June 25, 2021

STATE OF ALABAMA
COUNTY OF SHELBY

INVITATION TO BID – PRECAST CONCRETE VAULT WITH METER AND ACCESSORIES FOR HIGHWAY 49 METER PIT

Sealed bids for **PRECAST CONCRETE VAULT WITH METER AND ACCESSORIES FOR HIGHWAY 49 METER PIT** will be received in the office of the County Manager, Administration Building- Shelby County, 200 West College St, Room 123, Columbiana, Alabama 35051 until **2:00 p.m. July 8, 2021** at which time bids will be publicly opened and read. The Shelby County Commission reserves the right to reject any or all bids and to waive informalities in awarding this bid to the lowest bidder. Bidders are to state that bids submitted are firm and that no claims for errors will be made after bids are opened and subsequent thereof. If you have any questions concerning this bid, please contact Michael Cain at mcain@shelbyal.com.

GENERAL INFORMATION

All bidders must use our form for submitting their bids. All bids must be sealed and marked in the lower left corner "**BID – PRECAST CONCRETE VAULT** with opening date and time. Late bids will not be opened.

Records showing successful bidder(s) and prices quoted will be placed on file and may be examined upon request. If contract is awarded to someone other than lowest bidder, a note of explanation will appear in the file and Commission Minutes.

Should there be a change in ownership or management the contract shall be canceled unless a mutual agreement is reached with the new owner or manager to continue the contract with its present provisions and prices. The contract is not transferable by either party.

The County may cancel this contract at any time for any reason, provided a thirty day written notice is given.

DISQUALIFICATION OF BIDS

Bids may be disqualified before awarding of the contract for any of the following:

A. Failure to mark envelope as required;
B. Failure to sign or notarize the bid document; or
C. Failure to include requested information or other details of the bid.

IMMIGRATION LAW

By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.

OPEN TRADE

By signing this contract, vendor agrees that it is not currently engaged in, nor will it engage in, any boycott of a person or entity based in or doing business with a jurisdiction with which the State of Alabama can enjoy open trade.

METHOD OF AWARD

The award will be made to the lowest responsive bidder meeting specifications. It is not the policy of The Shelby County Commission to purchase on the basis of low bid only. Quality, conformity with specifications, purpose for which required, terms of delivery, and past service and experience are among the factors that may be considered in determining the responsive bidder.

The Shelby County Commission reserves the right to award separate contracts for each item, each product, or any combination of products if in the best interest of the Shelby County Commission.

Shelby County requires a purchase order for all purchases/services. Copies of purchase orders shall be required by vendor for orders to be processed and invoices paid.

Please provide your bid response in triplicate, one original and two copies.

Chad Scroggins

Chad Scroggins
County Manager

GENERAL CONDITIONS FOR
Precast Concrete Vault with Meter and Accessories for Highway 49 Meter Pit

I. CONTRACT PERIOD

Contractor shall assemble the precast concrete vault with meter and accessories and delivery onsite within 60 days from the date of the purchase order. This bid is for a one time purchase.

II. DELIVERY

Delivery shall be made during the timeframe of this contract. The vendor shall notify Shelby County Water Services two weeks prior to delivery so that site can be prepared for installation.

Vault delivery shall be made to the following location:

Onsite Location
Approximately 0.7 miles north of Shelby County 49/ Shelby County 61 intersection
Coordinates: (33° 15' 42.60" N, 86° 34' 17" W)

III. BILLING

All invoices shall be billed to:
Shelby County Water Services
200 West College Street, Room 145
Columbiana, AL 35051
ap-water-landfill@shelbyal.com

IV. BID QUALIFICATIONS

All BIDDERS must submit product information with bids. Information to be submitted must show the product proposed meets all the specifications listed below and list **ALL EXCEPTIONS** to the specifications in a separate document.

Shelby County Water Services

THE UNDERSIGNED OFFERS THESE PRICES, TERMS, AND DELIVERY AS PER BID GENERAL CONDITIONS AND SPECIFICATIONS:

NAME OF COMPANY: _____

BY: (Please Print): _____

SIGNATURE: _____

COMPANY ADDRESS: _____

_____

PHONE: _____

E-MAIL: _____

BIDS SUBMITTED ARE FIRM AND NO CLAIMS FOR ERRORS WILL BE MADE AFTER BIDS ARE OPENED AND SUBSEQUENT THEREOF.

