

REQUEST FOR Proposal  
FOR  
Advanced Meter Program

**SUBMISSION:**

Request for Proposal (hereafter referred to as bids or proposals), in electronic or hard copy, shall include this document, the signature page, and all additional documents as required. Bids/Proposal shall be submitted electronically or if submitting in hard copy, placed in a sealed envelope, signed by a person having the authority to bind the firm in a contract and marked clearly on the outside as outlined below. **FACSIMILE OR EMAIL TRANSMITTALS SHALL NOT BE ACCEPTED.**

**NOTICE TO BIDDERS**

Sealed bids will be received by the City of Graham at the Finance Manager's office located in City Hall, 429 Fourth St., Graham, Texas until 5:00 pm, cst, January 21, 2016 for the following:

Purchase and Installation of Advanced Metering Infrastructure System

**MARK ENVELOPE ON OUTSIDE: BID Water Meters AMI**

All responses must be received before closing date and time. Bids/Proposals received in the Finance Department after submission deadline shall be returned unopened and will be considered void and unacceptable. The City of Graham is not responsible for lateness of mail, carrier, etc. and time/date stamp clock in Finance Office shall be the official time of receipt. The right is reserved as the interest of the City may require to reject any and all bid/proposals and to waive any informality in the bid/proposals received.

**SUBMISSION OF BID/PROPOSAL:** All documents may be submitted electronically to [dirfin@grahamtexas.net](mailto:dirfin@grahamtexas.net). Please mail paper responses to:

City of Graham  
P.O. Box 1449  
Attn: Finance Department  
Graham, Texas 76450

Or hand deliver to:  
City of Graham  
429 Fourth Street  
Finance Department  
Graham, Texas 76450

RFQ responses filed with the Finance Manager shall be opened publicly in Graham City Hall, 429 Fourth Street, Graham, TX on January 22, 2016 at 10:00 am. Bids will be presented to City Council on January 28, 2016 at 9:30 a.m. in the City Council Chambers at 608 Elm Street, Graham, TX. The Council will select the bid that best meets the needs of the city. Cost will not be the sole determining factor, as they will consider integration with existing billing software, annual maintenance, customer services, local support and stocking, ease of operation, meter type, communication type, equipment, manufacturer warranty, references, expertise of installation Team, plan and timing of implementation, and other pertinent factors.

The City Council will consider awarding the RFQ at a regularly scheduled meeting within 30 days of the opening. The City of Graham reserves the right to reject any or all bids.

All requests for information, clarification or related inquiries shall be submitted via email to David Maddy at [dirfin@grahamtexas.net](mailto:dirfin@grahamtexas.net) or Jason Cottongame at [jcottongame@grahamtexas.net](mailto:jcottongame@grahamtexas.net) a minimum of one week prior to the proposed RFQ opening date. Requests received after this date will go unanswered. All answers and clarifications shall be shared with all Proposers.

## **Introduction**

### **City of Graham: Overview**

The City of Graham (COG) currently uses a drive by meter reading system to read approximately 4,800 residential, commercial and wholesale primarily Master Meter brand water meters installed in an area of 65 linear miles of streets in approximately 6.5 square miles. The City is interested in replacing the drive by system currently in place with a fixed base system.

### **Scope of Project**

The City of Graham (COG) seeks to deploy a Smart Grid AMI pilot program with the following primary AMI features:

Remote Meter Reading

Remote Connect and Disconnect

Customer Service Portal Used to Provide Near Real-time Usage Information to Customers

### **This bid is directed toward the purchase of the following:**

A hosted version of the head-end software that can be accessed by COG, which can be used to perform the meter management, meter reading, connect/disconnect, and provide a Customer Service Portal Battery back-up for system network elements in the field (base stations, collectors, access points, relays, etc.)

Network design

24x7 hour operations support for the network

Detailed requirements for these items are provided in the requirements section of this proposal

## **3.0 – AMI MODULE TECHNICAL SPECIFICATIONS**

### **3.1 – Water AMI Module Requirements**

- 3.1.1 The AMI Water Module (Radio) shall be capable of receiving meter data from water meters equipped with encoder registers.
- 3.1.2 AMI Modules meters/service and other related endpoint devices shall be capable of being configured to communicate with the Gateway Collectors via a Mesh (Multi-path) and Star topographical engineered network solution.
- 3.1.3 Communicate using unlicensed 900 MHz band, certified to comply with FCC Part 15 rules, utilizing frequency hopping data transmissions.
- 3.1.4 The AMI Module shall be designed and built for installation in outdoor water meter boxes.
- 3.1.5 Water endpoint devices shall be housed in a single package design designed for rugged, harsh environments and capable of complete submersion in water without damage and shall be manufactured within the USA.
- 3.1.6 The AMI Module must function accurately and not be damaged over an operating temperature range of -40 deg C to +70 deg C.

