 72.5 per cent on their technical proposal thus allowing the Region to open the financial portion of their proposal.

The Region adopted industry best practice for evaluating membrane system suppliers. This consisted of evaluating the financial proposal in three categories; including:

- Equipment supply and service cost
- Operating and life-cycle cost
- Membrane replacement cost

Operating and life-cycle costs were used to evaluate the value of the system. Evaluating these categories ensures the Region will obtain a system that does not rely heavily on electrical and chemical usage to perform as per specifications. These categories will also be used as a baseline for evaluating performance during commissioning.

Technical and financial results are summarized in Table 1.

Table 1
Supplier Proposal Evaluation Summary

Supplier	GE Water & Process Technologies
Technical Score (out of 80)	58
Contract Price – Equipment Supply and Service Cost	**$5,050,000***
Operating and Life-cycle Cost (20-year)	$1,206,988**
Membrane Replacement Cost (20-year)	$850,011**
Total Cost	$7,106,999
Financial Score (Out of 20)	20
Total Score (Out of 100)	78

* A purchase order will be created based on this contract price only
**Cost used to evaluate life-cycle cost of the membrane filtration system to enable staff to determine operating impact of capital

Evaluation of proposals revealed GE Water and Process Technologies Canada achieved a high technical score and represents a competitive price

Evaluation of proposal revealed that GE Water and Process Technologies Canada achieved a high overall score and is recommended for the supply contract.

The proposal submitted by GE Water and Process Technologies Canada demonstrated a thorough understanding of the detailed technical requirements of the membrane filtration system and demonstrated experience on projects with similar system requirements including two projects from York Region. The proposal offered value added services and innovative solutions to common issues.

GE Water and Process Technologies Canada has previously supplied membrane filtration systems for the Georgina Water Treatment Plant and Keswick Water Resource Recovery Facility. The Region experienced good customer service during and after commissioning of these two facilities. The membrane filtration system installed in Georgina Water Treatment Plant was commissioned in 2003

and the original membranes are still in operation exceeding performance expectations. Through these projects, the Region's Operation, Maintenance and Monitoring staff have gained over ten years of experience working directly with GE membranes.

GE Water and Process Technologies provided eight reference facilities that ranged from 7 million litres per day to over 100 million litres per day using the membrane filtration system proposed for the Upper York Water Reclamation Centre. Four of the plants are located in Canada experiencing similar cold weather climate while the other four are located in the United States. The Region contacted the municipalities and found that, overall, staff were pleased with the product and ranked GE Water and Process Technologies highly responsive for resolving issues during commissioning and routine maintenance.

Staff reviewed the contract price of $5,050,000, excluding HST, and determined the contract price is below engineer's pre-proposal cost estimate. This contract price, along with GE Water and Process Technologies' extensive project experience and a detailed project implementation plan, indicates that the proposal from GE Water and Process Technologies represents good value for money on this project.

Supplies and Services Branch reviewed the evaluation summary and issued its report confirming that GE Water and Process Technologies Canada be recommended as the successful proponent to supply a membrane filtration system for the Upper York Water Reclamation Centre.

GE Water and Process Technologies Canada will perform a one-year performance demonstration at Keswick Water Resource Recovery Facility

GE Water and Process Technologies Canada will demonstrate its ability to meet performance criteria through a one-year performance demonstration at the Keswick Water Resource Recovery Facility. The performance demonstration will confirm that the membrane filtration system can operate effectively in expected conditions at the water reclamation centre, and will also confirm that factors such as temperature and influent quality will not affect performance. All performance opportunities discovered during the demonstration period will be incorporated into the overall design of the water reclamation centre.

5. Financial Considerations

10 Year Capital Plan has adequate capital spending authority for pre-selection of a membrane filtration system

Funding for the membrane filtration system pre-selection is included in the approved 2017 10 Year Environmental Services Capital Plan under Project 74270 Upper York Sewage Solutions. The project has approved capital spending authority of $164,274,000 in the 2017 capital budget.

6. Local Municipal Impact

The Upper York Water Reclamation Centre is required to provide local sustainable sewage servicing to accommodate planned growth for the Towns of Aurora, East Gwillimbury and Newmarket. Pre-selecting a membrane filtration system will allow designers to continue to move forward with design of the water reclamation centre and achieve the required effluent criteria for this project.

7. Conclusion

Three suppliers were pre-qualified to submit proposals and two were received. A Bid Review Committee deemed the proposal from Evoqua Water Technologies to be non-compliant and was rejected.

The proposal from GE Water and Process Technologies Canada was reviewed. It demonstrated a strong understanding of the assignment and provided strong technical detail. Costs provided by GE Water and Process Technologies are below the engineer's cost estimate for this process equipment and assignment. GE Water and Process Technologies will perform a one-year performance demonstration, provide design assistance and manufacture equipment at the start of the construction period in time for installation.

It is recommended that GE Water and Process Technologies Canada be engaged to supply the membrane filtration system for the Upper York Water Reclamation Centre at a cost of $5,050,000, excluding HST.

For more information on this report, please contact Mike Rabeau, Director, Capital Planning and Delivery, Environmental Services at ext. 75157.
The Senior Management Group has reviewed this report.

December 14, 2016

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Accessible formats or communication supports are available upon request