Sworn to and subscribed before me this

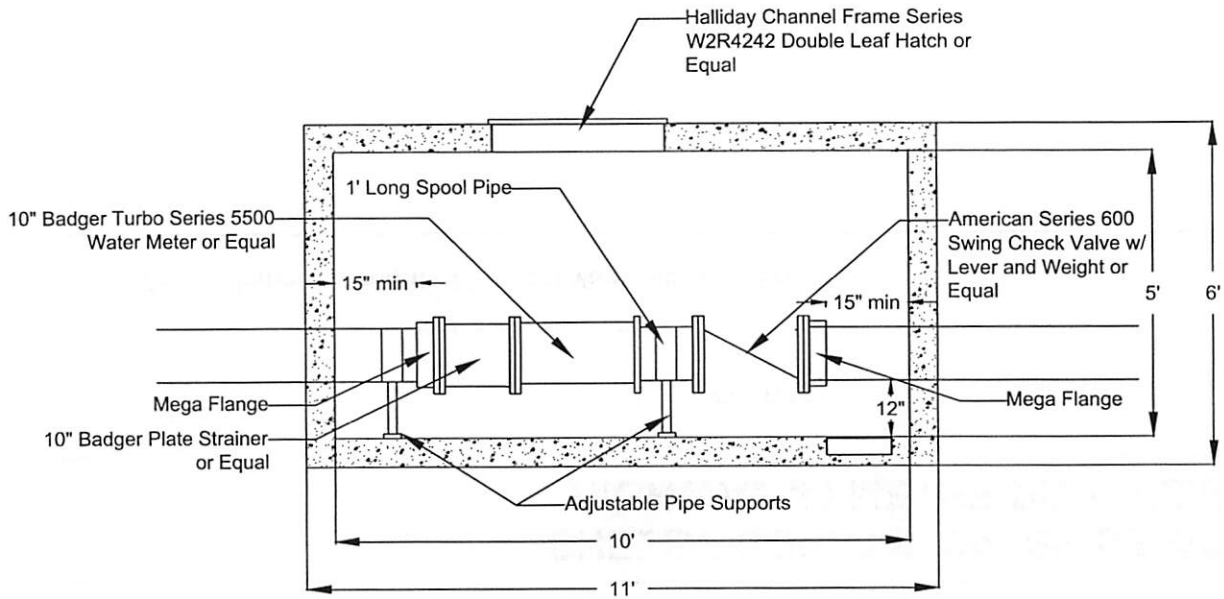
the_____day of_____,_____.

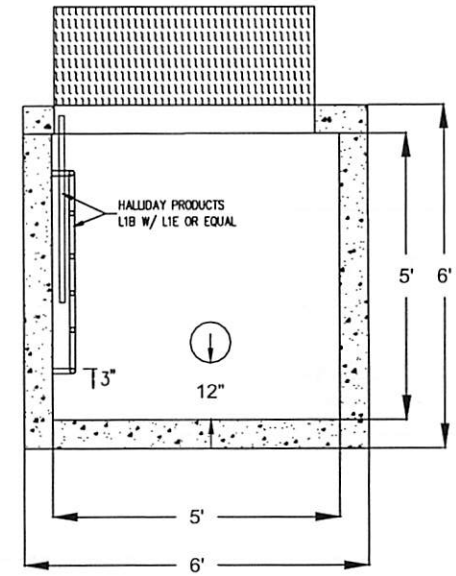
_____,Notary Public

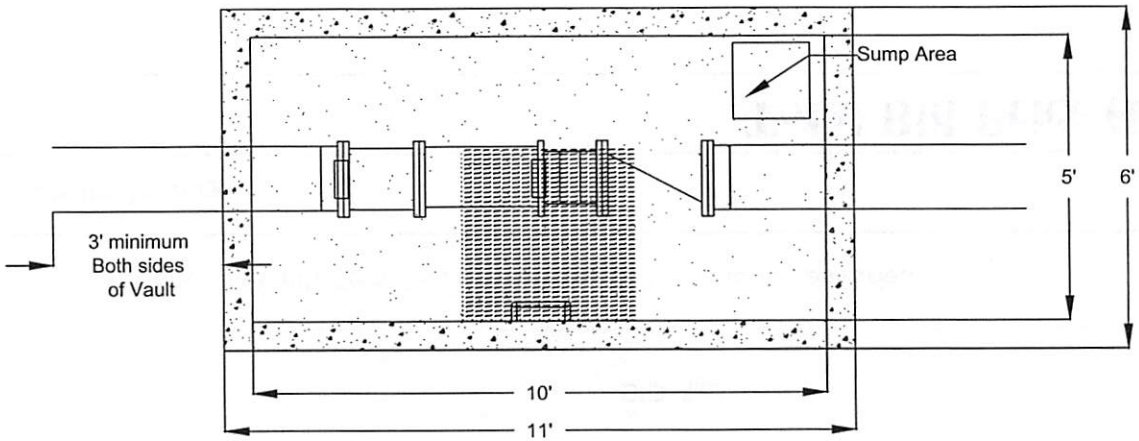
My Commission Expires:_____

SHELBY COUNTY WATER SERVICES HIGHWAY 49 METER PIT (Base Bid)	
BID ITEM	**COST**
Precast Concrete Vault Complete with Meter, Piping, and Accessories	
Onsite Delivery	
Total Bid Price (Base Bid)	

