

# **Eubank Water System**

## AMR SYSTEM REQUEST FOR PROPOSAL

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## INTRODUCTION AND BACKGROUND

Eubank Water System is soliciting proposals for an Automated Mobile Reading (AMR)/ Advanced Metering Infrastructure (AMI) that is capable of being installed as a mobile system and later migrating to fixed network in an effort to improve the process of collecting water meter reading data; detect tamper and theft, customer side leak detection as well as other alerts; also provide the capability to safely conduct disconnection and reconnect water services remotely at all residential meter locations. The selected network shall utilize a fully two-way Mobile Transceiver to read and communicate/transmit to metering devices. It is the intent of this project to enhance the customer's data gathering ability to improve the billing process and customer service through the addition of mobile meter reading software utilized in a vehicle.

Eubank's mission is to provide the most economical and reliable service possible for water customers. Eubank expects the proposed system will serve as a vital tool for achieving this vision while moving forward with other business process improvements. The migratable AMR/AMI system and meter replacement project is expected to provide an information technology which will:

- Replace approximately 4,400 of the existing water meters to increase meter accuracy.
- Provide the city with messages and timely information through mobile software applications which can be shared with customers, thereby empowering Eubank's residents and businesses to control water usage, costs and advance "Green" initiatives. Migration to fixed network at a later date would provide the option of utilizing a customer portal to share data directly with customers.
- Significantly enhance service to customers through:
  - Standardized reporting that enhances management capabilities
  - Improved billing accuracy
  - Faster response to customer needs and inquiries
  - More efficient customer service
  - Move-out meter readings via the Mobile Transceiver
- Improved meter accuracy and reading reliability.
- Improve the city's operational efficiency and reduce costs through reliable interval data from water meter reads for right-sizing programs, prompt notification of leaks, tampering, and theft and automating the meter disconnect/reconnect process at designated accounts.

The successful respondent will be selected using criteria set forth later in this RFP and based on the proposer's ability to meet Eubank's vision for the future.

### 1.1 Utility Background

Eubank has an inventory of nearly 4,750 water meters. Of these, approximately 4,400 will be replaced with new water meters equipped with ME-8 encoder registers and migratable AMR/AMI radio modules.

Currently, the city collects meter readings through the use of the following existing technologies and manufacturer(s):

- Manually reading meters and entering the reads into the city's CIS database

## 1.2 Instruction to Vendors

THE GENERAL TERMS AND CONDITIONS WHICH FOLLOW APPLY TO ALL PURCHASES OR SERVICES AND BECOME A DEFINITE PART OF EACH FORMAL INVITATION TO PROPOSE, PURCHASE ORDER, OR CONTRACT ISSUED BY THE EUBANK WATER SYSTEM, UNLESS OTHERWISE SPECIFIED. BY SUBMITTING A PROPOSAL, THE VENDOR AGREES TO BE BOUND BY THESE TERMS AND CONDITIONS. VENDORS OR THEIR AUTHORIZED REPRESENTATIVES ARE EXPECTED TO FULLY INFORM THEMSELVES OF THE CONDITIONS, REQUIREMENTS, AND SPECIFICATIONS BEFORE SUBMITTING PROPOSALS. FAILURE TO DO SO WILL BE AT THE VENDOR'S OWN RISK AND WILL NOT SECURE RELIEF ON THE PLEA OF ERROR.

