

REGION OF OTTAWA-CARLETON
RÉGION D'OTTAWA-CARLETON

REPORT
RAPPORT

Our File/N/Réf. Your File/V/Réf.	50-18-99-0003V
DATE	13 January 1999
TO/DEST.	Co-ordinator Corporate Services and Economic Development Committee
FROM/EXP.	Acting Deputy Commissioner Environment and Transportation Department
SUBJECT/OBJET	SCADA UPGRADE PROGRAMME CONSULTANT APPOINTMENT - PHASE 2 CONTRACT CA9616 DESIGN-BUILD CONTRACT AWARDS CA9601 AND CA9603

DEPARTMENTAL RECOMMENDATIONS

That the Corporate Services and Economic Development Committee and Council approve:

1. the award of Contract CA9616 for Phase 2 of the technical project management services for the SCADA Upgrade Programme to Acres & Associated Environmental Limited, Etobicoke, for a total contract provision of \$1,584,884 from Capital Project 922-41762;
2. the award of Contract CA9601 for the design and construction services for the SCADA Upgrade Programme Britannia and Lemieux Island Water Purification Plants component to Thorburn Penny Ltd., Burlington, for a total contract provision of \$4,116,690 from Capital Project 922-41755;
3. the award of Contract CA9603 for the design and construction services for the SCADA Upgrade Programme remote facilities component to CRA Contracting Services, Waterloo, for a total contract provision of \$2,595,271 from Capital Project 922-41755;
4. a pre-commitment of the 1999 Capital Budget for Accounts 922-41762, Turbidity Control Programme and 922-41755, SCADA Upgrade Programme to provide the necessary 1999 authority to award the professional services and design build contracts.

INTRODUCTION

This report requests approval of three contracts which will effectively complete work proposed in three capital programmes which have previously been approved by Council. Work on each of the programmes has been underway over the past three years. The opportunity has presented itself to complete each of these programmes under the current project on an accelerated schedule to produce operational effectiveness. The existing capital programmes are the SCADA (Supervisory Control and Data Acquisition) Upgrade, Turbidity Control and Master Drawing Programmes. Additional information on the status of the SCADA Upgrade Programme is also provided in this report to supplement the recent SCADA upgrade status report and the Year 2000 quarterly report both provided to Corporate Services and Economic Development Committee.

BACKGROUND

The SCADA (Supervisory Control and Data Acquisition) Upgrade Programme will replace an existing aged SCADA system that is becoming increasingly difficult to maintain due to the obsolescence of some of the critical components. The project will also provide more extensive automated control which will, in turn, result in improved water quality and operating efficiencies for the Water Division. In addition, the Supply Management, and Engineering and Water Divisions have jointly reviewed the potential for capital cost savings by modestly enlarging the scope of the essential SCADA Upgrade project to include the work of the Britannia Turbidity Control and Master Drawing capital programmes. Economies will be achieved by avoiding the duplication of effort that would occur if these projects were completed on their own, reducing the number of contracts that would have to be administered and also by taking advantage of the faster schedule of the design build SCADA Upgrade Programme. Savings are also expected by completing the work using the design build approach. The goals of each of these capital programmes are outlined as follows:

Project Goals

SCADA Upgrade Programme

- replace the existing SCADA system including some obsolete and some unsupported hardware (There are few spares remaining for critical communications hardware and we are unable to restock due to obsolesce);
- improve water quality through improved on-line, real-time process monitoring;
- increase system reliability;
- achieve operating cost savings through additional process automation;
- achieve operating cost savings in the areas of chemical consumption and hydro usage;
- ensure Y2K compliability.

Turbidity Control Programme

- enhanced water quality with decreased risk of pathogen passage through automation of the operation of the 18 dual media filters at the Britannia Water Purification Plant (this will result in similar filter operation at the two Water Purification Plants).

Master Drawing Programme

- standardization of drawings and creation of electrical and control and instrumentation master drawings for the Water Division facilities.

