



**Town of Hanover**  
**Department of Public Works**  
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## **INVITATION TO BID**

The Town of Hanover through its Department of Public Works will receive sealed bids from responsible and responsive parties for materials, supplies, and services for the period July 1, 2020 through June 30, 2021 for the following items in the quantities as indicated on the proposal forms and bid specifications:

### Material/Supply Contracts:

- Item 1 Water Meters and Reading Equipment
- Item 2A Water Treatment Chemicals: Commercial Liquid Aluminum Sulfate
- Item 2B Water Treatment Chemicals: Liquid Ammonium Sulfate
- Item 2C Water Treatment Chemicals: Potassium Permanganate
- Item 2D Water Treatment Chemicals: Potassium Hydroxide
- Item 2E Water Treatment Chemicals: Sodium Hypochlorite Bleach 12%-15%
- Item 2F Water Treatment Chemicals: Hydrated Lime
- Item 3 Water Distribution Materials and Supplies
- Item 4A Bulk Highway Materials: Stone Dust/Stone Screenings
- Item 4B Bulk Highway Materials: Pea Stone/Crushed Stone
- Item 4C Bulk Highway Materials: Sand Borrow
- Item 4D Bulk Highway Materials: Loam Borrow
- Item 4E Bulk Highway Materials: Reclaimed Asphalt Borrow

### Service Contracts:

- Item 5 Hauling and Disposal of Construction and Demolition Debris and Bulky Furniture
- Item 6 Equipment Rental with and without Operator
- Item 7 Catch Basin Cleaning
- Item 8 Trash Barrel Service
- Item 9 Pavement Markings

Sealed bids properly marked as identified in the bid specifications shall be accepted at the office of the Hanover Department of Public Works, 40 Pond Street, Hanover MA 02339 on the approved bid forms until 2:00 pm local time on May 28, 2020 at which time they will be opened and read aloud. All bidders must complete and submit the attached Non-Collusion Statement, Bidder's Certification Regarding Payment of Prevailing Wages (where indicated in the bid specification), 5% Bid Bond (where indicated in the bid specification), Tax Compliance Certificate, and Bidder's Qualification Form. Prequalification from MassDOT for Item 9: Pavement Markings is required.

Specifications and proposal forms may viewed and/or downloaded from the Hanover DPW website, <https://www.hanover-ma.gov/public-works/pages/open-bids-and-bid-results>. Documents will be available after 12:00 PM on May 6, 2020. Hardcopies of bid packages can be made available at the Hanover Department Works with an advance request through 781-826-3189.

All materials will meet all applicable standards as identified in the respective bid specifications including those of the Massachusetts Department of Transportation (MassDOT) and American Water Works Association.

All bids must be submitted on the bid forms supplied. All bid forms must be either typewritten or written in ink. All signatures must be in ink.

The Town of Hanover reserves the right to reject any or all bids should it be deemed in the best interest of the Town to do so.

DEPUTY SUPERINTENDENT OF PUBLIC WORKS

Kurt P. Kelley

**Town of Hanover – Department of Public Works  
Specifications for Annual Bid to Furnish Water Meters, Meter Radio Interface Units,  
Meter Reading Software, and Related Equipment**

**I. Invitation to Bid**

1. The Town of Hanover acting through its Director of Public Works is accepting sealed bids from responsible and responsive parties for the furnishing of water meters, meter reading software, meter reading equipment, meter radio read units and related accessories in quantities as estimated on the attached bid sheet, more or less, as ordered, to the Town of Hanover, in accordance with the following specification during the period of July 1, 2020 through June 30, 2021.
2. Sealed bids marked on the outside of the envelope “Bid for water meters and related equipment” shall be accepted at the office of the Hanover Department of Public Works, 40 Pond Street, Hanover MA 02339 on the approved bid forms until 2:00 local time on May 28, 2020 at which time they will be opened and read aloud. All bidders must complete and submit the attached Non-Collusion Statement, Tax Compliance Certificate, Bidders Certification of Minimum Requirements, and the Bidder's Qualification Form. All bid forms must be either typewritten or written in ink. All signatures must be in ink.
3. Copies of this bid package may be viewed and downloaded from the Hanover DPW website at <https://www.hanover-ma.gov/public-works/pages/open-bids-and-bid-results>. Documents will be available after 12:00 PM on May 6, 2020. Hardcopies of bid packages can be made available at the Hanover Department Works with an advance request through 781-826-3189.
4. The Town of Hanover Department of Public Works reserves the right to purchase only the quantities required by the Department.
5. The Town of Hanover reserves the right to issue contracts to vendors for multiple manufactures or to issue additional procurements for additional manufactures during the contract period.
6. The Town of Hanover reserves the right to reject any or all bids should it be deemed in the best interest of the Town to do so.

## II. General Overview

The Hanover DPW has approximately 5,500 water customers, who are presently metered. The Hanover DPW intends to accept bids on meters equipped with a solid-state absolute encoder register with integrated radio to enable meters to be read efficiently and with guaranteed accuracy.

These bid specifications cover product only. Products include: hand-held meter reading equipment, software, and cold water meters with solid-state absolute encoder with integrated high-power radios. The integrated radio will eliminate the need for any wiring and reduce installation cost. The electronic solid-state absolute encoder will provide high resolution, 8-digit reading, leak, tamper, backflow detection and data logging. Leak detection, tamper detection and backflow detection shall be based on 15-minute intervals of flow. The solid-state absolute encoder register with integrated radio shall include water consumption profiling with twenty-four one hour consumption points recorded for 96 consecutive days. The radio shall have a field replaceable battery and have a minimum transmission range of 1,000 feet. The integrated register must be warranted for twenty years, with battery replacement at no cost for ten years.

The specifications include the following sections:

- Meter reading System and Radio Interface
- Electronic Solid-State Absolute Encoder Register
- Cold Water Meter

**Modular System:** It is the intent of this specification to procure a modular meter reading system. Modularity has been deliberately built into the specification to allow legacy touch-read meters to be read as well as to incorporate trends in current and future meter reading technology. Meters shall be either be read manually through a hand held device, semi-automatically through a touch probe that shall interrogate a meter and communicate the reading back to the hand held device through a belt pack via 900 MHz and Bluetooth technology, or automatically through a radio frequency (RF) connection between a meter interface unit and the belt pack adaptor with a Bluetooth or other wireless connection making the final connection between the belt pack adaptor and hand held device. The modularity of the design shall reduce obsolescence as mobile hardware and communication technologies evolve over time. Deviation from the modular design may result in a bidder's response being declared non-responsive .

**Vendor Responsibility:** It is the responsibility of each bidder to carefully examine these specifications and the bid documents and become familiar with the requirements set forth herein. In addition, it is the responsibility of each bidder to submit all necessary information concerning their product to the Town of Hanover. Failure to do so could result in your bid being declared as non-responsive.

**Approved equals:** Throughout this specification, the Town lists detailed specifications for each component of metering system. Where specific products are listed, it is not the intention of the town to limit competition. The specifications listed should be considered minimum specifications and where listed, specific products are in the opinion of the town in compliance with the specification. Where bidders propose equipment not listed in the specification, the bidder shall send necessary drawings and technical data to the Town of Hanover and shall identify all deviations from the standard specification and in narrative form identify why the proposed equipment meets or exceeds the standard specifications. The Town reserves the right to require samples of products and additional documentation to fully test vendor claims.

**Bidder/Manufacturer minimum requirements:**

Bidders must certify on the “Bidder’s Certification of Minimum Requirements” form that they meet the vendor minimum qualifications and that the manufacturer of the proposed equipment meets the manufacturer minimum qualifications listed below:

Bidder (vendor) Minimum Qualifications:

1. Bidders must demonstrate an ongoing program of sales and service of proposed equipment in Massachusetts. At a minimum this shall include at least seven years of selling and servicing the proposed equipment in Massachusetts.
2. Bidders must be fully factory authorized to sell and support equipment proposed and employ at least two full-time factory-certified system specialists to provide ongoing support for equipment and software.
3. The winning bidder must certify that they provide a 24-hour delivery of loaner handheld and mobile drive-by reading units to support the Town of Hanover’s meter reading efforts.
4. Bidders must provide a list of at least five water systems of similar size in Massachusetts where the proposed water meters are currently in use.

