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EWW 12-57

REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, AUGUST 22, 2012

SUBJECT **CRAIGFLOWER PUMP STATION – ENGINEERING SERVICES**

ISSUE

The existing Craigflower pumps station has reached the end of its useful life and needs replacing.

BACKGROUND

The existing Craigflower pump station was originally built to serve the Town of View Royal. The sewage flows from the cities of Colwood and Langford were added to the pump station after the Western Communities Trunk Sewer was built in the 1990s. The Craigflower pump station has reached the end of its useful life and it is not considered feasible to upgrade the pump station for reliable, long-term use.

The detailed design for a new Craigflower pump station was completed in 2008 by Associated Engineering (AE). The construction phase was placed on hold until the wastewater treatment planning was completed and funding received for the Core Area Wastewater Treatment Program. The approved Liquid Waste Management Plan for the core area designates McLoughlin Point as the central wastewater treatment plant site; therefore, the function of the Craigflower pump station will remain the same.

The original 2005 proposal from AE for engineering included the provision for detailed design and services during construction.

The attached fee proposal in Appendix A from AE outlines the scope of services and fee proposal of $571,893 for services during construction. Since the detailed design was completed over 4 years ago, a design review is required to confirm code compliance as well as update electrical and controls with the most current technologies. The majority of the fee is to provide engineering and inspection services for the construction phase of the Craigflower pump station with an allowance for environmental monitoring.

ALTERNATIVES

1) That the Core Area Liquid Waste Management Committee recommend to the Capital Regional District Board that a contract in the amount of $571,893 be awarded to Associated Engineering for design review and engineering services during construction for the Craigflower pump station.

2) That the Core Area Liquid Waste Management Committee defer the award of the contract at this time.

IMPLICATIONS

The amount outlined in the fee proposal is within the engineering allowance for the construction of the Craigflower pump station that is included within the overall Core Area Wastewater Treatment Program budget.

AE would provide the best value for the Capital Regional District (CRD) if it continues with the project now that it is being reactivated by the CRD. Requesting proposal for these services poses some issues for the CRD if another consultant is selected to carry on with construction services of the Craigflower pump station. There are professional liability issues that could arise during the course of construction and design and construction sign-off can become onerous and contentious with two consultants providing different services on the project. There will be increased costs for the CRD to have a new consultant come in and familiarize themselves with the project.

CONCLUSION

Associated Engineering completed the detail design for the Craigflower pump station in 2008. The CRD requires AE to revisit the design prior to tendering to ensure code compliance and ensure the electrical and controls are the latest technology and compatible with other CRD equipment. The majority of the scope of services is for engineering and inspection during the construction.

RECOMMENDATION

That the Core Area Liquid Waste Management Committee recommend to the Capital Regional District Board:
That a contract in the amount of $571,893 be awarded to Associated Engineering for design review and engineering services during construction for the Craigflower pump station.

Tony Brcic, P.Eng
Project Manager
Core Area Wastewater Treatment Program

J.A. (Jack) Hull, P.Eng, MBA
Interim Project Director
Core Area Wastewater Treatment Program

Kelly Daniels
Chief Administrative Officer
Concurrence

TB:hr

Attachment: 1

Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

Associated Engineering (B.C.) Ltd.
Suite 206, 2728 Spencer Road
Victoria, B.C., Canada, V9B 4C6

TEL: 250.478.8383
FAX: 250.478.8101
www.ae.ca

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Tony Brcic, P.Eng.
Project Manager, Core Area Wastewater Treatment Program
Capital Regional District
625 Fisgard Street
PO Box 1000
Victoria, BC V8W 2S6

Re: CRAIGFLOWER PUMP STATION
ENGINEERING SERVICES DURING CONSTRUCTION

Dear Mr. Brcic:

As requested, we are pleased to provide you with a scope of services and fee proposal for the construction phase of the Craigflower Pump Station. We understand this project is the first project of the major wastewater capital improvement initiative and that the District has set up a Project Management Office (PMO) to manage the overall program. As the PMO will be responsible for some contract administration activities, we have appended a matrix (Table 1) that provides our understanding of the division of responsibilities between us and the PMO. Our fee proposal is based on this understanding. For the purpose of this proposal, we have organized our services into three groups: Project Initiation, Construction and Post Construction Services, and Recommended Value-added Services.

