

GENERAL CONDITIONS FOR WATER METER AND ACCESSORIES LEAD-FREE STANDARDS SEPTEMBER 2026

I. CONTRACT PERIOD

The period of this contract will be for **one (1) year** from the date the bid is awarded. This contract may be renewed for up to **three (3) years** from the initial award date upon the agreement of both parties. The bid price will remain firm during the period of the contract.

DELIVERY

Deliveries shall be made within seven (7) working days from the order date. The vendor shall notify Shelby County Water Services personnel (the person who ordered the product) of any problems in meeting the mandatory seven (7) working day deadline. The vendor must schedule a specific delivery day and time with personnel if the deadline is not met. Excessive failure to deliver within seven (7) working days shall be grounds for rejection of the vendor for future purchases at the sole discretion of Shelby County.

All quoted prices shall include delivery charges. Deliveries shall be made to the following location unless otherwise informed:

Please make sure your vendors have our correct delivery address.

Please do not send or deliver items to the old Columbiana address.

Shelby County Field Operations Office
10927 US Highway 280
Sterrett, AL 35147

II. BILLING

Billing and payments shall be based solely on the quantity of items received, noted on the receiving ticket and counted by our team, and the vendor's stated bid price. **The product shall be billed based on the signed receiving ticket for items received, and all prices shall include shipping.** Shelby County Water Services requires a Purchase Order for every order placed. Shelby County Water Services is tax-exempt.

All invoices shall be billed to:

Shelby County Water Services
10927 US Highway 280
Sterrett, AL 35147

ap-water-landfill@shelbyal.com - preferred delivery method

III. ESTIMATED ANNUAL USE

Products will be ordered on an **AS-NEEDED** basis.

IV. BID QUALIFICATIONS

All BIDDERS must submit product information with bids. Information to be submitted must show that the product proposed meets all the specifications listed in the Bid Specifications and list **ALL EXCEPTIONS** to the specifications in a separate document. Failure to submit these exceptions may be cause for disqualification.

BID SPECIFICATIONS FOR Water Meters and Accessories lead-free Standards September 2026

Residential Electromagnetic Flow Water Meters

3/4"(DN20mm) and 1"(DN25mm) Sizes

TYPE

Solid state, battery-operated electromagnetic flow measurement system with a hermetically sealed, glass-covered, electronic register with a programmable 9-digit display.

CONFORMANCE TO STANDARDS

Must conform to American Water Works Standard C-700 and C-710 as most recently revised with respect to accuracy and pressure loss requirements or other appropriate American Water Works Standard. Must be compliant with NSF/ANSI Standard 61 Annex F and G.

PERFORMANCE

The meter shall have a 20-year life cycle, along with a 20-year battery life guarantee. In evaluating bid submittals, warranty coverage will be considered. All bidders are required to submit their most current nationally published warranty statements for water meter maincases, register, and measuring chambers.

ELECTRONIC REGISTER

The register must be an electronic device encapsulated in glass with nine programmable digits utilizing a liquid crystal display (LCD). It will have indicators for flow direction, empty pipe, battery life, and unit of measurement. The register must be hermetically sealed with a heat-tempered glass cover and be tamper-resistant. The register shall not be removable from the measuring sensor. The register shall utilize a magnetic coupling technology to connect to a touch read, radio read or fixed base meter reading system in either an inside or pit set installation. The register shall also have data logging of 1056 data points minimum and be configurable in 15-minute intervals (11 days), hourly intervals (45 days), or daily intervals (3 years). The data log will contain the following information: date, time, hourly max flow, hourly consumption, max flow, average flow, average consumption, and total consumption over the programmed timeframe interval.

MEASURING ELEMENT

The measuring shall be comprised of a polyphenylene sulfide alloy flow tube. The measuring element shall be made of a noncorrosive, lead-free glass reinforced, composite alloy material with externally threaded spud ends. A battery-powered magnetic flow sensor will utilize silver/silver chloride electrodes to measure the velocity of the water, which is linearly proportional to the volume. The measuring element will have no moving parts and will be specific for each size.

EXTERNAL HOUSING

The meter shall be an integrated unit that incorporates an electronic register and measuring device encased in an external thermal plastic casing. This integrated unit will not be removable from the external housing. The systems shall have the size and direction of water flow through the system imprinted on the external housing.

