CATTAIL BRANCH SEWAGE PUMPING STATION
EQUIPMENT INSTALLATION
IFB NO. 500640-FY17-23
Addendum #1
April 12, 2017

ITEM NO. 1:

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ADD Section 15100, Valve Operators and Electric Valve Actuators
ADD Section 15109, Plug Valves

ITEM NO. 2:

Section 15100, Valve Operators and Electric Valve Actuators

ADD Section 15100 in its entirety with the attached.

ITEM NO. 3:

Section 15109, Plug Valves

ADD Section 15109 in its entirety with the attached.

ITEM NO. 4:

Contract Drawing M-10

REPLACE all instances (3 locations) of "(TYP. OF PUMP 3 & 4)" with "(TYP. OF PUMP 1 & 2)"

ITEM NO. 5:

Questions and Answers:

Question 1: Drawing C-1, Note 1 wet tap:

a. Confirm that the tap is new work.
b. Confirm the tap size. Normally the tap cannot be full sixe, ie 20" into 20".
c. No tapping valve is shown. Do you want a plug valve in addition to the tapping valve?

Answer 1:

a. Wet tap is confirmed as new work.
b. Tap size proposed is 20". Contractor shall confirm tap size following exposing the sewer. A 16" tap shall be provided with associated fitting to increase to

20" in the event field conditions do not permit a 20" tap, at no additional cost to the Owner.

c. **Yes, a plug valve shall be installed in addition to the tapping valve. Specification Section 15109 has been added to the Bid Documents accordingly (attached herein).**

Question 2: Drawing C-1, Note 2, bypass pumping:

a. I have not seen any information to be able to size the bypass. Please provide.
b. Note 4 states to perform bypass at low flow. What is the flow?
c. How does the pump station operate now? Do all 4 pumps operate, only 2 pumps? What is the flow? Provide complete information.

Answer 2:

a. **Bypass shall be designed to match the capacity of the Pump Station with two pumps in operation, which is 4,070 GPM. Only one of the four pumps typically operate at any one particular time, unless under wet weather conditions when the Town has historically operated two pumps.**
b. **Low flow is assumed to occur between the hours of 12 AM and 5 AM. However, the bypass shall be sized to meet the design capacity of the station – see response to Question 2a above.**
c. **Only one of the four pumps typically operate at any one particular time, unless under wet weather conditions. The existing flow meter is currently inoperable - the bypass shall be sized to meet the design capacity of the station – see response to Question 2a above.**

Question 3: Drawing C-1 note 3 requires a linestop if the existing valve does not operate. Should we include this cost in our bid?

Answer 3:

A linestop shall be included in the Contractor's bid. Should this item not be required, or the Town determine that the existing plug valve operates, the Town will pursue a credit from the Contractor.

Question 4: The drawings do not indicate specifically:

a. Confirm that influent flow can be diverted 100% into wetwell 1.
b. Confirm that the discharge valve on the forcemain can be closed during bypass.
c. Confirm that no work is required for valves on Pumps 3 & 4 (look at call-outs on M-10).

Answer 4:

a. **There are gates in the channels to allow flow to be diverted to either wet well. It may not be necessary to divert flow to the wet wells during bypass operations since the bypass pumps could pull from the area upstream of the grinders, if necessary. The station is designed to run off one wet well and with current operations should be able to without issue.**
b. **Per Sheet C-1, Note 3, the Contractor, with the Town's assistance, shall determine if the force main discharge valve is operating. If it is not operating, the Contractor shall install a linestop so bypass pumping can be performed. Please refer to the answer to Question 3 above for additional information.**

c. **No work is being performed on Pumps 3 and 4. Please refer to revisions to sheet M-10, including within this Addendum.**

Question 5: I do not see a specification for the plug valves, check valve or control valve. Please provide one.

Answer 5:

Valves inside the station were procured under a separate Contract. This Contract includes the installation of the valves inside the station and procurement and installation of the plug valve along the bypass connection. All information necessary to install the valves is provided on the drawings and covered in Specification Sections 11000 and 15095. Additionally, Plug Valve Specification Section 15109 has been added to the Bid Documents accordingly (attached herein).