- 3.1.7 The AMI modules shall be designed to operate in the above conditions and have a guaranteed battery life of 10 years with an additional 10 pro-rated year life.
- 3.1.8 Battery life data shall be transmitted to the Host System alerting of low battery levels for preemptive maintenance.
- 3.1.9 Each AMI Module shall function as a true two-way network gateway and allow for an engineered Mesh Network configuration with a primary route to the collector and up to three (3) alternate routes that are automated if communication is interrupted to the primary routing.
- 3.1.10 Water AMI Modules shall be capable of communicating with electric meters and other AMI modules and vice versa in the network.
- 3.1.11 The AMI Module shall be capable of storing meter data including date and time stamps down to five (5) minute intervals for a minimum of 45 days in non-volatile memory.
- 3.1.12 The AMI Module shall have true two-way communication on-demand from the Host Software. This shall allow for obtaining real-time data upon request.
- 3.1.13 Systems that communicate one and a half way to the collector or update to the collector 1 to 6 times a day in multi-hour intervals are not acceptable.
- 3.1.14 The AMI module shall have the capability to receive and process commands from the host system for all firmware updates to eliminate the need to manually perform the update function at each locale. AMI modules must support group firmware updates to reduce system maintenance time.
- 3.1.15 The AMI Module shall be capable of listening for Mobile AMR modules in the network a minimum of once a day and reporting consumption and alarm data to the host system.
- 3.1.16 The AMI Module shall employ actionable alerts; indicate compliance with each below.
- Tamper Alert or Meter disconnected
  - Bad Read - ? or – marks
  - Small Leak Detected
  - Large Leak Detected
  - No Flow detected – Specific period of time set in the host software
  - Reverse Flow / Backflow
  - High Flow Rate Detected – Specifics set in host software
  - Battery Health
- 3.1.17 Each AMI module's clock date & time settings shall be updated to match reference Date & time that shall be regularly provided to the meter via the Host Server.
- 3.1.18 Ability to use a hand-held device to upload data in the unit's memory.
- 3.1.19 AMI Module must be supplied with a through the meter box lids passive repeater capable of boosting the RF signal.

#### **4.0 – AMI NETWORK TECHNICAL SPECIFICATIONS**

#### **4.1 –Data Collectors**

- 4.1.1 The data collectors shall be an AC or solar powered unit with optional battery backup, which communicates in the unlicensed 900 MHz range with all the AMI Modules in its assigned area.
- 4.1.2 The collector shall communicate via a universal wide area network (WAN) connection, such as GSM/GPRS cellular, Ethernet or fiber to allow communication with the Host Server Software.
- 4.1.3 The Data Collectors shall collect and aggregate the stored meter data from all the AMI Modules in its zone a minimum of once per day and upload the information to the Host server a minimum of once per day providing interval reads from each AMI module as programmed.
- 4.1.4 The Data Collectors shall communicate on demand to AMI Modules meters/service and other related endpoint devices via Mesh or Star configuration.
- 4.1.5 The Data Collectors Software shall allow self diagnosis of any problems associated with the back haul of the communication system and the ability to automatically seek an alternate communication path if initial daily or real-time upload is unsuccessful.
- 4.1.6 The Data Collectors shall use RC4 state-of-art data security techniques to prevent unauthorized access to the data.
- 4.1.7 The ability to time synchronize all devices to within 5 seconds once per day and allow daily upload of meter data and system health checks is required.
- 4.1.8 The Data collector shall allow remote firmware and software upgrades.
- 4.1.9 The Data Collector shall utilize an outdoor NEMA4 enclosure, rated for -40C to +85C, with remote antenna capability, which can be pole or wall mounted.

#### **5.0 – TRAINING AND IMPLEMENTATION**

- 5.0.1 The Proposer shall be responsible for supplying and delivering the AMI System components complete, including training and ensuring the proposed AMI system is operational prior to full deployment. This includes, support for the development of an interface to the utility billing system and functional testing of the system.
- 5.0.2 The Proposer shall have a proven program of professional project management to ensure successful system installation. Provide resumes for key managers involved.
- 5.0.3 Project managers shall be experienced in managing the design, installation and optimization of systems. Project management experience shall include system integration and training support.
- 5.0.4 Provide a proposed implementation schedule for a system such as that proposed here.

#### **6.0 - Installation Requirements**

Utility prefers that the selected Proposer will provide all services including installation and on-going support.

- a. The proposer shall work with the Utility to coordinate all activities, routing, and scheduling.
- b. The proposer shall use electronic data capture equipment with scanning, so little or no data is captured manually.
- c. The proposer shall capture the GPS location of each meter location at the time of the meter changed out.

