

City of Brisbane

Agenda Report

TO: Honorable Mayor and City Council

FROM: Senior Civil Engineer (Utilities) to
Director of Public Works/City Engineer via City Manager

DATE: Meeting of January 17, 2019

SUBJECT: SCADA System Upgrades Project – Engineering Design and Construction
Management Services

City Council Goals:

To design infrastructure and public facilities to be efficient, cost effective and to contribute to the cohesion and character of the community (#2)

To maintain and improve infrastructure (#3)

Purpose:

To modernize the City's existing SCADA (Supervisory Control and Data Acquisition) system for water and wastewater facilities; this action is consistent with recommendations from the Water and Sewer Master Plans.

Recommendation:

Approve Task Order No. 8 with EKI Environment & Water, Inc. in the amount of \$175,700 for Engineering Design and Construction Management Services for the SCADA System Upgrades Project as described in Attachment A.

Background:

The City's existing SCADA system is based on obsolete hardware and software technology that has reached the end of its useful life. The City's SCADA system is responsible for the automated operation, control and monitoring of the City's water and wastewater utility facilities.

Discussion:

The City has engaged EKI Environment & Water starting in 2014, and based on a satisfactory experience with work performed by EKI Environment & Water under the current agreement staff

developed a Scope of Work for this current Task Order, and then negotiated content and final price with EKI as presented in Attachment A.

Fiscal Impact:


The cost of the Engineering Design and Construction Management Services for the SCADA System Upgrades Project is included in the water and sewer utility projects bonds issued June 2015. Cash for the work resides in Fund 545, Utility Capital.

Measure of Success


Completion of bid-ready plans and specifications for the SCADA System Upgrades Project. The bid documents will be delivered as a design/build turnkey project performed by a qualified System Integrator.

Attachments:

- A. Task Order 8 – SCADA System Upgrades Project Engineering Design and Construction Management Services



Senior Civil Engineer (Utilities)



Director of Public Works/City Engineer



City Manager

8 January 2019

To: Gerald Flanagan, P.E.
Senior Civil Engineer - Utilities
City of Brisbane
50 Park Place
Brisbane, CA 94005-1310

From: Jonathan Sutter, P.E., EKI Environment & Water, Inc.
Stephen A. Tarantino, P.E., EKI Environment & Water, Inc.

Subject: **Task Order 8 – SCADA System Upgrades Project – Engineering Design and Construction Management Services**
City of Brisbane, California
(EKI B7-084)

EKI Environment & Water, Inc. (EKI) is pleased to submit Task Order No. 8 under our Agreement with City of Brisbane (City) for Professional Services dated 14 July 2016 for Engineering Design and Program Management Services. Task Order No. 8 includes engineering services for the upgrades to the existing Supervisory Control and Data Acquisition (SCADA) System for all the City's water and wastewater sites (Project). The intent is for the SCADA upgrade process to be coordinated with the design of the Glen Park Pump Station Upgrades Project.

The proposed scope of work, cost proposal, and preliminary schedule for Task Order No. 8 is provided below.

BACKGROUND

The City's existing SCADA system is based on Telekey remote telemetry unit (RTU) hardware, software, and central DOS based SCADA human machine interface (HMI) that has reached the end of its useful life. Telekey is no longer in business and neither spare parts nor technical support are available. In addition to the Telekey system, the City's five San Francisco Public Utilities Commission (SFPUC) water turnouts sites were upgraded around 2011 to Rockwell Automation MicroLogix programmable logic controllers (PLCs). These newer units communicate using 170MHz radio licensed radios to a separate HMI running Rockwell Automation RSView software.

It should be noted that the existing MicroLogix PLC line is approaching the end of their product lifecycle: one model (MicroLogix 1500 has been discontinued), two models (MicroLogix 1100 and 1200) are listed a "Active/Active Mature" that indicates pending discontinuation, and only one model (MicroLogix 1400) listed as Active. In addition, the City's HMI responsible for monitoring the turnout sites, is running Rockwell Automation RSView under Windows XP. Both the HMI software and machine operating system

are no longer supported. Lastly, the HMI computer and some system modems used to monitor certain sites are reportedly no longer functioning.

PROJECT UNDERSTANDING

The intent of the project is to provide a new licensed radio-based SCADA system for the City's water and wastewater utilities. The new system will be delivered as a design/build (D/B) turnkey project performed by a qualified System Integrator (SI). The SI will be selected under an evaluated bid process in response to a formal Request for Proposal (RFP) document prepared by the EKI Team. Evaluation of the D/B RFP responses will be made based on design approach, cost, quality, responsiveness, experience, and other factors.