The overall project remains on schedule, however, the award of these contracts is a critical item to maintain the schedule. The project status has been described in detail in the 05 January 1999 status report to Committee.

Phase 1 has been completed. Final standards, documents, drawing standards, request for proposals, owner's statement of requirements (technical requirements and scope of work for three work packages) and contract general conditions made up the documentation required for the proposal call. To produce these documents significant effort was required by Acres & Associated and staff of the Engineering and Water Divisions. The high quality of the documents have ensured that the scope of work for the design build teams has been well defined.

The award of the design build contracts is the subject of this report. During the past 12 weeks, the selection process, lead by Supply Management Division, ensured that the operational goals and requirements of the Region were met in a competitive manner while adhering to a very aggressive schedule developed to meet our target date for the recommendation of contract awards. The preparation of the Request for Qualifications (RFQ) and Request for Proposal (RFP) and the evaluation of the various submissions were completed to maintain the highest degree of integrity and ensured that competitive pricing would be provided to the Region. Due to the nature of the SCADA Upgrade project, the majority of the design build team's scope of work involves the provision of professional services along with construction contracting. For this reason, the RFP evaluation criteria included a weighting of 40% for the Financial Proposal which was submitted and reviewed separately for its completeness.

Proposals for the three work packages (Britannia WPP, Lemieux Island WPP, and the Remote Facilities) were requested from Ainsworth Technologies, Thorburn Penny and CRA Services. Midway into the preparation of the proposals Ainsworth informed the Region that they would be unable to submit a proposal as they had competing workloads that would not allow them to devote to this project the resources required to complete the project in the timelines required.

The preparation and final evaluation of the proposals submitted by Thorburn Penny and CRA Services included several noteworthy steps. During proposal preparation, the proponents were required to attend five days of site tours to ensure familiarity and allow for review of each facility. During the proposal review period, the proponents were requested to provide clarifications on specific aspects of their submissions. The inquiry responses were provided to the Region's evaluation team prior to their attendance at a mandatory interview and were subsequently reviewed in greater detail at each proponents respective interviews. Final evaluation of the

proposals considered the proposed teams' methodology and financial submission. This process has begun the process of building a team approach needed to complete this project on schedule.

Phase 2 services for the *Project Implementation* is to be initiated immediately after award and contract execution for the design build assignments.

The Design-Build process will involve the successful design-builder teams and project consultant working closely together to deliver the combined programmes. The division of responsibilities are clearly defined in the contracts to ensure the Region's needs are met without overlap of duties. The scope of each assignment is outlined further.

Phase 2 consulting services with Acres & Associated will include the following scope of work:

- continued technical project management,
- software and hardware quality assurance and control,
- field services to ensure contract compliance,
- development of a training program to meet the operating and maintenance requirements of the new hardware and software systems,
- design build contract administration.

Through these services the Region will be assured the highest quality control during the execution of this complex control and instrumentation project.

The design builders' scope of work will require them to design and construct the new SCADA system for the Lemieux Island Water Purification Plant, the Britannia Water Purification Plant and the approximately 30 remote sites operated, maintained and monitored by the Water Division. As noted previously, also included in this project's scope of work will be the enhancement of the operation of the 18 Britannia Water Purification Plant filters through automation. The deliverables will also include drawing submissions to meet the Region's standards and complete operator and maintenance training for all new installed systems.

Major equipment purchases are required for this project. Specifically, Programmable Logic Controllers (PLCs), Remote Telemetry Units (RTUs), computers and networking equipment. Phase 1 included a review of the Region's requirements for PLC/RTU equipment. A business case analysis concluded Allen-Bradley PLCs are appropriate for the water plants and identified options for the equipment to be used in the remote facilities. Specifications were prepared based on the business case developed and pricing for the remote facility work package submitted by CRA Services which resulted in significant cost savings for the RTU option provided by Control Microsystem's SCADAPack equipment.

