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## FAX TRANSMITTAL

Date: November 30, 2016

To: Plan Holders

Company: Contractors

Number of Pages: 32 (Including Cover)

From:

RE: Project No.

**TMUA-W 16-04**

**AB JEWELL WATER TREATMENT PLANT LAB/OFFICE RENOVATION**

### ADDENDUM NO. 1

*PLEASE DISREGARD FIRST FAXED ADDENDUM*

Please fax or email a signed cover sheet to 918 699-3640 or  
[KristaSmith@cityoftulsa.org](mailto:KristaSmith@cityoftulsa.org) as acknowledgement of receipt.

Thank you,

Krista Smith

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company

\_\_\_\_\_  
Date

# TULSA METROPOLITAN UTILITY AUTHORITY

2317 SOUTH JACKSON

TULSA, OKLAHOMA 74107

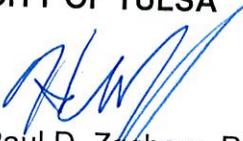
November 30, 2016

**ADDENDUM NO. 1  
TO  
PROJECT NO. TMUA-W 16-04  
AB JEWELL WATER TREATMENT PLANT  
LAB/OFFICE RENOVATION**

This Addendum No. 1 consisting of nine (9) items submitted by Cyntergy, is hereby made a part of the Contract Documents to the same extent as though it were originally included therein, and shall supersede anything contained in the Plans and Specifications with which it might conflict. **This Addendum shall be attached to the Index Sheet of the Contract Documents and submitted with bid. Failure to do so shall result in the bid being deemed non-responsive.**

All other provisions of the Plans and Specifications shall remain in full force and effect.

**CITY OF TULSA**



Paul D. Zachary, P.E.  
City Engineer

for

HAS FEB  
HAS/RTM/PEB/peb



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## Addendum No. 1

Date: November 28, 2016

Project: AB Jewell Water Treatment Plant Lab/Office Renovation  
Project No. – TMUA-W 16-04

To: Cheryl Wilson

This Addendum No. 1, consisting of revisions to drawings, specifications and bid proposal is hereby made a part of the Contract Documents to the same extent as though it were originally included therein, and shall supersede anything contained in the Plans and Specifications with which it might conflict.

This Addendum No. 1 consists of the following:

### Drawings

1. M-502 – Detail 1
  - a. Steam piping shall exit straight up at least 12" from the steam generator (connection is on top). A trap will be required at the connection to the steam manifold. Pipe the trap drain to the steam drain shown on 1/P-102
  - b. Use 3" copper piping meeting the manufacturer's requirements instead of steam hose. See changes to specification 23 22 13.
2. M-601 – Laboratory Fume Hood Schedule
  - a. Locate the receptacle included in Remark 2 on the exterior of the cabinet, not in the interior.
  - b. Digital airflow monitor shall be required per Remark 5.
  - c. Drainage trough shall be required per Remark 8. Refer to changes noted for 2/P-402 for piping requirements.
  - d. Pre-plumbed service piping shall be stubbed 6" out of the top of the hood structure for final connection per Remark 9. The valve controls shall be on the side post of the hood.
3. M-601 – Computer Room Air-Conditioning Schedule
  - a. Remark 2 requires 4", 65% efficient filters. 1", 20% efficient filters are acceptable.
  - b. Remark 9 calls for belt drive fan. Direct drive motor with fully variable speed is acceptable.
  - c. Clarification – unit is ductless.
4. P-402 – Detail 2
  - a. Provide 3" drainage piping plumbed to laboratory hood drainage trough. Provide trap and pipe to wall. Provide 1 ½" vent piping and connect to main vent piping. Main vent shall be 2" at connection of 1 ½" vent from drainage trough. Drainage and vent piping shall meet the requirements of specification 22 66 00 – Chemical-Waste Systems for Laboratory Facilities.
5. G-001 – Pay Item Sheet
  - a. Clarification has been made to Pay Item #9 that it refers to 3<sup>rd</sup> Floor Equipment. The quantity has been revised to 16. Refer also to Specification 024119.

- b. Pay Item #100 – 2-L3x3x1/4 beams were added. All pay items following this addition were renumbered.

