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DESIGN
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SUBDIVISIONS
TITLE SURVEYS
TOPOGRAPHIC SURVEYS

ADDENDUM NO. 1

CONTRACT NO. VNP-184

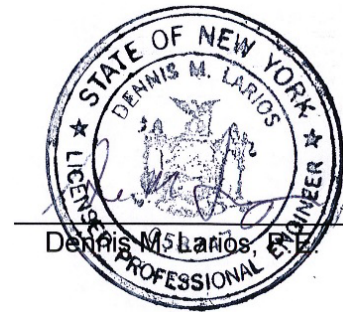
SUNY NEW PALTZ MASTER WATER METERS

FOR THE

VILLAGE OF NEW PALTZ

ULSTER COUNTY, NEW YORK

April 16, 2019



SPECIFICATIONS:

Page SGC-8

SUPPLEMENTARY GENERAL CONDITIONS – Delete Subsection 16. Administration of Contracts in its entirety and replace with the following:

16. Administration of Contracts

This contract between the Village and any person, firm or other entity for the performance of work related to any aspect of the Services, and any subcontract thereunder, shall contain the following:

- (i) The contractor or consultant, as applicable, perform such work in accordance with the terms hereof, and with all applicable federal, State and local laws and regulations;
- (ii) The contractor or consultant, as applicable, to indemnify the Indemnitees to the same extent and on the same conditions set forth as follows:

a) To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold the City of New York, including its officials and employees, and agents (the "Indemnitees") harmless against any and all claims (including, but not limited to, claims asserted by any employee of the contractor) and costs and expenses of whatever kind (including, but not limited to, payment or reimbursement of attorneys' fees and disbursements) allegedly arising out of or in any way related to the operations of the Contractor in the performance of this Agreement or the Contractor's failure to comply with any of the provisions of this Agreement or of the law. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Section by way of cross-claim, third-party claim, declaratory judgment action or otherwise. The Parties expressly agree that the indemnification obligation hereunder contemplates (i) full indemnity in the event of liability imposed against the Indemnitees without negligence and solely by reason of statute, operation of law or otherwise; and (ii) partial indemnity in the event of any actual negligence or willful misconduct on the part of the Indemnitees either causing or contributing to the underlying claim (in which case, indemnification will be limited to any liability imposed over and above that percentage attributable to actual fault whether by statute, by operation of law, or otherwise). Where partial indemnity is provided hereunder, all costs and expenses shall be indemnified on a pro rata basis.

b) Indemnification under this Section or any other provision of this Agreement shall operate whether or not the Contractor has placed and maintained the required insurance.

- (iii) Nothing in this contract or subcontract shall be deemed to create any contractual relationship between the contractor or consultant and the City of New York;
- (iv) Nothing contained in this contract or subcontract shall impair the rights of the City of New York under this Agreement;
- (v) The contractor or consultant, as applicable, obtain insurance upon the terms and conditions and in the amounts set forth in Exhibit C and as follows:

a) Prior to the Commencement Date, the Village must provide evidence that it has procured, and must maintain throughout the term of this Agreement, the insurance set forth in Part I of Exhibit C hereto. The City of New York, together with its officials and employees, shall be named as an additional insured on such insurance as set forth in Exhibit C.

b) Before they commence performance of any Services in connection with this Agreement, the Village shall require its contractors and consultants to procure and provide evidence of insurance in the types and amounts set forth in Part II of Exhibit C hereto, and require that such insurance be maintained during the entire period of their respective contracts to provide such Services. The City of New York, together with its officials and employees shall be named as an additional insured (without a requirement of privity of contract) on such insurance as set forth in Exhibit C. Proof of insurance for each and every policy required hereunder, as required in Exhibit C, shall be furnished to DEP for review and approval before the relevant Services are commenced.

c) In addition to other bonds required by law, if any, for the performance and completion of the construction work, the Village shall require its construction contractor(s) to provide a performance bond or other security acceptable to the City of New York, in a form acceptable to the City of New York. The performance bond or other security shall name the City of New York and the Village as obligees in the full amount of the cost of the work to be performed by the contractor, shall be issued by a surety company qualified to do business in the State, and shall secure the faithful performance and completion of all work required of the contractor. In addition, the Village shall require the contractor(s) to provide a payment bond or other security acceptable to the City of New York in the full amount of the work to be performed by the contractor guaranteeing prompt payment of monies due to all persons furnishing labor or materials in the prosecution of the construction work, as required by the State Finance Law Section 137.

- (vi) The contractor or consultant, as applicable, has not engaged and will not engage in any unlawful discrimination based upon race, creed, color, national

origin, sex, age, disability, marital status or sexual orientation with respect to all employment decisions, including but not limited to, recruitment, hiring, upgrading, demotion, downgrading, transfer, training, rates of pay or other forms of compensation, layoffs, termination, and all other terms and conditions of employment;

- (vii) The contractor will fully comply with all applicable prevailing wage requirements and all other applicable requirements of Section 220 of the State Labor Law; and
- (viii) Any subcontracting or sub-subcontracting by the contractor or consultant, as applicable, is subject to approval by the Village.
- (ix) Subcontracts over 50% must be approved by the Village prior to the execution of this contract.

Page 02200-6

SECTION 02200 – EARTHWORK – 3.02 EXCAVATION –
Subsection F. Rock payment lines – ~~Delete~~ in its entirety and replace with the following:

F. ROCK EXCAVATION

- a. Rock Measurement: Volume of rock actually removed by excavation, measured in original position, but not to exceed the following:
 - 1. Two feet outside of concrete work for which forms are required, except footings.
 - 2. One foot outside perimeter of footings.
 - 3. In pipe trenches, 6” below invert elevation of pipe and not less than 2 ft. minimum trench width.
 - 4. Neat outside dimensions of concrete work where no forms are required.
 - 5. Under slabs on grade, 6” below bottom of concrete slab.
 - 6. Under pavement to subgrade surface.
- b. Rock Payment:
 - 1. Trench rock excavation, by excavation will be paid on a unit basis of \$200.00/CY.
 - 2. Bulk or Mass rock excavation will be paid on a unit basis of \$85.00/CY.
 - 3. In areas in close proximity to existing water main where it is not possible to remove rock by equipment as specified in 1.04 G rock hammering may be utilized. Trench Rock Excavation by rock hammering will be

paid on a unit basis as indicated. Rock hammering will only be authorized in writing by the Engineer.

