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ADDENDUM NO. #1

Date: December 11, 2024
Project Name: Midwest City Edgewood Lift Station Improvements
Owner: City of Midwest City
Garver Project No. W02-2400683

This addendum shall be a part of the Plans, Contract Documents and Specifications to the same extent as though it were originally included therein, and it shall supersede anything contained in the Plans, Contract Documents, and Specifications with which it might conflict. This addendum, including all attachments, shall become part of the Contract and all provisions of the Contract shall apply thereto. The time provided for completion of the Contract has not been changed as noted in this addendum. Acknowledgement of receipt of this addendum must be noted in the appropriate section of the Bid Form and included with the Contract Documents.

A. SPECIFICATIONS – VOLUME 1

1. Remove the following specifications sections in their entirety, and replace with the same, attached hereto:
 - a. 40 71 13 – MAGNETIC FLOW METERS
 - b. 40 73 36 – PRESSURE AND DIFFERENTIAL SWITCHES
 - c. 43 23 21 – HORIZONTAL END SUCTION CENTRIFUGAL PUMPS
2. Add the following specifications in its entirety, attached hereto:
 - a. 40 72 76 – LEVEL SWITCHES

B. STANDARD DETAILS - VOLUME 2

- a. No revisions to Standard Details.

C. DRAWINGS – VOLUME 3

1. Remove the following drawings in their entirety, and replace with the same, attached hereto:
 - a. 08-I101 – LIFT STATION P&ID
 - b. 90-E502 – PROPOSED LIFT STATION ONE-LINE DIAGRAM

By: _____

Michael Nguyen, P.E.
Project Manager



Attachments:

A. Specifications

- a. 40 71 13 – MAGNETIC FLOW METERS
- b. 40 73 36 – PRESSURE AND DIFFERENTIAL SWITCHES
- c. 43 23 21 – HORIZONTAL END SUCTION CENTRIFUGAL PUMPS
- d. 40 72 76 – LEVEL SWITCHES

B. Standard Details

- 1. None

C. Drawings

- a. 08-I101 – LIFT STATION P&ID
- b. 90-E502 – PROPOSED LIFT STATION ONE-LINE DIAGRAM

END OF ADDENDUM NO. 1

SECTION 40 71 13 – MAGNETIC FLOW METERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section Includes:
 - 1. Full bore magnetic flow meters.
 - 2. Transmitters.
- B. Related Section:
 - 1. Section 40 70 00 – Instrumentation for Process Systems.

1.2 REFERENCES

- A. AWWA (American Water Works Association):
 - 1. M6 – Water Meters – Selection, Installation, Testing, and Maintenance.
 - 2. M33 – Flowmeters in Water Supply.
- B. ASME International:
 - 1. ASME B16.1 – Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

1.3 COORDINATION

- A. Refer to Section 40 70 00 – Instrumentation for Process Systems, for requirements.

1.4 SUBMITTALS

- A. Refer to Section 40 70 00 – Instrumentation for Process Systems, for requirements.
- B. Closeout Submittals:
 - 1. Refer to Section 40 70 00 – Instrumentation for Process Systems, for requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Refer to 40 70 00 – Instrumentation for Process Systems, for requirements.

1.6 WARRANTY

- A. Furnish five-year manufacturer's warranty for magnetic flow meters and appurtenant devices.
- B. See Section 01 78 36 – Warranties and Bonds, for additional requirements.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Furnish sensors, transmitters, and interconnecting cables as required for application.

2.2 MAGNETIC FLOW METERS

- A. Manufacturers:
 - 1. McCrometer Ultra Mag
 - 2. Siemens FM Mag 5100W
 - 3. Endress+Hauser Promag W400

4. Or Engineer Approved Equal.

- B. Description:
 - 1. Low-frequency, electromagnetic induction-type flow meter, producing a linear signal directly proportional to flow rate, consisting of flow tube, signal cable, and transmitter.
- C. Performance and Design Criteria:
 - 1. Design: According to AWWA M33.
 - 2. Provide models that require a maximum of one upstream straight pipe diameter and zero downstream straight pipe diameters.
- D. Flow Rate Range:
 - 1. As specified in schedule.
- E. Size:
 - 1. As specified in Drawings.
- F. Flow Tubes:
 - 1. Material: Type 304 stainless steel with polyurethane or hard rubber liner.
 - 2. End Connections: Flanged, ASME B16.1, carbon steel.
- G. Electrodes:
 - 1. Type 316L stainless steel.
 - 2. Self-cleaning.
- H. Accuracy:
 - 1. Plus or minus 0.5% of actual flow rate over a 10:1 range.
- I. Provide adjustment for zero and span.
- J. Accessories:
 - 1. Grounding rings and electrodes.
 - 2. Furnish cable between transmitter and receiver.

2.3 TRANSMITTERS

- A. Transmitter Output:
 - 1. 4 mA – 20 mA dc analog signal.
 - 2. Accuracy: Plus or minus 0.2% of full scale.
- B. Power Supply:
 - 1. 120VAC, 60Hz.
- C. Housing Material:
 - 1. Cast aluminum, IP67 or NEMA 4X.
- D. HMI:
 - 1. Touchscreen programming, functioning through enclosure window without opening enclosure.
 - 2. Display:
 - a. Backlit graphical LCD display.
 - b. Key touch programming.
 - c. User-selectable engineering units.
 - d. Readout of diagnostic error messages.
 - e. Sun shield cover for LCD display.

- E. Mounting:
 1. Integral or remote mounting from flow meter as specified in Drawings.
 2. Mounting Locations Less Than 4 ft above Grade: Provide stainless-steel mounting posts.

- F. Accessories:
 1. Current signal output simulation.
 2. Empty pipe detection.
 3. Bidirectional flow measurement.
 4. Self-diagnostics.
 5. Automatic zero adjustment.
 6. Sunshield.
 7. Signal Cable: Provided by flow meter manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Refer to Section 40 70 00 – Instrumentation for Process Systems, for requirements.

3.2 INSTALLATION

- A. Mount magnetic flowmeters according to manufacturer's instructions. Install grounding rings and ground magnetic flowmeters according to manufacturer's instructions.
- B. Refer to Section 40 70 00 – Instrumentation for Process Systems, for additional requirements.