**Specifications**

6. 02 41 19 – Selective Demolition
  - a. Revised requirements for equipment protection.
7. 23 22 13 – Steam and condensate heating piping
  - b. Included copper piping (see comments on M-502 – Detail 1).
8. 23 81 23.13 – Computer-Room Air-Conditioners, Ceiling-Mounted Units
  - c. Requirement for step-down transformer has been removed.

**Bid Proposal**

9. Delete the existing proposal in its entirety and replace with the revised proposal found at [www.cityoftulsa.org](http://www.cityoftulsa.org) \our city\ doing business with the city \ construction bids\ project no. tmua-w 16-04. It is the Bidders responsibility to download the revised proposal onto their thumb drive.

End of Addendum No. 1



Cytergy Engineering, PLLC  
CA# 3537  
Expires 6/30/2018

## **SECTION 024119 - SELECTIVE DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Demolition and removal of selected portions of building or structure.
  - 2. Demolition and removal of selected site elements.
  - 3. Salvage of existing items to be reused or recycled.

#### **1.2 DEFINITIONS**

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to CITY ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

#### **1.3 PREINSTALLATION MEETINGS**

- A. Pre-demolition Conference: Conduct conference at project site as part of the pre-construction conference.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For refrigerant recovery technician.
- B. Pre-demolition Photographs or Video: Submit before Work begins.
- C. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

## **1.6 QUALITY ASSURANCE**

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

## **1.7 FIELD CONDITIONS**

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so CITY's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by CITY as far as practical.
- C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. Hazardous materials will be removed by CITY before start of the Work.
  - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by CITY under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

## **1.8 WARRANTY**

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

#### **3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS**

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
  - 1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. CITY will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

### 3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- D. Temporary Protection: Provide protection for the following equipment to remain. The following list shall not limit the equipment to be protected. Contractor shall coordinate with the Owner. Equipment shall not be moved or modified in any way. Equipment shall be protected against physical damage and contamination by construction dust, debris, vapors, or other construction or demolition activities. For the purposes of bidding, each line item below shall be considered a separate quantity.
  - 1. Metals Equipment
    - a. Agilent ICP-MS 7700 Series Asset #00067946
    - b. Spectro Ciros CCD Asset #00035943 and autosampler
    - c. Hydra II AA model 010-00091-1 Asset #00100603
    - d. Agilent 5100 ICP-OES Asset #00100557 with autosampler
    - e. Perkin Elmer model SIMAA 6000 Asset #00034580
    - f. MARS Xpress Asset #00039742
  - 2. Organics Equipment
    - a. Agilent GC 6890 Asset #36921
    - b. Agilent GC 6890 Asset #35146
    - c. Agilent 5975 MS Asset #39155
    - d. Agilent GC 6890 Asset #34431
    - e. Agilent 5973 MS Asset #35930
    - f. Agilent GC 7890
    - g. Agilent 5977 MS
    - h. Quantity two (2) Aquatek 100 Purge and Trap Instruments
    - i. Quantity two (2) Stratum Purge and Trap Instruments
    - j. OI TOC 1030 Instrument Asset #38162

### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  5. Dispose of demolished items and materials promptly.
- B. Removed and Salvaged Items:
1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until delivery to CITY.
  4. Transport items to CITY's storage area designated by CITY.
  5. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition, cleaned and reinstalled in their original locations after selective demolition operations are complete.

### 3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

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- C. Disposal: Transport demolished materials off of CITY's property and legally dispose of them.

**3.6 CLEANING**

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

**END OF SECTION 024119**

SECTION 238123.13 - COMPUTER-ROOM AIR-CONDITIONERS, CEILING-MOUNTED UNITS

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. Section includes ceiling-mounted, computer-room air conditioners.