Page 24000-1 SECTION 24000 – E-SERIES® COLD WATER ULTRASONIC 4” METERS – **Add** the attached section to specifications.

Page 02500-1 SECTION 25000 – ORION® CELLULAR LTE ENDPOINT – **Add** the attached section to specifications.

Pages DS-1 – DS-15 DETAILED SPECIFICATIONS – **Add** the attached detailed specifications to the end of specifications. These were inadvertently left off the “digital copy.”

END OF ADDENDUM NO. 1
[EXCEPT FOR ATTACHMENTS]

SECTION 24000 – E-SERIES® COLD WATER ULTRASONIC 4” METERS

PART 1 - GENERAL

1.01 SCOPE

- A. This specification covers E-Series® Cold Water Ultrasonic Meters in sizes 3 inch and 4 inch, and the materials and workmanship employed in their fabrication. The meter must utilize ultrasonic transit time measurement technology and have no moving parts within the meter to wear or replace.
- B. Ultrasonic meters shall meet or exceed the most recent revisions of AWWA C715 and AWWA C750 Standards. The lead-free bronze alloy ultrasonic meters shall comply with the lead-free provisions of the Safe Drinking Water Act and NSF/ANSI Standards 61 and 372.

1.02 MANUFACTURER

- A. Ultrasonic meters shall be manufactured by a company with a minimum of ten (10) years experience in the manufacture of residential ultrasonic technology and demonstrate market longevity through a minimum of forty (40) years experience in the manufacture of cold water meters serving North American water utilities, including Positive Displacement Nutating Disc, Turbo and Compound type meters.

1.03 METER DESCRIPTION

- A. Only meters using ultrasonic transit type technology shall be accepted. The ultrasonic meter shall be fully electronic with encapsulated and sealed circuitry, display and battery.
- B. To ensure highest quality of design and to minimize the electronic complexity, the ultrasonic technology must be the intellectual property of the meter manufacturer and shall not utilize third-party ultrasonic technology.
- C. The meter encoder design shall allow for replaceable registration and transducers that are protected from tampering. The meter must have the ability to detect removal of registration and transducers, and report an empty pipe alarm as indication of removal.

1.04 METER MAIN CASE

- A. Ultrasonic meters supplied under this specification shall operate to a pressure of 175 psi and to a temperature of 140° F without leakage or damage. The housing shall be constructed of a lead-free bronze alloy and shall be designed so that at a working pressure of 175 psi, any distortion will not affect the accuracy of the meter.

- B. The metering tube shall have an unobstructed flow passage and shall not be repaired in any manner. The flow direction, meter size, and NSF-61 shall also be cast in the meter housing.

1.05 MEASURING ELEMENT

- A. To provide high accuracy and a wide flow range with no mechanical wear, ultrasonic meters shall utilize no moving parts in the flow stream.
- B. The measuring section shall have an unobstructed flow passage area for increased turn-down ratio and lower pressure loss (as referenced in “Table 1: Meter performance”), and be designed such that a strainer is not required.
- C. Paired transducers are to be mounted diagonally across sides in the measuring section. The ultrasonic technology shall continuously sample flow at a minimum of 8 Hz to ensure accuracy during changes in flow rate or sharp transitions in flow.

1.06 ELECTRONIC METERING

- A. The electronic circuit shall be microprocessor based and include nonvolatile memory capable of storing all programmable and accumulated data. The circuit shall control the ultrasonic transducers. The entire meter circuit and related components shall be fully potted and sealed from water intrusion.
- B. The registration shall consist of an electronic local display combined with electronic circuitry to provide a high resolution absolute encoder output. The electronic register assembly shall transmit a signal through properly shielded transmission wire for AMR/AMI connectivity.
- C. High resolution absolute encoder registration shall be capable of sending a 9-digit encoder output to the endpoint as well as extended status messages. Reading resolution sent to the reading software is based on the output of the endpoint technology the meter is connected to.

1.07 REGISTRATION LID

- A. Register box enclosures and lids shall be made of engineering thermoplastic or other suitable synthetic polymer. The lid shall have a snap close feature to prevent the lid from opening if installed in a vertical up position. The lid shall overlap the registration enclosure to protect the lens.
- B. The name or logo of the manufacturer shall be permanently molded into the lid, and at the option of the utility, a serial number shall be imprinted on the registration lid.

1.08 REGISTRATION

- A. The size, model, and direction of flow through the meters shall be permanently visible on the topside of all meter displays.