3.3 FIELD QUALITY CONTROL

- A. Testing:
 1. Test and calibrate flow meter to demonstrate that it meets specified accuracy requirements.
 2. Comply with AWWA M6.
- B. Refer to Section 40 70 00 – Instrumentation for Process Systems, for additional requirements.

3.4 DEMONSTRATION

- A. Refer to Section 40 70 00 – Instrumentation for Process Systems, for requirements.

3.5 ATTACHMENTS

- A. Flow Meter Schedule:

Instrument Tag	Application	Measurement Range (GPM)
10FE01	Lift Station Effluent Flow Meter	200-18,000

END OF SECTION

SECTION 40 73 36 - PRESSURE AND DIFFERENTIAL PRESSURE SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pressure switches.
 - 2. Differential pressure switches.
- B. Related Requirements:
 - 1. Section 40 70 00 – Instrumentation for Process Systems.

1.2 REFERENCE STANDARDS

- A. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA ICS 1 - Industrial Control and Systems: General Requirements.

1.3 COORDINATION

- A. Refer to Specification 40 70 00 – Instrumentation for Process Systems, for requirements.

1.4 SUBMITTALS

- A. Refer to Specification 40 70 00 – Instrumentation for Process Systems, for requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Refer to Specification 40 70 00 – Instrumentation for Process Systems, for requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Specification 40 70 00 – Instrumentation for Process Systems, for requirements.

1.7 WARRANTY

- A. Furnish five-year manufacturer's warranty for pressure switches.

PART 2 - PRODUCTS

2.1 PRESSURE SWITCHES

- A. Manufacturers:
 - 1. Ashcroft Inc.
 - 2. Dwyer Instruments, Inc.
 - 3. Omega Engineering, Inc.
 - 4. **Or Engineer Approved Equal.**
- B. Type: Diaphragm actuated.
- C. Materials:
 - 1. Diaphragm: Buna-N Stainless steel.
 - 2. Housing: Brass.

- D. Accuracy: Plus or minus 5 percent of operating range.
- E. Dead Band: Adjustable to 60 percent of full scale.
- F. Set Points: Adjustable between 20 and 80 percent of adjustable range.
- G. Connection:
 - 1. Location: Bottom.
 - 2. Size: 1/4 inch.
 - 3. Furnish taps for sensing lines.
- H. Electrical:
 - 1. Contacts:
 - a. Two.
 - b. SPDT.
 - c. Type: Snap action, according to NEMA ICS 1.
 - 2. Ampacity: 5 A at 120-V AC.
- I. Enclosures: NEMA 250 Type 4X.
- J. Differential Pressure Switches:
 - 1. Type: Adjustable diaphragm.
 - 2. Differential Range:
 - a. Adjustable.
 - b. Maximum: 0.50-inch water at low end.
 - c. Minimum: 6 inches water at high end.
 - 3. Accuracy: Plus or minus 2.0 percent of full-scale range.
 - 4. Maximum Operating Pressure: Up to 300 percent of rated pressure.
 - 5. Transmitter: Operable with low-pressure connection disconnected.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Refer to Specification 40 70 00 – Instrumentation for Process Systems, for requirements.

3.2 INSTALLATION

- A. Refer to Specification 40 70 00 – Instrumentation for Process Systems, for requirements.

3.3 FIELD QUALITY CONTROL

- A. Refer to Specification 40 70 00 – Instrumentation for Process Systems, for requirements.

3.4 DEMONSTRATION

- A. Refer to Specification 40 70 00 – Instrumentation for Process Systems, for requirements.

3.5 ATTACHMENTS

- A. Pressure Switch Schedule:

Instrument Tag	Application	Initial Setpoint
10PS01	Lift Station Pump Discharge Pressure Switch #1	100 psig

10PS02	Lift Station Pump Discharge Pressure Switch #2	100 psig
10PS03	Lift Station Pump Discharge Pressure Switch #3	100 psig

END OF SECTION

SECTION 43 23 21 – HORIZONTAL END SUCTION CENTRIFUGAL PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work necessary to furnish and install a complete and functional horizontal end centrifugal pump(s) as specified herein. The pump system shall be supplied with the necessary equipment to make a complete and operable system, including control panels, which will be provided as part of the vendor-supplied package (Section 40 67 23). Any portion or part of the system that does not operate as specified shall be replaced and made operable at no additional cost to the Owner.

1.2 RELATED SECTIONS:

1. Section 01 33 00 – Submittal Procedures.
2. Section 01 60 00 – Product Requirements.
3. Section 01 75 00 - Startup Testing and Training.
4. Section 01 78 23 – Operation and Maintenance Data.
5. Section 09 96 00 – High-Performance Coatings.
6. Division 26 – Electrical.
7. Section 40 67 23 – Control Panels

1.3 GENERAL

- A. Equipment Numbers: See supplemental data sheet(s) at end of section.
- B. PUMP SIZES AND FITTING SIZES MAY BE DIFFERENT FROM THOSE SHOWN ON THE PLANS DEPENDING ON THE PUMP MANUFACTURER SELECTED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE DIMENSIONS REQUIRED TO INSTALL THE PUMPS CORRECTLY.
- C. Like items of equipment provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, spare parts, and manufacturer's services.
- D. Unit Responsibility: The Work requires that the horizontal split case pumps, motors, instruments, and components be completed with all accessories and appurtenances be the end product of one responsible system manufacturer or responsible system supplier. Unless otherwise indicated, the Contractor shall obtain each system from the responsible supplier of the equipment, which supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions without altering or modifying the Contractor's responsibilities under the Contract Documents. The Contractor is responsible to the Owner for providing the equipment systems as specified herein.
- E. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.
- F. The equipment specified herein is included in the MANUFACTURER/ SUBCONTRACTOR Form. Refer to the bid Form and the Instructions to bidders for additional requirements.

