

Gentlemen,

The City of Milwaukee is requesting quotes to build four Human Machine Interface (HMI) screens for four unique pump stations in the City. One screen will be built new or modified from existing screens for each of the sites listed below.

Due Date

Quotes must be submitted to me via email by 3:00pm on Tuesday, December 3, 2013.

Background

The City of Milwaukee is responsible for the design, maintenance, and operation of local storm and sanitary sewers throughout the City. The sewer system includes 83 bypass pump facilities that are used to prevent basement backups in extreme wet weather events, seven sanitary lift stations that pump sanitary sewage from low-lying areas to existing sewers, and two stormwater lift stations. There is an existing Supervisory Control and Data Acquisition (SCADA) system that provides the City the ability to monitor these remote facilities, gather and store data, and make changes to the system as needed. This is done through the SCADA system's Human Machine Interface (HMI).

The existing sewer SCADA system includes remote site Allen Bradley Micrologix programmable logic controllers (PLCs), communicating via telephone FSK modems, direct ethernet connections, or cellular Ethernet to the Central Control Facility. The Central Control Facility is currently located at a DPW building at North 84th Street and West Florist Avenue. At the Central Control Facility, Rockwell FactoryTalk HMI SE provides supervisory-level monitoring and control applications. The FactoryTalk system is running on a Microsoft Server 2003 operating system platform with Microsoft XP client machines located at two other DPW facilities. The server and clients communicate via City ethernet.

Scope of Work

The City is seeking a firm (Consultant) that has significant experience in the design and maintenance of SCADA systems, and can provide said services to construct or modify HMI screens for pump stations at the four City pump locations listed below.

The quote will include all labor and materials necessary to perform the work described herein. The work generally consists of retrieving the existing programs from each PLC, retrieving the existing HMI program from the City, modifying existing PLC programs and HMI screens to conform with the general format of the City's existing screens and SCADA data, removing old and installing new PLCs, modifying I/O at existing PLCs, modifying tag databases as needed, testing the screens with various actual alarms scenarios, providing back-ups of all programs utilized, and 1 year of troubleshooting support for all sites. Additional cabling, connectors, relays, or other minor devices required to complete this work shall be considered incidental to the quote.

Locations

- 1. City Lights Lift Station (City Lights) – 2420 W. Mt Vernon Ave.**
- 2. Tara Vista Lift Station (Tara Vista) – 11729 W. Heather Dr.**

The City desires to integrate these lift stations in to its SCADA system. The pump stations are programmed to operate two pumps, set up in a lead/lag alternating configuration. The operation of the lift station is similar to and typical of existing sanitary lift stations in the City, and the City currently utilizes HMI screens for previously constructed lift stations already on our SCADA system. City Lights and Tara Vista were both built by a third-party utilizing a manufacturer specific controls system.

Therefore, we anticipate significant changes to the PLC program, the I/O, or the tag structure in the HMI program will be required to transform this station to a familiar lift station screen on our SCADA system. However, other solutions are welcome. The PLC at City Lights is a Micrologix 1400, and the PLC at Tara Vista is a Micrologix 1300. The .rss files for both sites are available for download, as well as a typical existing City site. Communications are not yet established between the remote PLC and the server. It is anticipated that a cellular ethernet modem will be installed by the City prior to implementation of HMI work.

3. Stormwater Pump Station at Proven Direct (13th and Canal) – 1301 W. Canal St., south of the Proven Direct building.

The City desires to integrate this stormwater pump station in to its SCADA system. It is a single pump with 4-20 mA level control that instructs the pump to turn on and off. The operation of this pump station is similar to and typical of sanitary bypass pump stations in the City. The City has HMI screens built and in use for existing bypass pump stations. This site was built by a third-party, and does not utilize the City's standard pump control program. The PLC is a Micrologix 1100. The existing .rss file is not available. A typical bypass pump .rss file is available for download. It is anticipated that the Consultant will utilize the "typical" program to mimic an existing bypass pump station, and make significant modifications to the I/O to transform this station to a familiar bypass pump station screen on our SCADA system. Communications are not yet established between the remote PLC and the server. It is anticipated that a cellular ethernet modem will be installed by the City prior to implementation of HMI work.

