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16TH AVENUE TRUNK SEWER, PHASE 2 CONSTRUCTION CONTRACT TOWN OF MARKHAM, PROJECT 74030

1. RECOMMENDATION

It is recommended that:

1. The following report be received for information by Regional Council.

2. PURPOSE

On June 24, 2004, Council authorized the Regional Chair and Clerk to execute the design-build contract on behalf of the Region once the dewatering permit is received from the Ministry of the Environment (MOE). This report provides an update on the construction contract for the 16th Avenue Trunk Sewer Phase 2 Project (*see Attachment 1* for a schematic of the project). It also outlines the finalized contract price for the construction of Phase 2 based on the regulatory agencies' approved Environmental Management Plan (EMP).

An additional report will be submitted to the Transportation and Works Committee on November 3, 2004, detailing the environmental inspection peer review program for the Phase 2 works.

3. BACKGROUND

On June 24, 2004, Regional Council approved the execution of a contract with McNally International Inc./Aecon Civil (Joint Venture), for the construction of the 16th Avenue Trunk Sewer, Phase 2 project, subject to key environmental approvals being secured from the MOE and the TRCA as well as negotiating acceptable terms and conditions of the contract.

Subsequently, Regional Staff worked with McNally International Inc./Aecon Civil (Joint Venture) and came to agreement with the general terms and conditions for the contract document. The Regional Solicitor has since finalized the review of the contract document, and the contract document with McNally International Inc./Aecon Civil (Joint Venture) has been executed following receipt of the permits from the regulatory agencies.

A significant component of the construction contract is the EMP. This plan, adopted by the regulatory agencies, is designed to protect the natural functions of the eco-system; fish and fish habitat, wetlands, streams and environmentally sensitive areas. The EMP operates on the principle of proactive management of stress to the natural environment. The EMP includes implementation of the mitigation plan, which incorporates comprehensive monitoring and adaptive management.

3.1 Environmental Management Plan

Following extensive review by the regulatory agencies over the past eight months, the plan, as outlined in the following documents, was included as a condition to be complied with under the Permit to Take Water received on October 5, 2004:

- 16th Avenue Trunk Sewer Phase 2 EMP Report, MacViro Consultants Inc., May 2004.
- Amendment to the 16th Avenue Phase 2 EMP Report, MacViro Consultants Inc. June 25, 2004.
- 16th Avenue Trunk Sewer Phase 2 Addendum 2 to EMP Report, MacViro Consultants Inc. July 15, 2004.
- 16th Avenue Trunk Sewer Phase 2 Addendum 3 to EMP report MacViro Consultants Inc. July 19, 2004.

The EMP outlines proactive mitigation measures, with significant capital costs, for the safeguarding of the groundwater resource, wetlands, woodlots and watercourses. It particularly addresses concerns associated with the reduction in stream base flows, the discharge of groundwater into the receiving streams, as well as dewatering effects on wetlands and woodlots. The plan identifies all temporary effects of dewatering on; groundwater recharge of streams and wetlands, erosion of streams from discharge, and temperature impacts of the discharge on cool or warm water fisheries as well as the potential affects of dewatering on the trees and vegetation. It also outlines the necessary steps to mitigate these temporary adverse affects from an environmental standpoint.

4. ANALYSIS AND OPTIONS

The commencement of construction of the 16th Avenue Phase 2 sewer is contingent upon receiving the permits from both the MOE and the TRCA. The MOE Permit to Take Water, received on October 5, 2004, is required to withdraw groundwater from the aquifer. The TRCA permit, received on July 9, 2004, is required to allow the safe discharge of the groundwater from the dewatering activity into watercourses. Integral to the issuance of the permits is a satisfactory EMP that manages the dewatering activity in an environmentally responsible manner.

Over the past eight months, the EMP was refined with extensive review by the regulatory agencies. The mitigation measures in the EMP, as adopted by the regulatory agencies, include a comprehensive monitoring program that provides the agencies with a measure of satisfaction that the EMP is carried out successfully. In addition, the Region will conduct independent monitoring of the EMP implementation, through its own consultant, Gartner Lee Ltd., to ensure the integrity of the program.

4.1 Ministry of Environment Permit

On October 5, 2004 the MOE issued the dewatering permit for the project. The permit references stringent obligations that must and will be met under the terms of the EMP.

4.2 Toronto Region Conservation Authority Permit

On July 22, 2004, the TRCA released the five permits approved by their Executive Committee on July 9, 2004. The permits allow for work to be carried out within a Regional storm floodplain and permit the safe discharge of groundwater from dewatering activities into Little Rouge Creek, Robinson Creek, Bruce Creek, Berczy Creek, Beaver Creek, Rouge River, Apple Creek and Carlton Creek.