SHELBY COUNTY WATER SERVICES HIGHWAY 49 METER PIT (Addition)	
BID ITEM	**COST**
1 Foot Additional Height of Precast Vault Above 6 Feet	/Foot







NOTE:

1. USE FULL FACE GASKETS ON ALL FLANGE FITTINGS.

STANDARD DETAIL OF
Highway 49 Meter Vault

DWN. BY: TSL	SCALE:	SHEET:
CHK. BY: MAC	NTS	S-1
DATE: 06/15/21		

SHELBY COUNTY
WATER SERVICES
P.O. BOX 10
200 WEST COLLEGE STREET
COLUMBIANA, AL 35051
PHONE: (205)670-6540

DRAWING

SECTION 03400

PRECAST CONCRETE VAULT

PART 1 GENERAL

1.1 SUMMARY

A. Work described in this section includes manufacture of precast concrete vault.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related work specified elsewhere includes:
   1. Section 03300 – Cast-in-Place Concrete

1.3 APPLICABLE STANDARDS

A. All precast prestressed concrete shall be designed to support the loads shown on the drawings.

B. Concrete vault construction shall meet the requirements of ASTM C858 & C857.

C. Reinforcing steel shall meet the requirements of ASTM A615.

D. Butyl sealant meeting ASTM C 990 to be used on joints.

1.4 MANUFACTURERS

A. Manufacturer shall have been engaged in the business of manufacturing precast and/or prestressed concrete vaults for a period of no less than five years.

1.5 QUALITY CONTROL AND INSPECTIONS

A. Concrete to be 4,000 psi @ 28 days.

PART 2 PRODUCTS

2.1 DESIGN

A. The manufacturer is responsible for the design of the prestressed vault .

B. Design work shall be in accordance with ACI 318 with supplements.

C. Vault shall contain a sump area for water to accumulate.

2.2 HATCH

A. The cover leaves shall be ¼" aluminum diamond plate.

B. Channel frame shall be ¼" aluminum with continuous anchor flange and a 1-1/2 inch drainage coupling located in the front left corner of the frame.

C. The hatch shall have a load rating of 300 pounds per square foot uniform live load.

D. The hatch shall have a non-corrosive locking bar

E. The hatch shall have the following T-316 stainless steel features: heavy duty hinges, tamper proof attaching hardware, automatic hold arm with aluminum latch.

F. Access hatch shall carry a lifetime guarantee against defects in material and/or workmanship.

G. Hatch shall be Halliday Channel Frame Series W2R4242 Double Leaf Hatch or Equal.

2.3 LADDER

A. The ladder shall be constructed entirely of aluminum.

B. The rails shall be ½" x 2-3/4" aluminum extrusion and shall be spaced 16" apart.

C. Wall mounted standoffs shall be 3/8" x 2-1/2" flat bar and welded to the rails at a maximum of 60" on center.

D. Standoffs shall be a minimum of 7" and manufactured to fit flush with the wall.

E. Rungs shall be 1-3/8" diameter type "D" with flat slip resistant surface and be be spaced at 12" on center and welded to the outside of each rail.

F. Ladder shall be equipped with a safety extension. The housing of the safety extension shall be aluminum and mounted to the ladder by means of stainless steel channel clamps secured to the ladder rungs with stainless steel "U" bolts. The aluminum telescoping post shall extend avot the top of the housing and lock into position with a stainless steel pin.

G. The safety ladder shall be Halliday Products L1B with L1E or Equal.

PART 3 EXECUTION

3.1 TRANSPORTING

A. Care shall be exercised in the handling and transporting of precast units.

B. Precast units shall be lifted with proper equipment in accordance with the manufacturer's standards.

3.2 ERECTION

A. All prestressed concrete members shall be erected into final position and all connections completed.

B. Where pipe is penetrating vault wall, proper sealants shall be used to prevent the leakage of water into the vault.

END OF SECTION

SECTION 15100

PIPING AND ACCESSORIES

PART 1 GENERAL

1.1 SCOPE

A. This section covers furnishing and installing all piping.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 REFERENCES

A. A21.4 ANSI - Standard for Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water

B. A21.10 ANSI - Standard for Ductile-Iron and Gray Iron Fittings 3 in. Through 48 in., for Water and Other Liquids

C. A21.11 ANSI - Standard for Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

D. A21.15 ANSI - Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges

E. A21.50 ANSI - Standard for the Thickness Design of Ductile-Iron Pipe

F. A21.51 ANSI - Standard for Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids

G. A21.53 ANSI - Standard for Ductile Iron Compact Fittings, 3 in. through 24 in. and 54 in. through 64 in., for Water Service