- B. The register shall be encased in non-corrosive plastic housing, with the circuit board, display, and battery completely potted and epoxy-sealed within to provide moisture resistance to flooded pit or submerged conditions. Ultrasonic meters shall meet and exceed IP 68 rating for submergence. Use of desiccants will not be allowed.
- C. To minimize expense, the ultrasonic meter encoder design shall allow for replaceable registration and transducers that are protected from tampering. The meter must have the ability to detect removal of registration and transducers, and report an empty pipe alarm as indication of removal.
- D. The registration enclosure face shall be slightly curved to prevent sediment buildup, and the registration housing shall have a molded-in clip to provide the option of mounting an approved endpoint to the side.
 - 1. The LCD shall display:
 - a. 9-digit consumption display with decimal and comma separator;
 - b. Icons for units of measure and time to represent total consumption and flow rate;
 - c. Icons to represent alarm conditions;
 - d. Segmented lines above and below digits to represent standard visual billing units for manual reading purposes.
 - 2. The visual totalized consumption resolution shall display to 0.1 gallons, 0.01 cubic feet, or 0.001 cubic meters. The enhanced resolution of the totalized flow display can be utilized as a flow indicator for leak detection.
 - 3. To conserve battery life, the display shall be off while in resting state. The display shall be activated by a change in light level through the infrared (IR) port. Meter shall not require special tools to activate the display. Opening/closing the lid or blocking/ unblocking the IR port will activate the display to cycle through display screens showing different meter information.
 - 4. Ultrasonic meters shall be factory programmed to display the following screens:
 - a. Standard Total Consumption;
 - b. Rate of Flow;
 - c. Pressure-if implemented in the meter-programmable to PSI or Bar;
 - d. Temperature includes water and ambient temperature, and is programmable to display in F or C;
 - e. Alarm and Operating Mode shall display current active alarms since the last transmission to the endpoint as well as any alarms that have latched during the specified threshold (35 days, for example). Operating Mode shall indicate the operating mode of the meter—Active, Transition, or Storage;
 - f. Firmware Version;
 - g. 4-20 mA Set Point (available when meter configuration includes a 4-20 output);
 - h. Scaled Pulse Set Point (available when meter configuration includes a scaled/unscaled output).
 - 5. The display shall be field-programmable to allow the utility to determine which screens are active, including the optional Low Resolution Total 6-digit Consumption Screen and meter Program Date. Programming shall be performed via an IR interface tool.

6. The ultrasonic meter shall be capable of displaying and reporting multiple alarm conditions. The alarms shall be displayed on the meter LCD, stored in memory for reporting through the encoder interface, and surfaced through ORION Cellular LTE endpoints. Available alarms shall include:
 - a. Tamper or Meter
 - b. Measurement
 - c. Temperature
 - d. Pressure (based on meter configuration)
 - e. Empty Pipe
 - f. Reverse Flow
 - g. Potential Lak
 - h. No Usage
 - i. End of Life (battery)
 - j. Program Alert
 - k. Exceeding Max Flow
7. Meter shall maintain an alarm and programming log of alarm conditions and alarm clearings. Data shall be capable of being read through an IR interface.

1.09 ADDITIONAL OUTPUTS

- A. Ultrasonic meters shall be available with the option of single or dual outputs. Single output meters shall include one (1) 3-wire cable, and dual output meters shall include two (2) 3-wire cables.
 1. Single output options shall include:
 - a. Encoder output;
 - b. *Scaled/Unscaled. Pulse output is to be either open drain FET where low current is required, or solid state relay.
 2. Dual output options include:
 - a. *Encoder and Encoder. One (1) encoder output is 3-wire while the second encoder output is available for 3-wire or 2-wire applications and is touch-read compatible.
 - b. *Encoder and Scaled/Unscaled.
 - c. *Encoder and 4-20 mA where the analog output is 4-20 mA current loop (operation is powered by an external device).
 - d. *Scaled/Unscaled and 4-20 mA.
 3. Wiring methods shall include the options of Twist Tight® in-line connectors for easy plug-and-play to mating endpoint, Nicor® connectors, or flying lead for field splice connections. Scaled/Unscaled and 4-20 mA shall utilize a flying lead wiring method.
***Will be available later in 2019.**

PART 2 - PRODUCTS

2.01 FIELD PROGRAMMABILITY

- A. Ultrasonic meters shall come standard as factory-programmed for meter-specific settings, and shall include the option for field programming the following settings:

1. Selection of displayed LCD Information screens;
2. Visual billing segment lines;
3. Unit of measure for total and flow rate;
4. Output reading resolution sent from the meter;
5. Alarm thresholds and durations;
6. Clearing alarms;
7. Pressure units – PSI or bar (if available at meter);
8. Temperature units (F or C);
9. Operation mode – Active, Transition, or Storage.

- B. Programming shall be performed through the IR port on the registration face using an IR interface tool.
- C. Meter serial number shall be permanently factory programmed. A 9-digit Year of Manufacturing serial number is preferred.

2.02 VALUE ADDED FEATURES

- A. When sold with or for approved endpoints, the ultrasonic meter shall be capable of measuring water pressure, and ambient and water temperature. If applicable, the meter shall take multiple pressure measurements and sample pressure at a minimum of 2 Hz. Pressure and temperature data and alarm information shall be sent as part of the encoder extended message to an ORION® Cellular LTE endpoint and surfaced through BEACON® AMA software. If applicable, the data and alarms shall also be capable of being read directly at the meter via an IR interface.

2.03 METER PERFORMANCE AND ACCURACY

- A. Meter performance and accuracy shall be as follows:

Size	Safe Maximum Operating Capacity	Maximum Allowable Head Loss at SMOC	Normal Test Flow Limits 100% ± 1.5%	Minimum Test Flow Rates 100% ± 3%
3 in.	560 gpm	6.6 psi	0.75...560 gpm	0.37 gpm
4 in.	1100 gpm	6.5 psi	1.5...1100 gpm	0.75 gpm

2.04 SIZE AND LENGTH

- A. Size and length shall be as follows:

Meter Size	Laying Length Options	Maximum Height from Center
3 in.	12 in., 17 in.	3.55 in.
4 in.	14 in., 20 in.	3.69 in.

2.05 REJECTED METERS

- A. The manufacturer shall have the right to repair or replace, at its option, meters rejected for failure to comply with this specification.

PART 3 - EXECUTION (Not Used)

END OF SECTION 24000

SECTION 25000 - ORION® CELLULAR LTE ENDPOINT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Orion® Cellular endpoint is an innovative, two-way water endpoint that utilizes existing cellular infrastructure to efficiently and securely deliver meter reading data to the utility via the reliable cellular network.
- B. The Cellular endpoint is a member of the time-tested Orion family of products from Badger Meter, designed for maximum flexibility. Since 2002, the Orion product family has provided comprehensive Advanced Metering Analytics (AMA) for interval meter reading and data capture using both one-way and two-way communications.