It was anticipated that most major equipment would be pre-purchased by the Region. As part of their scope of work, the design build teams are responsible for specifying all networking equipment, computer hardware and software and PLC/RTU hardware. The Region cannot purchase this equipment until the designs are sufficiently advanced, however the Region has the option to purchase all or a portion of these items under new or existing purchase contracts with the various vendors. To obtain the best value to the Region, the opportunity will be provided to the design build teams to price the supply of this equipment as it relates to their specific work

package. Recommendation for the award of purchasing contracts will be the subject of a later report to Committee and Council. Program funds are available in the existing Capital budgets and an allocation has been identified in the Y2K Capital project.

The project schedule has been maintained for the first phase of the programme but the importance of maintaining the schedule is highlighted by the Year 2000 component included in the work. Equipment involved in the water production processes will be replaced under the Y2K component of the SCADA Upgrade Programme. To achieve this, an accelerated schedule is required.

RATIONALE

Request for Proposals were sent to the 3 qualified proponents on 24 November 1998. Although a request was sent to Ainsworth Technologies, the Region was informed during the proposal preparation that due to their existing work load Ainsworth was no longer in a position to submit a proposal. Two proposals were submitted to the Region on 21 December 1998 from CRA Services (one of Conestoga-Rovers & Associates Group of companies) and Thorburn Penny Ltd. Details leading up to the proposal stage were outlined in the previous information report to Committee members.

Proposal submissions were separated in two, one containing the technical submission and the second containing the financial submission. The submissions were evaluated by a seven member evaluation team. Evaluation included the review and rating of both the technical and financial submissions using predetermined criteria. The specific areas evaluated include mandatory submission requirements, team qualifications (10 points), technical approach and project execution plan (40 points), innovative opportunities (10 points), and financial proposal (40 points).

Based on the submissions received and evaluation results, the Department recommends the award of two contracts to ensure that the Region draws on the strengths and experience of the two proponents who scored highest for each respective contract and to ensure that the project schedule is met. The Department recommends the award of:

- CA9601 to Thorburn Penny Ltd. with a contract provision of \$3,497,613 plus a \$349,761 contingency for unforeseen variations and \$269,316 for the G.S.T. resulting in a total contract provision of \$4,116,690. This project will involve the provision of the backbone of the entire SCADA system as well as the specific components and programming services for the Britannia and Lemieux Island Water Purification Plants, and;
- CA9603 to CRA Contracting Services with a contract provision of \$2,204,988 plus a \$220,499 contingency for unforeseen variations and \$169,784 for the G.S.T., resulting in a total contract provision of \$2,595,271. This project will involve the provision of specific components and programming to meet the requirements of the Water Division's approximately 30 remote sites as well as the communication system connecting these sites to the central SCADA system at the Purification Plants.

Acres & Associated Environmental Limited was selected from five consultants considered to provide technical project management services for the duration of the SCADA Upgrade Project and was awarded phase 1 of this work under Contract CA9562 by Corporate Services and Economic Development Committee on 06 October 1998. At that time it was reported that Phase 2 services would be brought forward at this stage of the project.

With the completion of the Phase 1 work, the scope of work for the consultant assignment has been finalized. Details of this work are broken down as follows:

- Provide construction administration services which include quality assurance and control for drawings and programming efforts and factory testing, shop drawing review, site supervision and co-ordination activities as required;
- Provide assistance as the owner's representative during commissioning;
- Record drawing and final documentation preparation;
- Contract administration including payment certifying functions;
- Provide technical project management services to ensure Regional standards are met, conformance to budget and schedule, and that the design build team designs are technically feasible, comply with standards and meet operational objectives;
- Update the SCADA Design Standards if and as required;
- Provide assistance in the development for all aspects of performance testing and commissioning of the SCADA system.