PRESSURE CAPABILITY

The system shall operate up to a working pressure of 200 pounds per square inch (psi), without leakage or damage to any parts. The accuracy shall not be affected by variation of pressure up to 200 psi.

OPERATING CHARACTERISTICS

Meter Size	Low Flow (95% min)	Operating Range 98.5% - 101.5%	Pressure Loss (Not to exceed)
5/8"	0.03gpm	0.11 to 25gpm	4psi @ 15gpm
5/8 x 3/4"	0.03gpm	0.11 to 35gpm	2psi @ 15gpm
3/4 S"	0.03gpm	0.11 to 35gpm	2psi @ 15gpm
3/4"	0.03gpm	0.11 to 35gpm	2psi @ 15gpm
1"	0.11gpm	0.4 to 55gpm	2psi @ 25gpm

Radio Transmitters

These specifications cover the radio transceiver units being used in a radio-based automatic meter reading system.

1. The radio AMR system shall have the ability to read absolute encoder registers using either a hand-held interrogation device or a mobile interrogation unit. The encoded register will be connected to an MXU that will provide the link from the meter register to the interrogation unit.
2. The radio AMR system must utilize a true two-way (interrogate and respond) communication protocol, which enhances system integrity and reliability.
3. The MXU will power up when a valid alert signal is received from an interrogation unit. Following the alert signal and transmission of meter reading data, the interrogation unit will signal to the MXU that valid reading parameters were met and instruct the MXU to power down.
4. The MXU must have the ability to utilize a reading cycle code, which is part of the transmission protocol. The reading cycle code is to be utility-controlled and change with each reading cycle. After the MXU has been interrogated and powered down, the MXU will not be alerted again until the cycle code has changed.
5. The MXU shall have a fixed, factory set, non-programmable factory identification number.
6. The MXU shall be capable of storing a programmable class code. The class code will be used to differentiate different classes of meters and to differentiate MXUs in any multi-utility areas that may exist.
7. All MXUs must meet current FCC regulations, which include proper labeling. Bidder shall supply

supporting documents at Shelby County's request.

8. The entire Radio System, including walk/drive by and fixed base, shall operate on a primary licensed FCC frequency within the 900-950 MHz band and operate within FCC CFR 47: Part 90 regulations for this band. Failure to comply with this section will result in proposal rejection.
9. Both the alert signal from the interrogation unit (VGB) and the response for the (MXU) must be in the FCC-owned frequency band.
10. Radio transmitters must be available for both pit and non-pit applications.
11. Radio transmitters must be able to support single or dual-port applications.
12. Radio transmitters must be able to support the reading of up to two meters.
13. Radio transmitters shall be housed in High Density Polyethylene – HDPE, to provide protection for the electronic components and be capable of being submersed in a water-filled pit environment without being damaged.
14. For AMR installations, the radio transmitter shall be capable of being installed in a meter pit lid or under the lid as conditions require. For AMI installations, the radio transmitter should be located through the lid to maximize reading distance. The pit lid installation shall be accomplished with a threaded nut bulkhead type fitting. Non-pit units shall be factory-potted to provide corrosion protection. The non-pit unit shall not be accessible by non-utility personnel. This shall be accomplished by use of a non-commercially available tool and a corrosion-resistant tamper-resistant screw.
15. All radio transmitters must be capable of attaching to existing Sensus Metering System encoders utilizing a 2-wire inductive coupling TouchRead system components without the use of a wire splice. The radio transmitter must also be capable of connecting to a 3-wire connection if necessary.
16. Radio transmitters shall have a battery cartridge available, which can be installed in the field.
17. Provide length of radio transmitter warranty. Provide a copy of published warranty for radio transmitters.
18. Once the Radio Transmitters are installed, they must be able to migrate to a Fixed Network Design without the need for replacement.