Manufacturer Minimum Qualifications:

1. Manufacturer casts all no-lead brass meters in the manufacturer’s foundry (disc, turbine, and compound meters)
2. Manufacturer has offered solid state registers for a minimum of 10 years
3. Manufacturer manufactures, tests, and assembles meters and registers in the United States.
4. Manufacturer offers a probe that is not manufactured by a third party.
5. Manufacturer’s probe is capable of reading Sensus Touch Pads with no delay.

### **III. Meter Reading System & Radio Interface**

#### **1.0 GENERAL SCOPE**

The Town of Hanover DPW issues these bid specifications to procure a meter reading system capable of meeting the current and future meter reading needs within our service area. The scope of work involves, but is not limited to, providing and implementing a meter reading system which includes software, hardware and all necessary training and installation support. The reading equipment shall be capable of reading existing Sensus TouchRead® Electronic Communications Register (ECR) while utilizing a mobile data collection radio receiver at the same time.

The system must utilize an unlicensed radio frequency technology to improve meter reading efficiency including “hard-to-read” meters and increasing meter reader safety. All system parts furnished (reading equipment, RF transmitters, meters with solid-state absolute encoders) shall be produced from an ISO 9001 manufacturing facility.

#### **1.1 SYSTEM OVERVIEW**

The meter reading system shall be adaptable to walk-by and mobile methods of collecting data. The transition from walk-by to mobile shall be seamless and allow all methods to operate together in a hybrid system using the same mobile meter reading software.

The meter reading system shall include a mobile system providing a migration path from the mobile to walk-by applications as required. The difference between the two systems shall be the method of gathering the meter readings. The system is mutually exclusive - it can be used seamlessly. The mobile unit shall be used either as a handheld data collection device or a mobile data collection device driven near the customer premises to collect reads. This method shall add its unique value to the Hanover DPW and the choice shall be driven by the needs of the Hanover DPW and its customers.

- *Host Software* - The software package shall be installed on the host system at the utility site. Its main function shall be to make route assignments to send to the data collection device and to transfer collected information to the billing/CIS system via a transfer file. The utility will be responsible for the transfer file.
- *Data Collection System* - The means of collecting data from the meter interface unit (MIU) installed at the meter site through the delivery of information to the host software. In a walk-by system, it must be a combination handheld/mobile computer capable of reading meters using keyed-entry, probing or RF communications with a belt-clip external receiver.
- *Meter/Radio Units* - Meters assembled with radio devices that shall collect meter usage from the solid state encoder meter register. The radio shall transmit the meter reading and a unique ID number to the data collection device along with leak detection, backflow, no flow detection and 96 consecutive days of twenty-four hours a day of water consumption.

#### **1.2 HOST SOFTWARE**

The Host Software must be able to transfer files between the Utility Billing/CIS System and the data collection devices. The utility will provide the transfer file to the vendor’s file format provided it is a standard ASCII format. The host software must be configurable for either a standalone installation or operate in a client/server environment.

##### **1.2.1 COMPUTER PLATFORM**

The meter reading software must be capable of running in a standalone mode and have the capability to support a Windows Client / Server environment. When operating in either standalone or client/server configurations, the PC computer will be equipped with a minimum Intel 800MHz Processor with at least 256MB of RAM, 1.5 GB of available space on the hard disk space, Super

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VGA (1024x768) or higher resolution video adapter and monitor, keyboard and mouse or compatible pointing device, 24X minimum CD-ROM drive and compatible printer. In addition, the software must be able to operate with Windows 7 professional or later operating system. System must be equipped with an Ethernet network adapter.

When operating in a client/server environment, the meter reading software shall operate on a server with Intel 800MHz or higher, with at least 256MB RAM, 4.0 GB of available space on the hard disk space, Super VGA (1024x768) or higher resolution video adapter and monitor, keyboard and mouse or compatible pointing device, 24X minimum CD-ROM drive and compatible printer. In addition, the software must be able to operate with Windows Server 2000®/Windows Server 2003®. Server must be equipped with an Ethernet network adapter.

Town of Hanover to provide computer(s).

### 1.2.2 BASIC FUNCTIONS

The software must provide easy management of the meter reading data. After the readings are collected, they must be unloaded to the PC for review and reporting and exported to a file to be sent to the Utility Billing/CIS System. New meter reading routes must then be imported into the database and prepared for loading into the handheld. The meter reading software shall manage the routes that are loaded into the data collection device and be able to split them into multiple routes if necessary.

The meter reading software must include the following:

- 1.2.2.1 Loads/unloads from the handhelds via Ethernet communications at a minimum speed of 10 Mbps.
- 1.2.2.2 Allows PC operator to review and edit any account in the meter reading database.
- 1.2.2.3 Generates route and activity reports defined by the user.
- 1.2.2.4 Provides database backup/restore functions.
- 1.2.2.5 Allows user to merge several separate files into one database.
- 1.2.2.6 Allows any unread accounts from a route to be loaded back onto the data collection device.
- 1.2.2.7 Enables the user to setup and save custom report formats.
- 1.2.2.8 Enables the user to specify the data to be exported from the database for transferring to the billing system.
- 1.2.2.9 Allows for database records to be automatically deleted during the export process.
- 1.2.2.10 Enables the user to search the database for records matching specified information.
- 1.2.2.11 Allows the user to define up to 100 notes, which are reviewed and entered on the handheld as two digit numeric codes.

### 1.2.3 TYPICAL READ CYCLE

In a typical Read Cycle, the meter reading system must allow the following operations:

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- 1.2.3.1 Merging of routes into the existing database for loading onto a data collection device.
- 1.2.3.2 The selection of routes to be read, splitting of routes and assignment of routes to a data collection device. Generate the route file and load it onto the data collection device or Flash Drive.
- 1.2.3.3 Unloading routes from the data collection device.
- 1.2.3.4 Posting of readings from the data collection device onto appropriate accounts within the database.
- 1.2.3.5 Making a backup copy of the routes within the database (including current system configuration files).
- 1.2.3.6 Printing pre-selected reports.
- 1.2.3.7 Exporting routes out of the database to be sent back to the utility billing system.

### 1.2.4 REPORTS

Standard reports must include:

- 1.2.4.1 Route Assignments
- 1.2.4.2 Accounts with Readings
- 1.2.4.3 Accounts without Readings
- 1.2.4.5 ID Compare
- 1.2.4.6 Returned With Notes
- 1.2.4.7 Hi/Lo Fails
- 1.2.4.8 Found Meters
- 1.2.4.9 Dashes/Opens
- 1.2.4.10 E-Coder plus data reports
- 1.2.4.11 E-Coder data logging reports
- 1.2.4.12 Leak Detection reports

The software must also provide a powerful custom report generator, allowing the user to select and order specific fields from the database to be printed; in addition, allows the entire database to be sorted by criteria such as date, reader ID or other specified fields.

### 1.2.5 SPECIAL REPORTS

Special Reports must provide meter reader productivity information. The reporting module must also be a detailed productivity report that will list total number of readings for a specific meter reader and book as well as the time elapsed between each read entered. Also available must be a summary of start time, stop time, elapsed time, mean, maximum and minimum read times.



The host software shall be Neptune N\_Sight Mobile or approved equal

### 1.3 DATA COLLECTION SYSTEM

#### 1.3.1 HANDHELD/MOBILE DATA COLLECTOR DEVICE

##### General Description

The hand held device shall be the primary means for a meter reader to navigate through a route, receive and review information about an account, and receive radio and touch reads from a belt clip device. The hand held device shall also be the primary means of communicating the collected readings to the host software through an Ethernet connection. The price quoted shall include all power supplies, batteries, charging cradles, etc. in addition to the basic device.