4. Bioretention Facility (26th and Canal) – 199 N. 25th St.

The City desires to integrate this stormwater pump station in to its SCADA system. It is a multi-pump system that has a low level pump, and two higher level pumps set up in a lead/lag configuration. This site also has multiple level sensors, including a 4-20 mA ultrasonic level sensor, and two sets of float sensors. The operation of this storm water pump station is NOT the same as other pump stations in the City. This site was built by a third-party utilizing a customized controls system. An new HMI screen will need to be built or an existing lift station screen significantly modified to capture and display the unique data available for this site. We do not anticipate significant modifications to the PLC program or the I/O, but instead anticipate that the majority of work will be on building the screen. The PLC is a Micrologix 1400 and the .rss file is available for download. Ethernet communications are available to this site.

Considerations for all Sites

As part of this contract, the Consultant shall demonstrate operability of the screens and pump stations. At a minimum, the Consultant will demonstrate the proper operation of the controls on site by simulating various alarm conditions listed below.

Pump control position (Hand/Off/Auto)
Pump Fail
Cabinet Intrusion
Generator Running
High Water Level (ultrasonic/pressure transducer)
High Water Level (floats)

The Consultant shall also demonstrate the ability to remotely operate the pump stations via the HMI, and at a minimum, perform the following the tasks.

Pump control position (Hand/Off/Auto)
Modify pump control setpoints
Log in/out between user and administrator mode.

The alarm conditions listed, and the remote operability listed shall be designed in a manner similar to existing HMI screens.

The Consultant is responsible for having the necessary software required for programming and operation of the PLC. The Consultant shall document changes made to the PLC, source of code (existing, copied from site xxx, etc.), and any other information required for future operation and maintenance of the sites. Copies of modified .rss files, and a back-up or image of the completed HMI program shall be provided to the City. The Consultant shall keep and store a copy of the program files on their own computers for a period of at least 3 years.

Provided Files

Additional supporting files are provided at the following site and are described below.
<http://mpw.milwaukee.gov/bids/docs/SCADA-HMI/>

Locations.pdf – A map of all locations

Milwaukee_HMI_SE.zip – Compressed file containing the City's existing Factory Talk SE program

City Lights.zip – Compressed file of the remote program for the City Lights location.

MILWAUKEE CANAL ST LIFT STATION - Copy.RSS – Remote Program for 26th and Canal location.

Tara Vista LS Programs.zip – Compressed file of the remote program for the Tara Vista location.

LiftC92u.zip – Compressed file of typical City program. Separate program ladders are utilized for lift stations and bypass pumps.

Warranty

All work and materials shall comply with all local, state and federal codes and regulations. A one-year warranty on all parts installed and labor performed shall be provided by the Consultant or manufacturer.

The Consultant shall provide the City with a minimum of 4 hours training of the operation, maintenance, and troubleshooting of the HMI screens built for the SCADA system.

As part of this contract, the Consultant shall provide the City with technical support and troubleshooting support for the work performed on this contract for a period of one year. The one-year support period will begin when the City determines that the Consultant has achieved substantial completion of the work required. At that time, the City will provide notice to the Consultant documenting commencement of the one-year support period.

Quote Format

Quote to include all costs associated with the work above. Please itemize the quote based on the following:

1 Lump Sum – Construct and Implement HMI screen for City Lights location.

1 Lump Sum – Construct and Implement HMI screen for Tara Vista location.

1 Lump Sum – Construct and Implement HMI screen for 13th and Canal location.

1 Lump Sum – Construct and Implement HMI screen for 26th and Canal location.

Existing facilities may be inspected prior to submitting quotes. Contact me at the number below to arrange a site inspection. Responses to questions received prior to the deadline will be broadcast to all invited firms.

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