SR II w/ E-Register+ Bid Specifications

Meter

1. The meter shall be equipped with a register designed to communicate with touchpads, AMR, or AMI systems.
2. The body of the meter shall be fully tested to withstand 150 psi working pressure.
3. The meter body shall be made of low-lead bronze material.
4. The spud ends shall be made of low-lead bronze material.
5. The water meter shall consist of: maincase, measuring chamber, sealed register, and bottom plate.
 - a. Maincases shall be made of low-lead bronze material with externally threaded spuds.
 - b. Registers shall be housed in a bonnet of synthetic polymer.
 - c. Measuring chambers shall be made of Rocksyn®, a corrosion-resistant, tailored thermoplastic material formulated for long-term performance and especially suitable for aggressive water conditions.
 - d. The meter shall have options for low-lead bronze, cast iron, and plastic bottom plates.
6. All parts of the meter shall be corrosion resistant.
7. All materials in the measuring chamber housing and device measuring elements shall be constructed of smoothly finished, water-lubricated engineered plastics.
8. Rigid polymer strainers shall be provided.
9. The meter shall use Oscillating Piston technology.
10. The meter shall be capable of horizontal installation.

11. Normal operating flow, low flow accuracy, maximum continuous operation, and pressure loss shall be as follows:

Meter Size	Normal Operating Flow	Low Flow Accuracy	Maximum Continuous Operation	Pressure Loss
5/8"	1 - 20 gpm	1/4 gpm	10 gpm	8 psi at 15 gpm
3/4"	2 - 30 gpm	1/2 gpm	15 gpm	4 psi at 15 gpm
1"	3 - 50 gpm	3/4 gpm	25 gpm	3.5 psi at 25 gpm

12. The meter shall have certification for compliance with NSF 61 and NSF-372 and the latest revision to AWWA standard C710.
13. The serial number shall be clearly stamped on the body of the meter.
14. There shall be no exposed bolts on the body.
15. The meter shall be compliant with the appropriate AWWA standard for lay length.
16. The meter shall have a tamper-resistant bottom plate.
17. The meter shall be tested for accuracy in the factory.
18. The meter shall not be shipped with water.
19. The warranty for the meter accuracy shall be 20 years (5 years at new meter accuracy, 15 years at used meter accuracy).
20. The meter shall be NTEP certified.

Electronic Register

21. The register shall be electronic with an LCD display.
22. There shall be nine digits on the register display.
23. There shall be a low battery icon indicator on the register display.
24. The meter size shall be on the register display.
25. The unit of measure shall be on the register display.
26. A forward and reverse flow indicator shall be on the register display.
27. The register shall include a low flow indicator on the dial face (i.e., 9th digit).
28. The register shall be removable without removing the meter from installation.
29. Barcoding shall be provided on the meter test tags.
30. Barcoding shall be provided on the shipment boxes.
31. The register serial number shall be clearly stamped on the register.
32. The register shall have a battery with a 20-year warranty (pro-rated).
33. The register shall conform to American Water Works Standard C-707 as most recently revised.
34. The register shall comply with Part 15 of the FCC Rules.
35. The register shall be of the straight reading type with no multiplier.
36. The register shall read in cubic feet, gallons, or cubic meter units
37. The register shall be capable of direct visual reading at the meter and by remote reading utilizing an interrogation device that connects to the water meter via a TouchPad located external to the meter or by a SmartPoint module for remote-based AMR/AMI.
38. The LCD digits shall use the standard notation (billions, millions, and thousands separators and decimal points).
39. The LCD shall identify the AMR digits with a bar above the digit.
40. The LCD display shall remain on for 30 seconds and then turn off to maximize battery life.
41. A rate of flow mode shall be viewable by closing and re-opening the lid.

42. An alarm mode shall be viewable by closing and re-opening the lid.
43. The register shall include the following alarms:
 - a. Register removal, magnetic tamper, high flow, customer leak, reverse flow, and battery.
44. The register shall store 120 days of hourly interval consumption and alarm data.
45. There shall be a unique locking system that prevents customers removal of the register to obtain free water.
46. A special tool shall be available only to water utilities, to remove the register assembly.
47. The register shall be field-replaceable.
48. The register output data format shall be 7-bit ASCII (American Standard Code for Information Interchange) digital, plus an even parity bit.
49. Upon interrogation with a TouchPad or AMR/AMI product, the register shall transmit a reading containing 4 to 8 digits (field programmable) and a user-defined alphanumeric identification of up to 12 characters (field programmable).
50. Encoders with a mechanical brush contact or “optical-sensing” technology with the odometer wheel shall not be acceptable.
51. The register shall also be able to be programmed to output a factory set, non-programmable identification number, Customer Text of up to 20 alphanumeric characters (field programmable), a reading multiplier ranging from 10^{-99} to 10^{99} (field programmable), and/or a reading measurement unit indicator (for example, US Gallons – field programmable).
52. Change gears shall not be allowed to calibrate the meter.
53. A single register type shall be used for any registration and all residential (5/8” - 1”) meter sizes.
54. The meter shall have a dry register and not an oil-filled register.
55. The register shall have inside-set and pit-set versions.