H. B16.1 ANSI - Standard for Cast Iron Pipe Flanges and Flanged Fittings 25, 125, 250, and 800 lb.

I. C-606 ANSI - Standard for Grooved and Shouldered Fittings

1.4 STORAGE AND HANDLING

A. CONTRACTOR shall store materials in accordance with manufacture's recommendation.

B. CONTRACTOR shall store materials either at the project site in designated areas or in a secure location approved by the ENGINEER.

C. CONTRACTOR shall not store material directly on the ground.

D. Handle items to prevent damage to interior or exterior surfaces.

PART 2 PRODUCTS

2.1 PIPING MATERIALS

A. Ductile Iron Pipe (DI)

1. The CONTRACTOR shall furnish, install and join all ductile iron pressure pipe, ductile iron fittings, and appurtenant materials and equipment, all as indicated on the drawings and as hereinafter specified.
2. Fittings shall be ductile iron.
3. Wall penetrations connecting buried outside piping and inside piping, or tank penetrations below water level, shall consist of ductile iron wall sleeves imbedded in the concrete with mechanical joint or flanged connections compatible with the piping system.
4. Ductile Iron Pipe Classification Usage

Pipe Size (in)	Pressure Class
12" and Smaller	350

5. Joints for ductile iron pipe and fittings shall be flanged, mechanical joint, push-on joint, or mechanically coupled grooved joint as indicated on the drawings and as specified in "Joining of Pipes" in this division.
6. Where required, pipe and fittings shall be furnished with approved lugs or hooks cast integrally for use with bolts or bridle rods and socket clamps to keep pipe from pulling apart under pressure.
7. Coatings
   a. All ductile iron pipe and fittings (except air systems) shall be coated as follows:
      1) The inside shall be given a standard thickness of cement coating and an asphaltic seal coat in accordance with ANSI A21.4.
         (i) Ductile Iron Pipe used for air service shall be unlined pipe.
      2) The outside of underground systems shall be coated with the standard bituminous coating specified under the appropriate ANSI specification for the pipe and fittings.
      3) Field coating of interior pipe shall be in accordance with Section 09900.
      4) Machined surfaces shall be cleaned and coated with a rust-preventive coating at the shop immediately after being machined.
8. Inspection and Testing
   a. All pipe and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured. The CONTRACTOR shall furnish in duplicate to the ENGINEER sworn certificates of such tests. All inspection and testing at the foundry shall be accomplished at no additional expense to the OWNER.
   b. Pipes and fittings shall be subjected to a careful inspection and hammer test just before being installed.

2.2 PIPING APPURTENANCES & ACCESSORIES

A. Wall Penetration Closure

1. Wall penetration closures are intended to keep a liquid on one side of a wall when a pipe must penetrate a wall. They are also used where liquids may be present on both sides of the wall and they should not mix.
2. Provide wall penetration closures where shown on the drawings. The closures shall be "Link-Seal" as manufactured by Thunderline

Corporation, Wayne, MI. Seals shall be modular mechanical type consisting of synthetic rubber links shaped to continuous fill the annular space between the pipe and the wall opening. The closure shall be watertight when bolts are tightened. Inside diameter of wall opening shall be sized as recommended by the manufacturer to assure a watertight joint.

2.3 PIPE JOINTS

A. General
1. The joining of pipes shall be in accordance with the system acceptable and recommended by the manufacturer of the piping system. The joining methods herein described and described in the section "Piping and Tubing Materials" are a guide.
2. Threaded piping connections for plastic pipe are not to be used. In the connection of plastic pipe to a metal pipe, flanged connections shall be used.

B. Flanged Joints
1. Steel pipe flanges shall conform to ANSI B16.5 "Steel Pipe Flanges and Flanged Fittings". Cast iron pipe flanges shall conform to ANSI B16.1 "Cast Iron Flanges and Flanged Fittings". Steel flanges shall be raised face except when bolted to flat face cast iron flange.
2. Flanged joints shall be made with bolts, bolt studs with nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same ANSI Standard as the flanges.
3. Mega flange shall be EBAA Iron Series 2100 or equal.
4. Bolting for services up to 500 degrees F shall be ANSI/ASTM A307 Grade B with square head bolts and heavy hexagonal nuts conforming to ANSI B18.2.1 "Square and Hex Bolts" and B18.2.2 "Square and Hex Nuts". Bolt studs and studs shall be of the same quality as machine bolts.
5. Gaskets for flat face flanges shall be full face type. Gaskets for raised face flanges shall conform to requirements for "Group I Gaskets" in ANSI B16.5. Gaskets shall be 1/8 in. thick minimum and of following types:
   a. Water, Sewage, Sludges (up to 175°F): Red rubber, heavy duty type, by John Crane Co., Morton Grove, IL, - Style 555.
   b. Gases, Teflon coated type by John Crane - Style 11FF, free flow with neoprene insert.