1.3 DEFINITIONS

- A. COP: Coefficient of performance.
- B. EER: Energy efficiency ratio.
- C. SCR: Silicon-controlled rectifier.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include material descriptions, dimensions of individual components and profiles, and finishes for computer-room air-conditioning units.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For computer-room air conditioners.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Include diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, elevations, and other details, drawn to scale, using input from installers of the items involved.
- B. Field quality-control reports.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For computer-room air conditioners to include in emergency, operation, and maintenance manuals.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of computer-room air conditioners that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.
  - 2. Warranty Period for Humidifiers: Manufacturer's standard, but not less than three years from date of Substantial Completion.
  - 3. Warranty Period for Control Boards: Manufacturer's standard, but not less than three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Data Aire Inc.
  - 2. Liebert; a brand of Emerson Electric Co.
  - 3. Stulz-ATS.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
  2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Ventilation Rate Procedures," and Section 7 - "Construction and Startup."
- C. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.
- 2.3 MANUFACTURED UNITS
- A. Description: Self-contained, factory assembled, prewired, and prepiped; consisting of cabinet, fan, filters, and controls.
1. Mounting Configuration: Exposed in the space.
- B. Cabinet: Galvanized steel serviceable from one side, with baked-enamel finish, insulated with 1/2-inch-thick duct liner, and mounting bracket attached to the unit.
1. Integral factory-supplied supply and return grille to fit ceiling grid kit of 24 by 48 inches, with filter.
  2. Unit with 24-by-48-inch air distribution plenum, with integral MERV 8 filter and three-way air distribution.
  3. Unit with two-speed, centrifugal direct-drive fan.
  - 4.
  5. Finish of Interior Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- C. Supply-Air Fan:
1. Plug/plenum, single inlet, direct drive, electronically commutated, and variable speed.
- D. Refrigeration System:
1. Compressor: Scroll, with oil strainer, internal motor overload protection, resilient suspension system, and crankcase heater.
  2. Refrigeration Circuit Components:
    - a. Low-pressure switch.
    - b. Manually reset, high-pressure switch.
    - c. Thermal-expansion valve with external equalizer.
    - d. Sight glass with moisture indicator.
    - e. Service shutoff valves.
    - f. Charging valves.
    - g. Hot-gas bypass.
    - h. Refrigerant charge.
  3. Refrigerant: R-407C or R-410A.

4. Refrigerant Evaporator Coil: Direct-expansion coil of seamless copper tubes expanded into aluminum fins.
  5. Refrigerant line sets precharged in lengths as required by site conditions
  6. Refrigerant line-sweat-adaptor kit to permit field brazing of refrigerant lines.
    - a. Mount stainless-steel drain pan complying with ASHRAE 62.1 and having a condensate pump unit with integral float switch, pump-motor assembly, and condensate reservoir under coil assembly.
  7. Remote, Air-Cooled Refrigerant Condenser: Integral, copper-tube aluminum-fin coil with direct-drive fan.
  8. Split system shall have suction- and liquid-line compatible fittings and refrigerant piping for field interconnection.
- E. Electric-Resistance Reheat Coil:
1. Finned-tube electric elements with contactor.
  2. Dehumidification relay.
  3. High-temperature-limit switches.
  4. SCR to proportionally control the reheat elements providing precise temperature control.
- F. Filter: 1-inch- thick, disposable, glass-fiber media.
1. Arrestance: 90 percent, according to ASHRAE 52.2.
  2. MERV: 8 according to ASHRAE 52.2.
- G. Electrode Steam Humidifier: Self-contained, microprocessor-controlled unit with disposable, polypropylene-plastic cylinders, and having field-adjustable steel electrodes and stainless-steel steam dispersion tube.
1. Plumbing Components and Valve Bodies: Plastic, linked by flexible rubber hosing, with water fill with air gap and solenoid valve incorporating built-in strainer, pressure-reducing and flow-regulating orifice, and drain with integral air gap.
  2. Control: Fully modulating to provide gradual modulation from zero to 100 percent capacity with field-adjustable maximum capacity; with high-water probe.
  3. Drain Cycle: Field-adjustable drain duration and drain interval.
- H. Disconnect Switch: Non-automatic, molded-case circuit breaker with handle accessible when panel is closed and capable of preventing access until switched to off position.
- I. Single point power kit permitting single electrical feed to the evaporator and condensing unit of a close-coupled system.
- J. Control System:
1. Microprocessor unit-mounted panel.
  2. Fan contactor.
  3. Compressor contactor.

4. Compressor start capacitor.
5. Control transformer with circuit breaker.
6. Solid-state temperature- and humidity-control modules.
7. Humidity contactor.
8. Time-delay relay.
9. Heating contactor.
10. Smoke sensor.
11. Filter clog switch.
12. Alarm contacts.
13. High-temperature thermostat.
14. Solid-state, wall-mounted control panel with start-stop switch, adjustable humidity set point, and adjustable temperature set point.
15. Remote panel to monitor and change temperature and humidity set points and sensitivities of the unit and unit alarms.
16. BACnet interface capability for connection to BAS.

