



STAFF REPORT ACTION REQUIRED

Purchase Order Amendment Digesters 1 to 8 Refurbishing Ashbridges Bay Treatment Plant

Date:	January 18, 2008
To:	Public Works and Infrastructure Committee
From:	Executive Director, Technical Services Director, Purchasing and Materials Management Division
Wards:	Ward 32 – Beaches-East York
Reference Number:	Purchase Order No. 47010691, Contract 04FS-48WP P:\2008\Cluster B\Tec\PW0810(AFS#6652)

SUMMARY

The purpose of this report is to request authority to amend Purchase Order No. 47010691 related to the refurbishment of Digesters 1 to 8 at the Ashbridges Bay Treatment Plant. The additional amount being requested is \$4,475,003.89 excluding GST, representing an increase of approximately 11% of the original contract value of \$42,277,570.09 excluding GST to accommodate additional work identified. The new contract value would be \$46,752,573.98 excluding GST.

RECOMMENDATIONS

The Executive Director of Technical Services and the Director of Purchasing and Materials Managements Division recommend that:

1. Funds in the amount of \$1,800,000 net of GST be reallocated to the Digesters 1 to 8 Refurbishment Project for construction as follows: \$900,000 from CWW465-02 Groups 2 & 3 Sewage Pumping Station Upgrades, and \$900,000 from CWW465-04 Drain Lining to CWW005-95 Digesters 1-8 Refurbishment. Funding is included in the approved 2008 Capital Budget.
2. Subject to approval of recommendation (1), authority be granted to amend Purchase Order No. 47010691 for the refurbishment of Digesters 1 to 8 at the Ashbridges Bay Treatment Plant with Bondfield Construction Company Ltd. by an additional amount of \$4,475,003.89 excluding GST, revising the current contract value from \$42,277,570.09 to \$46,752,573.98 excluding GST. Funding for the amendment, subject to approval of

recommendation (1), is available from account CWW005-95 ABTP Digesters 1-8 Refurbishment.

- Council authorize and direct the appropriate staff to take the necessary action to give effect thereto.

FINANCIAL IMPACT

The amendment for an additional \$4,475,003.89 excluding GST (\$4,698,754.08 with GST) increases the current contract value with Bondfield Construction Company Ltd. from \$42,277,570.09 to \$46,752,573.98 excluding GST. The amendment requires additional cash flows that will be funded in 2008 from the recommended fund reallocations and from funding in the approved 2008 Toronto Water Capital Budget in account CWW005-95 (ABTP Digesters 1-8 Refurbishment). Funding details are provided below. Toronto Water Capital Budget submissions for 2009 and 2010 will be adjusted accordingly.

Originating Account	To Account	2008	2009	2010	Total
CWW465-02 Groups 2 & 3 Sewage Pumping Station Upgrades	CWW005-95 (ABTP Digesters 1-8 Refurbishment)	\$900,000.00	-	-	\$900,000.00
CWW465-04 Drain Lining	CWW005-95 (ABTP Digesters 1-8 Refurbishment)	\$900,000.00	-	-	\$900,000.00
N/A	CWW005-95 (ABTP Digesters 1-8 Refurbishment)	\$2,000,000.00	\$675,003.89	\$0.00	\$2,675,003.89
TOTAL		\$3,800,000.00	\$675,003.89	\$0.00	\$4,475,003.89

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact.

BACKGROUND

Contract 04FS-48WP, Tender Call No 295-2004 for the refurbishment of Digesters 1 to 8 at the Ashbridges Bay Treatment Plant (ABTP) was awarded to Bondfield Construction Company Ltd. by Council on June 14-16, 2005 by adoption of Works Committee Report No. 6, Clause 9. The refurbishment of the Digesters 1-8 is required to make the digestion tanks structurally sound, to bring them up to Building Code standards and to improve the efficiency and performance of the digesters. Purchase Order No. 47010691 in the amount of \$42,277,570.09 exclusive of GST, was issued to Bondfield Construction Company Ltd. for the construction of Contract 04FS-48WP.