1.4 REFERENCES

- A. Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

1.5 SUBMITTALS

- A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.
- B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:
 - 1. Shop Drawings:
 - 2. Make, model, weight, and horsepower of each equipment assembly.
 - 3. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
 - 4. Hydraulic Shop Testing: Performance data curves showing head, capacity, horsepower demand, and pump efficiency over the entire operating range of the specific pump, from shutoff to maximum capacity. Indicate separately the head, capacity, horsepower demand, overall efficiency, and minimum submergence required at the guarantee point.
 - 5. Detailed mechanical and electrical drawings showing the equipment dimensions, size, locations of connections, and weights of associated equipment.
 - 6. Power and control wiring diagrams, including terminals and numbers.
 - 7. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications.
 - 8. Factory finish system.
 - 9. Quality Control Submittals:
 - 10. Factory Functional and Performance Test Reports.
 - 11. Manufacturer's Certification of Compliance that the factory finish system is identical to the requirements specified herein.
 - 12. Special shipping, storage and protection, and handling instructions.
 - 13. Manufacturer's printed installation instructions.
 - 14. Manufacturer's Certificate of Proper Installation.
 - 15. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
 - 16. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
 - 17. Operation and Maintenance manual.
 - 18. Contract Closeout submittals: Service records for maintenance performed during construction.

1.6 QUALITY CONTROL

- A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.
- B. Factory Tests and Adjustments: Test all equipment and control panels actually furnished.
- C. Factory Test Report: Include test data sheets, curve test results, and performance test logs.
- D. Functional Test: Perform manufacturer's standard pump test on equipment. Include vibration test, as follows:
 - 1. Dynamically balance rotating parts of each pump and its actual driving unit before final assembly.
 - 2. Limits:
 - 3. Driving Unit Alone: Less than 80 percent of NEMA MG 1 limits.
 - 4. Complete Rotating Assembly Including Coupling, Drive Unit, and Motor: Less than 90 percent of limits established in the Hydraulic Institute Standards at all operating speeds.
 - 5. Shop Performance Test:
 - 6. Conduct on each pump with actual motor furnished.

7. Perform under simulated operating conditions.
8. Test for a continuous 3-hour period without malfunction.
9. Test Log: Record the following for each flow head condition:
10. Total head.
11. Capacity.
12. Horsepower requirements.
13. Flow measured by factory instrumentation and storage volumes.
14. Average distance from suction well water surface to pump discharge centerline for duration of test.
15. Pump discharge pressure converted to feet of liquid pumped and corrected to pump discharge centerline.
16. Calculated velocity head at the discharge flange.
17. Field head.
18. Driving motor voltage and amperage measured for each phase.
19. Adjust, realign, or modify units and retest in accordance with Hydraulic Institute Standards, if necessary.
20. Motor Test: Provide NEMA short commercial test. Document guaranteed efficiency by providing certified test report for test conducted on actual motor furnished.

1.7 OPERATION AND MAINTENANCE DATA

- A. O&M Manuals: Content, form, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.
- B. Maintenance summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.8 WARRANTY

- A. Provide warranty for a period of 12 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer shall promptly repair or replace the defective equipment without additional cost to the Owner.
- B. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.1 HORIZONTAL END SUCTION CENTRIFUGAL PUMPS

- A. Manufacturers:
 1. Pentair
 2. Or Equal
- B. Design:
 1. General:
 2. Pumps shall be furnished and installed, as shown on the plans with drip rim base, coupling, coupling guard, and premium efficiency motor. The pump(s) shall meet the following design criteria.
 3. All related equipment in this Specification shall be furnished as a system complete and operable in every respect. Any portion or part of the system that does not operate properly shall be replaced and made operable at no additional cost to the Owner.
 4. Adjustable speed drives are required. Furnish a coordinated operating system complete with pump, motor, and drive.

5. Coordinate pump requirements with motor/adjustable speed drive manufacturers and be responsible for pump and motor/adjustable speed drive requirements
6. ANY EXCEPTIONS TO THESE SPECIFICATIONS MUST BE LISTED AND ATTACHED TO THE PROPOSAL. THE OWNER, BY ACCEPTANCE OF A SUBMITTED PROPOSAL, WILL REQUIRE THE SPECIFIED EQUIPMENT TO BE SUPPLIED UNLESS THOSE EXCEPTIONS DIFFERENT FROM THAT SPECIFIED ARE ATTACHED.
7. Compliance with the performance requirements of these Specifications will not relieve the manufacturer from his responsibilities to supply pumps, which have the structural, mechanical, and operational features specified. Equipment that is not considered an acceptable equivalent product in the opinion of the Engineer and Owner to the equipment specified will not be accepted.
8. All equipment herein shall be designed and installed in accordance with current OSHA standards.
9. Pump Casing:
10. Pump casing shall be close-grained cast iron conforming to ASTM A48 CL30 for working pressures up to 275 psig and shall be able to withstand stresses and strains at full operating pressures.
11. Casing shall withstand a minimum hydrostatic test of 150 percent of the specified duty point.
12. Casing shall be lined-bored to assure concentricity and angular alignment.
13. Suction and discharge connections shall be sized to reduce friction losses and to reduce turbulence and pipe noise. All suction and discharge flanges shall be designed for straight through nut and bolt flange connections. Pump casing connections shall standard ANSI B116.1, 125-psi flat faced suction and discharge flanges.
14. Impeller:
15. Impeller shall be of the enclosed type, double suction, Francis vane design, to minimize inlet losses and accommodate high suction lifts.
16. Impeller shall be hydraulically and statically balanced to reduce bearing loading.
17. Impeller shall be precision cast in one piece with smooth flow contours to promote maximum efficiency.
18. Impellers shall be fixed axially along the shaft by sleeves and sleeve nuts, and secured to the shaft through a precision fit and full-length key.
19. Impeller hub shall have sufficient metal thickness to allow machining for installation of impeller wear rings.
20. Shaft:
21. The shaft shall be high quality heat treated steel of sufficient diameter to allow no greater than 0.003 inches maximum deflection as measured at the sealing box for all normal performance conditions on the curve.
22. Shaft shall be manufactured to meet stiff shaft construction with a critical speed at least 25% in excess of operating speed, in order to prevent vibration and fatigue.
23. Shaft shall be accurately machined along its entire length. A keyway shall be machined at the coupling end. No threads shall be machined adjacent to the impeller.
24. Bearings and Bearing Housings:
25. Bearings shall be single row and deep groove ball type selected to carry radial and thrust loads.
26. Bearing housings shall be accurately doweled and accurately positioned onto the bearing shoulders located on the lower half casing to ensure accurate alignment.
27. Bearing shall be grease lubricated.
28. Bearings shall be designed for an L10 life of 100,000 hours, per ABMA at best efficiency point.
29. Wear Rings:
30. Wear rings shall be provided on both the impeller and casing so that clearances can be maintained throughout the life of the rings and minimize recirculation.
31. Impeller wear rings shall be annular type.
32. Casing wear rings shall be of annular type pinned at the parting flange of the casing to prevent rotation.