K. Fan Motors:

1. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
  - a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load does not require motor to operate in service factor range above 1.0.
  - b. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
  - c. .

2.4 CAPACITIES AND CHARACTERISTICS

- A. Refer to schedule for capacities and characteristics.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for hydronic piping systems to verify actual locations of piping connections before equipment installation.
- C. Examine walls, floors, and roofs for suitable conditions where computer-room air conditioners will be installed.

- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Layout and install computer-room air conditioners and suspension system coordinated with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
- B. Install computer-room air conditioners coordinated with computer-room access flooring Installer.
- C. Install computer-room air conditioners level and plumb, maintaining manufacturer's recommended clearances. Install according to AHRI Guideline B.
- D. Suspended Computer-Room Air Conditioners: Install using continuous-thread hanger rods and elastomeric hangers of size required to support weight of computer-room air conditioner.
  - 1. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC." Fabricate brackets or supports as required.
  - 2. Comply with requirements for hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- E. Air-Cooled Refrigerant Condenser Mounting: Install using elastomeric pads on concrete base. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

### 3.3 CONNECTIONS

- A. Piping installation requirements are specified in other heating, ventilating, and air-conditioning Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to computer-room air conditioners, allow space for service and maintenance.
- C. Water and Drainage Connections: Comply with applicable requirements in Section 221116 "Domestic Water Piping." Provide adequate connections for condensate drain and humidifier flushing system.
- D. Refrigerant Piping: Comply with applicable requirements in Section 232300 "Refrigerant Piping." Provide shutoff valves and piping.

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. Inspect for and remove shipping bolts, blocks, and tie-down straps.
  - 2. After installing computer-room air conditioners and after electrical circuitry has been energized, test for compliance with requirements.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Computer-room air conditioners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.
- F. After startup service and performance test, change filters and flush humidifier.

### 3.5 ADJUSTING

- A. Adjust initial temperature and humidity set points.
- B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.
- C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

### 3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain computer-room air conditioners.

END OF SECTION 238123.13

SECTION 232213 - STEAM AND CONDENSATE HEATING PIPING

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. Section includes pipe and fittings for LP HP steam and condensate piping:
- B. Related Requirements:
  - 1. Section 232216 "Steam and Condensate Piping Specialties" for strainers, flash tanks, special-duty valves, steam traps, thermostatic air vents and vacuum breakers, and steam and condensate meters.

1.3 ACTION SUBMITTALS

- A. Product Data: For RTRP and RTRF and adhesive.
- B. Shop drawings: Submit shop drawings showing piping routing for steam piping and condensate piping including all connections to equipment, as well as all steam piping accessories.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Piping layout, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Suspended ceiling components.
  - 2. Other building services.
  - 3. Structural members.
- B. Qualification Data: For Installer.
- C. Welding certificates.
- D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Fiberglass Pipe and Fitting Installers: Installers of RTRF and RTRP shall be certified by the manufacturer of pipes and fittings as having been trained and qualified to join fiberglass piping with manufacturer-recommended adhesive.

B. Steel Support Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Pipe Welding: Qualify procedures and operators according to the following:

1. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressures and temperatures unless otherwise indicated:

1. HP Steam Piping: 150 psig.
2. LP Steam Piping: 15 psig.
3. Condensate Piping: 15 psig at 250 deg F.
4. Makeup-Water Piping: 80 psig at 150 deg F.
5. Blowdown-Drain Piping: Equal to pressure of the piping system to which it is attached.
6. Air-Vent and Vacuum-Breaker Piping: Equal to pressure of the piping system to which it is attached.
7. Safety-Valve-Inlet and -Outlet Piping: Equal to pressure of the piping system to which it is attached.

2.2 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, plain ends, welded and seamless, Grade B, and Schedule as indicated in piping applications articles.