The Project consists of replacing the existing obsolete and unsupported Telekey equipment with a new SCADA system based on currently available hardware and software. The SFPUC turnout RTUs will also be upgraded to ensure commonality of parts, facilitate maintenance, and simplify troubleshooting. The SCADA Central HMI will be replaced with a current software platform.

In summary, sites to be addressed by the proposed new system are:

- Lake St Booster Pump Station
- Glen Park Tank
- Margaret Tank
- North Hills Booster Pump Station
- Crocker Tank
- Golden Aster Booster Pump Station
- Guadalupe Tank
- Sewage Lift Station #1
- Sewage Lift Station #4
- Valley Drive Lift Station
- City Hall (SCADA Central – HMI revisions)
- Turnout Sites (5)

Note that SCADA work at the Glen Park Pump Station will not be included in the SI's D/B scope of work. SCADA improvements at Glen Park Pump Station are assumed to be coordinated with the selected SI integrator and incorporated into the design of the Glen Park Pump Station Upgrades Project.

PROPOSED SCOPE OF WORK

The EKI team proposes the following scope of work for preparing draft construction contract documents suitable for public bidding.

Task 1 – Predesign

Task 1.1 - Reconnaissance

The EKI team will perform the following site visit and system reconnaissance tasks:

- Review condition of existing RTU panels and evaluate potential reuse with new replacement RTU hardware.

- Take photos at each site to document condition and to communicate existing conditions efficiently.
- Document existing inputs/outputs (I/O) and determine control scheme.
- Review details of existing SCADA central HMIs; obtain copies or photos of all graphic screens and investigate details of hardware and software. Confirm site I/O matches screen content.

Task 1.2 - SCADA System Requirements

The EKI team will establish project design criteria and standard hardware, panel design, wiring, logic templates and function block requirements for inclusion into the D/B RFP. Work shall include the following:

- Develop standard equipment and panel tagging system;
- Develop site specific I/O lists for each new RTU;
- Develop site specific control descriptions for each new RTU location;
- Develop standard panel requirements regarding layout, wiring, and features to ensure commonality of installed hardware;
- Develop open source specification requirements for RTU hardware, software, local operator terminal, and radio modem at each panel;
- Develop standard RTU control logic criteria for RTU programming to ensure commonality of system operation and functions;
- Develop HMI and Local Operator Interface Terminal (OIT) graphical programming criteria;
- Identify potential field instrumentation improvements (pressure, flow, etc.); make provisions in the RTU to accommodate future I/O required;
- Investigate potential for local control backup to RTU control on communication disruption (e.g., local zone pressure as surrogate for tank level);
- Investigate provision for video using the SCADA communication channel using standard commercial software;
- Prepare Engineer's Opinion of Probable Cost.
- Prepare summary PowerPoint Presentation summarizing SCADA system technical approach and procurement selection process. Present the project approach at a design review workshop for the City. Incorporate any City comments made at the workshop into the final TM for inclusion in the D/B RFP document.

The EKI team will also document the approach defining project requirements in a summary technical memorandum (TM) for incorporation into the D/B RFP. The SCADA design guidelines will be included in appendix with technical specifications.

The following drawings will be prepared as part of the technical design packages development:

- GI-1 Legend and Abbreviations
- I-1 System Architecture Diagram
- I-2 Typical Panel Elevation
- I-3 Schematic Site Plans and Photos, Sheet 1 of 4
- I-4 Schematic Site Plans and Photos, Sheet 2 of 4

- I-5 Schematic Site Plans and Photos, Sheet 3 of 4
- I-6 Schematic Site Plans and Photos, Sheet 4 of 4
- ID-1 Sample Wiring Diagram DI
- ID-2 Sample Wiring Diagram DO
- ID-3 Sample Wiring Diagram AI
- ID-4 Sample Wiring Diagram AO
- ID-5 Sample PLC/RTU and I/O Control Panel Power Distribution

Deliverables:

- Draft and Final TM with design criteria, equipment specifications, and standards development requirements
- Technical workshop agenda, PowerPoint presentation, and minutes

Task 1.3 - Radio Path Surveys

The EKI team will develop a strategy for radio communication improvements and perform the following tasks:

- Perform preliminary computer simulated radio path survey for all sites to determine feasible frequency (licensed frequency vs. unlicensed frequency), routes, and review communication quality and reliability issues. Some sites have reported poor communication with intermittent signal loss that needs to be addressed with radio system repeaters or changes to existing antennae locations (e.g., Glen Park PS).
- Determine potential need for repeater station(s) and identify possible sites, as necessary.
- Perform a field radio path survey based on results of preliminary computerized radio path survey.
- Incorporate requirements into the design and include into the D/B RFP.