##### Key Features:

- 1.3.1.1 AMR capability through a Bluetooth connection to the belt clip receiver
- 1.3.1.2 SD card backup of meter reading data
- 1.3.1.3 High-Resolution sunlight-readable VGA display with LED backlighting
- 1.3.1.4 Complies with IP68 & MIL-STD-810F
- 1.3.1.5 Replaceable long-life lithium ion battery – 10+ hours on a single charge

##### Specifications:

- 1.3.1.6 Operating System: Windows Mobile 6.1
- 1.3.1.7 Processor: 806MHz
- 1.3.1.8 Memory: 28 MB DDR SDRAM, 1GB Flash (900LE) & 512MB Flash (900B)
- 1.3.1.9 Display: Sunlight-Readable 480 x 640 pixel (VGA) 16-bit color TFT with LED backlighting
- 1.3.1.10 Keyboard: Physical Numeric
- 1.3.1.11 On-Screen Alpha-Numeric keypad accessible via touchscreen
- 1.3.1.12 Power Supply : Rechargeable lithium ion battery pack - 5000 mAh capacity
- 1.3.1.13 Intelligent fast charge system (4-6 hours)
- 1.3.1.14 Power management system
- 1.3.1.15 Integrated charge status and low battery indicator
- 1.3.1.16 Typical 10+ hour work day
- 1.3.1.17 Communication: Wi-Fi (CCX v4 ASD) (802.11 b/g)
- 1.3.1.18 Bluetooth 2.0 + EDR

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- 1.3.1.19 Audio: Integrated speaker and microphone
- 1.3.1.20 Operating Temperature Range: -22°F to 140°F (-30°C to +60°C)
- 1.3.1.21 Storage: -40°F to +158°F (-40°C to +70°C)
- 1.3.1.22 Humidity: 90% RH temp cycle 32°/158°F (0°C/+70°C)
- 1.3.1.23 Accessories: Ethernet communications and charging cradle
- 1.3.1.24 Spare battery charger
- 1.3.1.25 Hand Strap
- 1.3.1.26 AC Power Adapter
- 1.3.1.27 Anti-Glare screen protector
- 1.3.1.28 Replacement lithium ion battery
- 1.3.1.29 Stylus
- 1.3.1.30 Environmental (Meets or Exceeds):
  - ❖ Water: MIL-STD-810F, Method 510.3, Procedure I, IEC-529, IP68
  - ❖ Sand & Dust: MIL-STD-810F, Method 510.3, Procedure I, II, IEC-529, IP68
  - ❖ Drop: MIL-STD-810F, Method 516.5, Procedure IV
  - ❖ Vibration: MIL-STD-810F, Method 514.5, Procedure I, II
  - ❖ Operating and Storage Temperature: MIL-STD-810F, Method 501.4 - Procedure I, II, Method 502.4 – Procedure I, II, III
  - ❖ Temperature Shock: MIL-STD-810F, Method 503.4, Procedure I
  - ❖ Humidity: MIL-STD-810F, Method 507.4
  - ❖ Altitude: MIL-STD-810F, Method 500.5, Procedure I, II, III
  - ❖ Approvals FCC, CE/R & TTE, IC (Canada), RoHS Compliant, PTCRB, Section 508 compliant, CCX v4 ASD, MIL-STD-461E RE102, MIL-STD-461E RS103

### **Two year comprehensive warranty**

The handheld/mobile data collector device shall be a Trimble Nomad or approved equal

## 1.3.2 **BELT CLIP ADAPTOR**

### **General Description**

The belt clip adaptor shall be a modular RF interface between the hand held data collection devices, meter MIU's, and touch guns. Communication to the hand held device shall be by a Bluetooth connection. Communication with MIU's shall be through RF connection from the MIU. Communication from Touch Probes shall be through unlicensed 914 MHz connection.

### **Key Features:**

- 1.3.2.1 Bluetooth pairing with handheld data collection device

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- 1.3.2.2 SD card backup of meter reading data
- 1.3.2.3 USB charging and communications
- 1.3.2.4 Complies with IP68 & MIL-STD-810F
- 1.3.2.5 Replaceable long-life lithium ion battery – 10+ hours on a single charge

### Specifications:

- 1.3.2.6 Bluetooth 2.1 and USB Communications
- 1.3.2.7 Compatibility with supplied hand held software
- 1.3.2.8 Compatible with Trimble Nomad 900B, Trimble Nomad 900LE, and supplied hand held device
- 1.3.2.9 Minimum 4GB SD card
- 1.3.2.10 Minimum 4 LED identify indicators for Bluetooth communication, RF status, mode status, and battery status
- 1.3.2.11 Power supply rechargeable lithium ion attery pack – 5000mAh capacity minimum, field replaceable
- 1.3.2.12 Maximum dimensions 3.7” high x 1.7” wide x 5.9” long
- 1.3.2.13 Maximum weight 1.2 lbs including battery
- 1.3.2.14 Temperature range: operating -4F to 122F storage -40F to 185F
- 1.3.2.15 Environmental: Tested to MIL-STD-810F and IP67
- 1.3.2.16 Minimum receiver channels: 50
- 1.3.2.17 Minimum number of simultaneous channels: 8
- 1.3.2.18 FCC Class B, IC approvals
- 1.3.2.19 Supplied with spare battery
- 1.3.2.20 Supplied with belt clip, SD card, 12V car to USB power cable
- 1.3.2.21 Minimum 1-year warranty

The belt clip adaptor shall be a Neptune R900 Belt Clip Receiver or approved equal.

### 1.3.3 TOUCH PROBE

#### General Description

The touch probe shall be a compact visual reading device designed for reading remote receptacle pads as well as transmitting touch readings to the belt clip adaptor. It shall be fully capable of reading Sensus touch pads without delay.

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### Specifications:

- 1.3.3.1 Capable of reading Sensus touchpads
- 1.3.3.2 Acknowledge completed meter reads with a short tone and erroneous reads with a long tone
- 1.3.3.3 Transmits readings using a built in transmitter to belt clip adaptor via unlicensed frequency at 914 MHz. 6-ft minimum transmission range. Must meet FCC Part 15 requirements.
- 1.3.3.4 Rechargeable (through 120V wall charger) battery capable of a full day of reading (800-900 readings)
- 1.3.3.5 Equipped with an on-off switch
- 1.3.3.6 Memory OTP: 32K ROM RAM: 256 x 8 bytes
- 1.3.3.7 16 column x 2 line LCD Display with auto temperature compensation
- 1.3.3.8 Pillow embossed and waterproof keys with functions clearly marked
- 1.3.3.9 Inductive probe head capable of reading ProRead (ARB VI), Sensus ECR II and ICE (ECR III) meters
- 1.3.3.10 Operating range -20 degrees C to 50 degrees C
- 1.3.3.11 Water resistant
- 1.3.3.12 Impact resistant, capable of withstanding repeated drops of 3 feet or less to concrete
- 1.3.3.13 Displays meter reading and register identification

The touch probe shall be a Neptune Pocket Proreader RF Visual Reading Device or approved equal.

### 1.3.4 HANDHELD SOFTWARE REQUIREMENTS

The handheld software must be easy to use and give the meter reader control over the route in searching for accounts, tagging accounts for later action, entering related notes and manually reading meters. The handheld software must include entry of meter readings, identification numbers, up to four coded notes and 192 characters of free form notes for each account.

In addition, the handheld software shall include but shall not be limited to the following basic features:

- 1.3.4.1 Definable function keys.
- 1.3.4.2 Allows manual or automatic entry of meter readings, ID numbers and note codes.
- 1.3.4.3 Performs high/low test on readings.
- 1.3.4.4 Date and time stamped to each reading.
- 1.3.4.5 Identifies type of reading - manual keyed, probed or RF MIU.

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- 1.3.4.6 Must be able to read ARB® I - VI & E-Coder and Sensus ECR/ICE 6 wheels and 8 wheels encoders via either wireless, probed reading or via RF MIU.
- 1.3.4.7 Performs unread meter search.
- 1.3.4.8 Found meter processing for new accounts.
- 1.3.4.9 Verifies meter ID numbers when entered with manual meter readings.
- 1.3.4.10 Forward and reverse walk order allowed.
- 1.3.4.11 Data search capability (Display, Notes and ID).
- 1.3.4.12 Auto-Search for automatic reading of encoded meters.
- 1.3.4.13 Displays the number of read and unread accounts on demand.
- 1.3.4.14 Left-to-right, right-to-left or calculator entry of manual meter readings.
- 1.3.4.15 Collect the information for the host to generate reports on leak detection, tamper detection, and backflow conditions.

