ADDENDUM
PAGE 1 OF 1

OWNER:	City of Owosso 301 W. Main Street Owosso, MI 48867
ENGINEER:	Fishbeck 5913 Executive Drive, Suite 100 Lansing, Michigan 48911
DRAWING REVISION NO.:	A1
ISSUED HEREWITH:	
SPECIFICATION SECTIONS:	40 90 00
SHEETS:	A104
BIDS DUE:	Tuesday, May 20, 2025 at 3:00 p.m.

This Addendum is issued to all Bid Set Holders, is a part of the Contract Documents, and modifies the previously issued Bidding Documents. Acknowledge receipt of this Addendum in the space provided on the Bid form; failure to do so may result in rejection of the Bid.

ITEM NO. 1:
Section: 40 90 00 – Instrumentation and Control for Process Systems (Re-issued)

ITEM NO. 2:
Sheet: A104 – Schedules and Details (Re-issued)

A. Exterior Finish Schedule updated to reflect color and type selections for CMU.

END OF ADDENDUM

SECTION 40 90 00 – INSTRUMENTATION FOR PROCESS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes, but is not necessarily limited to, the furnishing and installation of the process control and instrumentation system comprised of the major items listed below, as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work:
   1. Field instruments.

1.3 GENERAL REQUIREMENTS

A. Provide components which are compatible with process equipment.

B. Functionally similar components shall be products of a single Manufacturer.

C. Installation of new systems and equipment shall be sequenced and coordinated to minimize disruptions to Owner's normal operations.

D. Existing systems and equipment shall be kept in operation until new systems and equipment are functional and demonstrated to be reliable, to satisfaction of Engineer, for a minimum of 2 weeks.

1.4 SUBMITTALS

A. Itemized Listings:
   1. Description of deviations from the requirements of this Section.
   2. Re-submittals shall contain response(s) to each comment made by Engineer. Re-submittals that do not contain response(s) will be returned and will be subject to re-review compensation.

B. Shop Drawings:
   1. Shop Drawing submittal schedule listing Shop Drawings to be submitted with estimated time frame of submittal relative to other project milestones (e.g. programming development, factory test, performance demonstration, project closeout).
   2. General: Shop Drawing submittal material shall be project specific.
   3. For all process control and instrumentation equipment, to include:
      a. Manufacturer's name and model number.
      b. Equipment descriptions.
      c. Product data sheet(s).
      d. Standard drawings and illustrations.
      e. Dimensions.
      f. Materials of construction.
      g. Details of construction and installation.
      h. Detailed system schematic.
      i. Project specific wiring diagrams, clearly indicating all field wiring requirements.
      j. Spare parts list.

C. Operation and Maintenance Manuals:
   1. General:
      a. Table of contents.
      b. Subdivided (tabbed) into separate sections that cover separate equipment or grouping of equipment.
      c. Each site shall be uniquely tabbed. Manuals for each site shall be repeated as required so that remote site material can be separated and stand alone.

d. Provide 1 electronic copy (CD-ROM) per hard copy, of the overall O&M Manual that includes information for all sites. Owner shall be permitted to make copies of CD-ROM without restriction.

2. For all process control equipment, to include:
   a. Equipment function, normal operating characteristics and limiting conditions.
   b. Assembly, installation, alignment, adjustment and checking instructions.
   c. Operating instructions for start-up, routine and normal operating, regulation and control, and shutdown and emergency conditions.
   d. Lubrication and maintenance instructions.
   e. Guide to “troubleshooting.”
   f. Parts lists and predicated life of parts subject to maintenance replacement.
   g. Outline, cross-sections, assembly drawings, engineering data and wiring diagrams.
   h. Test data and performance curves.

1.5 QUALITY ASSURANCE

A. Fabrication and Installation Personnel Qualifications:
   1. Trained and experienced in fabrication and installation of materials and equipment.
   2. Knowledgeable of the design and reviewed Shop Drawings.