Deliverables:

- Radio path survey report

Task 2 – Development of SCADA Procurement Request For Proposals

The EKI team will perform the following tasks to develop the D/B RFP:

- Develop “front end” D/B bidding document based on examples provided by the City.
- Develop SI qualification and performance requirements for incorporation into the D/B RFP.
- Establish quantitative parameters for evaluation of responses to the D/B RFP and selection of the SCADA system SI.
- Identify an initial list of qualified SI firms and contact and confirm interest in the Project.
- Finalize D/B RFP including Bid Form documenting project technical requirements and evaluation/selection criteria.
- Assist the City with distribution D/B RFP

Deliverables will include the following:

- Procurement RFP technical document Draft and Final

Task 3 – Design/Build Bidding Services and Bid Evaluation

The EKI team will be available to answer questions and clarify issues brought up by potential bidders. EKI team engineers will be present at the pre-bid meeting and site walk-through.

The EKI team will also perform bid evaluations of the submitted proposals to confirm conformance with the D/B RFP and rank bidders against the RFP evaluation criteria. Multiple EKI team engineers will review the documents independently and rank bidders accordingly. An average evaluation score will be used for the final ranking of firms.

If desired, City staff may evaluate the bid packages as well to provide a comprehensive, multi-party evaluation. If so, City scores will be incorporated into the final ranking of firms. A brief summary memorandum will be prepared to describe the evaluation process and provide the results of the bid evaluation process.

The EKI team will also provide limited support to assist the City in establishing a contractual relationship with the selected SI.

Deliverables:

- Written responses to bidder questions
- Bid evaluation summary memo

Task 4 – Engineering Services During Construction (ESDC)

Meetings and Engineering Site Visits

EKI team personnel will attend the pre-construction meeting and has assumed attendance at up to four (4) meetings or as-needed observational field visits for the project. In addition, Task shall include a two (2) day factory witness test held at the SI fabrication facility and a five (5) day startup, testing, and commissioning on site.

Requests for Information

EKI team personnel will provide written answers to Requests for Information (RFIs) including sketches and/or drawing revisions as appropriate. For budgeting purposes, EKI has included five (5) RFIs under this Scope of Work.

Contract Document Clarifications (CDCs)

EKI team personnel will provide written answers to CDCs including sketches and/or drawing revisions as appropriate. For budgeting purposes, EKI has included two (2) CDCs under this Scope of Work.

Submittals

EKI team personnel will review SI design drawings, equipment specifications, shop drawings and catalog data, and other materials that the SI is required to submit in accordance with the Design/Build Contract Documents. For budgeting purposes, EKI has included twelve (12) discipline-specific Submittals, with a 35% resubmission rate, within this its Scope of Work.

Construction Change Orders

EKI team personnel will provide written answers to Construction Change Orders, including sketches and/or drawing revisions as appropriate. For budgeting purposes, EKI has included one (1) Change Order within this Scope of Work.

Deliverables:

- Written reviews, RFI responses and other ESDC documentation as required.

ADDITIONAL PROJECT ASSUMPTIONS

The scope of work detailed above is based on EKI's current understanding of project requirements and is based on the following additional assumptions:

- Project Management services are included within the individual tasks.
- Copies of any record drawings of the facilities will be provided to EKI for reference; It is understood that any existing record drawings are not accurate and have limited value.
- Formal City building department review for permits if required will be incorporated into the procurement RFP SI scope of work.
- "Front end" D/B bidding details, D/B Bid Form, bonding, insurance, general provisions, special provisions, etc. for the SI D/B Contract shall be City standard or based on prior examples provided by the City.
- Design work at the Glen Park Pump Station including SCADA improvements will be incorporated in the Glen Park Pump Station Improvements Project design documents and will not be included in the SI's D/B scope of work.
- Drawings prepared under this Scope of Work will be provided in the EKI team's standard format and title block developed using AutoCAD.
- Drawings and RFP documents will be provided to EKI in electronic format for publishing. Printing costs are not included in this proposal.
- Radio path survey based on radio signal analysis at the identified City facilities. Determination of a repeater site if required is assumed to be located on an existing site. Development of a new site for radio repeater is not required but can be provided as an additional service upon authorization from the City.
- Material Specifications will conform to CSI Traditional (16 Division) format, developed in MS-Word, and will be provided to Client via e-mail.
- Facilitating interviews with prospective SI firms and engineering services during construction are not included but can be provided as additional services upon written authorization from the City.
- OITs will be provided only at pump stations and lift stations. Sites with tanks will not be provided with OITs.
- Development of guidelines for PLC, OIT, and HMI SCADA programming, devices, and tagging system will be performed by the SI using the development criteria provided in the SCADA preliminary design report.

The following services are NOT included in this proposal:

- Preparation of detailed site plans
- Providing control system programming and HMI graphic applications
- Designing radio repeater station at a site not presently listed in the City's RTU sites

PROJECT SCHEDULE

EKI is available to initiate work upon receiving authorization from the Client. The scope of services will be completed based upon a mutually agreeable time schedule. EKI anticipates that the above scope of work will be completed in the 2019 calendar year.