2.4 SUPPORTS

A. Pipe supports shall be designed in accordance with good engineering practice as well as to the requirements of individual pipe manufacturers. If standard details are shown, they should be used as a guide.

PART 3 EXECUTION

3.1 PIPE ERECTION AND LAYING

A. Carefully inspect all pipe, fittings, valves, equipment, and accessories prior to installation. Any items which are unsuitable, cracked or otherwise defective shall be rejected.

B. Exercise all necessary care at every stage of storage, handling, laying, and erecting to prevent entry of foreign matter into piping, fittings, equipment and accessories. Do not erect or install any item which is not clean. During construction, until system is fully operational, all openings in piping and equipment must be kept closed at all times except when actual work is being performed on that item or system. Closures shall be plugs, caps, blind flanges, or other items specifically designed and intended for this purpose.

C. Provide flanges at all equipment to facilitate dismantling.

D. Use full and double lengths of pipe wherever possible.

E. All pipe shall be cut to exact measurement and installed without springing or forcing. Particular care shall be taken to avoid creating, even temporarily, undue loads, forces or strains on equipment or piping supports.

3.2 JOINING OF PIPE

A. Flanged Joints
   1. Set flange bolts beyond finger tightness with an indicating torque wrench to insure equal tension in all bolts. Tighten bolts such that those 180 degrees apart or directly opposite are torqued in sequence.

3.3 SUPPORTS

A. The requirements of the applicable sections of ANSI B31 "Pressure Piping" shall be considered as minimum requirements governing fabrication, installation and support of piping systems except where more specific or stringent requirements are stated herein or shown on the drawings.

B. All piping and piping connected equipment, including valves, strainers, traps and other specialties and accessories shall be supported in a manner that will not result in or produce objectionable or excessive stress, deflection, swaying, sagging, or vibration in the piping or in the building structure either during erection, cleaning, testing, or normal operation of the systems. Piping shall not be so restrained, however, as to cause it to shake or buckle between supports or anchors or to prevent proper movement due to expansion and contraction. Piping shall be supported at equipment and valves such that they can be disconnected and removed without further supporting the piping. Piping shall not introduce any strains or distortion to the connected equipment.

C. All concrete inserts for support shall be set in place prior to pouring concrete.

D. All auxiliary structural steel required for the support of piping systems and not shown on the drawings as having been installed as a part of the building structure shall be furnished, installed and prime painted as part of the work under this section. Attach auxiliary steel to building structure as detailed on the drawings.

E. Hangers and supports shall be installed complete, including lock nuts, clamps, rods, bolts, couplings, swivels, inserts and required accessory items. Hangers for horizontal piping shall have adequate means of vertical adjustment for proper alignment of pipe and shall be provided with lock nuts. All hangers and supports in direct contact with copper tubing shall be copper plated or plastic coated.

F. It shall be the responsibility of the CONTRACTOR to coordinate the location and method of support of the piping systems with that of all installations under other sections of the specifications. Piping shall be supported in such a manner as to impose no eccentric loading on building structural members. The loading of any hanger or support shall in no case exceed the manufacturer's recommended maximum load.

G. Pipe Supports

1. Unless otherwise indicated on the drawings, maximum spacing of pipe supports for horizontal piping shall be as follows:

PIPE SUPPORTS

	Pipe Material	Maximum Spacing	
		Liquids	Air and Gases
a.	Steel (std. Weight or heavier), Ductile Iron		
	1-1/2" and under	7'-0"	7'-0"
	2", 2-1/2", 3"	10'-0"	14'-0"
	4", 6"	14'-0"	20'-0"
	8", 10", 20'-0"	20'-0"	
	12" and above	20'-0"	20'-0"
b.	Hard Drawn Copper Tubing		
	1" and under	5'-0"	5'-0"
	1-1/4", 1-1/2"	7'-0"	7'-0"
	2" and above	10'-0"	10'0"
c.	Cast Iron Soil Pipe	10'-0"	10'-0"
d.	PVC Flexible Hose, Soft Copper Tubing		
	2" and under	Continuous Support	
	2-1/2" and above	As shown on the drawings or as required by manufacturer for service temperature.	