The handheld software shall be Neptune N\_Sight R900 4.6 or approved

### 1.3.5 RADIO FREQUENCY CAPABILITY

The reading system must be capable of reading water meters equipped with radio frequency meter interface units (MIU's). In the radio read system, the MIU will be integrated into the register housing that will provide the radio link from the meter to the belt clip adapter. Radio read readings will then be transmitted from the belt clip adaptor to the handheld device through a Bluetooth or other wireless connection. The Town reserves the right to purchase and install external MIU's that are similar in functionality to integrated MIU's and the reading system shall read both types of MIU's. Note that while the Town currently has an installed base of Sensus Meter Transceiver Units (MXU's), the reading system does not need to read the Sensus MXU's.

### 1.3.6 RADIO FREQUENCY READING FUNCTION

The function of the handheld/mobile radio frequency mode is to provide the capability of reading meters via radio signals. The belt clip adaptor shall be the means of receiving radio signals from the MIUs. The handheld/mobile unit will receive readings that have been received by the belt clip adaptor through a wireless connection. All transmissions from supported MIUs will be collected. The reading of any MIU shall be automatically stored in the proper account record without the intervention of the meter reader.

Should any MIU not be able to be read during the route, the software shall support storage of a flag in the account record, indicating clearly that the MIU could not be read. When reading the meters in the RF mode, it should not require the meter reader to activate any wake-up tone.

## 1.4 RADIO FREQUENCY SPECIFICATIONS

### 1.4.1 RADIO FREQUENCY TRANSMITTER

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The radio frequency transmitter must be integrated within the solid-state water meter register with a field replaceable battery attached to the top cover of the register. The transmitter shall interrogate the encoder register and transmit the meter reading and other information to a remote reading device every 15 seconds. The same RF MIUs must be capable of being read by a walk-by handheld/mobile computer equipped with a RF interface unit. The integrated MIUs shall be manufactured in both basement and pit models. The basement MIU shall have the ability to be mounted in a basement and the pit MIU shall have the ability to be mounted in a pit or an underground vault. The pit MIU shall be a fully potted waterproof design.

### 1.4.2 PHYSICAL/MECHANICAL REQUIREMENTS

#### Integrated Radio Unit (enclosed within the register)

- 1.4.2.1 The device shall provide a location for a tamper deterrent seal. Tampering with the device functions or connections shall not be possible without causing visible damage to the device exterior or to the seal.
- 1.4.2.2 The device shall be capable of operating at temperatures of -22°F to 149°F (-30°C to +65°C) with a humidity factor of 0 to 95%.
- 1.4.2.3 The circuit board will be coated for moisture protection.
- 1.4.2.4 The battery will be protected by encapsulation in a hard potting material.
- 1.4.2.5 The unit must be capable of retrofitting to existing installations.
- 1.4.2.6 The MIU device must be protected against static discharge without loss of data per IEC 801-2,

### 1.5 OPERATION SPECIFICATIONS

- 1.5.1 The manufacturer will guarantee that the reading obtained electronically matches the LCD display read on the register when the register is interrogated by the MIU. Synchronization of electronic reading and mechanical read for any reason is not acceptable.
- 1.5.2 For the purpose of ease of implementation, the system shall not require any special licensing, including licenses from FCC. The system must, therefore, operate in the 902 MHz to 928 MHz unlicensed bandwidth.
- 1.5.3 The system implementation shall not be delayed due to the uncertainty of Federal licensing requirements.
- 1.5.4 The system must be expandable at any time without getting authorization from the FCC.
- 1.5.5 No wake-up tone shall be necessary.
- 1.5.6 To minimize the potential for RF interference from other devices, the MIU shall transmit using the Frequency Hopping Spread Spectrum technique comprised of alternating pseudo-random frequencies within the 902 MHz to 928 MHz unlicensed bandwidth.

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- 1.5.7 The meter interface unit shall operate within FCC Part 15 regulations for devices operating in the 902 MHz to 928 MHz unlicensed bandwidth. The output power of the devices will be governed by their conformance with these relevant FCC standards.
- 1.5.8 Output power shall meet FCC Part 15.247 requirements and shall be a minimum of 100 milliwatts.
- 1.5.9 Power shall be supplied to the MIU by a lithium battery. The Vendor shall warrant that any battery provided and installed in the MIUs by the Vendor shall be free of manufacture and design defects for a period of twenty years - the first ten (10) years from their date of shipment from factory without pro-rating, and the second ten (10) years with pro-rating, as long as the MIU is working under the environmental and meter reading conditions specified.
- 1.5.10 The battery life shall not be affected by outside erroneous wake-up tones (i.e. other water, gas, or electric utilities reading and therefore sending out a wake-up tone).
- 1.5.11 The number of reads performed must not affect the battery life.
- 1.5.12 The batteries shall be field replaceable (the replacement shall be demonstrated) and be designed for 20 year life expectancy. The MIU shall not require reprogramming if the battery discharges before it is replaced.
- 1.5.13 No MIU programming shall be necessary for installation.
- 1.5.14 The MIU shall not send readings older than an hour. Sending a reading older than an hour when wire is cut is not acceptable, as it can lead to mis-billing.
- 1.5.15 The MIU shall transmit the meter reading continuously at a predetermined transmission interval.
- 1.5.16 Each device shall have a unique pre-programmed identification number of 10 characters. ID numbers will be permanent and shall not be altered. Each device shall be labeled with the ID number in numeric and bar code form. The label shall also display FCC approval information, manufacturer's designation, and date of manufacture. A duplicate self-stick tear-off label with barcode data must also be provided. The duplicate can be affixed to the work order and scanned to ensure accurate and efficient data entry.
- 1.5.17 The MIU shall transmit the meter reading and a unique MIU ID number.
- 1.5.18 The MIU shall be integrated inside the solid state register.
- 1.5.19 The handheld/mobile reading equipment shall provide a test mode to verify proper operation of the MIU by displaying the MIU ID number and meter reading.
- 1.5.20 The MIU shall be capable of being received by a handheld receiver and mobile data collection receiver.

## **IV. Electronic Solid-State Absolute Encoder Specifications**

### **1.0 GENERAL SCOPE**

These specifications cover a self-contained solid state register-metering system designed to obtain remote simultaneous water meter registration that is to exactly match the registration on the register odometer. The register shall read in cubic feet as ordered by the Town of Hanover. The metering information shall be obtained through an integrated radio housed within the register. The above system shall be configured as follows:

- 1.0.1 Solid-state absolute meter register — Direct mounting, electro-magnetically encoded measuring element into an electronic solid-state odometer. Register shall provide value-added flow data including leak, tamper, back flow detection and data profiling when interrogated by the RF AMR MIU. Batteries and digital counters using volatile memory are not allowed. Register shall display flow rate information.
- 1.0.2 Integrated radio housed within the register providing a communication link for the transmission of information from the register to the handheld or mobile data collection device.

### **1.1 REGISTER UNIT**

- 1.1.1 The register shall provide at least a nine-digit visual registration at the meter.
- 1.1.2 The unit shall provide an 8-digit meter reading for transmission through the radio MIU.
- 1.1.3 The register shall have a high resolution nine-digit LCD display for meter testing.
- 1.1.4 The register shall employ a visual LCD leak detection indicator as well as provide remote leak detection through an ASCII format to the MIU.
- 1.1.5 Internal batteries shall not be allowed.
- 1.1.6 The manufacturer will guarantee that the reading obtained electronically matches the LCD odometer reading on the register.
- 1.1.7 The register should accumulate and register consumption without connecting to a receptacle or MIU.
- 1.1.8 The register shall display flow rate information.