Inside-Set Register

56. All components shall be contained in a permanently hermetically sealed, tamperproof enclosure made of a corrosion-resistant material and covered with a plastic lens
57. The meter register shall be provided with three terminal connections.
58. The terminal connections shall be protected with a dust cover on the register.
59. The terminal connection dust cover shall be of a snap-on configuration not requiring screws and be equipped with seal wire holes for security.
60. The connection between the meter register and the TouchPad shall be accomplished with the use of only two terminal connections.
61. The connection between the meter register and the SmartPoint shall be accomplished with the use of all three terminal connections.
62. The register shall transmit the meter reading and register data directly to the interrogation device through the TouchPad or to the SmartPoint when interrogated by an AMR/AMI system.

Pit-set Register

63. All components shall be contained in a permanently hermetically sealed, tamperproof enclosure made of a corrosion-resistant material and covered with a heat-tempered glass lens
64. The connection between the meter register and the remote pit lid module shall be accomplished with the use of all three terminal connections by using a 3-conductor cable.

65. The register shall transmit the register data directly to the pit lid when interrogated by the interrogation device.
66. To ensure a reliable interrogation system in the moisture environment of a meter pit or vault, the pit lid-mounted module shall be housed in a separate enclosure with factory-sealed connections consisting of an environmentally approved epoxy at both the pit lid module and register terminal connections.
67. The pit lid module shall be of sturdy and tamperproof construction.
68. The module shall allow for ease of installation on any pit lid (plastic, cast iron or concrete) by cutting an appropriately placed 1-3/4" hole in the lid.
69. The entire pit lid module shall be constructed of a suitable synthetic polymer for long service life under normal operating conditions.
70. The module shall be compatible with the TouchProbe, TouchGun, SmartGun, or AutoGun connected to a handheld or visual reader and be capable of reading when placed in any position on the pit lid module (i.e. without special alignment).
71. The meter shall be capable of being interrogated through the pit lid module when the module is submerged in water or covered with up to 3/16" of debris.

Turbo Meter Specifications 1 ½"-10"

The meter package shall meet or exceed all requirements of ANSI/AWWA Standard C701 for Class II turbine meter assemblies. Each meter assembly shall be performance tested to ensure compliance. The meter package shall meet or exceed all requirements of NSF/ANSI Standard 61, Annex F and G.

Maincases:

The meter maincase shall be of epoxy-coated ductile iron composition. The epoxy coating shall be provided as standard fusion-bonded and adhere to NSF for non-lead regulation compliance.

Measuring Chamber:

The measuring chamber shall consist of a measuring element, removable housing, and an all-electronic register. The measuring element shall be mounted on a horizontal, stationary stainless-steel shaft with sleeve bearings and be essentially weightless in water. The measuring chamber shall be capable of operating within the AWWA comparable accuracy limits without calibration when transferred from one maincase to another of the same size and type.

The Measuring Chambers for both the Compound and Turbo meter configurations shall utilize the same method of measurement and shall be interchangeable within the maincase. The purpose of this shall allow Turbo meter service locations to be upgraded to Compound meters and vice versa without the need for the meter service to be replumbed. Both Compound and Turbo meters shall utilize a drop-in type measuring chamber that allows for the replacement of the measuring chamber without the necessity of pulling the meter maincase from the service location.