1 BACKGROUND

The existing Craigflower Pump Station was originally designed to serve View Royal. However, with the construction of the Western Communities Trunk sewer, the pump station currently serves the municipalities of Colwood, Langford and View Royal. Considering the pump station arrangement, age, capacity, and condition of the equipment and the building, it was not considered feasible to further upgrade the existing pump station for reliable, long-term usage.

The Capital Regional District (CRD) retained AE to undertake the detailed design of a new, green-field facility, which was completed in 2008. The project was suspended to allow completion of the wastewater treatment planning and confirm conveyance requirements. AE's work was finalized with the completion of a design report, cost estimate, drawings describing the facility and technical specifications. Other than a bid form and summary of work (section 01110), no overall contract was prepared which combined all the documents with the CRD's General Conditions. The wastewater program is now funded and CRD requires construction of this pump station to be undertaken as the first of many such improvement contracts.

2 SCOPE OF SERVICES

2.1 PROJECT INITIATION

2.1.1 Project Initiation, Update Cost Estimate and Tender Document Preparation

The design was completed in 2008 and subsequently shelved. Though many of our staff are familiar with the project, some of the original design team have either retired or no longer work for AE. This task allows assigned staff to become familiar with the design, assist the PMO in the preparation of the tender documents, and to update the existing cost estimate.

Deliverables: A revised cost estimate and updated tender ready drawings and specifications.

2.1.2 Code Review and Product/Equipment Update

Since June 2008 and completion of the design, some amendments of the British Columbia Building Code 2006 have been produced; in particular the introduction of Part 10. An objective of this Code amendment is to limit the probability that, as a result of design, construction or renovation of a building, the use of energy or water will be unacceptably inefficient or the production of greenhouse gases will be unacceptably excessive. As a result, the requirement for thermal performance of the building and the water usage of fixtures was changed.

The next edition of the British Columbia Building Code (2012) is expected to come into force in the Fall of 2012. A number changes and additions to the requirements are anticipated. Of these changes, those anticipated to potentially affect Craigflower are:

- Requirements for Combustible Penetrations and Plenum Cables (NBC 2010, Parts 3)
- Dangerous Goods / Flammable and Combustible Liquids / Hazardous Activities (NFC 2010)
- Fire Alarms and Exit Signs (NBC 2010, Parts 3 and 9, and NFC 2010)
- HVAC and Plumbing (NBC 2010, Part 6 and NPC)
- Protection for Radon (NBC 2010, Parts 5, 6 and 9)
- Stairs, Ramps, Handrails and Guards (NBC 2010, Parts 3 and 9)
- Structural Loads (NBC 2010, Parts 4 and 5)
- Windows, Doors, Skylights and Sealants (NBC 2010, Parts 5)

None of the changes or additions in the next edition of the BCBC are thought to require any fundamental changes to the design of the facility, but there may be a requirement for detail amendments or specification revisions. These code changes may be avoided if a Building Permit is applied for, prior to the issue of the new BCBC. A new edition of the electrical code is also to be issued in October. Under this task we will review the completed design by each of the design disciplines against the code changes and identify what changes may be necessary or desired to accord with the new code.

In addition, specified equipment and proprietary products may have changed or may no longer be available. We will review and modify the documents to ensure all references are to the latest models and product data.

Deliverables: A list of design changes required to satisfy the latest edition of BCBC along with our estimate of effort and timing required to undertake the changes to the contract documents. Updated product and equipment references.

2.1.3 Confirmation of Pumping Requirements

The pump station was designed to meet the 2008 flow requirements, with space allocated for subsequent upgrades to allow the pump station to meet longer term, ultimately 2045, design flow requirements. It is recommended the design assumptions are reviewed to ensure the facility meets the current design objectives.

Deliverables: A revised design completion report and an estimate of effort and time required to make any design changes.