### **1.2 REGISTER UNIT MECHANICAL CONSTRUCTION**

- 1.2.1 The wall unit shall possess a hermetic sonic welded polycarbonate enclosure and lens. The pit unit shall have a rolled-seal enclosure with copper shell and glass lens.
- 1.2.2 The register shall be attached to the meter case by a bayonet attachment. Fastening screws or nuts shall not be required. A tamper-proof seal pin shall be used to secure the register to the maincase.
- 1.2.3 The register shall be removable from the meter without disassembling the meter body and shall permit field installation and/or removal without taking the meter out of service.
- 1.2.4 Provision shall be made in the register for the use of seal wires to further secure the register.
- 1.2.5 Radio frequency MIU must be integrated into the solid-state register.



1.3 REGISTER UNIT MECHANICAL CONSTRUCTION

- 1.3.1 The solid-state absolute encoder register shall incorporate an Application Specific Integrated Circuit (ASIC) and firmware designed to verify accurate measurement, information transmission and data integrity.
- 1.3.2 The Radio MIU will be integrated within the solid-state encoder register housing. The MIU power supply (battery) must be mounted on the outside of the register and be field replaceable.

1.4 METER READING INFORMATION

- 1.4.1 The solid-state absolute register shall provide to the reading equipment an eight-digit meter reading. An identification number of ten digits shall be transmitted with each reading when being read using a handheld radio read collection device.
- 1.4.2 The solid state absolute register shall provide additional value-added information remotely when interrogated by the radio MIU (i.e. detailed leak detection data, days of leak state, days of no consumption, back flow indication and data profiling). This information shall be communicated through the register protocol and RF MIU to the handheld software to allow the seamless integration of data into the data management software.

## **V. Cold Water Meters/Displacement Type - Magnetic Drive 5/8"-2" Specifications**

### **1.0 GENERAL SCOPE**

Except as otherwise modified or supplemented herein, the latest revision of AWWA Standard C-700 for Cold Water Meters shall govern the materials, design, manufacture, and testing of all meters furnished under this specification or equal as approved by the Director or his appointed agent. Multi jet and single jet meters will not be accepted.

The town reserves the right to request a sample meter to study prior to awarding the proposal.

### **1.1 TYPE**

Magnetic driven, positive displacement meters of the flat nutating disc type are required.

### **1.2 SIZE, CAPACITY, LENGTH**

The size, capacity, and meter lengths shall be as specified in AWWA Standard C700 (latest revision). The maximum number of disc nutations is not to exceed those specified in AWWA C700 latest revision.

### **1.3 MAINCASES**

- 1.3.1 All meter maincases shall be made of a no lead high copper alloy brass containing a minimum of 85% copper that meets the ANSI/NSF 61 standard.
- 1.3.2 The serial number should be stamped between the outlet port of the maincase and the register. Maincase markings shall be cast raised and shall indicate size, model, direction of flow, and NSF 61 certification. Plastic maincases are not acceptable.
- 1.3.3 Maincases for 5/8", 3/4" and 1" meters shall be of the removable bottom cap type with the bottom cap secured by four (4) bolts on 5/8" and 3/4" sizes and six (6) bolts on the 1" size. Intermediate meter maincases shall also be made of the same lead-free brass material in sizes 1-1/2" and 2" with a cover secured to the maincase with eight (8) bolts.
- 1.3.4 Meters with a frost plug, a screw-on design or no bottom cap shall not be accepted in 5/8"-1" sizes. The 5/8" meters shall have a synthetic polymer or cast iron bottom cap option.
- 1.3.5 1-1/2" and 2" meters shall have flange dimensions as indicated by AWWA standards.
- 1.3.6 All no lead maincases shall be guaranteed free from manufacturing defects in workmanship and material for the life of the meter.

### **1.4 BOLTS**

All maincase bolts shall be of 300 series non-magnetic stainless steel to prevent corrosion.

### **1.5 MEASURING CHAMBER**

- 1.5.1 The measuring chamber shall be of a 2-piece snap-joint type with no fasteners allowed. The chamber shall be made of a non-hydrolyzing synthetic polymer.
- 1.5.2 The control block shall be the same material as the measuring chamber and be located on the top of the chamber. The control block shall be located after the strainer.

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- 1.5.3 The measuring chamber outlet port shall be sealed to the maincase outlet port by means of an “O” ring gasket.
- 1.5.4 The flat nutating disc shall be a single piece made from non-hydrolyzing synthetic polymer and shall contain a type 316 stainless steel spindle. The nutating disc shall be equipped with a synthetic polymer thrust roller located within the disc slot. The thrust roller head shall roll on the buttressed track provided by the diaphragm.
- 1.5.5 The chamber shall be warranted for 10 years against freeze damage if the meter has been equipped with a frost proof cast iron or synthetic polymer bottom cap.

### 1.6 STRAINERS

All meters shall contain a removable polypropylene plastic strainer screen. The strainer shall be located near the maincase inlet port, before the measuring chamber. The strainer shall also function as the device that holds the measuring chamber in place within the maincase. Straps or other types of fasteners shall not be accepted.

### 1.7 PERFORMANCE

To ensure accuracy, each meter must be accompanied by a factory test tag certifying the accuracy at the flows required by AWWA C700 (latest revision). All meters shall be warranted as follows:

| Size | Low Flow     | Low Flow New Meter Accuracy | Low Flow Repaired Meter Accuracy |
|------|--------------|-----------------------------|----------------------------------|
| 5/8" | 1/4 gpm @95% | 5 Yrs. or 500 KGal          | 5-10 Yrs. or 1.5MGal             |
| 3/4" | 1/2 gpm @95% | 5 Yrs. or 750 KGal          | 5-10 Yrs. or 2.3MGal             |
| 1"   | 3/4 gpm @95% | 5 Yrs. or 1 MGal            | 5-10 Yrs. or 3MGal               |
| 1.5" | 1.5 gpm @95% | 2 Yrs. or 1.6 MGal          | 10 Yrs. or 5MGal                 |
| 2"   | 2 gpm@95%    | 2 Yrs. or 2.7 MGal          | 10 Yrs. or 8MGal                 |

Normal meter operating range shall be as follows:

| Size | Accuracy Range $\pm 1.5\%$ |
|------|----------------------------|
| 5/8" | 1/2 - 20 gpm               |
| 3/4" | 3/4 - 30 gpm               |
| 1"   | 1 - 50 gpm                 |
| 1.5" | 2 - 100 gpm                |
| 2"   | 2.5 - 160 gpm              |

### 1.8 MANUFACTURER

- 1.8.1 Bids will be accepted only from those companies who are actively engaged in the manufacturer of a complete line of water meters of various types, (i.e. turbine and compound).

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1.8.2 All meters furnished shall be manufactured by a registered ISO 9001 quality standard facility.

1.8.3 Meters and meter parts shall be manufactured, assembled, and tested within the United States. Manufacturers may be required to provide proof of where and of what percentage of the meter register, chamber, and main case is manufactured in the United States.

1.8.4 Manufacturers shall have a minimum of fifteen years of field and production experience with all sizes and models quoted. Manufacturers shall provide only one model of meter, which complies with these specifications. Suppliers must have been manufacturing meters for at least 100 years.

### 1.9 ACCEPTABLE METERS

In the interest of standardization, the following meter lines are acceptable to the Town of Hanover provided they fully comply with the above specifications and meet all requirements in the bid package:

- Neptune Model T-10 (series)
- Approved Equal

All meter models above shall be at a minimum magnetic driven, positive displacement meters of the flat nutating disc type.

## **VI - Turbine Type Specifications Cold Water Meters (1½" - 10")**

### **1.0 GENERAL SCOPE**

All meters, 1 ½ " - 10" furnished, shall meet or exceed the latest revision of AWWA Standard C701. This standard is considered by the Town of Hanover to be minimum requirements and shall be supplemented herein to ensure the quality required by the utilities department.

The town reserves the right to request a sample meter to study prior to awarding the proposal.

### **1.1 TYPE**

Meters shall be of the in-line horizontal-axis type per AWWA Class II.