1.02 FUNCTIONALITY

- A. Operation: The endpoint communicates with the encoder and captures 15-minute interval read data and meter status information. On a regular schedule (up to twice per day) the endpoint then automatically broadcasts the information, including endpoint status information, via the cellular network to the Beacon® AMA software.
- B. Activation: All Orion Cellular LTE endpoints are shipped in an inactive, non-transmitting state. The endpoints offer a Smart Activation feature. After installation, the endpoint begins broadcasting data when the encoder senses the first usage of water. No field programming or special tools are required. Alternatively, the Badger Meter IR Communication Device can be used to activate the endpoint and verify the encoder connection.
- C. Successful endpoint function can be confirmed through a web app demonstrating that communication has been verified to both the encoder and the network.
- D. Broadcast Mode: The endpoint broadcasts fixed network reading data through the secure existing cellular network within the service area. The endpoint also transmits a mobile message to support trouble shooting in the field.
- E. Data Storage: The endpoint stores 42 days of 15 minute data.
- F. Output Message: The endpoint broadcasts its unique serial number, meter reading data, and applicable status indicators. Each message is securely transported to the Beacon AMA software via Virtual Private Network (VPN) using Advanced Encryption Standard (AES) 256.

1.03 APPLICATION

- A. Configurations: The endpoint is a multi-purpose endpoint that can be deployed in indoor, outdoor and pit applications. The electronics and battery assembly are fully

encapsulated in epoxy for environmental integrity. The endpoint is available with a connector assembly for ease of installation.

- B. **Meter Compatibility:** When attached to a Badger Meter high resolution encoder, the endpoint is compatible with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies, and with E-Series® Ultrasonic, E-Series® Ultrasonic Plus, and M-Series® Electromagnetic flow meters.
- C. **Encoder Compatibility:** The endpoint is suitable for use with Badger Meter high resolution encoders as well as the following Badger Meter approved three-wire encoder registers that have a manufacture date of 2005 or newer, are programmed into the AMR/AMI three-wire output mode, and have three-wires connected: Elster InVISION and ScanCoder® encoders and evoQ4 meter (encoder output); Hersey® Translator; Master Meter® Octave® Ultrasonic meter encoder output; Metron-Farnier Hawkeye; Mueller Systems 420 Solid State Register (SSR) LCD; Neptune® ProRead, E-Coder® and ARB-V®; and Sensus® Electronic Register encoder (ECR) and ICE.

1.04 SPECIFICATIONS

- A. Specifications are as follows:

Dimensions	5.125 in. (130 mm) (H) 1.75 in. (44 mm) Diameter at top 2.625 in. (W) x 2.875 in. (D) at base 67 mm (W) x 73 mm (D) at base
Broadcast Network	LTE cellular network, with fallback to 3G where LTE is unavailable. Mobile backup frequency is FCC-regulated 902...928 MHz frequency hopping modulation
Operating Temperature Range	
• Storage, Meter Reading and Mobile Backup	−40...60° C (−40...140° F)
• Cellular Communications	−20...60° C (−4...140° F)
Humidity	0%...100% condensing
Battery	One (1) lithium thionyl chloride D cell (nonreplaceable)

- B. **Construction:** All Orion Cellular endpoints are housed in an engineered polymer enclosure with an ORION RF board, battery and antenna. To ensure long-term performance, the enclosure is fully potted to withstand harsh environments and to protect the electronics in flooded or submerged pit applications.
- C. **Wire Connections:** Orion Cellular endpoints are available with in-line connectors (Twist Tight or Nicor®) for easy installation and connection to compatible encoders/meters. The endpoints are also available with flying leads for field splice connections. Other wire connection configurations may be available upon request.
- D. **Features:**

Communication Type	Two-way
Application Type	Control/Monito
Reading Interval Type	15-minute
Encoder Compatibility	Absolute
Fixed Network Reading	<input checked="" type="checkbox"/>
Premise Leak Detection	<input checked="" type="checkbox"/>
Cut-Wire Indication	<input checked="" type="checkbox"/>
Reverse Flow Indication	<input checked="" type="checkbox"/>
No Usage Indication	<input checked="" type="checkbox"/>
Encoder Error	<input checked="" type="checkbox"/>
Low Battery Indication	<input checked="" type="checkbox"/>
Remote Programming	<input checked="" type="checkbox"/>
Remote Clock Synchronization	<input checked="" type="checkbox"/>
Firmware Upgrades	<input checked="" type="checkbox"/>

END OF SECTION 25000

ITEM NO. 1

MAINTENANCE AND PROTECTION OF TRAFFIC

Description

General: This work shall consist of maintaining traffic and protecting the public from damage to person and property within the limits of and for the duration of the contract.

Basic Maintenance and Protection of Traffic: Traffic shall be maintained over a reasonably smooth traveled way which shall be so marked by signs, delineators, guiding devices and other methods that a person having no knowledge of conditions may safely and with a minimum of discomfort and inconvenience ride, drive or walk, day or night, over all or any portion of the work where traffic is to be maintained. All work shall conform to the requirements of the New York State Manual of Uniform Traffic Control Devices. The basic maintenance and protection requirements shall be as follows:

Furnish, install and maintain work zone as required by the Engineer to maintain traffic and protect from public from damage to person and property within the limits of and for the duration of the contract.

Sign assemblies shall be in conformance with NYSDOT Standard Sheets and Manual of Uniform Traffic Control Devices.

Surface: Maintain the surface condition of the traveled way so it is consistent with the appropriate speed limit.

Drainage: Maintain the drainage facilities and other highway elements, old or new, including detours.

Bus Stops: Maintain existing bus stops, if any, so bus passengers are reasonably accommodated.

Pedestrian Traffic: Provide adequate protection for pedestrian traffic during all phases of construction.