B. Cast-Iron Threaded Fittings: ASME B16.4; Classes 125, 150, and 300 as indicated in piping applications articles.

C. Malleable-Iron Threaded Fittings: ASME B16.3; Classes 150 and 300 as indicated in piping applications articles.

- D. Malleable-Iron Unions: ASME B16.39; Classes 150, 250, and 300 as indicated in piping applications articles.
- E. Cast-Iron Threaded Flanges and Flanged Fittings: ASME B16.1, Classes 125 and 250 as indicated in piping applications articles; raised ground face, and bolt holes spot faced.
- F. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.
- G. Wrought-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
  - 1. Material Group: 1.1.
  - 2. End Connections: Butt welding.
  - 3. Facings: Raised face.
- H. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, black steel of same Type, Grade, and Schedule as pipe in which installed.

### 2.3 FIBERGLASS PIPE AND FITTINGS

- A. RTRP: ASTM D 2996, Type 1, Grade 1, Class F, filament-wound pipe with tapered bell and spigot ends for adhesive joints.
- B. RTRF: ASTM D 5685, Type 2 or Type 5, Grade 1, Class F, compression or spray-up/contact molded fittings of same material, pressure class, and joining method as pipe.
- C. Flanges: ASTM D 4024, Type 1, Grade 1, full-face gaskets suitable for the service, minimum 1/8 inchthick, 60-70 durometer. ASTM A 307, Grade B, hex head bolts with washers.
- D. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.

### 2.4 COPPER TUBING AND FITTINGS

- A. Copper tubing: ASTM B88, Type L, hard drawn.
  - 1. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper.
  - 2. Joints: ANSI/ASTM B32, solder, Grade 95TA or ANSI/AWS A5.8, BCuP silver braze.

## 2.5 JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness unless otherwise indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- D. Welding Materials: Comply with Section II, Part C, of ASME Boiler and Pressure Vessel Code for welding materials appropriate for wall thickness and for chemical analysis of pipe being welded.
- E. For copper pipe over 2 inches, bronze flanges shall be required; 1/16 inch thick preformed neoprene gaskets.

## PART 3 - EXECUTION

### 3.1 LP STEAM PIPING APPLICATIONS

- A. LP Steam Piping, NPS 2 and Smaller: , Type S, Grade B, steel pipe; Class 125 cast-iron fittings; and threaded joints.
- B. LP Steam Piping, NPS 2-1/2 through NPS 12: Schedule 40, Type E, Grade B, steel pipe; Class 150 wrought-steel fittings, flanges, and flange fittings; and welded and flanged joints.
- C. Condensate piping above grade, NPS 2 and smaller, shall be the following:
  - 1. Schedule 80, Type S, Grade B, steel pipe; Class 125 cast-iron fittings; and threaded joints.
  - 2. RTRP and RTRF with adhesive or flanged joints.
  - 3. Copper tubing with brazed or soldered joints.
- D. Condensate piping above grade, NPS 2-1/2 and larger, shall be the following:
  - 1. Schedule 80, Type E, Grade B, steel pipe; Class 150 wrought-steel fittings, flanges, and flange fittings; and welded and flanged joints.
  - 2. RTRP and RTRF with adhesive or flanged joints.
  - 3. Copper tubing with brazed or soldered joints.

3.2 ANCILLARY PIPING APPLICATIONS

- A. Blowdown-Drain Piping: Same materials and joining methods as for piping specified for the service in which blowdown drain is installed.
- B. Vacuum-Breaker Piping: Outlet, same as service where installed.
- C. Safety-Valve-Inlet and -Outlet Piping: Same materials and joining methods as for piping specified for the service in which safety valve is installed.

3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless otherwise indicated.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Install piping to allow application of insulation.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- K. Install drains, consisting of a tee fitting, NPS 3/4 full port-ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- L. Install steam supply piping at a minimum uniform grade of 0.2 percent downward in direction of steam flow.