B. Manufacturer’s Services:
   1. Submit Manufacturer’s sworn statement that equipment furnished complies with this Specification and Manufacturer’s engineer’s written approval of installation.
   2. Provide Manufacturer’s field service as specified herein.

C. All materials, installation and testing shall be in accordance with ISA Standards and Recommended Practice.

D. Contractor shall conduct field investigations as required to verify existing conditions, I/O, programming, wiring requirements, instrument ranges/calibration and signal types.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials in original, unbroken, brand marked containers or wrapping as applicable.

B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer’s directions.

C. Store materials indoors in a controlled environment with low moisture content. Do not store outdoors.

D. Reject damaged, deteriorated, or contaminated materials and immediately remove from Site. Replace rejected materials with new materials at no additional cost to Owner.

1.7 GUARANTEE AND WARRANTY

A. Process control and instrumentation system Supplier shall guarantee the entire system for a period of 1 year. This guarantee shall cover all parts, labor, troubleshooting, telephone consulting, travel, and equipment recalibration.

B. The 1-year guarantee period shall begin at Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

A. Acceptable Manufacturers for major system components are specified herein.

B. Not all components are specified. It is the system Supplier’s responsibility to furnish and install components necessary to achieve the functional intent and to meet or exceed the governing local, state or national standards and/or codes.

C. Coordination of all field mounted instrumentation device installation shall be system Supplier's responsibility:
   1. Mounting of each device shall be designed with consideration to:
      a. Manufacturer's installation recommendations.
      b. Ease of removal for maintenance.
      c. Safety.
   2. Provide all mounting hardware required.
   3. All mounting hardware shall be of the following corrosion resistant material. Coordinate mounting material with surrounding environment:
      a. PVC.
      b. Stainless steel.
      c. FRP.
   4. Provide sufficient length of sensor to transmitter cable for each field device.
   5. Provide unions, bulkhead fittings, isolation valves, etc.

D. **Pre-Approved Acceptable System Suppliers:**
   1. **Apex Controls,**
   2. **BVB Process Automation & Controls, Inc.**
   3. **CEC Controls.**
   4. **Commerce Controls.**
   5. **Integrated Controls.**
   6. **Perceptive.**
   7. **West Michigan Instrumentation.**
   8. **Windemuller.**
   9. **No substitutions.**

2.2 CABLES

A. **Network Cables:**
   1. **Unshielded Twisted Pair (UTP) Cabling:**
      a. **Multiconductor, Enhanced Category 6, nonbonded-pair cable consisting of 4 pairs of propylene (FRPO/FEP) insulation, tape separator, and low smoke polyvinyl chloride (LS PVC) outer jacket with ripcord. Outer jacket shall be blue.**
      b. **Suitable for Gigabit Ethernet and 100BaseTX applications.**
      c. **UL CMP (plenum) rated.**
      d. **Manufacturer: Belden; or equal.**
   2. **Fiber Optic Cable:**
      a. **Cable is to be all dielectric, loose tube, riser rated, indoor/outdoor cable design.**
      b. **Fiber Optic Type OM3 50/125 micron**
      c. **Multimode, 12 strand minimum.**
      d. **Outside Plant installation (OSP).**
      e. **Fully water blocked.**
      f. **Max Attenuation: 3.5/1.0 dB/1.0dB/km.**
      g. **Manufacturers:**
         1) **Belden; or equal.**
      h. **Provide LC style connectors for fiber optic cable terminations.**