2. Provide additional supports, a) where pipe changes direction, b) adjacent to flanged valves and strainers, and c) at equipment connections and heavy fittings. Provide at least one hanger adjacent to each joint in cast-iron soil pipe and grooved-end steel pipe with mechanical couplings.
3. Vertical pipe runs shall be supported and laterally braced at every floor level in multistory structures and at intervals not exceeding 15 ft in other structures.
4. Pipe and conduit supports shall be designed in accordance with good engineering practice as well as to the requirements of individual pipe manufacturers. If standard details are shown, they should be used as a guide.

END OF SECTION

SECTION 15110

WATER METER

PART 1 GENERAL

Section 1 - SCOPE

1. This section covers the Badger Turbo Series 5500 Water Meter or Equal and the materials and workmanship employed in the fabrication. The meter must be a turbine meter and meet the requirements of AWWA Standard C701 Class II Standards.

Section 2 - Meter Size, Capacity, and Length

1. The requirements of the meter are as follows:

Meter Size	10"
Meter Flange AWWA 125 Pound Class	Round
Typical Operating Range	50 – 7000gpm
Typical Low Flow	30 gpm
Maximum Continuous Flow	5500 gpm
Maximum Intermittent Flow	7000 gpm
Pressure Loss at Max Continuous Flow	1.6 psi
Maximum Operating Pressure	150 psi
Lay Length	26"
Width	16"
Height	17-15/32"

Section 3 – Cases

1. The meter housing should be made of a lead-free alloy that complies with the lead-free requirements as defined by the 2014 provisions of the Safe Drinking Water Act. The definition of "lead-free" shall be not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

2. The size, model, and direction of flow through the meter shall be molded/cast in the meter outer case.

Section 4 - Register

1. The register shall be set up for an absolute encoder register for connection to a Badger Beacon Cellular Endpoint.

2. The registration reading shall be U.S. Gallons.

3. High Resolution Absolute Encoder Register

a. The high resolution absolute encoder shall consist of an 8-dial mechanical local register combined with frictionless light emitting diode (LED) technology to sense the position of the eight numbers wheels for electronic reading purposes. The high resolution encoder shall utilize the industry standard ASCII protocol for connectivity to an approved endpoint.

b. The encoder's electronic reading shall be obtained through a frictionless form of encoding technology that utilizes optical sensing to determine the position of each number wheel. Absolutely no slide wires, contacts or load fire spring mechanisms will be allowed.

The encoder output shall provide an eight digit reading for AMR/AMI endpoints (number of digits sent to the reading software is dependent on the endpoint that is connected). The encoder output for touch applications shall have the factory-programmed option of 4, 5, 6, 7 or 8 digits. The electronic output of the encoder should be factory programmable to a 5 dial reading to meet the reading resolution of the utility.

Signal output shall be the industry standard ASCII format and signal type shall be three- wire synchronous for AMR/AMI endpoints or two-wire asynchronous for touch endpoints.

Encoder shall provide meter size and unit of measure and factory programmed serial number as part of the encoder message.

c. The high resolution encoder shall not be in contact with the water being measured. The encoder shall be designed to assemble to the meter with a four-position bayonet and seal screw fastening. The bayonet mount positions the encoder in any of four orientations on a water meter for visual reading convenience. The high resolution encoder shall be designed to permit removal and exchange without removal of the meter from the service installation or interruption of service water supply.

The encoder shall be tamper protected through the use of a tamper-resistant Torx® seal screw or optional proprietary tamper-proof screw that requires a special drive bit to remove the screw. Plastic push pin or plastic tamper devices that need to be destroyed in order to remove the encoder will not be accepted. The encoder shall be designed to assemble to the meter with a four-position bayonet and seal screw fastening. The encoder must be provided with a factory installed Twist Tight connector compatible with Touch pad endpoint or a standard fixed base/cellular endpoint as provided by the meter manufacturer. Twist tight connector shall provide a waterproof connection between the encoder and the Touch pad or other endpoints.

d. The meter size and units of registration, U.S. gallons shall be designated on the encoder dial face. Every encoder shall utilize a flow indicator for leak detection and shall display it in red for U.S. Gallons.

e. The encoder shall be encased in a housing, which shall consist of a glass lens and a non-corrosive metal bottom, which are permanently sealed with adhesive material.

The enclosure must be weatherproof, UV-resistant and permanently sealed to withstand harsh environments and provide moisture resistance in flooded or submerged pit applications. The permanent seal between the glass lens and non-corrosive metal bottom of the encoder enclosure shall utilize an adhesive seal without the use of gaskets and shall meet or exceed all applicable requirements of AWWA Standard C706 and C707. Absolutely no gasketed seals will be allowed. The encoder shall remain fog-free of moisture.