- M. Install condensate return piping at a minimum uniform grade of 0.4 percent downward in direction of condensate flow.
- N. Reduce pipe sizes using eccentric reducer fitting installed with level side down.
- O. Install branch connections to mains using mechanically formed tee fittings in main pipe, with the branch connected to top of main pipe.
- P. Install valves according to Section 230523.11 "Globe Valves for HVAC Piping," Section 230523.12 "Ball Valves for HVAC Piping," Section 230523.13 "Butterfly Valves for HVAC Piping," Section 230523.14 "Check Valves for HVAC Piping," and Section 230523.15 "Gate Valves for HVAC Piping."
- Q. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- R. Install flanges in piping, NPS 2-1/2 and larger, at final connections of equipment and elsewhere as indicated.
- S. Install shutoff valve immediately upstream of each dielectric fitting.
- T. Install strainers on supply side of control valves, pressure-reducing valves, traps, and elsewhere as indicated. Install NPS 3/4 nipple and full port ball valve in blowdown connection of strainers NPS 2 and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2.
- U. Comply with requirements in Section 230516 "Expansion Fittings and Loops for HVAC Piping" for installation of expansion loops, expansion joints, anchors, and pipe alignment guides.
- V. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for identifying piping.
- W. Install drip legs at low points and natural drainage points such as ends of mains, bottoms of risers, and ahead of pressure regulators, and control valves.
  - 1. On straight runs with no natural drainage points, install drip legs at intervals not exceeding 300 feet.
  - 2. Size drip legs same size as main. In steam mains NPS 6 and larger, drip leg size can be reduced, but to no less than NPS 4.
- X. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- Y. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

- Z. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."
- AA. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

#### 3.4 STEAM AND CONDENSATE PIPING SPECIALTIES INSTALLATION

- A. Comply with requirements in Section 232216 "Steam and Condensate Piping Specialties" for installation requirements for strainers, flash tanks, special-duty valves, steam traps, thermostatic air vents and vacuum breakers, and steam and condensate meters.

#### 3.5 HANGERS AND SUPPORTS

- A. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for installation of hangers and supports. Comply with requirements below for maximum spacing.
- B. Comply with requirements in Section 230548 "Vibration and Seismic Controls for HVAC" for seismic restraints.
- C. Install the following pipe attachments:
  - 1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
  - 2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.
  - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
  - 4. Spring hangers to support vertical runs.
- D. Install hangers for steel steam supply piping with the following maximum spacing:
  - 1. NPS 3/4 Maximum span, 9 feet.
  - 2. NPS 1: Maximum span, 9 feet.
  - 3. NPS 1-1/2: Maximum span, 12 feet.
  - 4. NPS 2: Maximum span, 13 feet.
  - 5. NPS 2-1/2: Maximum span, 14 feet.
  - 6. NPS 3 and Larger: Maximum span, 15 feet.

- E. Install hangers for steel steam condensate piping with the following maximum spacing:
  - 1. NPS 3/4: Maximum span, 7 feet.
  - 2. NPS 1: Maximum span, 7 feet.
  - 3. NPS 1-1/2: Maximum span, 9 feet.
  - 4. NPS 2: Maximum span, 10 feet.
  - 5. NPS 2-1/2: Maximum span, 11 feet.
  - 6. NPS 3 and Larger: Maximum span, 12 feet
- F. Support vertical runs at roof, at each floor, and at 10-foot intervals between floors.
- G. Fiberglass Piping Hanger Spacing: Space hangers according to pipe manufacturer's written instructions for service conditions. Avoid point loading. Space and install hangers with the fewest practical rigid anchor points.

### 3.6 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
- E. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- F. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

### 3.7 TERMINAL EQUIPMENT CONNECTIONS

- A. Size for supply and return piping connections shall be the same as or larger than equipment connections.

- B. Install traps and control valves in accessible locations close to connected equipment.
- C. Install bypass piping with globe valve around control valve. If parallel control valves are installed, only one bypass is required.
- D. Install vacuum breakers downstream from control valve, close to coil inlet connection.
- E. Install a drip leg at coil outlet.

### 3.8 FIELD QUALITY CONTROL

- A. Prepare steam and condensate piping according to ASME B31.9, "Building Services Piping," and as follows:
  - 1. Leave joints, including welds, uninsulated and exposed for examination during test.
  - 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
  - 3. Flush system with clean water. Clean strainers.
  - 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform the following tests and inspections:
  - 1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
  - 2. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength.
  - 3. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
- E. Prepare test and inspection reports.