Question 6: I was curious to know if any crane or rigging services will be needed on this project.

Answer 6:

There is an existing bridge crane in the facility that can be used during construction activities. It is up to the Contractor to determine the method in which they would like to lift equipment in and out of the lower level of the pump station.

Question 7: What are the maximum flows that would need to be bypassed during construction? The specifications state that the Design Capacity is 2035 GPM. Would this be the maximum?

Answer 7:

Each pump has a design capacity of 2,035 GPM. Bypass shall be designed to match the capacity of the Pump Station with two pumps in operation, which is 4,070 GPM. Only one of the four pumps typically operate at any one particular time, unless under wet weather conditions when the Town has historically operated two pumps. As noted on Sheet C-1, note 4, a backup bypass pump shall be provided.

END OF ADDENDUM #1

SECTION 15100

VALVE OPERATORS AND ELECTRIC VALVE ACTUATORS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Valve operators and electric valve actuators shall be designed to unseat, open or close, and seat the valve under the most adverse operating condition to which the valves will be subjected.

B. Operator mounting arrangements shall be as indicated on the Drawings or as directed by the manufacturer and/or Engineer. There shall be no mounting restrictions on the electric valve actuators.

C. The valve operators and electric actuators shall be the full and undivided responsibility of the valve manufacturer in order to ensure complete coordination of the components and to provide unit responsibility.

1.02 SUBMITTALS

A. The following items shall be submitted:

1. Certification that the force required to operate all valves is as specified herein.

2. Performance characteristics and descriptive data.

3. Detailed equipment dimensional drawings and setting plans.

4. General lifting, erection, installation, and adjustment instructions, and recommendations.

5. Complete information regarding location, type, size, and length of all field welds in accordance with "Standard Welding Symbols" AWS A2.0 of the American Welding Society. Special conditions shall be fully explained by notes and details.

6. The total uncrated weight of the equipment plus the approximate weight of shipped materials. Support locations and loads that will be transmitted to bases and foundations. Exact size, placement, and embedment requirements of all anchor bolts.

7. Details on materials of construction of all components including applicable ASTM designations.

8. Information on bearing types and bearing life.

9. Gear box design and performance criteria and AGMA service factor.

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10. Piping schematics.

11. Motor data sheet indicating motor horsepower; enclosure type; voltage; insulation class; temperature rise and results of dielectric tests; service-rating; rotative speed; motor speed-torque relationship; efficiency and power factor at ½, ¾, and full load; slip at full load; running, full load, and locked rotor current values; and safe running time-current curves.

12. Equipment and motor protective device details. Connection diagrams for motor and all protective devices.

13. Equipment shop coating systems, interior and exterior.

14. Panel layout drawings, schematic wiring diagrams, and component product data sheets for control panels.

15. A list of spare parts and special tools to be provided.

16. Any additional information required to show conformance with the equipment specifications.

17. Warranty documentation including statement of duration of warranty period and contact phone numbers and addresses for warranty issues.

B. Operation and Maintenance Manuals shall be submitted as follows:

1. Two (2) preliminary copies of Operation and Maintenance Manuals, prepared specifically for this Project, shall be furnished for each item of equipment furnished under this Contract. The preliminary manuals shall be provided to the Engineer not less than 60 days prior to the start-up of the respective equipment.

2. The preliminary manuals shall be reviewed by the Engineer prior to the Equipment Supplier submitting final copies for distribution to the Owner. Following review of the preliminary copies of the Operation and Maintenance Manuals, one (1) copy will be returned to the Equipment Supplier with required revisions noted, or the acceptance of the Engineer noted.

3. Manuals shall contain complete information in connection with assembly, operation, lubrication, adjustment, wiring diagrams and schematics, maintenance, and repair, including detailed parts lists with drawings or photographs identifying the parts.