B. **Patch Cables:**
   1. **Fiber Optic Patch Cables:**
      a. **Available with SC, ST, MT-RJ or LC style connectors, coordinate with equipment provided. Coordinate lengths with installation requirements.**
      b. **Multimode 9 microns and a cladding diameter of 0.125 microns.**
      c. **Minimum bending radius of 2 inches or less.**
      d. **Fiber optic patch cable outer jacket shall be PVC, colored yellow (single mode), unless otherwise noted. Ends shall be color coordinated to identify Tx and Rx.**
      e. **Manufacturers: Leviton, Panduit; or equal.**
   2. **UTP Patch Cables:**
      a. **Available with RJ-45 style connectors, coordinate lengths with installation requirements.**
      b. **Connectors shall be factory installed, with snagless molded strain relief.**
      c. **Minimum rating Category 6 in accordance with TIA/EIA-568.**

d. **Stranded construction, factory product. Field assembled terminations will not be acceptable.**
e. **Provide STP cables in panels where electrical interference may be generated within the panel (e.g. by VFDs or SCR drives).**
f. **Patch cables shall be colored green, unless otherwise noted.**

3. **Manufacturers: Leviton, Panduit; or equal.**

~~2.2~~2.3 FIELD INSTRUMENTS

A. General:
1. Schedules are provided as an aid to Contractor. It is Contractor's responsibility to verify information contained in the schedules for completeness and to provide equipment that is indicated elsewhere in Drawings and Specifications, but not listed in schedules.
2. Provide instruments rated for environment.
3. Field verify Manufacturer's cable lengths prior to Shop Drawing submittal.
4. Existing instruments that are relocated or modified shall be recalibrated.
5. Existing instruments with unknown scaling or ranges shall be recalibrated.
6. Existing instruments that do not agree with new instrumentation shall be recalibrated.
7. Existing instruments that are used in conjunction with new control systems shall be recalibrated.
8. Tagging: Equip all instruments with a permanently attached, stamped or engraved identification tag. The tags shall include the device name, Engineer's tag identification, and manufacturer's tag identification if different from Engineer's.
9. Finish: Finish on the instruments and accessories shall provide protection against corrosion by the elements in the environment in which they are to be installed.
10. Temperature Rating: Instruments shall be suitable for the temperature in which they are to be exposed. Therefore, instruments located outdoors or in unheated spaces shall be suitable for -20 degrees F to 120 degrees F. Instruments exposed to direct sunlight (without sunshield) shall be suitable for temperatures up to 140 degrees F.
11. Provide configuration software and cables or hand held device(s) for any instrument which cannot be fully programmed via keypad/interface which is integral to device.

B. Instrument Pipe Stand:
1. General: Modular support system for mounting of instrumentation components.
2. Provide for each instrument that cannot be wall mounted.
3. Material of construction: Galvanized carbon steel, aluminum or stainless steel as required by environment to prevent corrosion.
4. Floor stands shall have gussets for strength and stability.
5. Size as required to mount instrument at 4′-6″ above operating level, unless otherwise noted.
6. Manufacturers:
a. O'Brien, Saddlepak.
b. Techline Mfg.
c. Or equal.

C. Continuous Pressure Measurement:
1. Well Pump Discharge Pressure Monitoring:
a. Pressure Transmitters PIT for Well House LW1 and PW2.
2. Gage Pressure Transmitter:
a. Microprocessor based smart transmitter.
b. Display: Integral LCD.
c. Material:
1) Stainless steel wetted parts and diaphragm.
2) Teflon O-rings.
3) Silicone fill fluid.
4) Stainless steel mounting bracket and hardware.
5) Epoxy covered aluminum housing.
d. Accuracy: 0.075% of span with 5-year stability.
e. Rangeability: 30:1
f. Process Connection: ½-inch NPT.
g. Output: 4-20 mAdc plus HART protocol.
h. Power: Loop powered.

i. Schedule:
   1) PIT-101 LW1 Discharge Pressure 0-150 psig
   2) PIT-201 PW2 Discharge Pressure 0-150 psig
j. Manufacturers:
   1) Rosemount
   2) ABB
   3) Honeywell
   4) Endress & Hauser
   5) Siemens
k. Accessories:
   1) 316 stainless steel, two valve block and bleed manifold.
   2) Provide 316 stainless steel mounting hardware.