## AMR/AMI MIGRATABLE MODULE TECHNICAL SPECIFICATIONS

### 1.3 AMI Water Module Requirements

- 1.3.1 AMR/AMI modules must communicate at 13 dBm within one of 4 channels in the unlicensed 902 to 928 MHz frequency range, certified to comply with FCC Part 15 rules and utilize direct sequence spread spectrum for standard data transmissions in mobile mode. In fixed network mode, the modules must transmit at 20 dBm.
- 1.3.2 All system radio components shall incorporate open architecture communications technology such as established by the LoRa® Alliance, that support the use and interoperability of third party devices in the fixed network configuration which can bring added value to the system. Please describe these capabilities in detail.
- 1.3.3 The AMR/AMI module shall be designed and built for installation in indoor or outdoor environments with mounting options for mounting through the lid of water meter boxes and above ground discretely on a wall, to limit required inventory for various installations.
- 1.3.4 AMR/AMI modules shall be housed in a single package designed for rugged, harsh environments and capable of wide ranging temperatures and high humidity (zero (0) to one hundred (100) percent) for extended periods of time without damage. Describe moisture barriers which protect all electronic components within the proposed AMI Module.
- 1.3.5 The AMR/AMI module must function accurately and reliably while not being damaged over an operating temperature range of negative forty (-40) degrees Centigrade to seventy (70) degrees Centigrade.
- 1.3.6 The AMR/AMI modules shall be designed to operate in the above conditions while maintaining a battery life of twenty (20) years.
- 1.3.7 Battery status shall be transmitted to the mobile software or hosted user interface with alerts of low battery levels for preemptive maintenance at least six months in advance of failure.
- 1.3.8 Each AMR/AMI module shall function together with the Mobile Transceiver and in fixed network mode with collectors and repeater devices as a true two-way network that allows the remote configuration and firmware update of each.
- 1.3.9 True two-way communication must support requests initiated from the Mobile Transceiver in mobile mode or from the user interface in fixed network mode to obtain meter readings no more than one hour old in mobile mode or in near real time when in fixed network mode. Systems which gather and store interim meter readings at the collector in fixed networks (one and a half way) will not be accepted.

- 1.3.10 The AMR/AMI module shall be capable of storing meter data, including hourly meter readings, alarms, as well as date and time stamps, for a minimum of one hundred five (105) days in non-volatile memory for mobile data retrieval. Devices that can store > 105 days will be considered advantageous. A minimum of one hundred twenty (120) days of data must be stored in non-volatile memory for fixed network data retrieval.
- 1.3.11 AMR/AMI modules shall be capable of operating on the same mobile network as other functional devices such as meter service shut-off valves. In fixed network mode other functional devices such as meter service shut-off valves and acoustic leak detection devices for distribution mains that can be monitored and configured remotely from the user interface shall be incorporated.
- 1.3.12 The AMR/AMI module must report broadcast hourly readings at 6 second intervals for mobile reading applications. The AMR/AMI module must report batch readings on a scheduled basis, typically daily (i.e. one daily report including twenty-four (24) hourly readings and shall be remotely configurable by the utility through the host software application to change reporting interval when in fixed network mode.
- 1.3.13 The AMR/AMI module shall be capable of transmitting in mobile mode as installed and shall migrate to fixed mode upon receiving a hail from a network collector. The AMR/AMI module shall have the capability to receive and process commands from the host system for firmware updates to eliminate the need for manually performing the update functions at each meter location or by replacing AMI modules when in fixed network mode. AMI modules must support firmware updates in batches or groups to reduce system network congestion in fixed network mode.
- 1.3.14 The AMR/AMI Module shall employ actionable alerts. Please indicate compliance with each below:
- Tamper or Meter Disconnected
  - Bad Read or – “?” or “-” marks in register message in mobile or fixed mode
  - Small Customer-Side Leak Detected in mobile or fixed mode
  - Large Customer-Side Leak Detected in mobile or fixed mode
  - No Flow detected – in mobile or fixed mode. Specific period of time set in the host software
  - Battery Health in mobile or fixed mode

## AMR/AMI MIGRATABLE MOBILE HARDWARE SPECIFICATIONS

### 1.4 Mobile Hardware Kit

- 1.4.1 The mobile hardware kit must provide a complete meter reading solution for the installation, data collection, transfer and viewing of all data received for a migratable mobile AMR system.
- 1.4.2 The Mobile Transceiver must be portable and moved easily from one vehicle to another.
- 1.4.3 The Mobile Transceiver must utilize a single mast, powered, magnetic antenna for portability and movement between vehicles.
- 1.4.4 The Mobile Transceiver antenna must have a replaceable coax antenna cable.
- 1.4.5 The Mobile Transceiver must utilize a multi-channel platform which is capable of reading legacy Hot Rod transmitters on 3 channels and AMR/AMI modules on a minimum of 5 separate channels.
- 1.4.6 The Mobile Transceiver must provide full two-way communication to AMR/AMI modules. It must be capable of transmitting messages for receipt by the modules to initiate valve activation, and data retrieval and also of receiving data from the modules for meter reading data, data logging, and meter right sizing applications.