4. Manuals furnished shall be assembled and bound in separate volumes, by major equipment items or trades, and properly indexed to facilitate locating any required information. In addition, manuals should be labeled in the front cover with the project, name, equipment description, and manufacturer contact information.

5. Engineer and the Owner shall be the sole judge of the acceptability and completeness of the manuals and may reject any submittal for insufficient

information included, incorrect references and/or the manner in which the material is assembled.

6. Following the Engineer's review of the preliminary manuals, the Equipment Supplier shall submit five (5) paper copies and two (2) electronic copies of the final Operation and Maintenance Manuals to the Engineer. The manuals shall reflect the required revisions noted during the Engineer's review of the preliminary documents. Failure of the final manuals to reflect the required revisions noted by the Engineer during a review of the Preliminary documents will result in the manuals being returned to the Contractor. Acceptable final Operation and Maintenance Manuals shall be provided not less than two week prior to equipment start-up.

C. Certified Shop Test Records

1. Each piece of equipment for which pressure, head, capacity, rating, efficiency, performance, function or special requirements are specified or implied shall be tested in the shop of the Equipment Supplier in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents and applicable test codes and standards. Equipment Supplier shall keep the Engineer advised of the scheduling of shop tests so that the Engineer may arrange for the witnessing or inspection at the proper time and place.

2. The Equipment Supplier shall secure from the manufacturers seven (7) copies of the actual test data, the interpreted results and a complete description of the testing facilities and testing setup, all accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company and notarized. These reports shall be forwarded to the Engineer for review.

3. In the event any equipment fails to meet the test requirements, the manufacturer shall make all necessary changes, adjustments or replacements and the tests shall be repeated, at no additional cost to the Owner or Engineer, until the equipment test requirements are acceptable to the Engineer.

4. No equipment shall be shipped to the Project until the Engineer notifies the Contractor, in writing, that the shop test reports are acceptable.

1.03 WARRANTY AND GUARANTEE

A. The equipment furnished under this Contract shall be guaranteed to be free from defects in workmanship, design and/or materials for a period of one (1) year. The period of such warranties shall start on the date the particular equipment is placed in use by the Owner with corresponding start-up certification provided by the manufacturer's technical representative as specified herein, provided that the equipment demonstrates satisfactory performance during the thirty day operational period after the equipment startup. If the equipment does not perform satisfactorily during the thirty day operational period, the start of the warranty period will be delayed until the equipment demonstrates proper operation. The Equipment Supplier shall repair or replace without charge to the Owner any part of equipment which is defective or showing undue wear within the guarantee period, or replace the equipment with new equipment if the mechanical performance is

unsatisfactory; furnishing all parts, materials, labor, etc., necessary to return the equipment to its specified performance level.

B. The Equipment Supplier shall provide an equipment warranty log book prepared specifically for this project and submit two (2) copies of the document to the Engineer prior to final payment. The equipment warranty log book shall include a summary listing of all equipment warranties provided, date received, and start date and end date of warranty period. A copy of each equipment warranty and equipment start-up certification shall also be provided in the document.

C. The Equipment Supplier shall guarantee to the Owner that all equipment offered under these specifications, or that any process resulting from the use of such equipment in the manner stated is not the subject of patent litigation, and that he has not knowingly offered equipment, the installation or use of which is likely to result in a patent controversy, in which the Owner as user is likely to be made the defendant.

Where patent infringements are likely to occur, each Equipment Supplier shall submit, as a part of his bid, license arrangements between himself, or the manufacturer of the equipment offered, and the patent owner or the controller of the patent, which will permit the use in the specified manner of such mechanical equipment as he may be bidding.

Each Equipment Supplier, by submitting his bid, agrees to hold and save the Owner and Engineer or its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the work under this contract, including the use of the same by the Owner.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Electric actuators shall be provided as specified herein.

B. Manual operators shall be provided on all valves which do not receive electric actuators. Manual operator type shall be as specified herein and as shown on the Drawings.

C. Quarter turn valves 8” and greater in size shall have geared operators.

D. Operators/actuators shall be furnished with conservatively sized extension bonnets, extension stems, or torque tubes, and all required appurtenances required for a complete installation. Operators furnished with extension bonnets shall include stainless steel extension stems, or stainless steel torque tubes.