### **1.2 CAPACITY**

The capacity of the meters in terms of normal operating range, maximum continuous flow, maximum loss of head, and maximum intermittent flow shall be as shown below:

| <b>Size</b> | <b>Normal Operating Range (gpm)</b> | <b>Maximum Continuous Flow (gpm)</b> | <b>Maximum Loss of Head at Max Cont Flow (psi)</b> | <b>Maximum Intermittent Flow (gpm)</b> |
|-------------|-------------------------------------|--------------------------------------|----------------------------------------------------|----------------------------------------|
| 1 1/2"      | 4 - 160                             | 160                                  | 4                                                  | 200                                    |
| 2"          | 4 - 200                             | 200                                  | 4.5                                                | 250                                    |
| 3"          | 5 - 450                             | 450                                  | 5                                                  | 560                                    |
| 4"          | 10 - 1200                           | 1200                                 | 5.5                                                | 1500                                   |
| 6"          | 20 - 2500                           | 2500                                 | 5                                                  | 3100                                   |
| 8"          | 35 - 4000                           | 4000                                 | 5                                                  | 5000                                   |
| 10"         | 50 - 6500                           | 6500                                 | 3.5                                                | 8000                                   |

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### 1.3 SIZE

The size of the meters shall be determined by the nominal size (in inches) of the opening in the inlet and outlet flanges. Overall lengths of the meters shall be as follows:

| Meter Size | Laying Length          | Meter/Strainer Combined Length |
|------------|------------------------|--------------------------------|
| 1 1/2"     | 10" (13" w/test spool) | —                              |
| 2"         | 10"                    | 17"                            |
| 3"         | 12"                    | 18"                            |
| 4"         | 14"                    | 21.5"                          |
| 6"         | 18"                    | 27"                            |
| 8"         | 20"                    | 30"                            |
| 10"        | 26"                    | 41"                            |

### 1.4 CASE AND COVER

- 1.4.1 The maincase and cover shall be cast from an ANSI/NSF 61 certified no-lead alloy containing a minimum of 85% copper.
- 1.4.2 The size, model, and arrows indicating direction of flow shall be cast in raised characters on the maincase or cover.
- 1.4.3 The cover shall contain a calibration vane for the purpose of calibrating the turbine measuring element while the meter is in-line and under pressure. The calibration vane shall be mounted under the register or shall be covered by a protective cap that is attached in a tamper-resistant device.

### 1.5 EXTERNAL BOLTS

Casing bolts shall be made of AISI Type 316 stainless steel.

### 1.6 CONNECTIONS

Maincases shall be flanged. 1-1/2" and 2" sizes shall be oval flanged and 3" through 10" sizes shall be round flanged per Table 3, AWWA C701 (latest revision).

### 1.7 REGISTERS

- 1.7.1 Registers shall be permanently rolled-sealed, straight reading, indicating in cubic feet, gallons, or cubic meters. Registers shall include a center-sweep test hand, a low flow indicator and a glass lens. Registers shall be serviceable without interruption of the meter's operation.
- 1.7.2 Register boxes and covers shall be of bronze composition. The name of the manufacturer and the meter serial number shall be clearly identifiable and located on the register box cover.

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1.7.3 The register box shall be affixed to the top cover by means of a plastic tamper-proof seal pin that must be destroyed in order to remove the register.

1.7.4 The meter serial number shall be imprinted on the meter maincase or cover as well as the register box cover.

### 1.8 MEASURING CHAMBER

The turbine measuring chamber shall be a self-contained unit attached to the cover for easy removal. The turbine spindles shall be stainless steel; turbine shafts shall be tungsten carbide.

### 1.9 UNITIZED MEASURING ELEMENT

A UME is a complete assembly, factory calibrated to AWWA standards that includes the cover, registers, and both a turbine measuring element assembly. It shall be easily field removable from the meter body without the requirement of unbolting flanges.

### 1.10 INTERMEDIATE GEAR TRAIN

The intermediate gear train shall be directly-coupled to the turbine rotor and magnetically coupled to the register through the meter cover. All moving parts of the gear train shall be made of a self-lubricating polymer or stainless steel for operation in water.

### 1.11 REGISTRATION ACCURACY

Registration accuracy over the normal operating range shall be 98.5% to 101.5%. Manufacturer shall furnish a certificate showing that each meter has been tested for accuracy of registration and that each meter complies with the accuracy and capacity requirements of AWWA C701, Standard for Cold-Water Meters-Turbine Type (latest revision).

### 1.12 REMOTE CAPABILITY OPTIONS

1.12.1 Type A — All meters shall be equipped with encoder remote registers per AWWA C707 (latest revision), and meet all AWWA C701 performance standards.

1.12.2 Type B — All meters shall be equipped with generator remotes per AWWA C706, (latest revision) shall meet all AWWA C701 performance standards, and shall include all hardware. Two-wire cable shall not be included in quoted meter prices.

### 1.13 MANUFACTURER

1.13.1 Bids will be accepted only from those companies who are actively engaged in the manufacture of a complete line of water meters of various types, (i.e. turbine and compound).

1.13.2 All meters furnished shall be manufactured by a registered ISO 9001 quality standard facility.

1.13.3 Meters shall be manufactured by a company with a minimum of ten (10) years of experience in manufacturing of water meters. All water meters and meter components shall be assembled and tested within the Continental United States of America. Manufacturer's corporate home office shall be in the United States.

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- 1.13.4 Manufacturers shall have a minimum of fifteen years of field and production experience with all sizes and models quoted. Manufacturers shall provide only one model of meter, which complies with these specifications.

1.13 ACCEPTABLE METERS

In the interest of standardization, the following meter lines are acceptable to the Town of Hanover provided they fully comply with the above specifications and meet all requirements in the bid package:

- Neptune HP Turbine
- Approved Equal

All meter models above shall be at a minimum turbine type meters.



## **VII - Cold Water Meters/Compound Type Specifications (2" – 6")**

### **1.0 GENERAL SCOPE**

All specifications meet or exceed the latest revision of AWWA C702. All compound meters must be NSF-61 certified.

### **1.1 TYPE**

Compound meters shall consist of a combination of an AWWA Class II turbine meter for measuring high rates of flow and a nutating disc type positive displacement meter for measuring low rates of flow enclosed in a single maincase. An automatic valve shall direct flows through the disc meter at low flow rates and through the turbine meter at high flow rates. At high flow rates, the automatic valve shall also serve to restrict the flow through the disc meter to minimize wear.

### **1.2 OPERATING CHARACTERISTICS**

The meters shall comply with the operating characteristics shown below:

| <b>Size</b> | <b>Normal Operating Range (gpm)</b> | <b>Maximum Continuous Flow (gpm)</b> | <b>Maximum Loss of Head at Max Cont Flow (psi)</b> | <b>Maximum Intermittent Flow (gpm)</b> | <b>Low Flow (gpm)</b> |
|-------------|-------------------------------------|--------------------------------------|----------------------------------------------------|----------------------------------------|-----------------------|
| 2"          | 1/2 – 200                           | 160                                  | 8                                                  | 200                                    | 1/8                   |
| 3"          | 1/2 – 450                           | 350                                  | 8                                                  | 450                                    | 1/8                   |
| 4"          | 1 – 1000                            | 700                                  | 8                                                  | 1000                                   | 1/2                   |
| 6"          | 1 1/2 - 2000                        | 1400                                 | 8.5                                                | 2000                                   | 3/4                   |

### **1.3 SIZE**

The size of meters shall be determined by the nominal size (in inches) of the opening in the inlet and outlet flanges. Overall lengths of the meters shall be as follows:

| <b>Meter Size</b> | <b>Laying Length</b> |
|-------------------|----------------------|
| 2"                | 15 1/4"              |
| 3"                | 17"                  |
| 4"                | 20"                  |
| 6"                | 24"                  |

### **1.4 CASE AND COVER**

- 1.4.1 The maincase and cover shall be cast from no lead brass containing a minimum of 85% copper such as Envirobrass II.

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1.4.2 The size, model, and arrows indicating direction of flow shall be cast in raised characters on the maincase and cover.

1.4.3 The covers all contain a stainless steel calibration vane for the purpose of calibrating the turbine measuring element while the meter is in-line and under pressure. A test plug shall be located in the maincase or the cover for the purpose of field testing of the meter.

### 1.5 EXTERNAL BOLTS

Casing bolts shall be made of AISI Type 316 stainless steel.