4.3 Environmental Management Plan Impact on Construction Cost

It is the responsibility of McNally International Inc./Aecon Civil (Joint Venture) to construct all temporary infrastructure necessary to affect the dispersions and, through their consultant MacViro Consultants Inc., to manage the plan and monitor and report to the regulatory agencies on a monthly basis. In order to provide overall quality assurance on the EMP, the firm of Gartner Lee Ltd., was retained by the Region on May 20, 2004. Their role will be dedicated to an independent peer review of the environmental monitoring program.

The EMP as conditioned for compliance in the Permit to Take Water is made up of three major components:

- Dispersing the dewatering discharge east of Robinson Creek into the Cornell Development Storm Drainage, completed Ninth Line Trunk Sewer South of 16th Avenue and Exhibition Creek.
- Dispersing the dewatering discharge north of 16th Avenue to augment base flow in Little Rouge Creek, Robinson Creek, Bruce Creek, Berczy Creek, Beaver Creek, Rouge River, Apple Creek and Carlton Creek as well as dispersing the dewatering discharge west into Bruce Creek. In addition, dispersing dewatering discharge into the Angus Glen and York Downs golf courses for irrigation purposes.
- An extensive monitoring, adaptive management and reporting program.

The dewatering discharge east of Robinson Creek was approved earlier by the regulatory agencies and the diversion has been underway since May 2004. The balance of the EMP components will be implemented as part of Phase 2 construction activities.

The stringent requirements imposed on the management of temporary environmental impacts during construction by the regulatory agencies are reflected in the EMP. These conditions must be met without exception for the successful delivery of the 16th Avenue Phase 2 project.

As a result, the EMP program implementation will require extensive infrastructure and significant resources to manage and monitor and will, thus, contribute significantly to the

construction cost of Phase 2. In excess of 12 km of pipeline will have to be installed to disperse the dewatering discharge (*see Attachment 2.*) All the discharge locations will have to be provided with iron treatment measures. An elaborate network of monitoring locations will be set up to monitor flows, temperature and quality of water in the receiving watercourses and will be supplemented with groundwater monitoring stations and surveys of woodlots and wetlands. This rigorous monitoring program will be implemented through the three year construction time frame and continue for three years after construction for a total of six years.

The comprehensive and regulatory agency mandated EMP has a significant impact on the contract price for the 16th Avenue Trunk Sewer Phase 2 contract.

The additional cost for the EMP in the amount of \$14,028,952 is made up of the following major components:

- The installation and operation of approximately 12 km of pipeline complete with a temporary pumping station to disperse the dewatering discharge in Little Rouge Creek, Robinson Creek, Bruce Creek, Berczy Creek, Beaver Creek, Rouge River, Apple Creek and Carlton Creek as well as the dispersion of dewatering discharge onto the Angus Glen and York Downs golf courses for irrigation purposes for a total of \$11,028,952 million.
- The implementation of an extensive environmental monitoring program that will cover the three-year construction period. As part of this monitoring program, groundwater levels will be monitored, stream flows inclusive of water temperature and water quality will be monitored and all sensitive woodlots and wetlands will be monitored for moisture and critical wildlife species (see Table 1 below). The cost of this three year monitoring and reporting program will be a total of \$3,000,000 million.

Table 1
Monitors Implemented Under the EMP

Monitoring Feature	Number of Monitoring Sites	Parameter
Fisheries	40	Stream Gauge
	40	Piezometer
	40	Dissolved Oxygen
	40	Temperature
	31	Fish
	21	Benthos
	12	Water Quality
	30	Piezometer
	30	Temperature
	30	Soil Moisture
Total	274	

Wetlands	30	Amphibian Activity
	30	Vegetation Composition
	30	Photographic
	30	Wildlife
Total	120	
Woodlots	8	Tree Assessment
	8	Soil Moisture
Total	16	
Geomorphology	24	Site Erosion
Total	24	

All of the above mentioned additional costs have been reviewed by the Regional Contract Administrator, Marshall Macklin Monaghan Limited and have been found to be reasonable and in keeping with industry standards for the scope of work required to fulfill the mandate of the EMP as required by the Regulatory Agencies.

Once McNally International Inc./Aecon Civil (Joint Venture) completes construction of the sewer in August 2007, total performance will be granted and the sewer will be placed into service.

The environmental monitoring activity will also be required for an additional period of three years following this construction completion. The projected cost for this monitoring and reporting activity over the three year period including decommissioning the monitoring system is currently estimated at \$3,664,800 million. As this activity does not constitute part of the contractual requirements for the total performance of the contract, it is proposed that a separate contract in this amount be established with McNally International Inc./Aecon Civil (Joint Venture) through the issuance of a purchase order following the completion of the sewer construction.

4.4 Phase 2 Contract Cost

The phase 2 construction contract cost has been impacted by two major factors, namely, the extended delay between the completion of phase 1 and the start up of phase 2 as well as the implementation of the elaborate EMP. Both of these factors have contributed significantly to the phase 2 project cost being established at \$60,769,487 (GST exclusive). The following Table 2 outlines the major components of the project cost.