2.02 MANUAL OPERATORS

A. Unless otherwise specified or shown on the Drawings, manual operator type shall be as follows:

1. Exposed valves 8-inches and larger shall be handwheel operated.

2. Valves with centerline of operator located more than 6-feet above the floor or platform from which it is to be operated shall have a chainwheel operator unless otherwise indicated on the Drawings.

B. Manual operators shall be rigidly attached to the valve body unless otherwise specified or shown on the Drawings.

C. All operators shall turn counter-clockwise to open and shall have the open direction clearly and permanently marked.

D. Valve operators shall be designed so that the force required to operate the handwheel, lever, or chain (including breakaway torque requirements) does not exceed 80 pounds applied at the extremity of handwheel or chainwheel operator. Design pressures for sizing of valve operators shall be the piping test pressure for the piping in which the valve is to be installed.

E. Handwheels for valves operators shall not be less than 12 inches in diameter. The maximum diameter of any handwheel shall not exceed 24".

G. Geared manual operators shall be of the worm gear, traveling nut or scotch yolk type. Gear operators shall be of the worm gear or bevel gear type. Gear box designs incorporating end of travel stops in the housing shall be equipped with AWWA input stops. Each gearbox shall require a minimum of 10 turns for 90 degree rotation or full valve stem travel and shall be equipped with a mechanical valve position indicator.

H. Manual operators on below grade (and vault installed) valves shall be permanently lubricated and watertight under an external water pressure of 10 psi.

2.03 ELECTRIC VALVE ACTUATORS

A. Electric Actuators shall be open/close service or modulating service as specified herein.

1. Open/Close (non-modulating) valve actuators shall be IQ series as manufactured by Rotork, SA series as manufactured by AUMA, or Series 2000 as manufactured by EIM Controls.

2. Modulating valve actuators shall be Type IQM as manufactured by Rotork, Type SAR as manufactured by AUMA, or Series 2000 Futronic as manufactured by EIM Controls.

B. Performance Requirements

1. The actuators shall be designed for indoor and outdoor service and shall be capable of mounting in any position.

2. Torque capacity of the actuators shall be sufficient to operate the valves with the maximum pressure differential, as indicated in the Valve Schedule in Section 15390, with a safety factor of 1.5. Actuators in modulating service will be selected such that the required dynamic valve torque is no more than 60% of the electric actuator's maximum rated breakaway of torque.

3. Operating time for full limits of travel shall be not more than 2 seconds per inch diameter of the valve, +/- 50 percent through 20 inches; +/- 30 percent for valves 24 inches and larger. Operating time shall not be less than 60 seconds for all modulating valves.

4. Actuators shall be capable of operating in ambient temperatures ranging from 0 degrees F – 160 degrees F.

5. For open/close (non-modulating) actuators, the gearing, motor and contactor shall be capable of 60 starts per hour without overheating.

C. The actuators shall include, in one integral housing, individual compartments for the motor, gearing, wiring terminals, and control circuits. The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight seal. The inner seal shall protect the motor and all other internal electrical elements of the actuator from entrance of moisture and dust when the terminal cover is removed. Double cartridge shaft seals shall be provided on the hand wheel and output shafts for weatherproof protection. All external fasteners shall be stainless steel. Compartments shall be provided with moisture and dust-proof rigid cast covers meeting NEMA 6, certified to submergence in 6 ft of water for 30 minutes. The actuator shall be IP68 rated – submergence in 20 feet of water for 72 hours. Actuators located in classified areas shall be suitable for use in Class 1, Division 1, Group D environments.