33. Wear rings shall be bronze or stainless steel.
34. Seals:
35. The sealing box shall be machined into the casing.
36. Pumps with mechanical seals shall be John Crane Type 21 or approved equal. Arrangement shall assure that seal leakage cannot enter the bearing housings. Seals shall be suitable for conditions stated. Piping shall be supplied to provide seal lubrication and shall be mounted on the upper half of the casing.
37. Pumps with standard packing shall contain a two-piece interlocking gland, five (5) rings of synthetic graphite impregnated packing and water seal ring. External piping complete with snubber valves shall be installed from the casing to each sealing box to circulate sealing water.
38. See supplemental data sheets for seal type.
39. Baseplate, Coupling, and Guard:
40. The Baseplate shall be channel steel with drip rim and designed to resist torsional movement and to support the combined weight pump and driver. Final alignment of pump and driver shall be made after grouting and installation and shall be approved by the manufacturer/representative prior to operation.
41. The pump coupling shall be of the flexible type with steel flanges connected by a rubber sleeve for torque transmission.
42. Coupling guard shall be the all-metal type. Coupling guard shall be painted safety orange.

2.2 ACCESSORIES

- A. Equipment Identification Plate: 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in a readily visible location.
- B. Lifting Lugs: Shall be provided on all modular section, including motor and pump. Lugs shall be adequate to lift two times the equipment weight.

2.3 FACTORY FINISHING

- A. Prepare, prime, and finish coating and lining as shown on Drawings and in accordance with Section 09 96 00, HIGH-PERFORMANCE COATINGS, System No. 2.

2.4 MOTOR REQUIREMENTS

- A. Motor shall be selected in accordance with the pump's non-overloading performance characteristics. Motor horsepower rating shall be chosen in keeping with the pump's possible peak horsepower requirements.
- B. The motor shall be mounted with the pump of the baseplate at the pump manufacturer's plant and shipped as one unit.
- C. Motor shall be as specified in 26 05 93, Electric Motors, and following supplement data sheets.

2.5 ELECTRICAL AND CONTROL SYSTEMS

- A. Triplex Pump Control Panel 10PCP01: The pump system shall be provided with a control panel for operating a total of three pumps, with one as standby and the two in operation in a lead/lag configuration. No more than two pumps shall ever operate simultaneously.
- B. Refer to 40 67 23 Control Panels specification and P&ID drawing 08-I101 for additional control panel requirements.
 1. Enclosure: NEMA 12, for installation in a non-conditioned indoor space.
 2. Incoming power supply: 480VAC, 3-wire.

3. Provide control panel with UL listing.
4. Major components:
 - a. Solid-state soft starter for each pump. Conform to Section 26 29 33 – Solid State Reduced Voltage Starters.
 - b. Allen-Bradley CompactLogix PLC.
 - c. Touchscreen Operature Interface Terminal (OIT).
 - d. 24VDC, 10A (minimum) power supply.
 - e. 120VAC control power transformer.
 - f. Operator interface buttons, lights, and switches as shown on Drawing 08-I101.
 - 1) HOA switch for each pump
 - 2) Start/stop button for each pump
 - 3) Common Alarm light for each pump (activates if high pressure, motor overtemperature, or soft starter fault)
 - 4) High Wetwell Level alarm light
 - 5) Common reset button
 - g. Phase failure detection relay.
 - h. UPS.
5. Communications:
 - a. I/O points and cards shall be provided as required to implement the functions described herein.
 - b. Provide the following dry contacts for external use, and indicate each on OIT:
 - 1) Wetwell high level.
 - 2) Phase failure.
 - 3) Pump 10P-01 common alarm (activates if high pressure, motor overtemperature, or soft starter fault).
 - 4) Pump 10P-02 common alarm (activates if high pressure, motor overtemperature, or soft starter fault).
 - 5) Pump 10P-03 common alarm (activates if high pressure, motor overtemperature, or soft starter fault).
 - 6) Pump 10P-01 running.
 - 7) Pump 10P-02 running.
 - 8) Pump 10P-03 running.
 - 9) Pump 10P-01 high pressure.
 - 10) Pump 10P-02 high pressure.
 - 11) Pump 10P-03 high pressure.
 - 12) Pump 10P-01 motor overtemperature.
 - 13) Pump 10P-02 motor overtemperature.
 - 14) Pump 10P-03 motor overtemperature.
 - 15) Pump 10P-01 soft starter fault.
 - 16) Pump 10P-02 soft starter fault.
 - 17) Pump 10P-03 soft starter fault.
 - c. Provide the following analog (4-20mA) outputs for external use:
 - 1) Lift station discharge flow.
 - d. Provide the following signals to the Alarm Agent:
 - 1) Coordinate with owner and provide signals that match existing functionality.
6. Operational interlocks and alarms:
 - a. Pump overtemperature shall be monitored continuously via each pump thermal switch. An overtemperature condition shall cause an immediate shutdown of the affected pump. Once shutdown, the affected pump shall not be restarted until a reset has been performed. A corresponding indication light shall be displayed on the OIT.
 - b. A soft starter fault condition shall cause an immediate shutdown of the affected pump. Once shutdown, the affected pump shall not be restarted until a reset has been performed. A corresponding indication light shall be displayed on the OIT.
 - c. A pump high pressure condition shall cause an immediate shutdown of the affected pump. Once shutdown, the affected pump shall not be restarted until a reset has been performed. A corresponding indication light shall be displayed on the OIT.