D. Continuous Flow Measurement:
1. Well Pump Discharge Monitoring:
   a. Flow meters with integral transmitter FE/FIT for Well House LW1 and PW2.
2. Magnetic Flow Meters:
   a. Accuracy: Within ±0.25% of meter scale for a velocity of 1 to 33 fps and the repeatability shall be within ±0.1% of full scale.
   b. Complete with grounding rings. Grounding probes are not acceptable.
   c. Provide a standard 3-point calibration report traceable to a recognized standard.
   d. All flow meters shall be of the same model/series.
   e. NSF-61 certified meters suitable for use with potable water.
   f. Meter Tube:
      1) 304 stainless steel flow tube.
      2) Meter shall maintain ISO 13359 standard lay lengths.
      3) Liner:
         a) Teflon, PFA, or Tefzel for 10-inch or smaller.
         b) Polyurethane for 12-inch or greater.
         c) It is the Supplier's responsibility to provide liner that is chemically compatible with the process fluid being measured.
         d) Liners utilized in drinking water applications shall be NSF-61 certified.
      4) Electrodes:
         a) Bullet nose type.
         b) Hasteloy C.
         c) Titanium for Alum and Sodium Hypochlorite.
         d) Platinum for Hydrofluosilicic Acid.
         e) It is the Supplier's responsibility to provide electrodes that are chemically compatible with the process fluid being measured.
      5) Grounding Rings:
         a) 316 Stainless Steel for 12-inch or smaller.
         b) 304 Stainless Steel for 14-inch or greater.
         c) Titanium for Alum and Sodium Hypochlorite.
         d) Hasteloy C for Hydrofluosilicic Acid.
         e) It is the Supplier's responsibility to provide grounding rings that are chemically compatible with the process fluid being measured.
      6) Flanges:
         a) ANSI 150-pound, raised or flat for 1-inch to 24-inch.
         b) Wafer style to be mounted between 2 ANSI 150-pound flanges for smaller than 1-inch
         c) AWWA Class D flanges for meters larger than 24 inches.
         d) Meter shall be fully rated to withstand the same design pressure as the flanges.
      7) Epoxy or Powder Coated: 2 coats for a minimum of 7 mils.
      8) Meters above grade and smaller than 12 inches shall be capable of accidental submergence. Meters 14 inches and larger or meters installed in a meter vault shall be capable of continuous submergence or direct burial (IP68/NEMA 6P).
   g. Integral Transmitter:
      1) One for each flow tube.
      2) Solid state type.
      3) Housing: Die-cast aluminum.
      4) Integral to meter tube.
      5) HART protocol.

6) Provide universal HART communicator/configurator which supports all HART devices.
7) Display:
   a) Flow rate and totalized flow displayed on a backlit display.
   b) Integral transmitter display shall be able to rotated 90 or 180 degrees to accommodate meter mounting position/orientation.
8) Transmitter shall include nonvolatile memory so that flow totalization is not lost during power interruptions. Provide totalizers for forward, reverse and net flow.
9) Output:
   a) 4-20 mAdc into 0 to 800 ohms, proportional and calibrated to stated flow range.
   b) HART.
   c) Pulse output to be used for flow totalization. Configurable from 0 to 1000 pulses per second or pulses per unit volume. Pulse width shall be adjustable from 0.5 to 100 ms.
10) Provide empty pipe detection as standard.
11) Power: 120Vac, 60 HZ.
12) Enclosure: NEMA 4X.
13) Provide required lengths of Manufacturer's cable for remote mounted indicators.

h. Manufacturer:
   1) ABB.
   2) Rosemount.
   3) Yokogawa.
   4) Krohne.
   5) Toshiba.
   6) Endress + Hauser.