The responsibilities outlined will require significant efforts from the personnel at Acres & Associated and the fees are summarized as follows to provide information on the relative amount of effort required:

Project Management	\$334,435
Technical Project Management	\$252,320
Construction Services	\$347,305
Software and Training	\$293,025
Drafting and Documentation	\$154,115

The Department recommends the award of Contract CA9616 to Acres & Associated Environmental Limited with a contract provision of \$1,381,200 plus a \$100,000 contingency for unforeseen variations and \$103,684 for the G.S.T., resulting in a total contract provision of \$1,584,884.

CONSULTATION

The public consultation process is not applicable.

EXPENDITURE JUSTIFICATION

Modifications to the existing SCADA system are required to replace aged communication and control equipment. The master drawing project component will provide electrical and control and instrumentation drawings for each facility to the Water Division Standards. The Turbidity Control component will provide automated control of the Britannia Water Purification Plant filters and ensure consistent operating practices at both plants. All the work included in these contracts (the subject of this report) will eliminate additional contracts under the separate capital programmes and will no longer be required.

FINANCIAL STATEMENT

	922-41755	922-41762
	\$	\$
	Authority	Authority
Approved Budget to Date	2,785,000	3,240,000
Total Paid and Committed	<u>(571,341)</u>	<u>(3,041,310)</u>
Balance Available	2,213,659	198,690
Proposed 1999 Budget	5,045,000	2,805,000
REQUESTED BUDGET AUTHORITY	<u>(6,711,961)</u>	<u>(1,584,884)</u>
Balance Remaining	<u>546,698</u>	<u>1,418,806</u>

Funds have been requested in the 1999 Capital Budget Account Nos. 922-41762, Water Purification Plants Turbidity Control (Reference page 335), and 922-41755, SCADA Update Programme (Reference Page 349).

*Approved by
Doug Brousseau*

MS/jw

FINANCE DEPARTMENT COMMENT

Approval of these contracts represent a pre-commitment of the 1999 Capital Budget. Subject to Council Approval.

*Approved by T. Fedec
on behalf of the Finance Commissioner*

REGION OF OTTAWA-CARLETONRÉGION D'OTTAWA-CARLETONMEMORANDUMNOTE DE SERVICE

Our File/N/Réf.

DATE 24 November 1998

TO/DEST. The Chair and Members of Council

FROM/EXP. Acting Deputy Commissioner
Environment and Transportation Department

SUBJECT/OBJET **SCADA UPGRADE PROJECT STATUS**

BACKGROUND

The purpose of this report is to provide Council with an update on the status of the Water Division's SCADA Upgrade Programme, Project No. 922-41755. The following sections document the progress to date, key project developments and decisions as well as the future project milestones.

The existing Supervisory Control and Data Acquisition (SCADA) system provides control and monitoring of the water treatment process and water delivery at the Britannia and Lemieux Island Water Purification Plants and remote facilities. The system must be upgraded to meet the challenges of the next decade by providing automation, increased control and operational consistency and efficiencies for the Water Division's Water Purification Plants and remote facilities.

This project received Council's approval in 1996 with a budget of \$7.7 million. Work since that time has involved the completion of a SCADA Needs Survey, the preparation of SCADA Standards and the development of Operating Philosophies for each and every facility and unit operation.

The project is divided into the following distinct stages:

- Technical Project Management Services;
- Phase 1 - Project Scoping and Documentation Preparation;
- Phase 2 a - Design Builder(s) Selection Process;
- Phase 2 b - Project Implementation (Design and Construction).

INFORMATION PREVIOUSLY DISTRIBUTED
TO BE LISTED ON CORPORATE
SERVICES AND ECONOMIC DEVELOPMENT
COMMITTEE AGENDA - 05 Jan 99

TECHNICAL PROJECT MANAGEMENT SERVICES

The Environment and Transportation Department determined that resources with the experience necessary were not available within the Department to complete a project of this nature. Technical project management services were required. Consistent with the Region's consultant selection process, proposals covering the work for the entire programme were requested of five firms capable of completing this type of work. Acres & Associated Environmental Limited were awarded the contract on 06 October 1998 for these services and authority for the Phase 1 scope of work.

