

# SCADA SPECIFICATIONS

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# **I. SCADA SYSTEM OVERVIEW**

## **A. GENERAL**

This section contains the detailed specifications for the Master Flow Metering SCADA (Supervisory Control and Data Acquisition) work. The intent of these specifications is to detail the provision of a wireless SCADA (Supervisory Control and Data Acquisition) system for the water distribution operations of <<INSERT WATER DISTRICT NAME>>, hereafter referred to as "The Water District". The SCADA Contractor is responsible for providing all required SCADA equipment, programming, and installation. The delivered SCADA System shall be "turnkey".

## **B. PURPOSE AND OVERVIEW**

The purpose of the SCADA system detailed herein is to provide the Water District with a centralized and automatic system for collecting master meter data from the major flow meters within the distribution system. The Water District expects to realize significant cost savings based upon a substantial reduction in fuel consumption, man-hours, vehicle wear-and-tear, flow meter reading errors, and leak-detection delays.

## **C. SCADA LOCATIONS AND EQUIPMENT SUMMARY**

The SCADA locations include the following fixed sites:

1. Water District Office:
  - a. SCADA Workstation
  - b. SCADA Software
  - c. RadioModem System
  - d. RadioModem Enclosure
  
2. Master Flow Meter #1:
  - a. SCADA/Meter Interface Unit (SMIU)
  - b. RadioModem System
  - c. Solar Charging System
  - d. Water Meter Register Retrofit
  - e. Pressure Transducer
  - f. Telemetry Enclosure
  
3. Master Flow Meter #2:
  - a. SCADA/Meter Interface Unit (SMIU)
  - b. RadioModem System
  - c. Solar Charging System
  - d. Water Meter Register Retrofit
  - e. Pressure Transducer
  - f. Telemetry Enclosure

etc...

## **II. SCADA WORKSTATION**

### **A. COMPUTER**

<<INSERT COMPUTER SPECIFICATIONS HERE>>

### **B. SCADA SOFTWARE**

<<INSERT SCADA SOFTWARE SPECIFICATIONS HERE>>

### **C. RADIOMODEM SYSTEM**

<<INSERT RADIO MODEM SPECIFICATIONS HERE>>

<<(INCLUDES RADIO, SURGE ARRESTOR, COAXIAL CABLE, CONNECTORS, ANTENNA, ANTENNA TOWER)>>

### **D. RADIO MODEM ENCLOSURE**

<<INSERT RADIO MODEM ENCLOSURE SPECIFICATIONS HERE>>

## II. MASTER FLOW METER SITES (ALL)

### A. SCADA/METER INTERFACE UNIT (SMIU)

1. The master meter shall be equipped with a SCADA Meter Interface Unit (SMIU) that will perform protocol conversion between the flow meter register and the connected SCADA System.
2. Flow Meter Ports.

The SMIU shall contain two (2) flow meter ports that are capable of reading encoder-based flow meters, in conformance with AWWA Standard C707-05. The flow meter communication protocol(s) shall be recognized automatically by the SMIU, without user-intervention. At a minimum, the SMIU shall be compatible with the following protocols:

- a. Sensus Variable Length, 4 to 8 Digit.
- b. Sensus Fixed Length, 4 to 6 Digit.
- c. Neptune E-Coder Plus, 8 Digit.
- d. Neptune ProRead Basic, 3-6 Digit.
- e. K-Frame, 6 Digit.
- f. Mechanical Contact Pulse, 2400 Hz Max.
- g. Solid-State Contact Pulse, 2400 Hz Max.
- h. Open-Collector Pulse, 2400 Hz Max.

The SMIU shall automatically sample the flow meter(s) at pre-programmed intervals, and compute flow rate(s) based upon a delta-Volume/delta-Time finite difference calculation (fixed delta-Time or fixed delta-Volume).

The SMIU shall be compatible with a radio-read or touch-read interrogator attached in parallel to the target flow meter.

3. Serial Ports.

The SMIU shall contain the following serial ports:

- a. One (1) RS-232C serial port.
- b. One (1) RS-485 serial port.

The serial ports shall be capable of operating at speeds ranging from 300 bps up to 115200 bps.

The serial ports shall support the following handshaking methods:

- a. Fixed RTS
- b. Null Modem
- c. RTS/CTS
- d. None

The serial ports shall support the following data bit / parity / stop bit combinations:

- a. 8N1
- b. 7E1
- c. 7O1
- d. 7N2

Through the serial ports, the SMIU shall support the following automation protocols:

- a. MODBUS/RTU
- b. MODBUS/ASCII
- c. DF1/RADIO-MODEM
- d. DF1/FULL-DUPLEX

The serial ports shall provide a dip-switch activated setup terminal interface. The terminal interface shall utilize ANSI terminal emulation, 25x80 characters, and operate at 9600 bps, 8 data bits, No parity, and 1 stop bit.

#### 4. Ethernet Port.

The SMIU shall contain one (1) Ethernet port. The Ethernet port shall be 10BaseT and shall operate at a speed of 10 Mbps.