E. Submersible Level (Pressure) Sensor and Transmitter:
1. Well water level monitoring LE/LIT for Well House LW1 and PW2.
2. Level Sensor:
   a. 316 stainless steel housing.
   b. Ceramic sensor.
   c. Maximum diameter of 0.87 inches
   d. Accuracy: Within ±0.25% of full scale.
   e. Provide signal cable in length as required.
   f. Output: 4-20 mAdc proportional to level, wired to transmitter.
   g. Power: 10 to 30 Vdc from transmitter (loop powered).
   h. NSF-61 approved.
   i. Sensor shall be capable of measuring maximum water level in Well within which it is installed.
   j. Signal cable shall be designed to allow removal of the sensor from the Well without failure.
3. Transmitter:
   a. NEMA 4X weatherproof housing.
   b. UL listed.
   c. Output: 4-20 mA proportional to level.
   d. Power: 120 VAC from UPS.
4. Manufacturer and Model:
   a. Endress+Hauser Waterpilot, Model FMX21 with Model RIA46 Field Meter.
   b. Or equal.

F. Conductivity Level Switch:
1. Conductivity level switch for Well House LW1 and PW2.
   a. Probe Holder/Connector Housing:
      1) Process Connection: 1 1/2-inch NPT.
      2) Enclosure: NEMA 4 Aluminum with 1/2-inch NPT conduit entry.
      3) Stainless steel fitting.
   b. Electrode:
      1) Stainless steel.
      2) Number of electrodes:
         a) 1 per level switch.
         b) Provide reference sensor for non-metallic tank installations.
      3) Full electrode cladding, compatible with process fluid.

c. Electrode Relay:
   1) Number of Channels: 1 per level switch.
   2) Sensitivity: Adjustable.
   3) Mounting: DIN Rail.
   4) Power: 120 VAC.
   5) Output: SPDT, 4 Amp rated.
d. Manufacturer:
   1) Endress + Hauser, Liquipoint T.
   2) Kobold, Model NE.
   3) Or equal.
e. Accessories: Corrosion resistant hardware and mounting accessories.

G. Combination Temperature and Relative Humidity Transmitter:
1. Temperature Range: -40 to 140 degrees F.
2. Temperature Accuracy: ±0.9 degrees F at 72 degrees F.
3. Relative Humidity Range: 0 to 100%.
4. Relative Humidity Accuracy: ±3% at 20 to 80% RH; ±4% at 10 to 20% and 80 to 90% RH.
5. Relative Humidity Hysteresis: ±1%.
6. Relative Humidity Repeatability: ±0.1% typical.
7. Output Signals: 4-20mA, loop powered.
8. Response Time: 15 seconds.
9. Electrical Connections: Removable screw terminal block.
10. Relative Humidity Sensor: Capacitance polymer protected by a removable sintered filter.
11. Temperature Sensor: Solid state band gap.
12. Enclosure: ABS, NEMA 3S.
13. Schedule:
    a. TT-101 & TT-201: -40 to 140 degrees F (relative humidity not used).
14. Manufacturer:
    a. Dwyer WHT-311.
    b. Or equal.

PART 3 - EXECUTION

3.1 INSTALLATION COORDINATION

A. Install process control equipment and instrumentation in conformance with:
1. Shop Drawings reviewed by Engineer.
2. Manufacturer’s recommendation.

B. Electrical:
1. Install wiring in conformance with applicable Sections of Division 26 – Electrical.
2. Run all 4-20 mAdc process control wiring in separate conduit from power and control wiring.
3. Communication cabling shall be in separate conduits from power control and analog signal wiring.

C. Mount Control Panels:
1. Securely with framing and fasteners capable of handling additional future loads.
2. In a way that does not restrict access to internal components.

3.2 FIELD QUALITY CONTROL

A. System Supplier’s Field Service:
1. Schedule field services as soon as practical and at times approved by Engineer.
2. Promptly make all changes and additions required by system Supplier’s engineer and as necessary for proper operation of the system.
3. System Supplier’s engineer shall submit written approval of installation.

B. Field Performance Demonstration:
   1. Instruments:
      a. Demonstrate proper calibration and maximum accuracy.
      b. Demonstrate that system performs monitoring functions as specified and indicated on the Drawings.

END OF SECTION 40 90 00