D. All gearing shall be hardened alloy steel or bronze and shall be rated at twice the output torque of the operator and shall be designed to withstand the stall torque of the motor without failure. Output drive gearing shall consist of a worm shaft and worm gear pinion operating in an oil bath. The worm gear pinion shall be alloy bronze. Worm gear drive shall be self-locking to prevent creeping of the valve disc in an intermediate position. Heavy-duty grease shall protect gearing and sealed ball bearings of the main shaft for five years without changing. Motor reduction gearing shall be spur or planetary gearing and shall allow for field repair and change in gear ratio. For quarter turn applications, overtravel of the operator shall be prevented by internal mechanical stops cast into the actuator.

E. A mechanical dial position indicator shall be furnished to continuously indicate the position of the valve at and between the fully open and fully closed positions. The indicator shall be driven by gearing driven off of the main worm gear pinion and shall operate when the actuator is in either the electrical mode or manual mode.

F. A handwheel shall be permanently attached for manual operation. A gear assembly shall be provided between the handwheel and the worm shaft if required to reduce the force necessary to operate the handwheel to less than 40 pounds. A positive declutch mechanism shall engage the handwheel when required. When the actuator is set in the declutched position for handwheel operation, it shall return automatically to electric operation when actuator motor is energized. The handwheel shall not rotate during electric operation nor shall a fused motor prevent handwheel operation.

G. The drive motor shall be specifically designed for actuator service and shall be characterized by high starting torque and low inertia. Motors shall be 460 volts, three phase, 60 Hz AC reversible squirrel cage induction type motors and shall be specifically

designed for modulating service as specified herein. Motors shall be totally enclosed, non-ventilated, with NEMA Class F insulation minimum

The electric motor shall have a time rating of at least 15 minutes at 104°F (40°C) or twice the valve stroking time, whichever is longer, at an average load of at least 33% of maximum valve torque. Motor bearings shall be permanently lubricated by premium lubricant. The motor shall have plug and socket electrical connection to facilitate easy removal and replacement. The actuator shall include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel with either phase sequence of the three-phase power supply connected to the actuator.

The motor shall include single phase protection. A suitable thermal protection device shall be incorporated in the motor or motor starter circuits, connected to a tripping device. Fast acting fuses shall be provided to protect solid state components. The motor shall be capable of starting against the rated load in either the open or close direction when voltage to the motor terminals is plus or minus ten (10) percent of nameplate rating.

H. A 120 VAC space heater shall be provided in the motor compartment.

I. Leads from the motor shall be brought to the control circuit (limit switch) compartment without external piping or conduit box. An adequately sized space heater shall be installed in the control circuit compartment to aid in the prevention of damage resulting in from condensation. The following items shall be located in the control circuit compartment.

1. Torque limit switches shall be provided to de-energize the motor control circuit in the event of a stall when attempting to unseat a jammed valve and when torque is exceeded during valve travel. Each actuator shall have an open direction torque switch and a close direction torque switch. The torque switches shall be mechanically operated and able to be set in torque units. Torque switches shall be calibrated prior to the actuator's assembly to the valve.

2. Travel limit switches shall be provided to de-energize the motor control circuit when the actuator reaches the limits of travel in the open and close directions. The limit switch drive shall be of the counter gear type and "in step'" with the actuator output drive at all times in either the electrical or manual mode of operation. A minimum of six (6) contacts, three (3) normally open and three (3) normally closed, shall be supplied at each end of valve travel. Four (4) additional contacts shall be provided to report end of travel or any desired position between ends of travel.

J. The electrical terminals shall be housed in a double sealed terminal compartment isolated from the rest of the actuator components. The actuators shall be designed to operate from a single 480VAC, 3-phase source. The actuators shall be furnished with fuses inside of the terminal compartment. A quantity of two – ¾ inch NPT conduit entries shall be furnished.

K. Actuators shall contain wiring and terminals for the following control functions. All dry contacts shall be rated for .5A at 250VAC.

1. Open, Close, and Stop commands from external dry contacts (utilizing internal 120VAC power supply). The inputs for the open, close, stop signals shall be field selectable to be respond to either maintained or momentary remote signals. In

momentary mode, the actuator shall have internal latching circuitry that causes the operator to drive the valve to its limit of travel upon receipt of the momentary contact signal unless a stop signal is received.