Electronic Register

The meter's register is all-electronic and does not contain any mechanical gearing to display flow and accurate totalization. The electronic register includes the following partial list of features:

- AMR resolution units fully programmable
- Pulse output frequency fully programmable
- Integral data logging capability
- Integral resettable accuracy testing feature
- Totalizer view
- Alarm notification view

- Flow rate view
- 10-year battery life guarantee

Operating Characteristics

Meter Size	Low Flow (95% Min.)	Operating Range (98.5 - 101.5%)	Intermittent Flows (98.5 - 101.5%)	Pressure Loss (Not to Exceed)
1-1/2"	.75 GPM	1.25 to 160 GPM	200 GPM	6.9 PSI @ 160 GPM
2"	1.0 GPM	1.5 to 200 GPM	250 GPM	7.0 PSI @ 200 GPM
3"	1.5 GPM	2.5 to 500 GPM	650 GPM	5.1 PSI @ 500 GPM
4"	2.0 GPM	3.0 to 1000 GPM	1250 GPM	8.7 PSI @ 1000 GPM
6"	2.5 GPM	4.0 to 2000 GPM	2500 GPM	8.2 PSI @ 2000 GPM
8"	4 GPM	5 to 3500 GPM	4700 GPM	5.1 PSI @ 3500 GPM
10"	5 GPM	6 to 5500 GPM	7000 GPM	7.2 PSI @ 5500 GPM

Compound Meter Specifications 1 1/2"-10"

The meter package shall meet or exceed all requirements of ANSI/AWWA Standard C701 and C702 for Class II compound and turbine meter assemblies. Each meter assembly shall be performance tested to ensure compliance. The meter package shall meet or exceed all requirements of NSF/ANSI Standard 61, Annex F and G.

Maincases:

The meter maincase shall be of epoxy-coated ductile iron composition. The epoxy coating shall be provided as standard fusion-bonded and adhere to NSF for non-lead regulation compliance.

Measuring Chamber:

The measuring chamber shall consist of a measuring element, removable housing, and an all-electronic register. The measuring element shall be mounted on a horizontal, stationary stainless-steel shaft with sleeve bearings and be essentially weightless in water. The measuring chamber shall be capable of operating within the AWWA comparable accuracy limits without calibration when transferred from one maincase to another of the same size and type.

The Measuring Chambers for both the Compound and Turbo meter configurations shall utilize the same method of measurement and shall be interchangeable within the maincase. The purpose of this shall allow Turbo meter service locations to be upgraded to Compound meters and vice versa without the need for the meter service to be replumbed. Both Compound and Turbo meters shall utilize a drop-in type measuring chamber that allows for the replacement of the measuring chamber without the necessity of pulling the meter maincase from the service location.

Electronic Register

The meter's register is all-electronic and does not contain any mechanical gearing to display flow and accurate totalization. The electronic register includes the following partial list of features:

- AMR resolution units fully programmable
- Pulse output frequency fully programmable
- Integral data logging capability
- Integral resettable accuracy testing feature
- Totalizer view
- Alarm notification view
- Flow rate view
- 10-year battery life guarantee

Operating Characteristics

Meter Size	Low Flow (95% Min.)	Operating Range (98.5 - 101.5%)	Intermittent Flows (98.5 - 101.5%)	Pressure Loss (Not to Exceed)
1-1/2"	.25 GPM	.5 to 160 GPM	200 GPM	6.9 PSI @ 160 GPM
2"	.25 GPM	.5 to 160 GPM	200 GPM	4.3 PSI @ 160 GPM
3"	.5 GPM	1.0 to 400 GPM	500 GPM	3.2 PSI @ 500 GPM
4"	.75 GPM	1.5 to 800 GPM	1000 GPM	6.4 PSI @ 800 GPM
6"	1.5 GPM	3.0 to 1600 GPM	2000 GPM	5.5 PSI @ 1600 GPM
8"	2.5 GPM	4 to 2700 GPM	3400 GPM	4 PSI @ 2700 GPM
10"	3.5 GPM	5 to 4000 GPM	5000 GPM	4.5 PSI @ 4000 GPM

Fire Hydrant Meter Specifications

Maincases:

The meter maincase shall be cast iron.

Measuring Chamber:

The measuring chamber shall consist of a measuring element, removable housing, and an all-electronic register. The measuring element shall consist of hydro-dynamically balanced impeller floats between bearings. The floating ball technology allows the measuring element to operate virtually without friction or wear. The measuring chamber shall be capable of operating within the AWWA comparable accuracy limits without calibration when transferred from one maincase to another of the same size and type.