Table 2
Major Components of Project Costs

Item	Amount
Council approved original McNally/Aecon contract amount on June 27, 2002	\$46,740,535
EMP costs excluding post construction monitoring.\	14,028,952
Sub-total McNally/Aecon revised contract amount	\$60,769,487
Independent environmental monitoring/peer review	750,000
Post completion environmental monitoring for three years including decommissioning EMP infrastructure	3,664,800
Projected construction and EMP costs	\$65,184,287

4.5 Independent Environmental Inspection Peer Review

On May 20, 2004 (Report No.5, Clause 7), Council approved the retention of Gartner Lee Ltd., to provide the independent inspection function throughout the duration of the project. Based on the approved EMP as it currently stands, the peer review function has increased in scope and magnitude. The regulatory agencies have stressed the importance of an independent due diligence review to the successful delivery of the EMP and thus the project. To this end, the peer review program will be rigorous and will adapt to suit the needs of the project as it progresses. Gartner Lee Ltd., will employ the protocols prescribed by the Canadian Standards Association's Z-768 and CAN/CSA – ISO 14010-96 in undertaking this peer review.

This program will include a comprehensive review of the daily, weekly and monthly monitoring carried out by McNally International Inc./Aecon Civil (Joint Venture) as outlined in the EMP. The peer reviewer will review the practices and record keeping as mandated by the EMP. Any and all corrective action taken to mitigate adverse impacts to the environment will be reviewed for compliance to the EMP. Recommendations on improvements to the EMP during the course of the construction will be provided as part of the adaptive management approach. Accordingly, it is proposed that \$750,000 (GST exclusive) be allocated for this independent environmental review of the 16th Avenue Trunk Sewer Phase 2 project. The peer reviewer will submit all their reports to the Regional Project Manager and will place the report on the project website. This program will also be the subject of an upcoming report to Transportation and Works Committee.

4.6 Well Mitigation

As part of the well mitigation program, the Region's proactive mitigation program has identified potential impacts to private wells prior to the commencement of the dewatering operation. This proactive mitigation program based on an analysis undertaken using

information obtained from MOE well records and from well surveys conducted throughout the area has predicted impacts at the locations noted in Table 3.

Table 3
Predicted Well Impacts

Location	Number of Wells Impacted
Cachet Estates	43
Jennings Gate	3
Victoria Square	0
Rural Areas	38
Heavy Water Users	4
Total	88

Implementation of the planned proactive measures of the enhanced mitigation program has been initiated following receipt of the permits from the MOE and the TRCA. These measures will include one of the following:

- Lowering of the pumps in the existing wells.
- Providing a new deeper drilled well.
- Connection to a local watermain where feasible.

The proactive mitigation option chosen for the anticipated well interference in the Cachet Estates and Jennings Gate areas is the connection of the potentially affected residents in the area to an extension of a local watermain service into this area by the Town of Markham. The Region has indicated that it is prepared to consider a financial contribution equivalent to the estimated cost of providing mitigation to the private wells in these areas, and is finalizing the details towards implementing the proactive mitigation measures in both Cachet Estates and Jennings Gate.

In addition to the proactive mitigation, the Region will maintain a commitment to its reactive mitigation program including the 24 hour call center and investigation, Complaint Review Committee (CRC) and Community Liaison Committee (CLC) throughout the duration of the project.

4.7 Project Schedule

Based on the project commencement date of October 2004, the following major milestones are established for the completion of the 16th Avenue Trunk Sewer Phase 2 construction.

Table 4
Major Milestones

Milestone	Date
Commencement of proactive well mitigation	October 2004
Completion of EMP infrastructure	January 2005
Commencement of dewatering	February/March 2005
Commencement of tunnelling	May/June 2005
Completion of sewer construction	August 2007

5. FINANCIAL IMPLICATIONS

The total construction and EMP costs of \$65,184,287 (GST exclusive) for Phase 2 will be funded from development charges (80%) and wastewater user rates (20%).

It is noted that there are sufficient funds in the 2004 Budget and Business Plan to initiate the construction of works anticipated in 2004. Adjustments to the overall project budget will be made as part of the preparation of the 2005 Capital Budget and Business Plan.

6. LOCAL MUNICIPAL IMPACT

The 16th Avenue Trunk Sewer and associated integrated components form an integral link to the continued development of The Regional Municipality of York in both the short and long term.

7. CONCLUSION

The 16th Avenue Trunk Sewer Phase 2 Construction project is now underway with a contract price established at \$60,769,487 (GST exclusive). The completion date for this sewer is established as August 2007.

A report will be submitted to the Transportation and Works Committee on November 3, 2004, detailing the environmental inspection peer review program for the Phase 2 works.

(The attachment referred to in this clause is attached to this report.)