COMPENSATION

Inasmuch as the exact level of effort to complete this scope of work cannot be identified at this time, compensation for EKI's services will be on a time and expense reimbursement basis in accordance with attached the Schedule of Charges dated 1 January 2019.

On the basis of the proposed scope of work described above, we propose a budget of \$175,700 for the completion of Tasks 1 through 4, as detailed in Table 1, which will not be exceeded without additional authorization from the Client.

| Task | Description | Fee |
|--------------|--|-------------------|
| 1.1 | Predesign - Reconnaissance | \$ 8,200 |
| 1.2 | Predesign – SCADA System Requirements | \$ 47,000 |
| 1.3 | Predesign – Radio Path Survey | \$ 21,400 |
| 2 | Development of SCADA Procurement Request for Proposals | \$ 26,200 |
| 3 | Design/Build Bidding Services and Bid Evaluation | \$ 22,300 |
| 4 | Engineering Services During Construction (ESDC) | \$ 50,600 |
| TOTAL | | \$ 175,700 |

If this Task Order meets with your approval, please sign where noted below and return an executed copy to our office to confirm your authorization to proceed.

EKI ENVIRONMENT AND WATER, INC.



Stephen A. Tarantino, P.E.
Vice President

CITY OF BRISBANE

(Authorized Representative)

(Date)

Attachments:

1. Schedule of Charges dated 1 January 2019

Client/Address: City of Brisbane
Jerry Flanagan
50 Park Place

Brisbane, CA 94005-1310

Proposal/Agreement Date: 7 January 2018



EKI Proposal # B7-084

SCHEDULE OF CHARGES FOR EKI ENVIRONMENT & WATER, INC.

1 January 2019

| <u>Personnel Classification</u> | <u>Hourly Rate</u> |
|--|---------------------------|
| Officer and Chief Engineer-Scientist | 286 |
| Principal Engineer-Scientist | 275 |
| Supervising I, Engineer-Scientist | 265 |
| Supervising II, Engineer-Scientist | 255 |
| Senior I, Engineer-Scientist | 243 |
| Senior II, Engineer-Scientist | 230 |
| Associate I, Engineer-Scientist | 219 |
| Associate II, Engineer-Scientist | 205 |
| Engineer-Scientist, Grade 1 | 191 |
| Engineer-Scientist, Grade 2 | 180 |
| Engineer-Scientist, Grade 3 | 165 |
| Engineer-Scientist, Grade 4 | 146 |
| Engineer-Scientist, Grade 5 | 129 |
| Engineer-Scientist, Grade 6 | 113 |
| Technician | 104 |
| Senior GIS Analyst | 133 |
| CADD Operator / GIS Analyst | 118 |
| Senior Administrative Assistant | 130 |
| Administrative Assistant | 103 |
| Secretary | 85 |

Direct Expenses

Reimbursement for direct expenses, as listed below, incurred in connection with the work will be at cost plus ten percent (10%) for items such as:

- a. Maps, photographs, reproductions, printing, equipment rental, and special supplies related to the work.
- b. Consultants, soils engineers, surveyors, drillers, laboratories, and contractors.
- c. Rented vehicles, local public transportation and taxis, travel and subsistence.
- d. Special fees, insurance, permits, and licenses applicable to the work.
- e. Outside computer processing, computation, and proprietary programs purchased for the work.

A Communication charge for e-mail access, web conferencing, cellphone calls, messaging and data access, file sharing, local and long distance telephone calls and conferences, facsimile transmittals, standard delivery U.S. postage, and incidental in-house copying will be charged at a rate of 4% of labor charges. Large volume copying of project documents, e.g., bound reports for distribution or project-specific reference files, will be charged as a project expense as described above.

Reimbursement for company-owned automobiles, except trucks and four-wheel drive vehicles, used in connection with the work will be at the rate of sixty cents (\$0.60) per mile. The rate for company-owned trucks and four-wheel drive vehicles will be seventy-five cents (\$0.75) per mile. There will be an additional charge of thirty dollars (\$30.00) per day for vehicles used for field work. Reimbursement for use of personal vehicles will be at the federally allowed rate plus ten percent (10%).

CADD Computer time will be charged at twenty dollars (\$20.00) per hour. In-house material and equipment charges will be in accordance with the current rate schedule or special quotation. Excise taxes, if any, will be added as a direct expense.

Rate for professional staff for legal proceedings or as expert witnesses will be at a rate of one and one-half times the Hourly Rates specified above.

The foregoing Schedule of Charges is incorporated into the Agreement for the Services of EKI Environment & Water, Inc. and may be updated annually.