The name or logo of the manufacturer shall be permanently molded and the serial number shall be imprinted on the lid of the encoder box. The lid and shroud components shall overlap to protect the lens and optional identification of the serial number inside the lid. Register box enclosures and lids shall be made of engineering thermoplastic or other suitable synthetic polymer.

f. The encoder shall be factory programmed and shall contain a standard or customer specified eight-digit serial number. Electronic read data shall be provided using an industry standard ASCII protocol.

g. The encoder must be permanently sealed to provide moisture resistance to flooded pit or submerged conditions. The permanent seal between the glass lens and non-corrosive (metal) bottom shall utilize an adhesive seal without the use of gaskets. Absolutely no gasketed seals will be allowed.

h. It is the preference of the County that the absolute encoder register offered is constructed of scratch resistant glass face, non-corrosive metal bottom, and adhesive seal. The encoder shall have a lid/shroud that covers the glass face for added protection and optional identification of serial number. Absolutely no oil filled encoder register shall be accepted.

Section 5 – Strainer

1. The strainer shall be a dual flange plate strainer 10" in size. Flange to be compatible with any ASA 125 flange.

2. Strainer shall comply with the lead-free requirements as defined by the 2014 provisions of the Safe Drinking Water Act. The definition of "lead-free" shall be not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

3. Straining area shall have a minimum 2 to 1 ratio of meter inlet.

4. Screen shall be removable for cleaning.

5. Screens to be made of non-corrosive stainless steel .

6. Housing and cover shall be comprised of fabricated steel. Housing shall be designed and individually tested to withstand 150 psi maximum working pressure. Head loss for the strainer shall be 1.1 psi at 3,000 GPM.

7. Screen perforations shall be 5/32" holes.

8. Strainer to have a 1-1/2 NPT drain plug.

Section 6 – AMI/AMA Modules

Under this specification, the manufacturer shall have the capability to provide an Advanced Metering Infrastructure and Analytics (AMI/AMA) system. System shall have the ability to use either a fixed base network (gateways transceivers) or a cellular based network using the secure LTE-M cellular network. The endpoints shall come with twist tight connectors that will allow it to interchange with the connector to the encoders.

1. SYSTEM DESCRIPTION – The primary function shall be to provide accurate and timely meter reading data for billing purposes. A secondary function of the system will be to provide meter consumption data, backup message to use in troubleshooting meter/endpoint issues, and meter-based analytical alarms to facilitate enhanced utility operations and management as well as providing the water customer with consumption and alarm information concerning their service.

   The network shall be engineered by the manufacturer to utilize either a fixed base system made up of gateways and applicable options for backhaul to a central hosting server or a cellular based network connected to water meters by cellular endpoints to send data through an existing cellular network. The cellular endpoints will operate on FCC regulated frequencies reserved for secure cellular communications. Endpoints for either system shall provide two-way communications capabilities between the endpoint and the AMA software.

   The AMA software will support an open system platform design and have multiple options to provide metering data to the utility's billing system including CSV format and optional API. In addition, system information, and other service tools will be provided to assist the utility in serving their customers. The AMA software will also be used to monitor and control system performance all the way down to the endpoint. The AMA software shall provide a consumer engagement module that includes online access and a smartphone application to allow the utility customer access to their usage information. The consumer engagement module is required to be built into the AMA software platform to increase data availability and to eliminate additional interface requirements between multiple software platforms. No third-party consumer engagement software is allowed.

2. MANAGED SOLUTION REQUIREMENTS – For a managed solution, the manufacturer must provide the following:

   a. Engineered deployment design

b. Hosted and managed AMA software using a secure data warehouse with SOC2 reports and ISO27001 security certification in place for the software holding the data and data warehouse.

c. All AMA software upgrades and updates

d. Periodic web-based training of AMA software and system operation

e. Consumer engagement tools

f. Access to up to three years of 15-minute interval metering data

g. 24/7 Technical support for all supplied software and hardware

h. Future-proof technology

i. All software and server updates are included by manufacturer

3. ENDPOINT PERFORMANCE REQUIREMENTS

a. ENDPOINT TYPES – The manufacturer must provide an engineered deployment design that includes cellular or point-to-point fixed network endpoints for use in commercial and residential applications.