2.1.4 Geotechnical Review

The subsurface conditions include a significant subsoil profile and that the lower portion of the profile includes soft blue grey Victoria clays. The soils are characterized by low strength and are prone to consolidation settlement if loaded. As such, the particulars of the project in terms of excavation, final grading and loading will be important in assessing soil response. We note that the most recent seismic soils characterization was undertaken in the infancy of the current 2006 BC Building Code and that the state of practice has somewhat refined over the past number of years. While we would tend to concur with the seismic classification of Site Class E given in the January 2007 report, there may be aspects of seismic ground response for this project that warrant some further interaction with the Structural Engineer. This will be influenced by the Owner's seismic performance

criteria (defining post-disaster operability of station), an aspect that has not been fully defined in the earlier work.

Based on our review of the prior information, we would suggest that the scope of work needed to carry the project through to completion would include:

- A review and assessment using current project details including location, grades and loads with respect to existing geotechnical factual data and, in particular, performance criteria established by the Owner. The intent of this would be to determine data gaps or areas of uncertainty where further work is required.
- We would suggest an allowance be made for a day of SCPT testing to collect subsurface information to assist in refining seismic response and developing geotechnical design parameters in support of retaining wall and foundation design. The value in this further testing should be reviewed with the Structural Engineer as part of the data gap analysis.
- There would appear to be challenges related to construction excavation and the need and type of temporary excavation support and potential impacts of dewatering on items such as consolidation. Responsibilities for temporary geotechnical works typically lie with the contractor and their engineering consultant and we would suggest that the division of responsibilities be clarified at the onset to avoid confusion.
- Detailed foundation/wall design is expected to necessitate interaction between the Structural and Geotechnical Engineers.
- For tender, (and dependent upon how the contract is prepared) it may be necessary for the Geotechnical Engineer to prepare a special provision related to temporary shoring/deep excavation and performance requirements to provide a framework for the contractor's engineer.
- Pre-construction surveys of adjacent structures may be required including considerations of settlement induced by construction dewatering

Deliverables: Additional geotechnical information, input into contract documents and design criteria.

2.2 CONSTRUCTION AND POST CONSTRUCTION

2.2.1 Contract Administration

AE's Project Manager, with the assistance of a more junior engineer, will act as the primary contact between the PMO, operations staff, Site Inspector and discipline design engineers.

He will administer some aspects of the construction contract, by providing the following services:

- Co-ordinate the Schedule B forms for Building Permit approvals.
- Handle any technical enquiries during the tender period.
- Preparing of the Issued-for-Construction drawings by incorporating any changes resulting from addenda during the tender period.
- Administrating and reviewing shop drawings, including providing the Contractor with a submittal schedule for the project at the pre-construction meeting.
- Attending bi-weekly construction progress meetings with the General Contractor.
- Providing timely written responses for Requests for Information (RFIs).
- Calling for the support of the design discipline leads where necessary
- Adjudicate contemplated change orders and make recommendations.

Deliverables: Issued-for-Construction drawings, WorkSafe BC documents, shop drawing reviews and approvals, distribution of construction meetings, responses for contractor RFIs, testing certificates, photographic record, monthly status reports, and marked-up drawings.

2.2.2 Construction Inspection

AE's part-time Construction Inspector will provide inspections to verify that the work is in general conformance with the contract drawings and specifications, and administer the construction contract, by providing the following services:

- Implementing the formal documentation procedures with the General Contractor, including Health & Safety Plans, WorkSafe BC documents, review of submissions, schedule, environmental management, traffic management, staging and tie-in plans, etc.
- Attending bi-weekly construction progress meetings with the General Contractor.
- Providing day-to-day interpretation of the drawings and specifications, as required.
- Calling for the support of the design discipline leads where necessary, to adjudicate contemplated change orders and make recommendations.
- Resolving issues, disputes, and potential claims at the site level, where they can be dealt with quickly and efficiently.
- Providing general inspection of materials and equipment prior to installation.
- Performing pre-final inspections and maintain an updated deficiency list.

- Maintaining a diary of construction activities, including photographs, monthly construction status reports, and provide these to the Project Manager and the PMO.
- Maintaining a set of marked-up drawings to be used with the General Contractor's markups for producing record drawings.