Electronic Register

The meter's register is all-electronic and does not contain any mechanical gearing to display flow and accurate totalization. The electronic register includes the following partial list of features:

- AMR resolution units fully programmable
- Pulse output frequency fully programmable
- Integral data logging capability
- Integral resettable accuracy testing feature
- Totalizer view
- Alarm notification view
- Flow rate view
- 10-year battery life guarantee

Operating Characteristics

The operating range of the fire hydrant meter shall be 10 to 350 gallons per minute with a maximum intermittent operation of 600 gallons per minute. The fire hydrant meter shall have a maximum operating pressure of 150 psi.

Additional Features

The fire hydrant meter shall also come with a 2" gate valve on the outlet end and a factory-installed gate valve.

Fireline Meter Specifications 4"-10"

The meter package shall meet or exceed all requirements of ANSI/AWWA Standard C703 class II. Each meter assembly shall be performance tested to ensure compliance. The meter package shall meet or exceed all requirements of NSF/ANSI Standard 61, Annex F and G. The meter is UL (Underwriters Laboratories) Listed and FM (Factory Mutual) approved for use on fire protection and domestic water applications

Maincases:

The meter maincase shall be of epoxy-coated ductile iron composition. The epoxy coating shall be provided as standard fusion-bonded and adhere to NSF for non-lead regulation compliance.

Measuring Chamber:

The measuring chamber shall consist of a measuring element, removable housing, and an all-electronic register. The measuring element shall be mounted on a horizontal, stationary stainless steel shaft with sleeve bearings and be essentially weightless in water.

Strainer

The meter includes a designed "V" shaped UL Listed/FM-approved strainer, which utilizes a stainless-steel screen. A removable strainer cover permits easy access to the screen for routine maintenance. Strainer drain ports allow for easy discharging of debris without the need to remove the cover.

Electronic Register

The meter's register is all-electronic and does not contain any mechanical gearing to display flow and accurate totalization. The electronic register includes the following partial list of features:

- AMR resolution units fully programmable
- Pulse output frequency fully programmable
- Integral data logging capability
- Integral resettable accuracy testing feature

- Totalizer view
- Alarm notification view
- Flow rate view
- 10-year battery life guarantee

Operating Characteristics

Meter Size	Low Flow (95% Min.)	Operating Range (98.5 - 101.5%)	Intermittent Flows (98.5 - 101.5%)	Pressure Loss (Not to Exceed)
4"	.75 GPM	1.5 to 1000 GPM	1250 GPM	6.4 PSI @ 1000 GPM
6"	1.5 GPM	3.0 to 2000 GPM	2500 GPM	6.7 PSI @ 2000 GPM
8"	2.5 GPM	4 to 3500 GPM	4700 GPM	5 PSI @ 3500 GPM
10"	3.5 GPM	5 to 5500 GPM	7000 GPM	7 PSI @ 5500 GPM

Magnetic Flow Water Meters

- The meter shall support an accurate measurement over a wide range of flow (minimum flow to high flow). Demonstrate how the proposed meter meets this requirement.
- This meter shall be available in versions from 1 ½ inches up to 24 inches in diameter.
- The meter shall support sending its consumption reading to the Smart Utility Network.
- The meter shall support being programmed via mobile application and Near Field Communication (NFC).
- The meter shall have no moving parts.
- The meter shall be available for potable, reclaimed, and raw water applications.
- The electronic register shall be available in integral or remote designs with remote register placement up to 300 feet away from the meter.
- These meters should use the UI 1203 protocol, which is a widely accepted industry protocol.
- The electronic register is to be available in integral or remote designs with remote register placement up to 330 feet (100m) away from the meter.

Ally Water Meters

3/4"(DN20mm) and 1"(DN25mm) Sizes

- The meter shall support Smart Utility Network two-way communication with a variety of meter types using attached communications modules. These modules shall be able to perform their two-way functions without using non-water meters.
- To help ensure long product life and accuracy, the meter shall utilize a solid-state design that has no moving parts in the flow path.
- The meter shall support accurate time using the Smart Utility Network.
- These meters should use the UI 1203 protocol, which is a widely accepted industry protocol.
- The meter shall be able to detect magnetic tamper.
- The meter shall support the detection of higher-than-usual water flow for the service.