Intersecting Highways: Provide ingress and egress to and from intersecting highways, homes, businesses and commercial establishments.

Dust Control and Spillage. Control dust and keep the traveled way free from materials spilled from hauling equipment. This shall also apply to dust control and spilled material resulting from the Contractor's operations in the areas outside the contract limits.

Flagmen. Provide the necessary traffic control equipment and flagmen for adequate traffic control on the traveled way. Sign Paddles, in lieu of flags, may be required by the Engineer.

Repairs. Make the necessary repairs to existing pavement and structure wearing surfaces as required to provide a reasonably smooth traveled way where vehicle operation is maintained.

Responsibility to the Public. Protect the public from damage to person and property which may result directly from any construction operation.

Schedule. Schedule work to keep to a minimum and consistent with the physical requirements of the contract, the amount of existing pavement and/or facilities that are destroyed or substantially torn-up at any one time.

Delineation and Guiding Devices. Provide and maintain delineation and guiding devices which shall include, delineators, drums, cones, railing and other similar material or methods acceptable to the Engineer.

The installation, moving and removing of any such delineators or guiding devices shall be included in the work.

Project Site Patrol. The Contractor shall provide personnel to patrol the contract area as necessary to ensure that conditions on the site are adequate for public safety and convenience at all times.

The Contractor is placed on notice that maintenance and protection of traffic over a street during construction is considered as important as the construction itself. The Contractor shall, therefore, at all times conduct his operations in a manner to insure the convenience of all travelers and the abutting property owners and their safety as well as the safety of his own employees.

Such conduct shall include, but not be limited to, insuring that all construction materials and equipment are removed from the work site during non-working hours, or are protected in such a manner that they shall not constitute a traffic hazard; construction shall be conducted in such a manner as to minimize the amount of time during which fixed objects are without protection; shoulder construction and paving operations shall be conducted in such a manner as to minimize the period of time the traveling public is exposed to sharp dropoffs; and workers shall not be allowed to park personal vehicles in the shoulder area.

Construction Signs, Construction Barricades, and Lighting for Construction Barricades. The Contractor shall furnish, install, move and maintain construction signs, construction barricades, and lighting for construction barricades as ordered by the Engineer, and in accordance with the New York State Manual of Traffic Control Devices.

Mailboxes. During construction, the Contractor shall maintain in a usable condition and location specified by U.S. Postal requirements, postal route mailboxes services from motor vehicles.

Duration of Contract. The duration of the contract, for the purpose of this work, shall be from the date any work is started on the contract, including moving in equipment, signs, offices, shops and the like, until the date the contract is officially accepted.

MATERIALS. All materials used shall comply with the requirements of the appropriate subsections Materials, or as established by this section or the drawings.

Existing Pavement Repair. Existing pavements shall be kept in repair using materials compatible with the pavement. In general, plant-mixed bituminous concrete is suitable for all pavement surfaces. Material other than plant-mixed bituminous concrete may be used if approved by the Engineer.

Construction Signs and Other Signs. Sign panels may be made of aluminum, galvanized steel or plywood except when placed on Type III Breakaway Barricades, then sign material shall conform to the requirements for the aluminum panels. When reflectorization is required by the N.Y.S.M.U.T.C.D., reflective sheet material shall be used and it shall conform to the photometric and color requirements of material specifications as follows:

For signs that are exclusively used during daylight hours, 730-05.01 Reflective Sheeting (Class A) or 730-05.02 Reflective Sheeting (Class B) may be used at the Contractor's option.

For signs that are used during daylight and/or night hours, 730-05.02 Reflective Sheeting (Class B) shall be used.

When reflectorization is not required, the sign face background shall be any one of the following: 730-05.01, Reflective Sheeting (Class A), 730-05.02, Reflective Sheeting (Class B), or exterior type paint conforming to the appropriate Highway Color Tolerance Chart PR Colors No. 1 through No. 6.

Black characters shall be non-reflective, Type V, and shall conform to the requirements of subsection 730-13, Reflectorized Sheeting Sign Characters (Type V), except that reflective background material shall meet the requirements stated above.

White characters shall meet the requirements of either subsection 730-12, Reflectorized Sheeting Sign Characters (Type IV) or subsection 730-13, Reflectorized Sheeting Sign Characters (Type V), except that type IV characters shall consist of cutout reflective sheeting material meeting the requirements of subsection 730-05.02, Reflective Sheeting (Class B) and reflective background materials shall meet the requirements stated above.

Construction Barricades and Lighting for Construction Barricades: Barricades and lighting for construction barricades and similar materials shall meet the requirements of these specifications and shall be in accordance with the plans, applicable standard sheets and the New York State Manual of Uniform Traffic Control Devices. No materials or methods which will cause damage to any pavement or paving course that will be retained shall be employed in the removal of pavement markings.

CONSTRUCTION DETAILS

Basic Maintenance and Protection of Traffic

- A. General. The Contractor shall generally provide a traveled way suitable for at least one lane of moving traffic. The traveled way shall be kept reasonably smooth and hard at all times, and shall be well drained and free of potholes, bumps, irregularities and depressions that hold or retain water. Construction operations shall be conducted to insure a minimum of delay to traffic. Stopping traffic for more than five minutes shall not be permitted unless specifically authorized in writing by the Engineer. The necessary equipment and personnel to attain and maintain a satisfactory riding surface shall be available and used as needed at all times when work is under way and when work is temporarily suspended for any period of time. Special attention to maintenance of a satisfactory traveled way shall be given during weekends, holidays, and the winter season. Detouring of traffic shall be kept to a minimum and all detours shall be in conformance to these specifications.
- B. Cleaning of Highways. The Contractor shall keep the traveled way free of foreign objects such as spilled earth, rock, timber and other items that may fall from transporting vehicles. Materials spilled by or dropped from the undercarriage of any carrying vehicle used in the Contractor's hauling operations along or across any public traveled way both within and outside the contract limits shall be removed immediately.
- C. Dust Control. Dusty conditions resulting from the Contractor's operations shall be corrected by the use of calcium chloride and/or water. Water used as a dust palliative shall be distributed uniformly over a minimum width of eight feet by the use of suitable spray heads or spray bar.
- D. Traffic Control. Whenever it becomes necessary to maintain traffic on one lane, the Contractor shall provide adequate traffic controls on the section of highway on which vehicle operation is maintained. He shall employ a sufficient number of competent flagmen to control one lane traffic continuously. In the event the length of the one lane operation is extremely short and conditions are favorable for safe operation, the Engineer may, in writing, authorize the Contractor to dispense with flagmen.