COMMENTS

The construction of Contract 04FS-48WP commenced in September 2005. The project was divided into three phases of work. Phase 1A, which has been completed, was for the conversion of two existing decant tanks to equalization tanks in order to retain the regulated 15 days solids

retention time in the digestion process, thus allowing for the continued ability to dispose of biosolids using land application methods throughout the construction contract.. Phase 1B is the refurbishment of Digesters 1 to 4, and Phase 2 will be the refurbishment of Digesters 5 to 8. Phase 1B is now approximately 60% complete and this phase is anticipated to be completed in September 2008. Phase 2 and the remainder of the project is expected to be completed in 2010. During the refurbishment of the Digesters 1-8 project, additional work has been identified as being required that was not in the original scope of the contract and cannot be accommodated within the awarded contract value.

This amendment is required for this additional work which comprises the following: a) replacement of the existing gasproof lining in Digesters 2 and 4, b) provision of hot water heating for Digesters 1-4; c) modification of Motor Control Center (MCC) D2 and provision of new MCC D1 in the old dewatering building, d) mobile centrifuge dewatering of sludge from Digesters 5-8, e) costs associated with extra work related to asbestos, and f) replacement of the decant tank roof slab. The following summarizes these major additional work items:

a) Replacement of Existing Gasproof Lining in Digesters 2 and 4

The base scope of the contract includes the surface preparation and installation of a gasproof coating system for Digesters 5-8, and local gasproof coating for areas of existing gasproof disturbed or damaged during modifications to Digesters 1-4. The existing gasproof coatings were replaced in 1991 - 1992 in Digesters 2 and 4, and in 1997 for Digesters 1 and 3. These coatings were expected to be in satisfactory condition, requiring only patching in areas where installation of new piping etc. under the current refurbishment contract disturbed the continuity of the existing gasproof coating. The gasproof coating is required on the inside of the digesters to protect the exposed concrete surfaces from deterioration due to the presence of digester gas in a high humidity environment (methane gas with various impurities) and to prevent leakage of the digester gas from the digestion tanks to the exterior environment.

To avoid duplicating disruption of plant processes and minimize downtime of plant facilities, inspection of the inside of the digestion tanks could not be done until the digesters were taken out of operation for commencement of the rehabilitation. The digesters could not be removed from service until Phase 1A of the project was completed, as the equalization tanks were required to ensure the digestion process maintained a solids retention of 15 days as required by the site Certificate of Approval (Sewage). Digesters 1-4 were emptied and cleaned from May through September 2007. Initial inspection of Digesters 1 and 2 in August by the contractor and City staff indicated that the coating on Digester 1 appeared to be sound, but that the coating inside Digester 2 appeared to be in poor condition. Subsequent visual inspection of Digesters 3 and 4 found that while Digester 3 was acceptable, the coating on Digester 4 also appeared to be in poor condition. A third party inspection company, which had performed the gasproof coating inspection on the installation for the equalization tanks, was hired to inspect Digesters 2 and 4 and prepare a report, at a cost of \$575.00 plus GST. The inspection found that the coatings inside Digesters 2 and 4 had numerous areas where adhesion of the coating had failed and it appeared that liquid had seeped in behind the coating. Removal and replacement of the gasproof coating was recommended.

A Notice of Change was issued to the contractor, requesting a quotation for the replacement of the gasproof coating of approximately 1,200 m² per digester in both Digesters 2 and 4. The cost for the additional work and time to remove the existing coating, properly prepare the concrete surface, and apply the gasproof coating is \$1,801,370.60 exclusive of GST for the above additional work (\$1,891,439.13 inclusive of GST). The cost for this work has been reviewed and is considered fair and reasonable.

b) Provision of Hot Water Heating for Digesters 1-4

The contract includes a provisional item for installation of hot water piping to provide hot water to Digesters 1-4 for process heating and for building heating in the digester galleries and structures. The provisional item was based upon a preliminary design concept provided from an earlier project, namely the Plant Wide Heating Phase 2 project. Review of the original design concepts for modifying and extending the existing secondary loop hot water piping in D tunnel found that these proposals would have required significant heating system downtime, and could not be practically implemented due to space restrictions in the tunnel as a result of the extent of existing piping, and the required pipe size for heating purposes. An alternate route for providing hot water was proposed by the engineering consultant for the Digesters 1-8 project, and agreed to by the City. The alternate route is both feasible and eliminates the need to shut down the heating for significant periods of time. Work required to install the new hot water piping system for Digesters 1-4 can now be done at any time during this contract, including during the heating season, without interruption to the existing hot water system.

