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MEMBRANE EQUIPMENT SUPPLIER PRE-SELECTION FOR GEORGINA WATER TREATMENT PLANT PHASE 2 EXPANSION TOWN OF GEORGINA, PROJECT NO. 72140

The Transportation and Works Committee recommends the adoption of the recommendations contained in the following report, February 13, 2007, from the Commissioner of Transportation and Works:

1. RECOMMENDATIONS

1. The Region enter into a contract with Zenon Membrane Solutions, part of GE Water and Process Technologies Canada, for the supply of membrane filtration media and related equipment for the Georgina Water Treatment Plant (WTP) phase 2 expansion not to exceed \$3,500,000.00 pursuant to the sole source provision of the purchasing by-law.
2. The Regional Chair and Regional Clerk be authorized to sign the necessary contract, subject to review by Legal Services.

2. PURPOSE

The purpose of this report is to obtain Council authorization for the sole source purchase of membrane filtration media and related equipment required for completion of the phase 2 expansion of the Georgina Water Treatment Plant.

The purchasing by-law requires that, with respect to award of a sole source purchase contract, if the total cost exceeds one hundred thousand dollars (\$100,000.00), the award shall be subject to Council approval.

3. BACKGROUND

The population of the Town of Georgina is expected to grow to almost 74,000 with an employment base of 22,000 by 2026. The majority of growth is anticipated to occur in the Community of Keswick and to a lesser extent in the Community of Sutton. The forecast water demand from the Keswick, Sutton and rural lakeshore area in-between will exceed the existing supply capacity of water supply plants in Keswick and Georgina by 2008-2010.

At its meeting of October 12, 2000, Council adopted Clause 2 of Report No. 10 of the Transportation and Works Committee, awarding the membrane system supply for the

phase 1 project and long-term maintenance support for Georgina WTP to Zenon Environmental Systems Inc. (Zenon). Following that, Zenon was pre-selected as the sole supplier of the membrane filtration system for phase 1. Phase 1 construction, which uses Zenon membrane system equipment and ancillaries, was completed in November 2005 and provided an initial design capacity of 20,000 m³/d.

The plant is being expanded as part of a long-term water supply strategy being implemented for Keswick, Sutton and the intermediate rural lakeshore areas. The expansion is part of a phased construction project for the Georgina Water Treatment Plant.

In 2005, Zenon Environmental Systems Inc. became Zenon Membrane Solutions, part of GE Water and Process Technologies Canada.

4. ANALYSIS AND OPTIONS

4.1 Existing Facilities

The water treatment process system at Georgina Water Treatment Plant is based on a membrane filtration system, which involves the use of a proprietary product (the membrane). The plant (phase 1) was commissioned in 2005 and has a capacity of 20ML/day.

The plant built in phase 1 was designed to accommodate, within existing buildings, successive phases of expansion by installing additional pumps and parallel membrane equipment trains and/or by adding more membranes to existing trains up to 50ML/day capacity. The balance of the plant - which feeds, services, and receives the flow from the membrane equipment was designed, sized, and constructed for the membrane system as supplied by Zenon.

4.2 Constraints for Expansion

In weighing options for the phase 2 expansion, the following constraints must be considered:

- Plant must remain functional (deliver its daily production) during the expansion work.
- Minimize changes to the existing plant systems, equipment and procedures.
- Minimize cost of expansion.
- Minimize spare parts inventory.
- Minimize supplemental training requirements.
- Minimize complexity of operation, maintenance and emergency procedures.
- Use the space allotted for expansion within the building provided in phase 1.

4.3 Membrane System Expansion Options

The following water supply capacity expansion options have been considered as they relate to the constraints noted in the preceding section. Consideration for each of the options is provided below.

4.3.1 Sole Source Zenon Membrane Filtration System

- Plant will remain functional during expansion work.
- Minimal changes to existing plant system equipment and procedures.
- Overall cost of expansion is minimized.
- Inventory of spare parts is minimized.
- No additional operator training required.
- Seamless operation of overall plant system.
- Able to utilize the space allocated for the expansion under Phase 1.

4.3.2 Select Membrane Filtration System via Competitive Bid

- Plant will remain functional during expansion work.
- Results in two different plant systems, equipment and procedures.
- Additional cost required for integration of existing and new systems.
- Spare parts must be available on site for both systems.
- Additional operator training required for new system.
- Adds complexities to plant operation, maintenance and emergency procedures.
- May not be able to utilize the space allocated for the expansion under Phase 1.