The Contractor shall also provide a sufficient number of competent flagmen in areas where construction equipment is operating in potential conflict with public traffic, regardless of the

volume of traffic or the sight distance. Flagmen shall wear orange caps or hats and vests in conformance with the New York State Manual of Uniform Traffic Control Devices, and shall direct traffic in conformance with said manual. Sign Paddles, in lieu of flag, maybe required by the Engineer.

Whenever it becomes impossible to maintain one lane of traffic, the Contractor shall detour traffic and shall erect barricades and detour signs as directed by the Engineer and in accordance with the N.Y.S.M.U.T.C.D. The Contractor shall notify all homes, business and commercial establishments of his intent to shut-down traffic and shall keep detours in effect for the minimum length of time necessary to complete the installation of the water main and appurtenances. The Contractor shall provide access to local traffic and emergency vehicles at all times unless approved by the Engineer.

- E. Drainage. The Contractor shall devote particular attention to all drainage facilities, keeping them fully operative at all times. Ditches shall be provided at all times, even during grading operations and periods of accumulated plowed snow, to adequately drain the traveled way and the remainder of the right-of-way areas.
- F. Ingress and Egress. The Contractor shall provide and maintain, at all times, safe and adequate ingress and egress to and from intersecting highway, homes, business and commercial establishments at existing or at new access points, consistent with the work, unless otherwise authorized by the Engineer. The Contractor will not be responsible for snow removal or entrances. On roadways on which motor bus service is maintained, he shall provide suitable areas or locations for the loading and unloading of passengers. The existing pavement, at improved intersecting streets, shall not be disturbed without prior consent of the Engineer.
- G. Delineation and Guiding Devices for Construction. The Contractor shall furnish, erect, move and remove delineation and guiding devices as required and directed by the Engineer. In areas where grading is being done, a safe and reasonable roadway shall be properly delineated at all times, either by the use of guiding devices or flagmen. The Contractor shall delineate areas where there is a drop-off near the edge of the traveled way and areas on which it is unsafe to travel.

Where the drop-off is less than six inches, and where soft or unsafe areas occur, an approved delineator shall be placed along the edge of the traveled way at intervals of not more than 200 feet. Where the drop-off is between 6 inches and 18 inches, the spacing between delineators shall be reduced to 100 feet maximum. Where the drop-off is greater than 18 inches, a continuous delineation consisting of 2 inch or wider brightly colored tape, ribbon, or other similar, flexible material as approved by the Engineer shall be used in addition to the individual delineators spaced not over 50 feet apart.

Thirty to fifty-five gallon drums or containers set on end, may be used as delineators,

provided they are properly painted and reflectorized in accordance with the New York State Manual of Uniform Traffic Control Devices. They shall be kept clean at all times. Other markers or delineators may be circular or rectangular in shape and shall be constructed of reflective sheeting having a minimum area of 20 square inches or of reflective buttons having a minimum diameter of 3 inches. All reflective delineators or marks shall conform to the requirements of the New York State Manual of Uniform Traffic Control Devices.

At commercial establishments the entire entrance area between adjacent markers, shall be kept safe and smooth for convenient ingress and egress. Delineators shall be substantially mounted so that the bottom of the reflective unit is 4 feet above the elevation of the traveled way. Any area determined by the Engineer to be particularly hazardous, shall be marked by the use of signal flashers with large reflectorized yellow lenses in addition to the reflective markings.

H. Signs

1. Control and Authority. All existing highway signs, markers, delineators and their supports within the contract limits shall remain under the control and jurisdiction of the Engineer and shall be maintained for the duration of the contract by the Contractor as directed by the Engineer. Any signs not authorized by the Owner shall be removed from the right-of-way as ordered by the Engineer.
2. Maintenance of Route Marker Signs. Route markers shall be maintained by the Contractor during construction. Should relocations be necessary at various stages of construction, they shall be placed in conformance with the New York State Manual of Uniform Traffic Control Devices and as directed by the Engineer in locations visible to traffic. Appropriate directional signing shall also be used in conjunction with route marker signs.
3. Storage of Existing Signs, Markers and Delineators. The Contractor, when ordered, shall remove existing signs, markers and delineators and their supports which interfere with his construction operations; store, protect, clean and replace them on the contract as directed in a location approved by the Engineer. Signs, markers, delineators not to be replaced, shall be cleaned and delivered to the Engineer as directed. Signs, markers and delineators lost or damaged because of negligence on the part of the Contractor, shall be replaced at the Contractor's expense.

Construction Signs, Reflectorized Signs. The Contractor shall furnish and erect, move and remove, as required and as directed by the Engineer, reflectorized signs to adequately and safely inform and direct the motorist and to satisfy legal requirements.

All signs shall be kept clean, mounted at the required height on adequate supports and placed in proper position and alignment so as to give maximum visibility both night and day. All wood

supports and backs of plywood sign panels shall be painted with two coats of white paint. All signs and markers shall indicate actual existing conditions and shall be moved, removed, relocated or changed immediately as directed by the Engineer. Sign sizes and details shall conform to the standard sheets, the New York State Manual of Uniform Traffic Control Devices or to details shown in the plans. The number of signs indicated in the New York State Manual of Uniform Traffic Control Devices, the standard sheets or plans are a minimum and the Contractor shall have an adequate quantity of each of these signs immediately available for use as required. The Engineer may require additional signs. In that event, they shall be consistent with the arrangement, material and details of those shown on the standard sheets, the New York State Manual of Uniform Traffic Control Devices and the plans.