2. Emergency override input from a normally closed or normally open contact. The actuator shall either open or close (field selectable) upon receiving the emergency override input.

3. Remote Local-Off-Remote selector switch, Open/Close pushbuttons, and Open/Closed pilot lights for a remote manual control station (see below). The remote Local-Off-Remote selector switch and Open/Close pushbuttons shall be a dry contact input to the actuator control circuitry. The Open/Closed pilot lights shall be powered from the valve actuator control power.

4. Four (4) unpowered contacts shall be provided which can be selected to indicate valve "Opened" and "Closed" position, "Remote" status of the actuator, and fail status of the actuator. The fail status contacts shall activate upon motor overtemperature and actuator overtorque as a minimum.

5. Terminals for 4-20mADC position command and 4-20mADC position feedback as described above for modulating actuators, where indicated.

L. Local Controls

1. Actuators shall be furnished with a Local-Off-Remote selector switch; Open, Close, and Stop pushbuttons for local control; a red lamp indicating closed and a green lamp indicating open. L-O-R switch shall be padlockable in any of the three positions.

   a. When the LOR is in the "Local" position, open/close control shall be by the open and close pushbuttons on the actuator. The stop push button shall stop the actuator travel.

   b. When the LOR is in the "Off" position, the actuator shall not operate.

   c. When the LOR is in the "Remote" position, the actuator shall be controlled by remote inputs from the PLC or from the remote manual controls station.

2. The local controls shall be arranged so that the direction of travel can be reversed without the necessity of stopping the actuator.

M. Local disconnects shall be provided for each valve, provided by others under a separate contract.

PART 3 -- EXECUTION

3.01 MANUFACTURER'S FIELD SERVICES

A. The services of a qualified manufacturer's technical representative shall include the following site visits for electric actuators:

Service	Number of Trips	Number of Days/Trip
Installation and Testing	1	1
Startup and Training	1	1
Services after Startup	1	1

B. The manufacturer shall provide a qualified Technical Representative from the manufacturer or supplier of equipment who is regularly involved in the inspection, installation, start-up, troubleshooting, testing, maintenance, and operation of the specified equipment. Qualification of the Technical Representative shall be appropriate to the type of equipment furnished and subject to the approval of the Engineer and the Owner. Where equipment furnished has significant process complexity, furnish the services of engineering personnel knowledgeable in the process involved and the function of the equipment.

C. For each site visit, the Technical Representative shall submit jointly to the Owner, the Engineer, and the Contractor a complete signed report of the results of his inspection, operation, adjustments, and testing. The report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results obtained if such are specified.

D. The manufacturer's Technical Representative shall provide the following services.

1. Installation: The Technical Representative shall inspect the installed equipment to verify that installation is in accordance with the manufacturer’s requirements. Where required by individual equipment specifications, the Technical Representative shall also supervise the installation of the equipment.

2. Testing: After installation of the equipment has been completed and the equipment is presumably ready for operation, but before it is operated by others, the Technical Representative shall inspect, operate, test, and adjust the equipment as required to prove that the equipment is in proper condition for satisfactory operation under the conditions specified. Unless otherwise noted in the signed site visit report, the report shall constitute a certification that the equipment conforms to the requirements of the Contract and is ready for startup and that nothing in the installation will render the manufacturer's warranty null and void. The report shall include date of final acceptance field test, as well as a listing of all persons present during tests.

3. Startup: The Technical Representative shall start up the equipment for actual service with the help of the Contractor. In the event that equipment or installation problems are experienced, the Contractor and the representative shall provide the necessary services until the equipment is operating satisfactorily and performing according to the specifications at no additional cost to the Owner. Unless otherwise noted in the signed site visit report, the report shall constitute a certification that the equipment conforms to the requirements of the Contract and

is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void.