- d. Interlock to prevent the system from permitting more than two (2) pumps to run simultaneously in all modes of operation.
- 7. Operational description:
 - a. The PLC shall be programmed to command the pumps in a lead/lag configuration.
 - b. The PLC program shall alternate lead/lag assignment of the pumps after a set amount of time.
 - c. Pump operation shall be interlocked with the lowest level probe to prevent pumps from running dry.
 - d. In the event one of the two pumps in operation fails, the standby pump shall automatically be called into operation. **A warning notification shall appear on the panel's OIT.**
 - e. **In the event the conductivity probe fails, the backup float switches shall automatically be used to continue operation of the pumps. A warning notification shall appear on the panel's OIT.**
- 8. DC Power Supply:
 - a. Provide 12-24V DC power to Alarm Agent, as required by manufacturer.
- 9. Provide all other items not specifically called out which are required to implement the functions described herein.
- 10. Wiring shall meet the requirements of Division 26, ELECTRICAL, and NFPA 70. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in twisted, shielded pair cable.
- 11. Electrical wiring shall be installed in conduit meeting the requirements of Division 26, ELECTRICAL. Raceways shall be installed in accordance with Division 26, ELECTRICAL, and NFPA 70.

C. Instrumentation: All instrumentation for monitoring and control of wetwell level shall be provided for a functional control system.

- 1. 10-point conductivity probe.
 - a. Manufacturer: WasteWater Level LLC FOGRod, or equal
 - 1) Equipment tag(s): 10LE001
 - 2) Mounting elevations shall be as required to achieve the indicated functionality.
- 2. Pressure switches. Conform to Section 40 73 36 – Pressure and Differential Pressure Switches.
 - a. Equipment tag(s): 10PS01, 10PS02, 10PS03
 - b. Measurement range shall be 0 to 100psi.
 - 1) Setpoint: 100psi
- 3. **Tilting float switches. Conform to Section 40 72 76 – Level Switches.**
 - a. **Equipment tags(s): 10LSLL01, 10LSL01, 10LSM01, 10LSH01, 10LSHH01**
 - b. **Mounting elevations shall be as required to achieve the indicated functionality.**

2.6 TOOLS AND SPARE PARTS

A. Tools: The work includes furnishing two complete set of special tools recommended by the manufacturer for maintenance and repair of each separate type of equipment; tools shall be stored in tool boxes, and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.

B. Spare Parts:

- 1. All equipment shall be furnished with the specified manufacturers spare parts as indicated in the individual equipment sections.
- 2. Spare parts shall be tagged by project equipment number and identified by part number, equipment manufacturer, and subassembly component (as appropriate). Spare parts subject to deterioration, such as ferrous metal items and electrical components, shall be properly protected by lubricants or desiccants, and encapsulated in hermetically sealed plastic wrapping. Spare parts with individual weights less than 50 pounds and dimensions

less than 2 feet wide, or 18 inches high, or 3 feet in length shall be stored in a wooden box with hinged wooden cover and locking clasp. Hinges shall be strap type. The box shall be painted and identified with stenciled lettering stating the name of the equipment, equipment numbers, and the words "spare parts." A neatly typed inventory of spare parts shall be taped to the underside of the cover.

3. Provide, at a minimum, the following spare parts for the equipment:
4. Complete set packing or replacement mechanical seal.
5. Complete set pump bearings.
6. Complete set gaskets and O-ring seals.
7. Complete set of shaft sleeves.
8. Complete set keys, dowels, pins, etc.
9. Impeller.
10. Impeller shaft.
11. Wear rings.
12. Head shaft.
13. One complete set of any special tools required to dismantle pump.

2.7 FABRICATION

- A. Shop Assembly: The system shall be factory assembled and tested.
- B. Shop/Factory Finishing: Shop prime coatings shall conform to the requirements of Section 09 96 00, HIGH-PERFORMANCE COATINGS; coordinate color with Owner.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The pump(s) shall be furnished for installation by the Contractor in accordance with the manufacturer's printed instructions, Plans, and as specified herein. The Contractor shall furnish all necessary foundation bolts required of the size and type recommended by the pump manufacturer (minimum ASTM A307, Grade A), unless shown otherwise on the Plans. The bolts shall be carefully set by means of a jig or template. All pump foundations shall be Class "A" concrete. They shall be accurately located, and all exposed concrete surfaces shall receive a rubbed finish which will be smooth and uniform and free from all form marks.
- B. The erection work shall include the furnishing of the necessary oil and grease for initial operation. The grades of fuel, oil, and grease shall be in accordance with the recommendations of the pump manufacturer.
- C. The pump and motor of each unit shall be assembled in its position and shall be carefully set and aligned by a competent mechanic. The base of the unit shall be shimmed or wedged to a level position in all directions on the foundation blocks. Pump alignment shall be checked under the supervision of the pump manufacturer's representative before grouting.
- D. Adjust alignment of pump and motor shafts for angular and parallel alignment by use of calibrated laser alignment equipment, and procedures shall comply with the method specified in the Hydraulic Institute's Standards for Centrifugal, Rotary & Reciprocating Pumps - "Instructions for Installation, Operation and Maintenance."
- E. The base shall be grouted by the deep grouting method using "Embeco", a product of Master Builders or "Ferrolith G", a product of Sonneborn-Contach or equal as an admixture in the cement mortar grout to prevent shrinkage. The admixture shall be used in accordance with the recommendations of the manufacturer using a mix of one part admixture, one part cement, and one part sand. Grout shall be placed under the entire base being careful to fill all voids and space.

- F. After the base has been grouted, the alignment of the unit shall be rechecked. If the connected shafts of the pump and motor are found to be in true alignment, the motor and pump shall be secured by approved means.
- G. Install automatic air release valve at the top of pump casing and plumb to drain any air/water vented by the ARV.

3.2 FINISHING

- A. Painting of all pumps and motors shall be as specified in SECTION 09 96 00, HIGH-PERFORMANCE COATINGS of these Specifications.