All signs shall be mounted in accordance with the New York State Manual of Uniform Traffic Control Devices. All signs shall be mounted at a height of at least five feet. Under special conditions, signs may be mounted at a greater height, as ordered by the Engineer, to fit the situation.

All signs shall be the property of the Contractor and shall be maintained in good condition for the duration of the contract and removed from the work site when the contract is accepted.

Construction Barricades and Lighting for Construction Barricades. The Contractor shall furnish, erect, move and remove, construction barricades and lighting for construction barricades where and as indicated on the plans, on the standard sheets, in the New York State Manual of Uniform Traffic Control Devices, or as directed by the Engineer. Posts and painted members or bands used to delineate drop-offs will not be considered barricades.

Where indicated on the plans or in the proposal, construction barricades and temporary concrete barriers shall be supplemented either by approved flashing or steady burning lights.

Steady burning of flashing barricade lights have a minimum nominal diameter of 7 inches and shall emit yellow light. Steady burning lights may be used to supplement other channelizing devices to delineate the traveled way. Flashing lights shall not be used for delineation or channelizing purposes.

Flashing barricade lights shall be either Type A, Low Intensity, or Type B, High Intensity conforming to the requirements of section 294.3 of the N.Y.S.M.U.T.C.D. High intensity lights shall be used where barricade lights are required to operate 24 hours per day. Low intensity lights shall be used where barricade lights are required only at night. In that event, the hours for operation of the low intensity lights shall be dusk to dawn.

Steady burning lights shall have a minimum beam candle power of 2 candles maintained within a solid angle of 9 degrees on each side of the vertical axis, and 5 degrees above and 5 degrees below the horizontal axis. The hours for operation of steady burning barricade lights shall be dusk to dawn.

Mailboxes. The Contractor shall not move any mailbox which contains mail. He will advise the

owner to remove such mail before he moves the box. Before acceptance of the work, any mailbox which has been distributed or removed, shall be replaced by the Contractor in a location approved by the Engineer.

In the event the original mounting pole has been lost, damaged or is unusable, the Contractor shall furnish a similar device or mounting acceptable to the Engineer, or when directed shall furnish a galvanized pipe mounting post of 1 inch (minimum) diameter with flanged top fitting and will firmly install the new mounting and mailbox at the designated location and at the proper height in accordance with the requirements of the U.S. Postal Service and to the satisfaction of the Engineer.

Opening Highway to Traffic Prior to Contract Acceptance. The construction details specified in preceding sections shall apply when required.

METHOD OF MEASUREMENT AND PAYMENT

Maintenance and Protection of Traffic. Payment for Maintenance and Protection of Traffic will be made on a lump sum basis.

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
1	Maintenance & Protection of Traffic	Lump Sum

ITEM NO. 2

SITE PREPARATION AND MAINTENANCE

Description

Under this item, the Contractor shall mobilize and prepare the entire project to receive the other items. This item includes the removal of all existing curbing, sidewalks, driveways, hydrant and valve assemblies, culverts, fencing where required, saw cut, and paving in the area of the work, topsoil and seeding, and the temporary relocation of other items that might interfere with this project. This item also includes the protection of existing utilities within the project area.

Construction Methods

The Contractor shall examine the site of work and, in conjunction with the plans, shall prepare the work area to receive all other items of this contract. Contractor shall make the necessary saw cut along the trench of the proposed work. This item shall also include all other work necessary to complete this contract and the restoration of all surfaces including lawn areas, concrete curb and sidewalks, unit pavers, asphalt concrete pavement and any other items that might be disturbed during construction. Contractor's work.

Method of Payment

This item shall be paid the lump sum bid in the Proposal for this Item, which payment shall be complete including all mobilization, removing and replacing to the satisfaction of the Engineer, existing sidewalks and curbs, driveways, landscaping, culverts, light poles, fencing, signs where required, clean-up, make a saw cut at all locations where proposed paving is to match existing pavement, and all other appurtenances necessary to complete this item.

The cost of removing existing gate valves and cutting, plugging and abandoning of existing water mains, as shown on the drawings and as directed by the Engineer, shall be included under this Item.

The cost of removing existing water mains and connecting to new water main, as shown on the drawings and as directed by the Engineer, shall be included under this item.

<u>Payment Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
2	Site Preparation and Maintenance	Lump Sum

ITEM NOS. 3, 4, 5, 6, 9, 10 & 11

FURNISHING AND INSTALLING 4" & 6"

METERS IN PRECAST METER PIT

General

Under these items, the Contractor shall furnish and install 6" diameter precast manholes, 30" manhole frame and cover, Cretex Inflow Dish (or approved equal) Class 52 Ductile Iron Pipe, fittings, elbows, gate valves, concentric reducers, bedding, 4" and 6" Badger M5000 water meters, brackets, connections, meter junction box and all appurtenances in accordance with the previous sections of these specifications. Trench excavation, piping, jointing, shoring, dewatering, connections to existing water main and backfilling shall be included. Restoration of all surfaces shall be included in Item No. 2 - Site Preparation and Maintenance.

Materials

All pipe and fittings shall be cement-lined centrifugal cast ductile iron pipe, Class 52 in accordance with the latest revisions of ANSI/AWWA C151/A21.51 or ANSI/AWWA C150/A21.50-76 with a pressure class of 350 psi.

Cement mortar lining shall conform to the ANSI A21.4-1974 (double thickness)(AWWA C104-74) latest editions. Pipe shall be given a coat on exterior of approved bituminous paint.

Water mains and appurtenances shall be in accordance with Section 02666 Potable Water Systems of these specifications.

Precast concrete manholes shall be in accordance with Section 03410 of these specifications. Water Meters shall be in accordance with Section 23000 of these specifications and as per contract plans.