4.3.3 Replace Existing Membrane Filtration System with New Expanded System via Competitive Bid

- Some minimal interruption in plant operation would be required.
- Maximizes changes to plant systems, equipment and procedures.
- Additional costs for the replacement of the existing filtration system.
- Inventory of spare parts is minimized; however, existing inventory must be disposed.
- Additional operator training required for new system.
- Seamless operation of overall plant system.
- May not be able to utilize the space allocated for the expansion under Phase 1.

4.3.4 Construct Additional Plant to Provide Required Capacity Increase

- Plant will remain functional during expansion.
- Results in two separate plants with individual systems, equipment and procedures.
- Additional cost for new plant structure and appurtenances.
- Spare parts must be available on each site for respective systems.
- Additional operator training required for new plant and system.
- Adds complexities to overall water system operation, maintenance and emergency procedures.
- Will not utilize the space allocated for the expansion under Phase 1.

4.4 Recommended Option

Considering the listed constraints, we recommend Option 1: Adding Zenon trains of same type as existing.

The capital cost of any other option would require additional and expensive changes to existing plant systems which would not be recovered by the immediate, possible savings due to competitive bid for membrane system or from future energy and/or space savings.

Also, the Zenon membrane system which was built in phase 1 of the project is now well known to the operators of the plant and the supplier's technical support services have been found to be satisfactory. As the capacity already installed in phase 1 will cover 40 % of the final projected capacity of the plant, introducing another system or type of equipment for expansion would increase the cost and risk of plant operation.

Therefore there is no compelling reason to change the initial design concept of the plant and allow an open bid for the membrane system to be used in plant expansions.

5. FINANCIAL IMPLICATIONS

The value of the membrane system totals approximately 50% of the total capital cost of phase 2 expansion (estimated at \$7.4 million). In membrane water treatment plant design and construction, where a proprietary product (the membrane) is used, there is a risk that expansion of the plant may result in a cost premium being paid for the supply of additional membranes for expansion. In order to mitigate this risk, the following steps were taken:

- Zenon prepared a detailed proposal for the Region's review including itemized costs for optional equipment/sub-processes.
- The Region reviewed the technical content of the proposal and made decisions on optional features to confirm what should be included in the final proposal for the supply of the system.
- Zenon prepared a comparative pricing report referring to other similar supply to demonstrate the competitiveness of the proposal.
- The consultant on record (MacViro Consultants - a division of Genivar Ontario Inc.) analyzed Zenon's proposal and report, as well as data from Zenon's Best Available Final Offer for phase 1 of the project. They provided the Region with their report indicating that the current Phase 2 proposal cost is between 3% and 5% higher than the original year 2000 BAFO (phase 1) estimate. However, considering that the volatility of certain raw material markets (steel and petro-chemical which have risen considerably over the past six years resulting in increased production costs for GE Zenon), and the CPI (Construction Price Index) not being indexed to this particular industry, the 3%-5% disparity is not unreasonable. They believe that the October

2006 GE Zenon Phase 2 Cost Proposal is a true reflection of the current market price for membranes.

Additional negotiations will be undertaken with Zenon to ensure that all terms of their final proposal are supported by pertinent data for similar supply to other membrane plants and/or by market driven changes.

6. LOCAL MUNICIPAL IMPACT

The membrane system supply is a critical part of the design and construction of the water plant expansion which augments the capacity of the existing plant and permits future growth.

7. CONCLUSION

The existing membrane system used in Georgina Water Treatment Plant performed adequately and the operators are familiar with it. The supplier had a good track record with the Region in providing good technical support. They've indicated that they plan to support the supplied membranes for an indefinite time. There is no compelling reason to change the initial design concept of the plant and allow an open bid for the membrane system to be used in plant expansions. It is, therefore, appropriate to continue the design and construction of Georgina Water Treatment Plant expansions based on using Zenon's membrane system. This is preferred for technical, operational and maintenance reasons and would minimize modifications to the existing plant.

For more information on this report, contact Bala Araniyasundaran, extension 5131, Director, Capital Delivery of the Water and Wastewater Branch in the Transportation and Works Department.

The Senior Management Group has reviewed this report.