- g) The meter shall be able to detect continuous consumption based on a customer's configurable settings and alarm when the setting is exceeded.
- h) The meter shall support the detection of reverse water flow.
- i) The Smart Utility Network solution shall support notifying the utility and the customer when a continuous flow alarm has occurred.
- j) The settings for the water alarms shall be configurable on-site and remotely over the air from the Smart Utility Network head-end software.
- k) The vendor shall provide a meter with the ability to remotely shut off the water flow for 5/8-inch to 1-inch meter sizes at the customer. The following capabilities shall be supported:
 - 1. *Water flowing - on position*
 - 2. *Water not flowing – off position*
 - 3. *Reduced water flow option*
- l) The meter shall support the remote over-the-air operation of the shut-off valve from the Smart Utility Network head end software, locally via a wireless connection, or based on defined events.
- m) The meter shall support an alarm that notifies the utility when the battery voltage is low.
- n) The meter shall come equipped with integral temperature and pressure sensors, which will facilitate providing the utility insight into water quality and pressure throughout the water system.

Coronel Water Meters

2", 3", and 4" Sizes

Conformance to standards:

- Meters will comply with the current requirements of the Safe Drinking Water Act and other federal regulations for potable water, meet the current ANSI/AWWA standards, and meet the current NSF standard 61 requirements

Meter Design

- The meter body will be constructed of epoxy-coated ductile iron.
- Meter flanges will be U.S. ANSI B16.1 / AWWA Class 125
- The meter will have an open-flow tube design preventing obstruction of flow to reduce pressure loss.
- Meter will be available in standard AWWA compound and turbo lay lengths.
- Register and meter electronic components will be fully potted and must be weatherproof, UV-resistant, and fully submersible.
- Maximum operating pressure of the meter body will be a minimum of 200 psi
- Register housing and lid will be noncorrosive and constructed with engineering thermoplastic or an equivalent with a fully encapsulated battery within the register housing and a minimum 20-year battery life.
- Register will be permanently attached to the meter and sealed to prevent moisture intrusion
- 2" meters will offer an optional integral pressure sensor
- 3" and 4" meters will have an integrated pressure sensor
- The size, model, and direction of flow through the meters will be permanently visible.

Measurement

- Meter will sample six times per second or more.
- Meter test mode will offer enhanced reading resolution and will not alter the sampling rate

from the standard meter operation sampling rate.

- 2" meters will have a starting flow rate of .05 gpm
- 2" meters will have a low flow accuracy range of 0.18-0.26 gpm where flow accuracy is guaranteed to be 97%-103% with zero upstream and downstream straight pipe requirements
- 2" meters will have a standard operating accuracy range of 0.26-220 gpm where flow accuracy is guaranteed to be 98.5%-101.5% with zero upstream and downstream straight pipe requirements
- 3" meters will have a starting flow rate of .44 gpm
- 3" meters will have a low flow accuracy range of 0.44-0.70 gpm where flow accuracy is guaranteed to be 97%-103% with zero upstream and downstream straight pipe requirements
- 3" meters will have a standard operating accuracy range of 0.70-550 gpm where flow accuracy is guaranteed to be 98.5%-101.5% with zero upstream and downstream straight pipe requirements
- 4" meters will have a starting flow rate of 0.70 gpm
- 4" meters will have a low flow accuracy range of 0.70–1.14 gpm where flow accuracy is guaranteed to be 97%-103% with zero upstream and downstream straight pipe requirements
- 4" meters will have a standard flow accuracy range of 1.14-1000 gpm where flow accuracy is guaranteed to be 98.5%-101.5% with zero upstream and downstream straight pipe requirements

Register Features

- Batteries will be fully encapsulated within the register with a 20-year battery life.
- The meter will have water temperature alarm capabilities
- Register to display up to nine digits with lines over the reading digits, which will be transmitted via the AMR output communication
- Register will have the ability to communicate through NFC
- Meter will be able to withstand being fully submersed
- Register will have the capability to transmit up to 9 AMR digits
- Register will have the capability to transmit a pulse output
- Register pulse weight and width should be programmable
- The meter will have a programmable electronic register capable of changing the unit of measure and AMR digits
- Register will have configurable alarm thresholds for transmission of customer leak, low battery, reverse flow, high flow, high or low pressure, and high or low temperature alarms.