Through the Ethernet port, the SMIU shall support the following automation protocols:

- a. MODBUS/TCP
- b. MODBUS/UDP
- c. ETHERNET/IP

The Ethernet port shall be configurable so as to be compatible with both DHCP and Static IP addressing methods.

The Ethernet port shall contain an integral web server that, when interrogated, provides flow meter totalization, rate, statistics, and auxiliary I/O data.

The SMIU shall contain an integral ping server, and respond to ARP ping requests.

The Ethernet port shall provide a telnet server interface that is available for remote management and setup. The telnet terminal interface shall utilize ANSI terminal emulation and 25x80 characters.

The SMIU shall be pre-programmed with a unique, valid, IEEE-approved MAC ID.

#### 5. Mechanical/Environmental/Electrical.

The SMIU shall weigh 13.5 ounces or less, and its outer dimensions shall not exceed 8.25"x4.75"x1.75".

The SMIU shall be capable of operating with a temperature range of -20C to +70C.

The SMIU shall contain an integral 2x16 character LCD display with a backlight.

The SMIU shall operate on a supply voltage within the range of 10 VDC to 36 VDC.

The supply current draw shall be 85mA or less at 24VDC, and 62mA or less at 24VDC with the backlight turned off.

The power consumed by the SMIU shall not exceed 2.5 Watts when supplied by a voltage within the range of 10 VDC to 36 VDC.

The power efficiency of the SMIU shall be 76% or more.

The terminal block of the SMIU shall support wire diameters within the range 16AWG to 26AWG.

The SMIU shall contain an integral overcurrent-protection fuse, and shall also contain a minimum of nine (9) TVSS diodes.

The SMIU shall be ROHS-compliant and contain no lead.

The SMIU shall be manufactured in the USA.

6. The SMIU shall contain the following auxiliary inputs/outputs:

- a. Two (2) 4-20mA analog input channels.
- b. Three (3) discrete input/output channels (dry contact input, TTL output).

7. The following MODBUS function codes shall be supported:

- a. 01 - Read Coil Status
- b. 02 - Read Input Status
- c. 03 - Read Holding Registers
- d. 04 - Read Input Registers
- e. 05 - Force Single Coil
- f. 15 - Force Multiple Coils

8. The following DF1 and ETHERNET/IP (PCCC Encapsulation) functions shall be supported:

- a. Protected Typed Logical Read With 3 Address Fields
- b. Protected Typed Logical Write With 3 Address Fields

9. Standards And Regulatory Compliances.

- a. Safety (USA/Mexico) - UL 60950-1
- b. Safety (Canada) - CSA C22.2 No. 60950-1
- c. Meter Interface - AWWA C707-05
- d. Environmental - ROHS Compliant, Lead-Free
- e. Emissions (USA) - FCC Part 15, Class A
- f. Emissions (Canada) - ICES-003

## **B. RADIOMODEM SYSTEM**

<<INSERT RADIO MODEM SPECIFICATIONS HERE>>

<<(INCLUDES RADIO, SURGE ARRESTOR, COAXIAL CABLE, CONNECTORS, ANTENNA, ANTENNA TOWER)>>

## **C. SOLAR CHARGING SYSTEM**

<<INSERT SOLAR CHARGING SYSTEM SPECIFICATIONS HERE>>

<<(INCLUDES SOLAR PANEL, CHARGE CONTROLLER, FUSING, SURGE ARRESTOR)>>

**D. WATER FLOW METER REGISTER RETROFIT (IF NECESSARY)**

1. The master flow meter shall be retrofitted with an encoder register as detailed herein.
2. The currently-installed water meter is a <<INSERT METER BRAND AND MODEL>>. The register shall be of the same manufacturer as the meter itself.
3. The register type shall be an ADE (if Badger), OMNI-T2 (if Sensus OMNI-T2), ICE (if other Sensus/Rockwell), E-Coder (if Neptune/Schlumberger), CybleCoder (if Itron/Actaris), InVision or evoQ4 (if Elster-AMCO/ABB/Kent), Translator (if Hersey), Acculinx (if Master Meter), HawkEyeOER (if Metron-Farnier), FM Mag 8000 Encoder Module (if Siemens/Sitrans).
4. The register shall communicate using either the Sensus 3-Wire Protocol, the Neptune 3-Wire Protocol, or the K-Frame 3-Wire Protocol.
5. The register shall be pre-programmed so as to transmit the maximum number of digits available from the register.
6. Pulse-Output type and 4-20mA-output type flow meter registers shall not be acceptable.

**E. PRESSURE TRANSDUCER**

<<INSERT PRESSURE TRANSDUCER SPECIFICATIONS HERE>>  
<<(TRANSDUCER SHOULD BE A 4-20MA TYPE)>>

**F. TELEMETRY ENCLOSURE**

<<INSERT TELEMETRY ENCLOSURE SPECIFICATIONS HERE>>