## **7.0 – WATER METER SPECIFICATIONS**

### ***7.1 – Water Meter Compatibility***

- 7.1.1 The Utility is committed to selecting the technology that provides the most efficient, cost effective and flexible solution. Proposed systems must fully operate within the existing meter spacing.

### ***7.2 – Absolute Encoder Register***

- 7.2.1 The register shall be a true absolute encoder register that provides direct electronic transfer of Meter data information to the AMI Module.
- 7.2.2 The encoder register shall send data in ASCII format (American Standard code for Information Interchange) to the AMI Module.
- 7.2.3 The encoder register shall transmit the complete odometer wheel reading, a minimum of 6 digits, all 10 positions and an 8-digit identification number that has been factory set and never duplicated.
- 7.2.4 A Locating Clip shall be affixed to each of the odometer wheels in close proximity to the Segment Pads located on the encoders printed circuit board.
- 7.2.5 When an AMI Module interrogates the encoder register, the microprocessor shall determine the true position of each number wheel, encode the reading and send it to the AMR device.
- 7.2.6 The Locating Clip shall not make physical contact with the Segment Pad in order to prevent wear of the clip and pads.
- 7.2.7 The encoder register shall be permanently factory sealed with an epoxy coating of all terminal connections. Encoder registers requiring field sealing of the wire connection will not be allowed.
- 7.2.8 Waterproof in-line connectors are permissible to facilitate the installation of the AMI Module.
- 7.2.9 No wire connections or wire splicing of any kind shall be required to be performed during installation.

7.2.10 The register shall be secured to the meter main case by a tamper resistant bayonet-style locking mechanism protecting against unauthorized removal of the register.

7.2.11 No special tools shall be required to remove the register.

## **7.6 –Remote Disconnect Water Meter – Residential Meters**

### ***Scope:***

This Specification covers low lead body, cold-water, positive displacement meters that employ an integral remote disconnect valve which is compatible with open architecture radio read equipment, in residential meters and the materials employed in their fabrication. These meters shall offer a low lead alternative that encourages conservation, recycling, water purity and green lifestyles. The integral pilot valve and transceiver shall allow the utility to remotely turn on/turn off water supply to a residence as required through a multipath network without a site visit.

- 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.
  - All Meters equipped with encoder registers shall meet or exceed the American Water Works Association Standard C707 for Encoder-Type Remote-Registration systems for Cold Water Meters equipped with an open architecture radio MIU or similar device.
  - All Meters shall comply with the latest NSF-61 requirements including Annex G, F, 372 and all EPA requirements.
  - All Meters shall comply with the latest state low lead initiatives due to their unique design, which incorporates low lead bronze for all wetted surfaces in the meter.
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- Main cases shall be composed of low lead bronze that meet the latest NSF requirements and the upcoming EPA requirement.
  - 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.
  - The main case must incorporate the measuring element and a remote disconnect valve inside the standard 7-1/2" laying length specified by the AWWA C-700 standard.
  - The meter design must incorporate a pilot valve as the means of turning on/turning off the water.
  - Pilot valves are more efficient in design than ball valves and consume less energy during activation
  - Pilot valves have been utilized extensively in irrigation systems and have a proven track record in domestic water systems for reliability
  - The manufacturer shall warranty the main case for a period of 25 years from the date of shipment.
  - The meter serial number shall be stamped on the main case of the meter.

- Bottom plates shall be made of engineered plastic only.
- The bottom plate shall utilize a gasket seal.
- The bottom plate shall utilize stainless steel bolts as a means of securing the bottom plate to the main case.
- Measuring chambers shall be made of a suitable engineered polymer as described in AWWA C-700.
- Chamber shall be of the Nutating Disc style.
- The measuring chamber shall incorporate a locating device that aligns to the main case of the meter to ensure proper chamber orientation and alignment.
- The measuring chamber shall be locked into place with a single unit strainer/chamber retainer.
- The chamber shall be designed for long life, to reduce wear and must not exceed the following the recommended nutatons per gallon.
- The valve assembly must be of a pilot valve design.
- A replacement valve kit shall be offered for the ongoing maintenance of the valve.
- A dual strainer shall be utilized in the valve diaphragm.
- Meters shall not exceed the C-700 pressure loss specification at AWWA safe maximum operating capacity.
- Meters shall be 100% factory tested for accuracy and have the factory test results provided with each meter.
- Meters shall be pressure tested to ensure against leakage.
- Meters shall comply with the latest AWWA C-700 accuracy requirements as specified in the standard for a period of five years from the date of installation.
- Additionally, the manufacturer shall warranty the meter to meet or exceed AWWA repaired meter accuracy standards with a 15 year warranty or 1.75 millions of gallons registered:
- All meters shall be provided with strainer screens installed in the meter.
- Strainers shall be rigid, fit snugly, be easy to remove, and have an effective straining area at least twice that of the inlet opening.
- Registers shall be magnetic driven, straight reading, and permanently sealed by the manufacturer.
- The register shall provide for visual registration at the meter.
- The numerals on the number wheels of the register shall not be less then 1/4" in height and should be legible at a 45-degree angle.
- Registers shall incorporate a center sweep test hand and a low flow indicator.