3.3 FIELD QUALITY CONTROL

- A. Initial operation of the pumps shall take place in the presence of a representative of the pump manufacturer, and in the presence of a licensed electrician. The operation shall be intermittent to the extent that each pump shall be started and stopped at least three (3) times. The operation shall extend over a long enough period to assure that the equipment has been installed properly and is in satisfactory condition. Power and water will be furnished by the Owner. All other costs shall be borne by the Contractor.
- B. Functional Tests: Conduct on each pump.
 - 1. Alignment: Test complete assemblies of actual pump with motors furnished for correct rotation, proper alignment and connection, and quiet operation.
 - 2. Vibration Test:
 - 3. Test with units installed and in normal operation and discharging to the connected piping systems at rates between the low discharge head and high discharge head conditions specified. The actual building structures and foundations provided shall not develop vibration exceeding limits specified in HIS 9.6.4 at all operating speeds.
 - 4. If units exhibit vibration in excess of the limits specified adjust or modify as necessary. Units which cannot be adjusted or modified to conform as specified shall be replaced.
 - 5. Flow Output: Measured by pump station instrumentation.
 - 6. Operating Temperatures: Monitor bearing areas on pump and motor for abnormally high temperatures.
- C. Performance Test: In accordance with Hydraulic Institute Standards, latest standard.

3.4 MANUFACTURER'S SERVICES

- A. A manufacturer's representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services herein under, travel time excluded:
 - 1. Installation, Startup, and Testing Services:
 - a. 1 person day for installation assistance, inspection, and Certificate of Proper Installation.
 - b. 1 person-day for functional and performance testing.
 - c. Provide Qualifications of Manufacturer's Representative.
 - 2. Training Services:
 - a. 1 person-day of prestart classroom or jobsite training of Owner's personnel.
 - b. Training of Owner's personnel shall be at such times and at such locations as required and approved by the Owner.

3.5 MANUFACTURER'S CERTIFICATES

- A. Provide Manufacturer's certificate(s) in accordance with Section 01 75 00, STARTUP TESTING AND TRAINING.

3.6 SUPPLEMENT

- A. The supplements listed below, following “End of Section,” is a part of this Specification.
 - 1. Horizontal End Suction Lift Station Pump Data Sheet.

END OF SECTION

SECTION 40 72 76 – LEVEL SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section Includes:
 - 1. Tilting Float Level Switches for wastewater applications.
- B. Related Section:
 - 1. Section 40 70 00 – Instrumentation for Process Systems

1.2 SUBMITTALS

- A. Subject to the requirements of Section 01 33 00 – Submittal Procedures.
- B. See Section 40 70 00 – Instrumentation for Process Systems for requirements.

1.3 COORDINATION

- A. See Section 40 70 00– Instrumentation for Process Systems for requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. See Section 40 70 00 – Instrumentation for Process Systems for requirements.

1.5 WARRANTY

- A. Furnish one-year manufacturer's warranty for tilting float switches.
- B. See Section 01 78 36 – Warranties and Bonds for additional requirements.

PART 2 - PRODUCTS

2.1 TILTING FLOAT SWITCHES

- A. Manufacturers:
 - 1. Siemens
 - 2. Anchor Scientific
 - 3. Madison
 - 4. Or equal.
- B. Type:
 - 1. Direct acting tilt float switch.
- C. Materials:
 - 1. Rigid, Teflon coated.
 - 2. Mercury free.
- D. Electrical Contacts:
 - 1. One normally open or normally closed contact, as specified in Drawings.
 - 2. Rated 1A, 120 VAC minimum.
- E. Furnished with required length of cable and weight kit for cable suspension, as required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. See Section 40 70 00 – Instrumentation for Process Systems for requirements.

3.2 INSTALLATION

- A. Hang level switch cords with strain relief devices to prevent cord damage.
- B. See Section 40 70 00 – Instrumentation for Process Systems for additional requirements.

3.3 FIELD QUALITY CONTROL

- A. See Section 40 70 00 – Instrumentation for Process Systems for requirements.

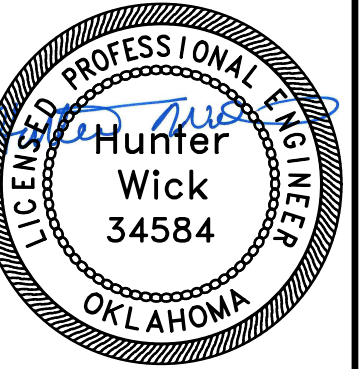
3.4 DEMONSTRATION

- A. See Section 40 70 00 – Instrumentation for Process Systems for requirements.



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 EXPIRES 06/30/2025



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GENERAL NOTES:

1. SIGNAL LINES TO EQUIPMENT INTENDED ONLY TO INDICATE A REQUIRED ELECTRICAL CONNECTION. REFER TO PLAN SHEETS, CONTROL SCHEMATICS, AND I/O LIST FOR ADDITIONAL INFORMATION ABOUT NUMBER AND TYPES OF SIGNAL WIRING.
2. EQUIPMENT TAGS WITH X, INSERT CORRESPONDING EQUIPMENT NUMBER
3. HMI LEVEL IS SHOWN FOR GENERAL REFERENCE.
4. FOR TAGS WITH *, EQUIPMENT IS SUPPLIED AS PART OF MANUFACTURER PACKAGE.