In the early stages of this project, it was determined that key elements of the existing SCADA system were not Year 2000 compliant. Working with the Year 2000 Project office, the technical project manager and staff of the Water Division, it has been determined that by accelerating the SCADA Upgrade project, the Region would be able to meet the challenge of the Y2K problem without having to expend financial resources on "stop gap" solutions intended to tie the Region over the new millennium while the new SCADA system was installed and commissioned.

PHASE 1 - PROJECT SCOPING AND DOCUMENT PREPARATION

A series of workshops lead by Acres & Associated Environmental Limited were held to assist the Region with standards development and project fundamentals decision making. Workshop topics included: project goals and objectives, operational objectives, data information needs, critical processes, alarm handling strategies, control issues, standards review and revision, network system architecture and project implementation options.

All workshop conclusions and information have been documented in a final report to the Region which has fully scoped the project.

One of the key tasks of Phase 1 of the project was to assess and recommend an implementation plan. The recommendation is for a "design build" approach that will permit the project to be completed on an accelerated schedule while meeting the Region's need for competitiveness, completeness and adequacy.

Three individual work packages have been developed for procurement:

- Lemieux Island Water Purification Plant - (Work Package 1);
- Britannia Water Purification Plant - (Work Package 2);
- Remote Facilities - (Work Package 3).

PHASE 2 a - DESIGN BUILDER(S) SELECTION PROCESS

The Supply Management Division of the Finance Department has taken the lead role in the design builder(s) selection process. This process has 2 phases:

1. Request for Qualifications (RFQ) phase and,
2. Request for Proposals (RFP) phase.

The RFQ was advertised on 13 October 1998 in the major newspapers, and the Daily Commercial News and later in the MERX system. RFQ submissions were received from 12 proponents (consortiums or firms). These submissions were evaluated based on predetermined criteria and associated ratings by 7 members of the project team. Three firms have been short-listed and are named as follows:

Thorburn Penny Limited;
Ainsworth Technologies International Limited;
Conestoga-Rovers & Associates.

Request for Proposals were sent to the qualified proponents on 24 November 1998. The qualified proponents are required to bid on each of the three work packages and the Region reserves the right to award the work to one or all of the proponents for one or all work packages.

The process for the selection of Design Build Team(s) and award of contracts is scheduled as follows:

DESCRIPTION	DATE
Advertise RFQ	13 Oct 98 *
RFQ Submission Deadline	21 Oct 98 *
Short List Proponents	12 Nov 98 *
Issue RFP to Short-listed Proponents	24 Nov 98 *
RFP Submission	17 Dec 98
Negotiate Final Scope of Work with Selected Design Builder	6-8 Jan 99
Award of Contract	Feb 99

* Task has been completed.

PHASE 2 b - PROJECT IMPLEMENTATION

The Technical Project Manager's Phase 1 work has concluded with submission of the final report and the preparation and circulation of the work packages to the short-listed proponents. Staff are presently working with Acres & Associated Environmental Limited to assemble a Phase 2 scope of services and budget. A report will be brought to Committee and Council for approval in January which will entail overall project management services, software and hardware quality assurance and control as well as contract administration field services for the next phase of the program. Staff of the Water Division will be directly involved with the technical project manager throughout project construction, testing and commissioning to ensure that when the new SCADA system is delivered to the Water Division, staff will be in a position to support and make best use of the installation.

As this SCADA system will fundamentally change the manner in which the water treatment and distribution system is monitored, training on the new system will be a key element in the overall success of the project. Staff are working with the technical project manager to develop a training program that will complement the new technology and approach and meet the Water Division's need to operate and maintain this highly complex, versatile and flexible SCADA system.

SUMMARY

The SCADA Upgrade Project is currently on schedule. No delays or significant obstacles are foreseen which will affect the delivery of the new SCADA system before the year 2000. The selected implementation option provides a unique method to arrive at the most cost-effective solution for delivery of this programme within a challenging schedule.

*Approved by
Nancy B. Schepers, P.Eng.*

MS/jw