Deliverables: Testing certificates, photographic record, monthly status reports, and marked-up drawings.

2.2.3 Design Discipline Inspections and Support

A pump station is defined by ACECBC as a complex project and a submittal often requires reviews by multiple disciplines. To ensure a single point of responsibility, we have allowed for an AE person to handle RFIs, shop drawings, change orders, non-compliance reports, inspections by design specialists, off site inspections (welding, fabrication), requests for alternatives/substitutions, etc. We have indicated this responsibility will be with our named Project Manager, assisted by a more junior engineer to reduce costs. We understand the PMO will administer such tasks as chairing meetings, preparing and distributing minutes and memos, approving change orders and progress payments, etc.

During the course of the work, AE's Discipline Leads (and sub-consultants) will visit the site periodically to monitor the work, as required to meet BCBC for civil, architectural, structural, mechanical, building mechanical and electrical installations.

2.2.4 Testing and Commissioning

At this stage, our team will develop, monitor, coordinate and review Pre-Operational Checkout Plan, Equipment and System Performance Testing Plan performed by the Contractor and Vendors.

AE will work with the PMO and the Contractor to develop a sequential Commissioning Plan (included in the Commissioning Package) based on an agreed strategy. We will conduct pre-commissioning, and assist the District during Commissioning and start-up carried out on site by the General Contractor and equipment suppliers and review with the PMO to confirm acceptance. We will finalize a Commissioning Deficiency list and manage Contractor to correct deficiencies. We will prepare a two (2) day training presentation for O&M personnel. Following completion of construction, and in accordance with the accepted commissioning strategy, AE will be on site to observe the Contractor's activities

during the testing and commissioning of the equipment and ancillary services at the pump station.

2.2.5 Post-Construction Services

AE will prepare and submit record drawings to the PMO, based on the information provided by the Contractor. The record drawings will be submitted in both electronic and hard copy format.

The O&M manual will include operating instructions for the new facility, key design basis, functional descriptions, operational procedures, startup and shutdown procedures, photos for equipment and process description, all submitted as per the District's requirements.

During the warranty period, we will assist the PMO in the technical aspects of warranty claims under the contract. In addition we will attend a warranty inspection with the PMO and the Contractor.

2.3 RECOMMENDED VALUE ADDED SERVICES

2.3.1 Environmental Monitoring Plan

We understand discussions are currently ongoing with respect to the environmental approvals required for the overall Program; however, to support the relevant approvals for this project, we will work with the PMO and prepare a plan that defines the construction activities and safety measures to protect the surrounding environment on this site. In addition to the baseline "Plan", we have also included an estimate for monitoring the Plan.

Deliverables: Environmental Monitoring Plan.

3 PROJECT TEAM

AE proposes to staff the project with personnel who are recognized for their many years of experience in municipal engineering design and contract administration. Members of this team have carried out a number of similar assignments successfully. The duties and qualifications of AE's key team members are listed below. A full list of our design support staff and resumes for the key team members can be provided upon request.

Mark Dhillon, P.Eng.
Project Manager and Contract Administration
Duties:

- Ensure the project is completed on time and on budget.
- Liaise with the PMO.
- Attend project meetings.
- Coordinate and direct technical efforts of project team.
- Coordinate the construction inspection.
- Manage the sub-consultants.

Qualifications:
Mark is a civil engineer with over 23 years of experience, and Branch Manager for our Victoria operation. He is responsible for the branch's day to day operations and ultimate success as well as undertaking project management and design roles on a broad scope of civil engineering projects.

Brian Callow, P.Eng.
Construction Inspection
Duties:

- Undertake the construction inspection to ensure conformance with the contract documents.

Qualifications:
Brian is a Senior Construction Inspector and engineer with over 40 years of broad inspection and design experience in the civil, mechanical and marine disciplines.

Since 2004, Brian has worked with AE on several high profile water and wastewater projects (greenfield and upgrades) as both Resident Inspector and Resident Engineer. Brian has provided inspection and field engineering services for these multi-discipline projects including water main and sewer installation, water reservoir construction, monitoring of foundation preparation, re-bar inspection, building erection, mechanical and electrical installations. Brian has provided inspection services on water treatment projects for AE for the Capital Regional District's Sooke River Road Disinfection Facility, Campbell River's Elk Falls Water Quality Centre and Epcor's E.L. Smith WTP in Edmonton.