1.4.7 The hardware kit must include a pocket sized installation tool that is capable of verifying radio frequency reception during mobile installation and proper connectivity in the event gel capping of flying lead wires is required or connectors are utilized between the meter and the node.

1.4.8 The Mobile Transceiver must provide LED lights on the face of the unit that indicate operational status and the availability of radio transmissions from AMR/AMI modules.

1.4.9 The Mobile Transceiver must be capable of being powered by a vehicle auxiliary power outlet.

1.4.10 The Mobile Transceiver must be connected to the mobile reading computer via a USB connection. Bluetooth connections are not always reliable and communication can be lost during the reading process requiring extensive rereads and lost time.

1.4.11 The mobile hardware must be provided in a carrying case with foam inserts to provide a safe and manageable storage solution.

# WATER METER REGISTER SPECIFICATIONS

## **1.5 Electromechanical 6-Dial Absolute Encoder Register (for MVR, RFM, FM3, Hydrant Meters Only; Positive Displacement PD Meters to use only ME-8 Registers)**

- 1.5.1 The register shall be a true absolute encoder register which provides direct electronic transfer of meter register information to the AMR Module. The register of choice shall be Mueller Systems Translator register or equal. Data shall include:
- Register ID (minimum of eight digits)
  - Meter Read (minimum of six dials)
  - Reading Errors (number wheel location error, etc.)
- 1.5.2 The encoder register shall send data in ASCII format (American Standard code for Information Interchange) to the AMI Module.
- 1.5.3 The encoder register shall transmit the complete odometer wheel reading, a minimum of six (6) digits, all ten (10) dial positions of the number wheels, plus at least an eight (8) digit register identification number that has been factory set and never duplicated.
- 1.5.4 Encoders shall use a non-contact position reading technology so as to prevent drag and wear of critical electronic parts.
- 1.5.5 When an AMR/AMI Module interrogates the encoder register, a microprocessor within the register shall determine the true position of all number wheels, encode the reading then send it to the AMR device.
- 1.5.6 A method of preventing register reading ambiguity shall be utilized so as to eliminate reading errors due to number wheels being in unreadable positions which would cause the register to forward reading error code.
- 1.5.7 The encoder register shall be permanently factory sealed with epoxy potting of all terminal connections. Encoder registers requiring field sealing or field splices of the wire connection will not be allowed.
- 1.5.8 The register must conform to the most current revision of AWWA C-707.
- 1.5.9 No wire connections or wire splicing of any kind shall be required during installation.
- 1.5.10 In-line waterproof (Nicor) connections shall be permissible when required to facilitate installation.
- 1.5.11 Registers shall be secured to the meter main case by a tamper resistant bayonet-style locking mechanism and an unobtrusive security pin, protecting against unauthorized removal of the register.
- 1.5.12 No special tools shall be required to remove the register.

## **1.6 Electromechanical 8-Digit Absolute Encoder Register for 5/8 Inch through 2 Inch Positive Displacement Meters Only**

- 1.6.1 The register shall be a true absolute encoder register which provides direct electronic transfer of Meter register information to the AMI Module. The register of choice shall be the Mueller Systems ME-8 register or equal. Data shall include:
- Register ID (minimum of ten digits)
  - Meter Read (minimum of eight dials)
  - Reading Errors (number wheel location error, etc.)

- 1.6.2 The encoder register shall send data in ASCII format (American Standard code for Information Interchange) to the AMI Module.
- 1.6.3 The encoder register shall transmit the complete odometer wheel reading, a minimum of eight (8) digits, all ten (10) dial positions of the number wheels, plus at least a ten (10) digit register identification number that has been factory set and never duplicated.
- 1.6.4 Encoders shall use a non-contact position reading technology so as to prevent drag and wear of critical electronic parts.
- 1.6.5 When an AMI Module interrogates the encoder register, a microprocessor within the register shall determine the true position of all eight number wheels, encode the reading then send it to the AMR device.
- 1.6.6 A method of preventing register reading ambiguity shall be utilized so as to eliminate reading errors due to number wheels being in unreadable positions which would cause the register to forward reading error code.
- 1.6.7 The register must conform to the most current revision of AWWA C-707.
- 1.6.8 The encoder register shall be permanently factory sealed with epoxy potting of all terminal connections. Encoder registers requiring field sealing or field splices of the wire connection will not be allowed.
- 1.6.9 A heat-treated, tempered glass lens is required.
- 1.6.10 In line waterproof (Nicor or Itron) connections shall be permissible as required to facilitate installation and field investigations.
- 1.6.11 Registers shall be secured to the meter main case by a tamper resistant bayonet-style locking mechanism and an unobtrusive security pin, protecting against unauthorized removal of the register.
- 1.6.12 No special tools shall be required to remove the register.