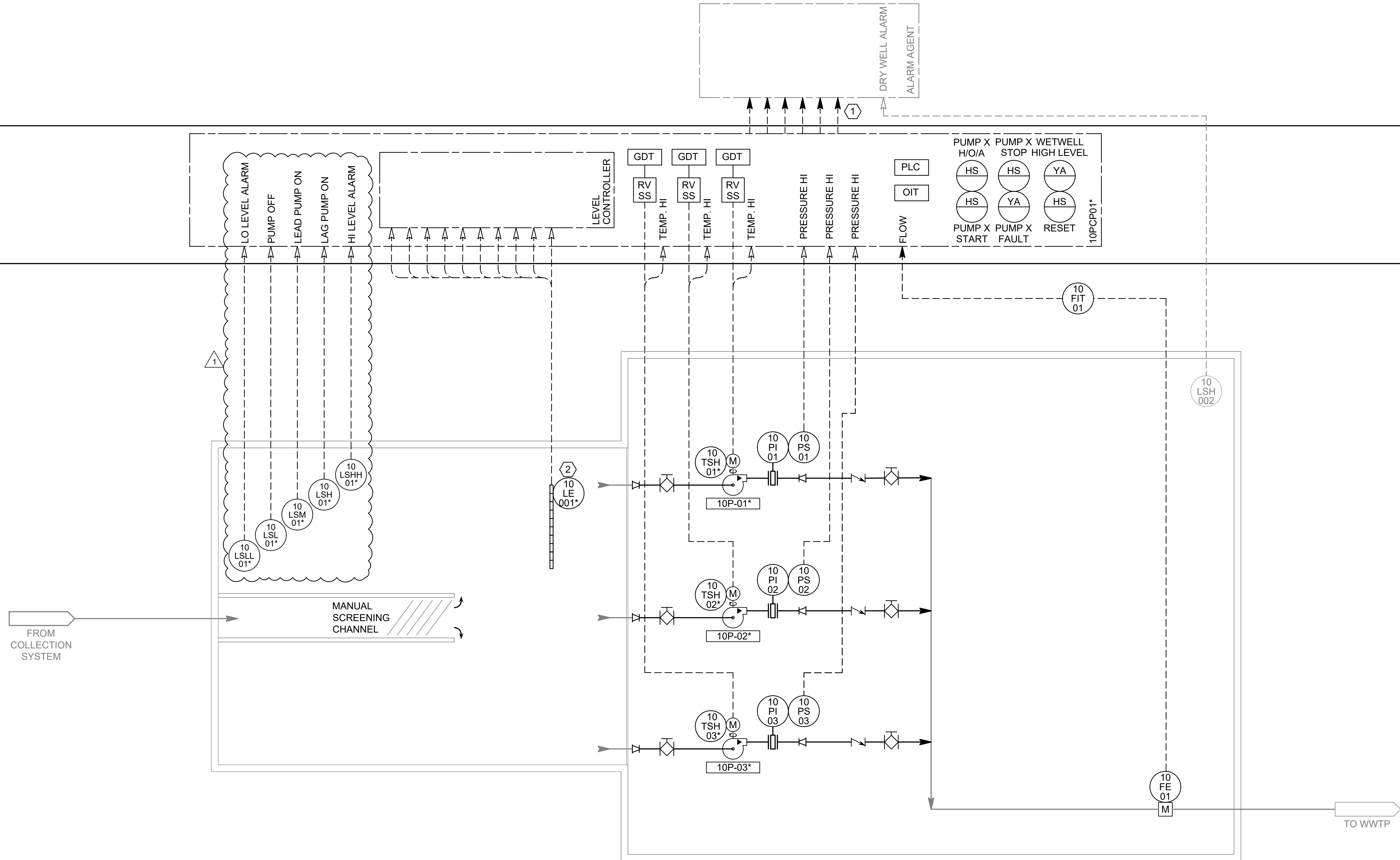
KEYED NOTES:

- ① CONTRACTOR SHALL FIELD INVESTIGATE SIGNALS BEING TRANSMITTED TO AND FROM ALARM AGENT AND PROVIDE SAME FUNCTIONALITY FROM NEW PUMP CONTROL PANEL. COORDINATE WITH OWNER AS NEEDED FOR STATUSES SEEN FROM ALARM AGENT. PROVIDE CONDUIT AND CONDUCTORS AS NEEDED.
- ② 10 PROBE CONDUCTIVITY ROD, SEE SPECIFICATIONS FOR MORE INFORMATION.

HMI LEVEL

PLC LEVEL

MCC/CP LEVEL



REV	DATE	DESCRIPTION	BY
1	12/06/24	ADDENDUM NO. 1	HGW



MIDWEST CITY
 11500 NE 5TH ST, CHOCTAW, OK 73020
 MIDWEST CITY, OK.
EDGEWOOD LIFT STATION IMPROVEMENTS

LIFT STATION P&ID

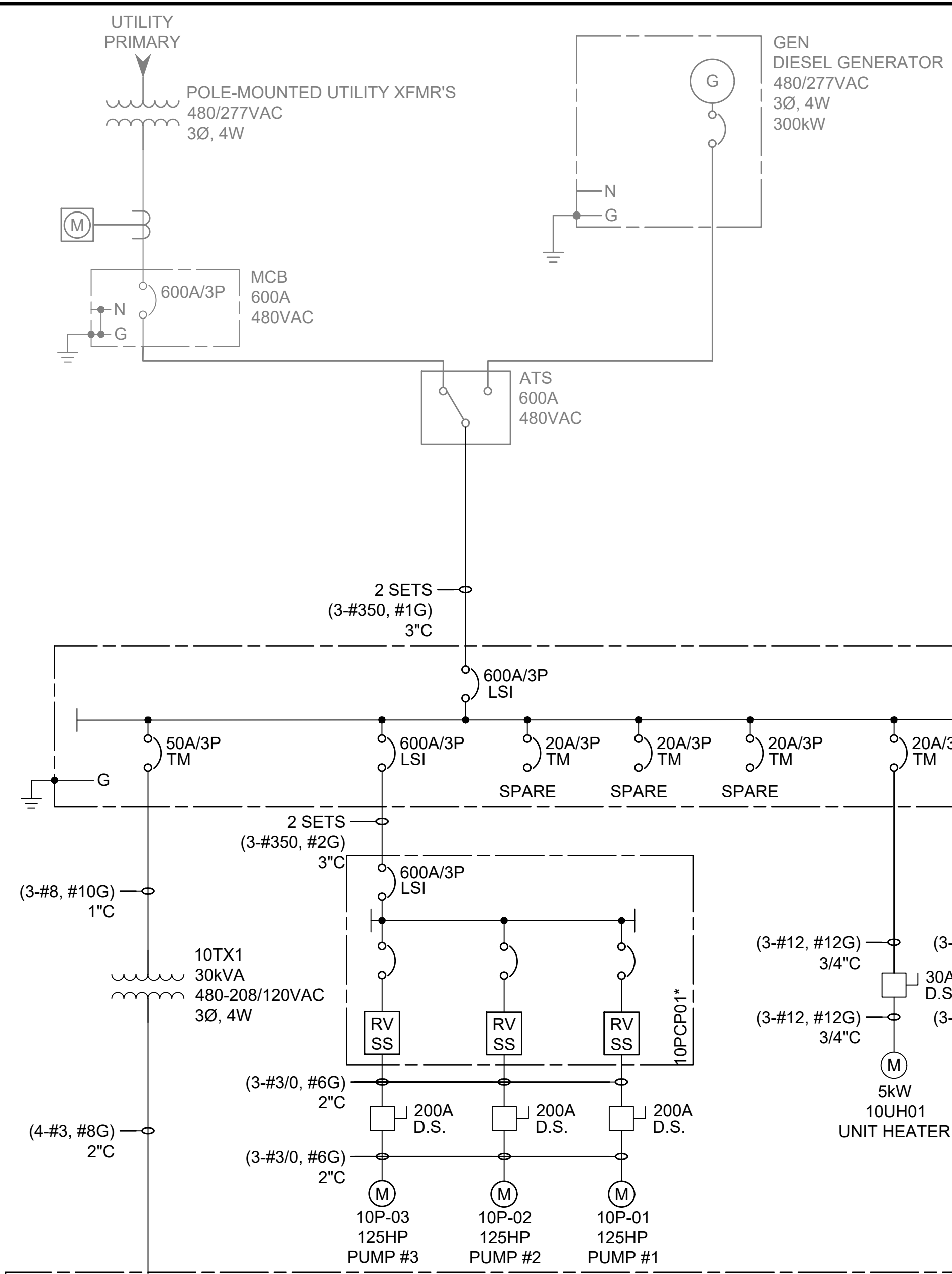
JOB NO.: 2400683
 DATE: AUG. 2024
 DESIGNED BY: HGW
 DRAWN BY: LCB
 CHECKED BY: JCW