Warranty

- Meter will have a twenty (20) year non-prorated accuracy warranty
- Meter will have a twenty (20) year battery warranty in which the first fifteen (15) years is a non-prorated replacement.
- Meter will have a five (5) year non-prorated warranty on integrated sensors

Pit Set Meter Transceiver

- For pit or vault applications, the pit Meter Transceiver antenna shall be designed to be installed through the industry standard 1-3/4" hole in the pit lid with no degradation of transmission range. The pit set Meter Transceiver antenna unit will be capable of mounting to various types and thicknesses of pit lids — Cast Iron, Aluminum, Concrete, Composite or Plastic from 1/2" to 2-1/2" in thickness. The pit set Meter Transceiver design shall not require the replacement of the pit lid material with plastic to improve the propagation of the RF signal.
- The device shall be capable of operating at temperatures of -30°F to +165°F (-34°C to +74°C) and be 100% submersible.
- The Meter Transceiver circuit board and battery will be encapsulated in High-Density Polyethylene (HDPE) for superior water ingress protection. The pit set Meter Transceiver must be suitable for operation in flooded pits and be able to be submerged for extended periods of time. The range will not be affected when the pit is flooded, provided the pit Meter Transceiver antenna is not submerged under water.
- The pit set Meter Transceiver antenna shall be made of a material to withstand traffic.
- The pit set Meter Transceiver shall provide a location for a tamper deterrent seal.
- The pit set Meter Transceiver Unit shall communicate with the meter without any wire terminations by using an inductive coupling communication platform to interface with the meter.

Operation Specifications

- The Meter Transceiver shall operate on a primary licensed FCC frequency within the 900-950 MHz band and operate within FCC CFR 47: Part 90 regulations for this band.
- The Meter Transceiver shall utilize two-way communications with the Tower Gateway Base station to allow for "over-the-air" communications between the two devices for re-programming and time synchronization.
- The Meter Transceiver shall be configurable via "over-the-air" communications.
- Power shall be supplied to the Meter Transceiver by a lithium battery and a capacitor. The Vendor shall warrant that any battery provided and installed in the Meter Transceivers by the Vendor shall be free of manufacture and design defects for a period of twenty (20) years - the first fifteen (15) years from the date of shipment from factory will be warranted for full replacement cost, and the second five (5) years will be warranted on a prorated basis, as long as the Meter Transceiver is working under the environmental and meter reading conditions specified.
- The Meter Transceivers must be capable of reading two encoder registers at one time.
- The Meter Transceiver shall transmit up to six times per day under normal transmission conditions without impacting the battery life. The Meter Transceiver shall have the ability for time synchronization.
- The Meter Transceiver programmer should have the ability to place the Meter Transceiver into the optimum transmission mode during programming.
- In addition, if the Meter Transceiver is configured in hourly usage, the Meter Transceiver shall provide the current meter reading and a data packet with hourly historical data .
- Each Meter Transceiver shall provide a unique pre-programmed eight digit identification ID number. Each Meter Transceiver shall be labeled with the ID number in both numeric and bar code form. The label shall also display FCC approval information, manufacturer's designation, and date of manufacture.
- The Meter Transceiver shall transmit the encoder meter reading and a unique 8 digit Meter Transceiver ID number.
- Tamper - If wiring between the Meter Transceiver and encoder register has been disconnected/cut, a "non-reading" shall be transmitted indicating wire tamper. The System

should have the ability to validate that the installation is successful at the installation site. The system shall also provide for the provision to interrogate the Meter Transceiver to extract a reading that will be displayed on the programmer. The installation tool shall display the Meter Transceiver ID number, valid meter reading and the signal strength (SNR = Signal to Noise Ratio) of the communication between the Meter Transceiver and Tower Gateway Base station.

- The Meter Transceiver shall have the capability of sending alarms for leak, tamper, and backflow when connected to an absolute encoder register and reading data from a distribution line leak detection device.