## WATER METER SPECIFICATIONS

### **1.7 5/8 Inch X 1/2 Inch and 5/8 Inch X 3/4 Inch Low Lead Bronze Positive Displacement Meters**

This Specification covers low lead body cold-water positive displacement meters in 3/4" sizes and the materials employed in their fabrication. These meters shall offer a low lead alternative that encourages conservation, recycling, water purity and green lifestyles.

- 1.7.1 6.6.1 These meters shall offer a lead free solution that encourages conservation, recycling, water purity and green lifestyles.
- 1.7.2 All meters shall meet or exceed the latest version of the American Water Works Association Standard C700 for Cold Water Meters - Displacement Type, Bronze Main Case.
- 1.7.3 All meters shall comply with the latest NSF-61 372 requirements and those included in the EPA requirement change of January 4, 2014.
- 1.7.4 All meters shall comply with the latest state low lead initiatives due to their design which incorporates suitable engineered polymers for wetted surfaces inside the meter.
- 1.7.5 Main cases shall be composed of a low lead bronze.



- 1.7.6 Main case shall incorporate the choice of bottom plates that include cast iron which is painted black, bronze, or polymer bottoms.
- 1.7.7 The cast iron bottom shall provide a frost bottom designed to break prior to the main case.
- 1.7.8 Bronze and polymer bottoms provide protection against “hot soil” and will not corrode.
- 1.7.9 The spud threads shall provide adequate length to permit complete tightening of existing bronze couplings of the setter to prevent interference with the body.
- 1.7.10 The meter case must utilize stainless steel fasteners for securing the bottom plate to the main case.
- 1.7.11 All materials used in the construction of the main cases shall have sufficient dimensional stability to retain operating clearances at working temperature up to 105 degrees F.
- 1.7.12 The manufacturer shall warranty the main case for a period of 25 years from the date of shipment.
- 1.7.13 The meter serial number shall be stamped on the main case of the meter.
- 1.7.14 The bottom plate shall utilize a gasket seal
- 1.7.15 Measuring chambers shall be made of a suitable material as described in AWWA C-700.
- 1.7.16 Chamber shall incorporate a nutating disc. Oscillating piston style measuring elements are not acceptable.
- 1.7.17 The chamber magnet shall incorporate a protective plastic shroud around the magnet.
- 1.7.18 The measuring chamber shall incorporate a locating device that aligns to the main case of the meter to ensure proper chamber orientation and alignment.
- 1.7.19 The measuring chamber shall be locked into place with a single unit strainer/chamber retainer.
- 1.7.20 The chamber shall be designed for long life, to reduce wear and must not exceed 58 nutations per gallon.
- 1.7.21 Meters shall not exceed seven PSI pressure loss at AWWA safe maximum operating capacity.
- 1.7.22 Meters shall be 100% factory tested for accuracy and have the factory test results provided with each meter.
- 1.7.23 Meters shall be pressure tested to ensure against leakage.
- 1.7.24 Strainers shall be rigid, fit snugly, be easy to remove, and have an effective straining area at least twice that of the inlet opening.

## INVITATION TO BID

Eubank Water Systems will be accepting sealed bid proposals for the above referenced AMR System. Sealed bids must be received no later than Tuesday, May 26, 2020 at 5:00 pm EST, at the Eubank Water System office, 20 Waterway, Eubank, KY 42567. Bids received after this date and time will not be accepted unless the contractor can present evidence that the cause of the delay was beyond the contractor’s control.

Sealed bids will be opened and reviewed Wednesday, May 27, 2020 at 10:00 am EST at the Eubank Water System office. The contract will be awarded by written notice to the responsible bidder whose bid offers the best value.