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 SHEET NUMBER
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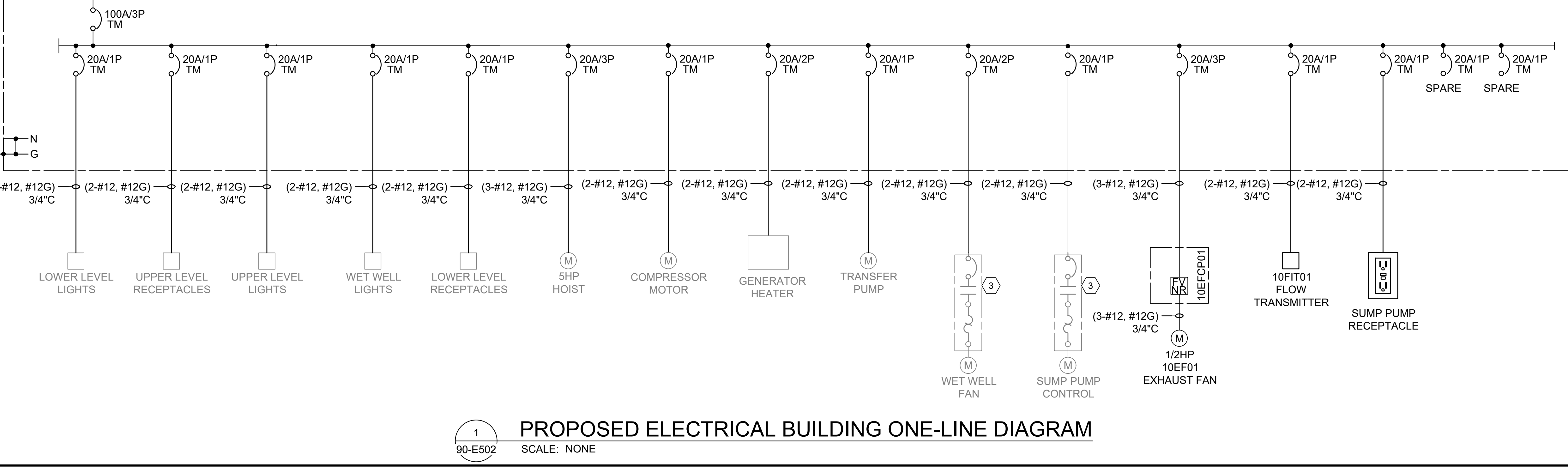
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- KEYED NOTES:**
- RE-USE EXISTING CONDUITS AND PULL NEW CONDUCTORS WHERE AVAILABLE. IF EXISTING CONDUIT IS NOT SUITABLE, ROUTE NEW CONDUIT AND CONDUCTORS OVERHEAD. MINIMIZE WALL AND FLOOR PENETRATIONS.
 - CONTRACTOR SHALL FIELD INVESTIGATE SIGNALS BEING TRANSMITTED TO AND FROM ALARM AGENT AND PROVIDE SAME FUNCTIONALITY FROM NEW PUMP CONTROL PANEL. PROVIDE CONDUIT AND CONDUCTORS AS NEEDED.
 - RE-LOCATE STARTER PANELS AS NEEDED FOR NEW EQUIPMENT LAYOUT.
 - CONTRACTOR SHALL FURNISH AND INSTALL 12VDC WIRING AS REQUIRED TO SUPPLY EXISTING ALARM AGENT COMMUNICATIONS SYSTEM. 12VDC SHALL BE SOURCED FROM UPS WITHIN PUMP CONTROL PANEL.

- GENERAL NOTES:**
- ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE NFPA 70 NATIONAL ELECTRICAL CODE, NFPA 101 LIFE SAFETY CODE, NFPA 70E ELECTRICAL SAFETY CODE, STATE ELECTRICAL CODE, AND LOCAL ELECTRICAL CODE.
 - EQUIPMENT GRAYED BACK INDICATES EXISTING
 - COORDINATE ALL ELECTRICAL WORK AND POWER OUTAGES WITH OWNER AND POWER UTILITY.
 - THE CONTRACTOR SHALL MAKE ELECTRICAL CONNECTIONS TO EVERYTHING FURNISHED OR INSTALLED BY THIS CONTRACT, WHETHER INDICATED OR NOT ON THE ELECTRICAL DRAWINGS.
 - PROVIDE LUGS AS REQUIRED TO FIT WIRING.



2
 90-E502
CONTROL CONDUIT & WIRING DIAGRAM
 SCALE: NONE

1
 90-E502
PROPOSED ELECTRICAL BUILDING ONE-LINE DIAGRAM
 SCALE: NONE



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REV	DATE	DESCRIPTION	BY
1	12/06/24	ADDENDUM NO. 1	HGW



MIDWEST CITY
 11500 NE 5TH ST, CHOCTAW, OK 73020
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EDGEWOOD LIFT STATION IMPROVEMENTS

PROPOSED LIFT STATION ONE-LINE DIAGRAM

JOB NO.: 2400683
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