4 PROJECT SCHEDULE

We have assumed that this project will proceed before the end of 2012, with construction occurring over a 50 week period and with part-time on-site inspection during this construction period.

5 PROJECT FEES

AE will undertake the project on the basis of time and materials. We have detailed the estimated level of effort required in Table 2 (attached); however, following is a summary:

Task No.	Task Description	Total Fees and Disbursements
Project Initiation		
310	Project Initiation, Update Cost Estimate	$12,092
320	Code Review	$23,831
330	Confirmation of Pumping Requirements	$21,236
340	Geotechnical Review	$21,046
	Total	**$78,205**
Construction and Post Construction Engineering Services		
410	Construction Administration Support	$65,405
420	Geotechnical Services During Construction	$14,774
430	Engineering Inspections	$43,648
440	Resident Engineering Services (Part-time)	$162,216
450	Environmental Monitoring	$24,257
460	Submittals Review	$70,977
470	Testing and Commissioning	$36,007
710	Post Construction Warranty	$8,554
720	Operations Manuals	$23,285
730	Record Drawings	$27,368
	Total	**$476,490**
Recommended Optional Services		
350	Environmental Plan	$17,199
	Total	**$17,199**

August 15, 2012
Tony Brcic, P.Eng.
Capital Regional District
- 10 -

The current charge-out rates for the personnel involved on the project are outlined in the following table:

Hourly Charge-Out Rates

Personnel	Hourly Rate (excluding HST)
Mark Dhillon	$195
Brian Callow	$120
Senior Engineer	$165
Junior Engineer	$95
Survey Crew	$155
CADD	$95

All rates are valid for work completed by December 31, 2013. Charge-out rates for work undertaken after that date will be adjusted to account for staff salary changes implemented for January 2014.

Travel costs, including meals and accommodation will be billed at cost. Disbursements such as print and communication will be billed at 8% of labour cost. Sub-consultants are billed with a 5% mark-up to account for management and administration. In the event of additional work being required, we will bill at the hourly rates listed above.

Our invoices will be presented monthly for the fees and disbursements for the preceding month. All fees and charge-out rates stated in this proposal do not include HST.

Thank you for the opportunity of proposing on this project. We can be contacted on (604) 293-1411 if you have any questions, or would like to discuss the proposal further.

Yours truly,

Steve Croxford
Manager - Water and Wastewater Group

SC/lp

Table 1
Definition of Roles

Task	AE	PMO
TENDER PERIOD		
Statement of Probable Cost	X	X
Prequalification of Contractors		X
Preparation of Tender		X
Equipment Pre-Purchase Contract(s) (if any)		X
Application for Building Permit and Other Approvals (DFO, Water Act)		X
Letters of Assurance (Schedule B per BCBC)	X	
Tender Advertising		X
Review Tender Submitted and Advising	X	X
Review Alternative Proposals	X	
CONSTRUCTION PERIOD		
Progress payment Certificates	X	X
Chair Progress Meetings, Produce Minutes, Schedules		X
Respond to RFI	X	
Co-ordinate and Review Contractor Submittals (Shop Drawings)	X	
Field Inspection (part-time) to determine if General Contractor is carrying out the work in general conformance to the contract	X	
Advising Client/Contractor of continuing or newly observed defects and deficiencies	X	
Attend Bi-weekly Progress Meetings	X	X
System Start-up and Commissioning	X	
Operations and Maintenance Manuals	X	
Commissioning Training	X	
Contract Document Interpretation		X
Determine Substantial Completion	X	X
Claims Processing	X	X
Quality Assurance	X	X
Materials Testing (QA)	X	
Environmental Monitoring	X	
POST-CONSTRUCTION		
Letters of Assurance (Schedule C per BCBC)	X	
Record Drawings	X	
Advising Client/Contractor of continuing or newly observed defects and deficiencies		X
Warranty Inspections	X	