### 1.6 CONNECTIONS

Maincases shall be flanged. The 2" meters shall be oval flanged and 3" through 6" sizes shall be round flanged per Table 4, AWWA C702.

### 1.7 REGISTERS

The flow of the turbine and disc meters and their total will be the registration of the compound meter. All meters shall be provided with solid-state absolute encoder registers. The registers shall be serviceable without interruption of the meter's operation.

### 1.8 MEASURING CHAMBERS

1.8.1 The turbine-measuring chamber shall be a self-contained unit, attached to the cover for easy removal. The turbine shaft shall be tungsten carbide with tungsten carbide inserts and shall rotate in removable graphite bushings. Thrust bearings shall be tungsten carbide.

1.8.2 The nutating disc chamber shall be a self-contained unit mounted on the cover and easily removable from the cover. It shall conform to AWWA Standard C700 for the following sizes: 2" and 3"-5/8" disc, 4"-3/4" disc, 6"-1" disc.

### 1.9 UNITIZED MEASURING ELEMENT

A UME is a complete assembly, factory calibrated to AWWA standards that includes the cover, registers, and both a turbine measuring element and a nutating disc chamber assembly. It shall be easily field removable from the meter body without the requirement of unbolting flanges.

### 1.10 INTERMEDIATE GEAR TRAIN – TURBINE SECTION

The intermediate gear train shall be directly coupled from the turbine rotor and magnetically coupled to the register through the meter cover. The gear train shall be housed in the turbine measuring chamber. All moving parts of the gear train shall be made of a self-lubricating polymer or stainless steel for operation in water.

### 1.11 AUTOMATIC VALVE

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- 1.11.1 The automatic valve shall be of the spring-loaded, poppet type. All valve parts shall be made of no lead brass containing a minimum of 85% copper such as Envirobrass II, stainless steel, or a suitable polymer with a replaceable semi-hard EPDM rubber seat.
- 1.11.2 Only the cover must be removed to gain access to the valve for inspection or service.
- 1.11.3 The disc meter shall include a self-actuated valve that directs flow through the disc meter at low flow rates and through the turbine meter at high flow rates. At high flow rates, the self-actuated throttle valve shall restrict the flow through the disc meter to minimize wear.

### 1.12 STRAINER

A strainer shall be provided for the disc meter. It shall be easily removable and have an effective straining area of double the disc meter inlet.

### 1.13 MANUFACTURER

- 1.13.1 Bids will be accepted only from those companies who are actively engaged in the manufacturer of a complete line of water meters of various types, (i.e. turbine and compound).
- 1.13.2 All meters furnished shall be manufactured by a registered ISO 9001 quality standard facility.
- 1.13.3 Meters shall be manufactured by a company with a minimum of ten (10) years of experience in manufacturing of water meters. All water meters and meter components shall be assembled and tested within the Continental United States of America. Manufacturer's corporate home office shall be in the United States.
- 1.13.4 Acceptable meters shall have a minimum of five years of successful field use.

### 1.14 ACCEPTABLE METERS

In the interest of standardization, the following meter lines are acceptable to the Town of Hanover provided they fully comply with the above specifications and meet all requirements in the bid package:

- 1. Neptune TRU/FLO Compound
- 2. Approved Equal

All meter models above shall be at a minimum magnetic driven low flow disc type meter coupled with a magnetic driven high flow turbine type meter.

## VIII -Training

### 1.0 TRAINING

- 1.0.1 **Prerequisite to installation.** The Town of Hanover requires that its staff be trained prior to the commencement of installations. No installations will be permitted until training is completed.
- 1.0.2 **Training on installed equipment.** Vendor shall perform all training using the Town of Hanover AMR system equipment. This includes the control computer, data collection unit and several meters with MIUs.
- 1.0.3 **Location.** All training shall be performed at the Hanover DPW office at 40 Pond Street, Hanover, Massachusetts.
- 1.0.4 **Curriculum.** The Vendor shall provide thorough training for all aspects of AMR system operation and must include the following.
  - 1.0.4.1 Obtaining readings and consumption data from the system.
  - 1.0.4.2 Transferring readings and other information between the AMR system and billing system.
  - 1.0.4.3 Creating reports.
  - 1.0.4.4 Troubleshooting and diagnostic procedures for all AMR system components.
  - 1.0.4.5 Changing or adding customer accounts/MIU/meters to the system.
  - 1.0.4.6 AMR installation procedures based on manufacturer documents and requirements.
- 1.0.5 **Training Checklist.** Vendor shall provide training checklist in order to review training topics covered. Upon completion of review both vendor and appropriate utility personnel shall initial checklist.
- 1.0.6 **Training cost:** The cost of training shall be carried in the unit prices proposed on the bid sheet.

## IX - Support

### 1.0 SUPPORT

- 1.0.1 **Telephone support.** Vendor shall provide trained persons to answer technical questions and guide the Town of Hanover employees through the use or diagnosis of the system through a toll-free number. Telephone support shall be available at a minimum from 8:00 a.m. through 6:00 p.m. Eastern time. Indicate telephone support hours proposed and response time expected.
- 1.0.2 **On-site support and additional training.** The Town of Hanover requires that a manufacturer representative visit the appropriate utility personnel on no less than a quarterly basis to provide service and support for the life of the system. Additional on-site training shall also be available for a daily fee if necessary.

## X. Pricing Structure and Rule for Award

- 1. Bidders shall quote unit prices for each item on the bid form, delivered, based on the delivery information listed in the delivery section (section XI) of this specification. This price shall include any and all fees and surcharges and shall be firm for the contract period.
- 2. While this is a unit price contract and the Town reserves the right to adjust actual quantities ordered, one contract will be awarded to the responsible and responsive bidder who offers the lowest overall expected price for the proposed equipment based on the estimated quantities on the bid sheet and the proposed unit prices, delivered, for each item on the bid sheet.

## XI. Deliveries

- 1. Deliveries shall be made only between the hours of 7:00 am and 2:30 pm, Monday through Friday. Deliveries outside of these hours may be allowed upon prior arrangements with the Town at no additional cost to the Town.
- 2. Deliveries shall be made to either the Pond Street Water Treatment Plant, 40 Pond Street, Hanover MA or the Hanover Water Distribution Garage, 219 Winter Street, Hanover, MA. The proper delivery information will be specified at the time of ordering. All delivery trucks shall bear a current Massachusetts seal of inspection, and shall be properly insured. Any damages to Town property caused by the vendor shall be repaired and paid for by the vendor.
- 3. The bidder shall be in compliance with all Federal and State regulations.
- 4. If awarded a contract for meters, the bidder guarantees to start delivery of the meters within thirty days of execution of the contract in quantities as specified by the Director of Public Works or his designee.

## XII. Bid Sheet Additional Instructions

The bid sheet lists types and sizes of meters. The specification lists requirements for meters, absolute encoder registers, and meter interface units separately. In proposing prices, meter prices shall include the meter as well as the absolute encoder register and integrated meter interface unit as one complete unit.

### **XIII. Bid Form**

The undersigned hereby proposes and agrees to furnish the Town of Hanover with water meters, software, reading equipment and related accessories, in accordance with the specifications listed above during the period of July 1, 2020, through June 30, 2021.

The price per item is as listed on the attached bid form. Quantities listed are estimated quantities. The prices submitted are unit prices for each item and shall include all delivery charges, insurance charges, and all fees and surcharges.

The Town of Hanover Department of Public Works reserves the right to purchase only the quantities required by the Department.

The prices on the bid sheet are for the period of 12 months as indicated. In the event market conditions would cause a price change, the bidder agrees to provide one month advance notice of the price change and accept an order for delivery at the above quoted price up to 60 days following the date of notification provided the order is placed within 30 days of receipt of the price change notice and/or cancel the agreement.