- The register shall be secured to the meter main case by a tamper resistant bayonet-style locking mechanism protecting against unauthorized removal of the register.
- No special tools shall be required to remove the register.
- The register shall be a true absolute encoder register that provides direct electronic transfer of meter reading information to the attached Mi.Node AMI device.
- The encoder register shall send data in ASCII format (American Standard code for Information Interchange) to the interrogation device.
- The encoder register shall transmit the complete odometer wheel reading, 6 digits and all 10 positions. An 8-digit register identification number that has been factory set and never duplicated shall be used to identify the encoder register.
- A Locating Clip shall be affixed to each of the odometer wheels in close proximity to the Segment Pads located on the encoders printed circuit board. When an AMI device interrogates the encoder register, the microprocessor shall determine the true position of each number wheel, encode the reading and send it to the AMR device. The Locating Clip shall not make physical contact with the Segment Pad in order to prevent wear of the clip and pads.
- For all installations, the encoder register shall be permanently factory sealed with an epoxy coating of all terminal connections. Encoder registers requiring field sealing of the wire connection or oil-filled will not be allowed.
- All wiring for radio MIU's shall be installed and potted by the manufacturer.
- In line waterproof connections are not permitted.

## **8.0 - WARRANTY**

Provide the warranties and any services, including additional costs, your firm will offer to ensure system functionality and availability of system components. At a minimum, a 100% warranty on all equipment, software and labor on the AMI system will be in effect during the first 12 months following commissioning and acceptance. Provide a price for software support and upgrades following the initial warranty period, as well as any hosting costs associated.

### **SCHEDULE OF UNIT PRICES**

All items, including lump sums and unit prices, must be filled in completely. Quote in figures only, unless words are specifically requested.

See Schedule of Unit Prices – Attachment 1

**CITY OF GRAHAM- TEXAS  
REQUEST FOR Proposal  
FOR  
Advanced Meter Program**

**Schedule of Unit Prices – Attachment 1**

**City of Graham AMI Project Bid Schedule**

<b>Item 1, AMI System Hardware</b>					
<b>Fixed Base AMI System</b>	<b>Quantity</b>	<b>Type</b>	<b>Materials</b>	<b>Installation</b>	<b>Extension</b>
AMI Collectors (Base Stations)					
AMI Repeaters					
Endpoints/MXUs					

<b>Item 2, AMI System Software and Recurring Costs</b>		
<b>Fixed Base AMI System</b>	<b>Description</b>	<b>Cost</b>
AMI Software		
Network and Hosting Services		
Annual Costs (Backhaul and Communications)		
Annual Costs (Software Related)		
Annual Costs (Hardware Related)		

<b>Item 3, Meter Replacements</b>					
<b>Meters, Services and Boxes</b>	<b>Quantity*</b>	<b>Type</b>	<b>Materials</b>	<b>Installation</b>	<b>Extension</b>
5/8 inch Meter Replacements	3850	Each			
1- inch Meter Replacements	475	Each			
1.5- inch Meter Replacements	250	Each			
2 inch Meter Replacements	200	Each			
3 inch Meter Replacements	10	Each			
4 inch Meter Replacements	20	Each			

\* Estimates

<b>Item 4, Installation, Integration and Support Services</b>		
<b>Fixed Based AMI System</b>	<b>Description</b>	<b>Cost</b>
Billing Company Integration Support	Allowance	
IT Technician	Hourly Rate	
Training	Lump Sum	
Project Management Services	Lump Sum	
Setup and Integration Services	Lump Sum	

Item 5, Bid Alternates				
Fixed Based AMI System	Description	Materials	Installation	Unit Cost
Meter Register Retrofit				
Meter Box Lid Replacement				
Replace Existing Meter Box				

Item 6, Miscellaneous Servies			
Support Services	Cost Basis	Description/Assumptions	Cost
Plumbing Retrofits	Hourly Rate		
Standby Charges	Hourly Rate		
Notifications to Occupants	Lump Sum		
Call Center Support Services	Lump Sum		
Clean/Vactor Meter Boxes	Each		

Item 7, Other Costs (Necessary Costs not Covered in Items 1-6, above)			
Other	Cost Basis	Description/Assumptions	Cost

The TOTAL COST PROPOSAL AMOUNT described in words is:

\_\_\_\_\_ and \_\_\_\_\_ /100 DOLLARS