4. Training: The Technical Representative shall instruct the Owner's operating personnel in correct operation and maintenance procedures. The instruction shall demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment. Such instruction shall be scheduled at a time arranged with the Owner at least 2 weeks in advance of the training and shall be provided while the respective Technical Representative's equipment is fully operational. The equipment supplier shall have submitted, and had accepted, the O&M Manuals prior to commencement of training. Training shall be provided to three separate shifts of the Owner's personnel between the hours of 8:00 A.M. and 6:00 P.M. as necessary. The equipment supplier shall provide professional video taping of all training sessions. Completed, labeled tapes shall be provided to the Owner for each type of training session.

5. Services after Startup: The Technical Representative shall return to the project site thirty (30) days after the start up date to review the equipment performance, correct any equipment problems, and conduct operation and maintenance classes as required by the Owner. This follow-up trip is required in addition to the specified services of Technical Representative prior to and during equipment startup. At this time, if there are no equipment problems, the manufacturer shall certify to the Owner in writing that his equipment is fully operational and capable of meeting operating requirements. If the equipment is operating incorrectly, the Technical Representative will make no certification to the Owner until the problems are corrected and the equipment demonstrates a successful thirty (30) days operating period.

D. Services of the Technical Representative will require a minimum of two (2) site visits, one for installation and testing and one for startup and training, and will be for the minimum number of days recommended by the manufacturer and approved by the Engineer but will not be less than the number of days specified in individual equipment sections.

E. The equipment supplier shall include the cost of furnishing the Technical Representative for the minimum number of days specified, and any additional time required to achieve successful installation and operation. The times specified for services by the Technical Representative in the equipment Specifications are exclusive of travel time to and from the facility and shall not be construed as to relieve the manufacturer of any additional visits to provide sufficient service to place the equipment in satisfactory operation.

F. The equipment supplier shall notify the Engineer at least 14 days in advance of each equipment test or Owner training session.

3.02 INSTALLATION

A. All valve actuators shall be installed in accordance with the manufacturer's published recommendations and the applicable specification sections for valves, and motor controls.

B. Valve actuators shall be factory coated in accordance with the manufacturer’s standard paint system.

3.03 SHOP TESTING

A. All equipment shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents and that it will operate in the manner specified or implied.

B. No equipment shall be shipped to the project until the Engineer has been furnished a certified copy of test results and has notified the Contractor, in writing, that the results of such tests are acceptable.

C. Five (5) certified copies of the manufacturer's actual test data and interpreted results thereof shall be forwarded to the Engineer for review.

D. Shop testing shall include the following additional requirements:

1. Conduct a complete functional check of each unit. Correct any deficiencies found in shop testing prior to shipment.

2. Submit written certification that:

a. Shop tests for the electrical system and all controls were successfully conducted;

b. Electrical system and all controls provide the functions specified and required for proper operation of the valve operator system.

3. Each actuator shall be performance tested and individual test certificates shall be supplied free of charge. The test equipment shall simulate each typical valve load and the following parameters should be recorded:

a. Current at maximum torque setting

b. Torque at maximum torque setting

c. Flash Test Voltage

d. Actuator Output Speed or Operating Time

e. In addition, the test certificate should record details of specification, such as gear ratios for both manual and automatic drive, closing direction, and wiring diagram code number.

f. Verification of actuator torque rating with valve.

3.04 FIELD TESTS

A. Field testing shall be in accordance with Section 11000, Equipment General Provisions and with the following additional requirements:

1. Valve actuators shall be field-tested together with the associated valves.

2. Test all valves at the operating pressures at which the particular line will be used.

3. Test all valves for control operation as directed.

4. Field testing shall include optimization of opening and closing times of the valves. Valve opening and closing times shall be adjusted based on process requirements to optimize operation of the valves. Final valve opening and closing times as determined by field tests shall be approved by the Engineer prior to final acceptance of the system.

B. Preliminary Field Tests

1. General: Preliminary field tests shall be conducted prior to start-up and shall include a functional check of the entire valve operator system and all system components.

2. Scope: Preliminary field tests shall demonstrate that the valve operator system performs according to specifications and that all equipment, valves, controls, alarms, interlocks, etc., function properly.

3. Based on results of preliminary field tests, the Contractor shall make any adjustments required to settings, etc., to achieve the required valve closing time and operation, as specified or otherwise directed.