A Notice of Change was issued to the contractor, requesting a quotation for construction of the selected alternate hot water supply system design. The cost for the supply and installation of the hot water piping, pumps, controls and wiring is \$817,990.34 exclusive of GST for the above additional work (\$858,889.86 inclusive of GST).

c) Modification of MCC D2 in the Old Dewatering Building

The contract included the transfer of remaining existing electrical loads from the Motor Control Centre (MCC) No. D1 in the old dewatering building to the existing MCC D2, and the demolition of the old MCC D1. At the time of design for the contract, there was sufficient load supply available in MCC D2. During the construction phase it was found that the older sections of MCC D2 were not being supported by the manufacturer and spare parts were no longer available. MCC D2 could not be used to provide the load requirements for the loads to be transferred from D1; accordingly, construction of a new MCC section adjacent to MCC D2 with rerouting of the power supply from the old MCC D1 to the new MCC D2 would be required. Modifications to MCC D2 to enable proper load integration, and installation and connection of disconnect switches, is included in the required work.

A Notice of Change was issued to the contractor, requesting a quotation for the modification of MCC D2 including new MCC sections. The cost for the work is in the amount of \$253,951.74 exclusive of GST for the above additional work (\$266,649.33 inclusive of GST).

d) Mobile Centrifuge Dewatering of Sludge from Digesters 5-8

The contents of the digesters (consisting of heated digested sludge) must be removed in order for the modifications under the contract to be carried out. The contract allowed for the remaining sludge in the digesters to be pumped back to the head of the plant. The cleaning of Digester 1 was started in this manner, in accordance with the contract. Due to a number of operational issues at the plant, the primary tanks (receiving the digester cleanout sludge) were experiencing very high sludge blanket levels. The consequences of these high levels were odour complaints from the public and potential non-compliance with the plant's Certificate of Approval effluent criteria. Toronto Water decided that the contributing factors of sludge input from the Humber digesters via the Mid-Toronto Interceptor and the ABTP digesters were easily controllable factors best able to be treated separately to enable the plant to improve the primary tank level situation and continue meeting the C of A requirements. An Emergency Sole Source request in the amount of \$753,789.38 excluding GST was approved for provision of mobile sludge dewatering services to enable the cleaning of digesters 1-4, thereby permitting the project to continue while minimizing delay claims, and more importantly, mitigate noxious odours and avoid MOE non-compliance. Trucking of the dewatered sludge was handled as part of the existing biosolids trucking contract in place between Toronto Water and the trucking provider.

It is expected that the cleanout of Digesters 5-8 will also require use of a mobile centrifuge for dewatering of the sludge rather than pumping the sludge to the head of the plant. Other projects, such as centrifuge upgrades, are underway that would improve processes associated with the operational problems experienced when Digesters 1-4 cleanout started pumping sludge to the head of the plant, but these upgrades will not be in place when the Digester project needs to empty Digesters 5-8. It would be preferred to have the mobile centrifuge operation for Digesters 5-8 controlled by the Digesters project contractor, as part of the Digesters 1-8 project. It would eliminate costs for ABTP to fence off the separate area and to provide monitoring and supervision services for the mobile centrifuge operation. The work to be done on Digesters 5-8 is more complex than the work being done for Digesters 1-4, as, unlike Digesters 1-4, the roofs of Digesters 5-8 are being totally replaced and the scheduling of the digester cleanout will be much more integral to maintaining the work schedule for Digesters 5-8 thereby minimizing delays and resulting in cost efficiencies.