1) CELLULAR NETWORK – The endpoint must be capable to communicate on the LTE-M (machine-to-machine) network with the ability to use a 5G network.

b. CONFIGURATIONS – Manufacturer shall provide a single endpoint that is fully potted and can be deployed in an indoor, outdoor or submersible (pit) application. The endpoint shall be programmed in the factory and available for connectivity to a compatible absolute encoder register. The endpoint shall also be available in an endpoint-only configuration for field splicing, or with a submersible inline connector. To ensure optimal system performance, the endpoint must be designed to be mounted through a standard 2" hole in a plastic or composite pit lid. Endpoints may be started using wake on consumption or through IR communication. In addition, the endpoint must support an optional installation message using the mobile back-up feature or IR to confirm that the endpoint was successfully installed.

c. ENDPOINT TRANSMISSION - The standard endpoint radio frequency operation shall incorporate automatic, two-way radio frequency communication of metering data, requiring no auxiliary communication necessary to trigger the transmission of the standard metering data. Endpoint must store a minimum of 40 days of time-synchronized, 15-minute interval data. In the unforeseen event that the communication system is unavailable for a period of time, readings continue to be captured and stored and returned automatically to the utility upon network restoration. As a data

security measure, network data transmissions to and from the endpoint must be transported only via private network and never over the public internet.

d. ENVIRONMENTAL – The endpoint shall, at a minimum, be able to withstand temperatures between -40° F to +140°F. In addition, the endpoint shall be fully potted to withstand harsh environments.

e. POWER SOURCE – Endpoints with replaceable batteries are not acceptable due to potential water intrusion.

f. WARRANTY – The endpoints must be covered under warranty against defects in material and workmanship for a period of time that meets or exceeds the industry standard of 20 years after shipment from the manufacturer. Under the warranty, the manufacturer shall agree to repair or replace a non-performing product at no cost during the first ten (10) years, and at a prorated price during the last ten (10) years of the warranty.

g. WIRE TAMPER DETECTION – The endpoint must utilize a three-wire conductor cable, allowing monitoring of the integrity of its connection to the meter encoder. It will also indicate a tamper alert status within the endpoint transmission signal if either a short or open-circuit condition is sensed in the three-wire connection.

h. MOBILE BACK-UP – The endpoint must support a mobile message in addition to the cellular communication to support installation, troubleshooting, and a walk-by back-up method of data collection as desired by the utility.

i. IR PROGRAMMING – The endpoint will have infrared communication connection to aid in installation and troubleshooting.

j. TWO-WAY COMMUNICATION – The endpoint will be capable of two-way communications with the AMA system, which allows for endpoint firmware upgrades and endpoint clock synchronization and supports a residential meter with an integral shut off valve upon release or other auxiliary devices (such as leak detection) and exterior shut off valve.

k. ENCODER COMPATIBILITY - A single endpoint shall be available which is fully programmed and capable of being used in conjunction with the Badger Meter HR- E, HR-E LCD, ADE®, 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 (Intelligent Communication Encoder).

4. SOFTWARE/ENDPOINT INSTALLATION AND TRAINING – The manufacturer's certified training personnel shall setup and test the AMA

software for the utility. Upon successful completion of the set-up, the manufacturer's certified training personnel shall provide training on the operation and maintenance of the system, and endpoint installation. Follow up customized training will be available. To support a community of users, manufacturer will provide periodic web-based training on the different features of the AMA software to ensure the user can enjoy all the benefits the system provides.

5. TECHNICAL SUPPORT - The manufacturer must have a staff of technical support personnel trained in all aspects of the metering and AMA system. Technical support must be available via the phone 24 X 7. After- hours return calls must be guaranteed within 30 minutes.

6. EXPERIENCE – The manufacturer shall have a minimum of twenty years of product experience in the field of water AMR / AMI and should have sold a minimum of 12,000,000 AMR or AMI endpoints (touch-read not included) into water utilities over the past fifteen

7. MANUFACTURER – Badger Beacon Cellular End Point

SECTION 15120

Valves

PART 1 GENERAL

Section 1 - SCOPE

1. This section covers the requirements for the 10" American Series 600 Swing Check Valve with Lever and Weight or Equal and the materials and workmanship employed in the fabrication. Check valve shall be in full compliance with ANSI/AWWA C508 and UL listed.

2. Section 2 - Meter Size, Capacity, and Length

    1. The check valve shall be 10" in diameter.

    2. The check valve shall be UL listed with a rated working pressure of 175 psig.

    3. The lay length shall be 22 inches.

Section 3 –Components

1. Check valve cover and body shall be manufactured from gray cast iron meeting or exceeding ASTM A126, Grade B. The body of the valve shall have an area depicting the direction of water flow.

2. All body to bonnet fasteners shall be Type 304 Stainless Steel.

3. Clapper arm shall be made of high-strength bronze.

4. Clapper arm to be stainless steel.

5. The resilent seted disc shall be constructed of high strength bronze with a nitrile rubber seal recessed into the disc.

6. Check valve shall be designed with full waterway opening per Type I of MSS SP-71.

7. Check valve and clapper arm assembly shall be removable from the check valve body without having to remove the check valve from piping.

8. Check valve to be equipped with outside lever and weight. Weight lever to be constructed of bronze. Weight to be gray cast iron.