C. Final Field Tests

1. Final field tests shall be conducted in accordance with the latest revision of AWWA C500.

2. Final field tests shall be conducted simultaneously with the start-up and field testing of the pumps.

3. Final field tests shall be conducted for the full range of operating modes and conditions specified and as directed by the Engineer. Each of the valves shall be tested at minimum, maximum, and normal head/flow conditions, and under all specified conditions of opening and closing.

4. Certification of Equipment Compliance: After the final field tests are completed and passed, submit affidavit according to Section 11000.

- END OF SECTION -

SECTION 15109

PLUG VALVES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The contractor shall furnish and install one (1) isolation plug valve installed in the bypass pumping connection.

1.02 DESIGN CONDITIONS

Location	Size (inch)	Units (no.)	Operation	Design Flow (gpm)	Design Pressure (ft)
Bypass Pumping Connection (Buried)	20	1	Manual	6,105	202

1.03 SUBMITTALS

A. The contractor shall submit the following:

1. Performance testing in accordance with latest version of AWWA C500.
2. Shop Drawings:
    a. Layout dimensions
    b. Size
    c. Materials of construction for all components
    d. Hydraulic characteristics
3. Descriptive information to illustrate conformance with Contract Documents.
4. In addition to the above submittals, submittals for electrically operated valves shall include the following:
    a. Electrical control schematics
    b. Details, notes, and diagrams
    c. Status and alarm indicating devices information
5. Operation and maintenance manuals in accordance with contract document requirements.

PART 2 -- PRODUCTS

2.01 PLUG VALVES

A. Plug valves shall be of the non-lubricated, eccentric seating plug type with synthetic rubber-faced plugs as manufactured by DeZurik Company. All valves shall be provided with limit stops and rotate 90° from fully open to fully shut. The minimum working pressure for all valves shall be 150 psi, and the test pressure shall be at least 270 psi for valves up through 12-inch and at least 230 psi for valves 14-inch and larger. Ports shall be 100% area and rectangular. Bearings shall be sleeve type and made of sintered, oil impregnated permanently lubricated type 316 stainless steel, ASTM A743 Grade CF8M through 36" (900mm). The body materials shall be of epoxy coated cast iron or semi-steel, unless specified otherwise. Seats shall have a welded overlay of 90 percent pure nickel and machined to a finish containing no stress cracks. Plug facings shall be of Hycar, or equal and completely suitable for use with domestic sewage.

B. Adjustable packing shall be Acrylonitrile-Butadiene (NBR) multiple V-ring type, with a packing gland follower. Packing gland shall permit inspection, adjustment or complete replacement of packing without disturbing any part of the valve or actuator assembly, except the gland follower. Non-adjustable packing or packing requiring actuator removal to replace the packing, is not acceptable.

D. Unless otherwise shown, all exposed valves 4-inches in diameter and larger shall have flanged ends conforming to ANSI B16.1-125/150 pound standard with face-to-face dimensions of standard plug valves.

E. Valves 8-inches in diameter and larger shall be handwheel or floorstand operated where required or indicated on the Drawings through totally enclosed worm gear actuators, unless otherwise specified or shown on the Drawings. Manual operators for plug valves mounted above 6 feet from the operating floor shall be equipped with worm gear chainwheel actuators.

F. The manufacturer shall certify that the plug valves are capable of operating in continuous duty service under these pressures and flow conditions.

G. Each valve shall by hydrostatically tested and tested for bubble tightness after the operator has been mounted and adjusted. Copies of the hydrostatic and leakage test certification and certification of conformance shall be submitted to the Engineer prior to shipment.

H. All internal and external ferrous components and surfaces of the valves, with the exception of stainless steel and finished or bearing surfaces, shall be shop painted with two coats (10 mils min. dry film thickness) of the manufacturer's premium epoxy for corrosion resistance. Damaged surfaces shall be repaired in accordance with the manufacturer's recommendations.

2.02 MANUAL OPERATORS

A. As specified in Section 15100.

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