The cost of the mobile centrifuge operation for Digesters 1-4 was \$753,789.38 excluding GST. Taking into account the volume of sludge to be handled for Digesters 5-8, approximately 29,600 m³, and contractor supervision, the cost for provision of mobile dewatering services for Digesters 5-8 is estimated to be \$842,500.00 exclusive of GST (\$884,625.00 inclusive of GST).

e) Costs Associated with Extra Work Related to Asbestos

An asbestos survey was done for the Digesters 1-8 project prior to tendering which identified where asbestos was located. The Digesters 1-8 contract includes asbestos abatement by the contractor, as required, where it has been identified. The asbestos survey did not identify

asbestos in the roofs of Digesters 1-8. The roofs could not be thoroughly sampled while the digesters were in operation. Once Digesters 1-4 were cleaned out, the roofs were surveyed, and no asbestos was found. A visual survey of Digesters 5-8 was also done to meet the requirements of the new Asbestos Regulation 278/05. As part of this survey, it was determined that the roofs of Digesters 5-8 are suspected of containing asbestos. As the construction project calls for demolition of these roofs and replacement as part of the work to be done, the asbestos regulation requires that all asbestos must be removed prior to demolition. Digester 5 is currently not in operation and a sampling program is planned to confirm the extent of the asbestos, but it is now suspected that the entire roof areas of Digesters 5-8 contain asbestos. As this asbestos was not identified in the original report, this would be an extra to the contract. Current practice within Toronto Water is for the abatement of asbestos to be performed by the approved contractors under the blanket contracts set up for that purpose. Due to the location of the asbestos as part of the buildings under the control of the general contractor for Digesters 1-8 contract, the abatement contractor could not operate as it's own Constructor as is normal practice for other current asbestos removal work at ABTP. Moreover, due to the nature of the asbestos location on the roofs, with embedded gravel, and the restriction that the roofs cannot be removed until the digesters are taken out of operation and emptied, it would be practical to have the asbestos abatement/removal specialists work under the direction of the general contractor for Digesters 1-8 contract to allow for optimum integration and scheduling of the work, and reduce the potential for delay claims.

The Digesters 1-8 contract also includes the demolition of the old gas control building. A re-survey of that building to meet the new Asbestos Regulation 278/05 found that there is asbestos in the form of transite piping. This was not included in the previous survey done for the project, as at that time transite materials were not required to be listed or abated. In order to remove the asbestos prior to building demolition, excavation and other work is required which is not normally part of the scope of an asbestos abatement contractor. This issue, combined with minimizing any impact on the project Constructor status, renders it appropriate to have this asbestos abatement work also done under the Digesters 1-8 contract.

The estimated cost for the asbestos abatement work is in the amount of \$665,000.00 exclusive of GST (\$698,250.00 inclusive of GST).

f) Replacement of the Decant Tank Roof Slab

The contract called for leaving the existing decant tank roof in place. To suit the conversion of the decant tanks to digested sludge equalization tanks, the contract included provision of new openings in the existing reinforced concrete roof slab for pipe penetrations and access hatches. Detailed inspection of the roof including testing could not be done while the decant tanks were in operation. Upon review of the east section of the roof slab during the construction, it was determined that this section of the roof was structurally unsound and not suitable for salvage and repair as originally intended. This section of the roof slab, an area of 47 m², representing 12% of the overall roof area that needed to be removed and replaced.

The cost for the additional work to replace the east section of the decant tank roof slab is

\$94,191.21 exclusive of GST for the above additional work (\$98,900.77 inclusive of GST).

Based on the above additional construction activities which are necessary for the effective completion of the ABTP Digesters 1-8 Refurbishment project, it is recommended that P.O. No 47010691 to Bondfield Construction Company Ltd. be amended by additional amount of \$4,475,003.89 excluding GST (\$4,698,754.08 with GST). This amendment revises the current contract value with Bondfield Construction Company Ltd. from \$42,277,570.09 to \$46,752,573.98 excluding GST.

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