Inflow dish shall be fabricated for the 30" diameter frame and cover, shall be supplied with a gasket and shall be manufactured by Cretex Specialty Products or approved equal.

Water meters shall be supplied complete with Orion Cellular LTE Endpoints per Section 25000 of these specifications.

Construction Methods

All pipe shall be laid at a depth of 4'-6" to the top of the pipe. Trenching shall be done in accordance with the General Specifications. The bottom of the trench shall be excavated to subgrade being 6"

below the bottom of the pipe. Approved Item No. 4, Crushed Stone or Pea Gravel shall be placed in the trench bottom to bring the pipe bed to proper grade. This material shall be compacted and bell holes prepared. Run-of-bank gravel shall then be placed over the pipe in 6" lifts and compacted.

When laying the pipe, the Contractor shall handle material carefully to avoid damage. While it is suspended over the trench, the pipe shall be inspected for defects and rung with a light hammer to detect cracks. Before the pipe is laid, all dirt, oil or grass shall be removed from inside the bell and from outside the spigot end.

Fittings

All fittings shall be either mechanical joint in accordance with ANSI A21.10-72 (AWWA C110-72) and shall be furnished complete with all accessories including cast iron glands, bolts, nut and rubber gaskets in accordance with ANSI A21.11-72 (AWWA C111-72) Class 250 Cast Iron or Tyton or approved equal employing a single elongated grooved gasket to effect the joint sealed. Fittings may also be supplied in accordance with ANSI/AWWA C153/A21.53-84 Ductile Iron Compact Fittings shall be rated at 350 psi.

Jointing

The joint shall be either mechanical joint or Tyton or approved equal employing a single elongated grooved gasket to effect the joint sealed. Jointing shall be done in accordance with the manufacturer's specifications. Pressure and leakage tests shall be required and shall be in accordance with the sections in General Specifications.

Excavation and Backfill

Excavation and backfill shall conform to the requirements outlined in the General Specifications. All unsuitable material shall be removed from the project and select run-of-bank gravel shall be used as backfill. No extra payment shall be made for this run-of-bank gravel, payment for which is considered included in the unit price for these items.

Thrust Blocks

All valves and fittings shall be securely anchored by the pouring of concrete thrust blocks sufficient to resist all thrust of hammer and as approved by the Engineer.

Restrained joints may be used upon the approval of the Engineer.

Testing and Chlorination

The Contractor shall be responsible for testing and chlorinating the water distribution system as per Section 02666 of these specifications.

Subbase and Pavement Replacement

Subbase and pavement replacement shall conform to Sections 02200 and 02513 of these specifications and as shown on the drawings.

Measurement and Payment

Items 3, 4,5,6,9,10 and 11 shall be paid for the installation of all items required for a 6" master water meter including manholes, valves, fittings, piping and all appurtenances for a complete water meter installation in a precast meter pit.

Item 4 shall be paid for the installation of all items required for a 4" master water meter including manholes, valves, fittings, piping and all appurtenances for a complete water meter installation in a precast meter pit.

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
3, 5,6,9,10 and 11	6" Master Water Meter in Precast Meter Pit	Each
4	4" Master Water Meter in Precast Meter Pit	Each

ITEM NO. 7 & 8

FURNISHING AND INSTALLING 4"

MASTER WATER METERS IN OLD LIBRARY AND SHANGO HALL

General

Under these items, the Contractor shall furnish and install 4" Badger M5000 water meters and appurtenances in old Library and Shango Hall in accordance with the previous sections of these specifications.

Materials

All pipe and fittings shall be compatible with existing water system as acceptable to the Engineer with a pressure class of 350 psi.

Water mains, meters and appurtenances shall be in accordance with Section 02666 Potable Water Systems and Section 24000 Electromagnetic Flow Meters of these specifications and as per the contract plans.

Water meters shall be supplied complete with Orion Cellular LTE Endpoints per Section 25000 of these specifications.

Construction Methods

All plumbing shall be in accordance with current applicable building and plumbing codes.

Testing and Chlorination

The Contractor shall be responsible for testing and chlorinating the water distribution system as per Section 02666 of these specifications.

Measurement and Payment

Items 4 & 5 shall be paid for the installation of all items required for a 4" master water meter including valves, fittings pipe and all appurtenances for a complete water meter installation inside old library and Shango Hall.

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
5	4" Master Water Meter in old Library	Each
6	4" Master Water Meter in Shango Hall	Each

ITEM NO. 12 & 13

FURNISH 4" AND 6"

BADGER METER MODMAG M SERIES M5000 WATER METER

General

Under these items, the Contractor shall furnish 4" and 6" Badger M5000 water meters as spare water meters in accordance with the previous sections of these specifications.

Materials

All pipe and fittings shall be compatible with existing water system as acceptable to the Engineer with a pressure class of 350 psi.

Water meters shall be in accordance with Section 02666 Potable Water Systems and Section 23000 Electromagnetic Flow Meters of these specifications and as per the contract plans.

Construction Methods

N/A

Measurement and Payment

Items 12 & 13 shall be paid for the furnishing of 4" and 6" master water meters.

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
12	4" ModMAG M Series M5000 Water Meter	Each
13	6" ModMAG M Series M5000 Water Meter	Each

ITEM NO. 14

FURNISHING MODMAG M SERIES M5000 FIELD VERIFICATION DEVICE

General

Under this item, the Contractor shall furnish ModMAG M Series M5000 Field Verification Device in accordance with the previous sections of these specifications.

Materials

Field Verification Device shall be in accordance with Section 23000 Electromagnetic Flow Meters of these specifications and as per the contract plans.

Construction Methods

N/A

Measurement and Payment

Item 14 shall be paid for furnishing of a ModMAG M Series M5000 Field Verification Device.

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
14	ModMAG M Series M5000 Field Verification Device	Each

END OF DETAILED SPECIFICATIONS