All deviations from the specifications must be submitted in writing with the bid. Any products proposed as equal must be so noted and accompanied by technical documentation and narratives as required by the specification to allow the Town to fully evaluate compliance with the specification. The town reserves the right to request sample products of “or equal” submittals to fully investigate the technical capabilities of said products and determine compliance with the specifications.

| <b>Item Number</b>                          | <b>Description</b>                                                | <b>Estimated Quantity</b> | <b>Unit Price</b> |
|---------------------------------------------|-------------------------------------------------------------------|---------------------------|-------------------|
| <b>Meter Reading Software and Equipment</b> |                                                                   |                           |                   |
| 1.1                                         | Host Software                                                     | 0                         |                   |
| 1.2                                         | Handheld/Mobile Data Collector Device with all necessary software | 1                         |                   |
| 1.2                                         | Belt Clip                                                         | 1                         |                   |
| 1.3                                         | Touch Probe                                                       | 1                         |                   |
| <b>Displacement Type Meters</b>             |                                                                   |                           |                   |
| 2.1                                         | Displacement Type Meter - 5/8 inch                                | 600                       |                   |
| 2.2                                         | Displacement Type Meter – ¾ inch                                  | 20                        |                   |
| 2.3                                         | Displacement Type Meter – 1 inch                                  | 20                        |                   |
| 2.4                                         | Displacement Type Meter – 1.5 inch                                | 20                        |                   |
| 2.5                                         | Displacement Type Meter – 2 inch                                  | 10                        |                   |
| <b>Turbine Meters</b>                       |                                                                   |                           |                   |
| 3.1                                         | Turbine Meter – 1.5 inch                                          | 1                         |                   |

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|                             |                         |    |  |
|-----------------------------|-------------------------|----|--|
| 3.2                         | Turbine Meter – 2 inch  | 1  |  |
| 3.3                         | Turbine Meter – 3 inch  | 1  |  |
| 3.4                         | Turbine Meter – 4 inch  | 1  |  |
| 3.5                         | Turbine Meter – 6 inch  | 1  |  |
| 3.6                         | Turbine Meter – 8 inch  | 1  |  |
| 3.7                         | Turbine Meter –10 inch  | 1  |  |
| <b>Compound Type Meters</b> |                         |    |  |
| 4.1                         | Compound Meter – 2 inch | 10 |  |
| 4.2                         | Compound Meter – 3 inch | 5  |  |
| 4.3                         | Compound Meter – 4 inch | 5  |  |
| 4.4                         | Compound Meter – 6 inch | 1  |  |

5.0 Host software name, version, manufacturer:

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6.0 Handheld data collector name, version, manufacturer:

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7.0 Handheld software name, version, manufacturer:

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8.0 Belt clip adaptor manufacturer, model:

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9.0 Touch probe manufacturer, model:

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10.0 Displacement meter manufacturer, model(s), place of manufacture:

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11.0 Turbine meter manufacturer, model(s), place of manufacture:

Hanover Annual Bids Item # 1: Meters & Reading Equipment

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12.0 Compound meter manufacturer, model(s), place of manufacture:

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|                  |                          |
|------------------|--------------------------|
| _____<br>Company | _____<br>By<br>Signature |
| _____<br>Address | _____<br>Print Name      |
| _____<br>Address | _____<br>Title           |
| _____<br>Date    | _____<br>Telephone       |

All bidders must complete the attached Certificate of Non-Collusion, Tax Compliance Certificate, Bidders certification of Minimum Requirements, and Bidder's Qualification Form.

The Town of Hanover reserves the right to reject any or all bids should it be deemed in the best interest of the Town to do so.

Sealed bids shall be accepted at the office of the Hanover Department of Public Works, 40 Pond Street, Hanover MA 02339 on the approved bid forms until 2:00 pm local time on May 28, 2020 at which time they will be opened and read aloud. All bid forms must be either typewritten or written in ink. **All signatures must be in ink.**



**Bidder's Certification of Minimum Requirements**

Bidder (vendor) Minimum Qualifications:

Bidders must demonstrate an ongoing program of sales and service of proposed equipment in Massachusetts. At a minimum this shall include at least seven years of selling and servicing the proposed equipment in Massachusetts. Please list the number of years selling and servicing the proposed equipment in Massachusetts: \_\_\_\_\_

Bidders must be fully factory authorized to sell and support equipment proposed and employ at least two full-time factory-certified system specialists to provide ongoing support for equipment and software. Please certify that you are factory authorized and list the number of full-time factory-certified system specialists that you employ:

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The winning bidder must certify that they provide a 24-hour delivery of loaner handheld and mobile drive-by reading units to support the Town of Hanover's meter reading efforts. Please certify the availability of loaner equipment

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Bidders must provide a list of at least five water systems of similar size in Massachusetts where the proposed water meters are currently in use. Please list at least five systems below where proposed equipment is in use:

| Water Supply | Approximate Number of Accounts |
|--------------|--------------------------------|
|--------------|--------------------------------|

|       |       |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

Manufacturer Minimum Qualifications:

Manufacturer casts all no-lead brass meters in the manufacturer's foundry (disc, turbine, and compound meters)  
Manufacturer has offered solid state registers for a minimum of 10 years  
Manufacturer manufactures, tests, and assembles meters and registers in the United States.  
Manufacturer offers a probe that is not manufactured by a third party.  
Manufacturer's probe is capable of reading Sensus Touch Pads with no delay.

Hanover Annual Bids Item # 1: Meters & Reading Equipment

Please certify the manufacturer's minimum qualifications to service this contract:

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Attach additional sheets as necessary.

I hereby certify under the penalties of perjury that the statements I have made in Bidder's certificate of minimum requirements are true to the best of my knowledge and belief and in submitting this certificate I certify that my firm and the proposed manufacture meet the minimum requirements as outlined in this document.

---

Signature of Authorized Individual

---

Date

---

Name and title of person signing this form

---

Company Name

**CERTIFICATE OF NON-COLLUSION**

The undersigned certifies under penalties of perjury that this bid has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

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(Signature of Individual signing/submitting the bid)

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(Name of person signing bid)

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(Name of business)

## TAX COMPLIANCE CERTIFICATE

Pursuant to M.G.L. Chapter 62C, Section 49A, I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all State tax returns and paid all State taxes required under law.

\_\_\_\_\_  
Social Security Number  
or Federal Identification  
Number

\_\_\_\_\_  
Signature of Individual or  
Corporation

\_\_\_\_\_  
Corporate Officer  
(If Applicable)

Date: \_\_\_\_\_

BIDDER'S QUALIFICATION FORM

1. Name of Bidder:
2. Permanent Main Office Address:
3. When Incorporated (If Applicable):
4. Where Incorporated (If Applicable):
5. How many years have you been engaged in the contracting business under your present firm name:
6. Contracts on Hand: (Type of project, client, gross amount, estimated completion date):
7. General character of work performed by your company:
8. Have you ever failed to complete any work awarded to you?  
Yes \_\_\_\_\_ No \_\_\_\_\_  
If yes, where, when and why:
9. Have you ever defaulted on a contract?  
Yes \_\_\_\_\_ No \_\_\_\_\_  
If yes, where, when and why:
10. List the more important projects, similar to the work of this contract, recently completed by your company, stating the name, address and telephone number of the owner, name and location of similar project, approximate cost for each, and time period of contract performance (month and year started/month and year completed).
11. List your major equipment available for this contract.
12. With what banks do you do business?

13. Do you grant the Awarding Authority permission to contact this (these) institution(s)?

Yes \_\_\_\_\_ No \_\_\_\_\_

Dated at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_

\_\_\_\_\_  
Name of Bidder

\_\_\_\_\_  
By

\_\_\_\_\_  
Title

COMMONWEALTH OF MASSACHUSETTS

\_\_\_\_\_ being duly sworn, deposes and says that he is

\_\_\_\_\_ of \_\_\_\_\_ and that the  
Title Name of Organization

answers to the foregoing questions and all statements contained therein are true and correct.

Sworn to me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
Notary

My commission expires \_\_\_\_\_

**Bidder's Courtesy Checklist:**

This list does not need to be submitted with the bid. However, the following items **MUST** be submitted, typed or filled in and signed (where applicable) in ink, in order for a bid to be considered responsive.

\_\_\_\_\_ Bid Sheets

\_\_\_\_\_ Certificate of non-collusion

\_\_\_\_\_ Tax compliance certificate

\_\_\_\_\_ Bidder's certification of minimum requirements

\_\_\_\_\_ Bidder's qualification form (notarized and filled in completely)