COT-232213

END OF SECTION 232213

**PROPOSAL**  
**PROJECT NO. TMUA-W 16-04**  
**CITY OF TULSA AB JEWELL WATER TREATMENT PLANT**  
**LAB/OFFICE RENOVATION**

TO: TULSA METROPOLITAN UTILITY AUTHORITY  
CITY OF TULSA, OKLAHOMA

THE UNDERSIGNED BIDDER, having carefully examined the drawings, specifications, and other Contract Documents of the above project presently on file in the City Clerk, City of Tulsa Oklahoma:

CERTIFIES THAT he has inspected the site of the proposed work and has full knowledge of the extent and character of the work involved, construction difficulties that may be encountered, and materials necessary for construction, class and type of excavation, and all other factors affecting or which may be affected by the specified work; and

CERTIFIES THAT he has not entered into collusion with any other bidder or prospective bidder relative to the project and/or bid: and

HEREBY PROPOSES: to enter into a contract to provide all necessary labor, materials, equipment and tools to completely construct and finish all the work required by the Contract Documents referred to therein; to complete said work within 240 calendar days after the work order is issued; and to accept in full payment therefore the amount set forth below for all work actually performed as computed by the Engineers as set forth in the Contract.

**Basis of Award**

**IT SHOULD BE NOTED THAT THE LOWEST RESPONSIBLE BID SHALL BE DETERMINED BY THE TOTAL BASE BID PLUS ADDITIVE ALTERNATES NOS. 1 AND 2. THE ITEMS IN ADDITIVE ALTERNATES NOS. 1 AND 2 MAY OR MAY NOT BE INCLUDED IN THE CONTRACT AWARD AT THE SOLE DISCRETION OF THE CITY OF TULSA. ANY PROPOSAL SUBMITTED WITH THE ADDITIVE ALTERNATES NOS. 1 AND 2 INCOMPLETE SHALL BE CONSIDERED NON-RESPONSIVE.**

**Note: - Item numbers omitted are not a part of the Contract.**

**PROPOSAL**  
**PROJECT NO. TMUA-W 16-04**  
**AB JEWELL WTP LAB/OFFICE RENOVATION**  
**BASE BID**

ITEM NUMBER	SPEC NUMBER	ITEM DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	AMOUNT
1	011000, 015000	Mobilization				
2	024119	Protect existing - 2nd Floor	EA	1		\$ -
3	024119	Interior Demolition - 2nd Floor	EA	1		\$ -
4	092216	Interior Partition Walls and Soffits - 2nd Floor	EA	1		\$ -
5	099123	Prep and Paint Interior Walls and Soffits - 2nd Floor	SF	800		\$ -
6	081416, 081213, 087110	Interior doors / frames / hardware - 2nd Floor	SF	3,360		\$ -
7	095123	Acoustical ceiling and suspension system - 2nd Floor	EA	6		\$ -
8	096813	Flooring - 2nd Floor	SF	900		\$ -
9	024119	Protect existing - 3rd Floor	SY	78		\$ -
10	024119	Protect Existing 3rd Floor Equipment	EA	1		\$ -
11	024119	Interior Demolition - 3rd Floor	EA	16		\$ -
12	092216	Interior Partition Walls and Soffits - 3rd Floor	EA	1		\$ -
13	099123	Prep and Paint Interior Walls and Soffits - 3rd Floor	SF	800		\$ -
14	081416, 081213, 087110	Interior doors / frames / hardware - 3rd Floor	SF	800		\$ -
15	095123	Acoustical ceiling and suspension system - 3rd Floor	EA	1		\$ -
16	123216	Institutional Casework and Countertops - 3rd Floor	SF	360		\$ -
17	096519	Flooring - 3rd Floor	LF	33		\$ -
18	087110	Floor-mounted doorstop	SY	40		\$ -
19	M-102	Demolition of makeup air unit	EA	1		\$ -
20	M-102	Demolition of lab exhaust fan	EA	1		\$ -
21	M-102	Demolition of general exhaust fan	EA	1		\$ -
22	M-102	Demolition of associated ductwork on roof	EA	1		\$ -
23	M-401	Demolition of exhaust and supply ductwork in plenum	LF	100		\$ -
24	233113, 233300	New general use ductwork	LF	400		\$ -
25	233713	New diffusers: perforated, high flow, low velocity	LF	350		\$ -
26	233713	New diffusers and grilles: general use	EA	16		\$ -
27	232300, 230719	New refrigerant piping (Line set lengths)	EA	16		\$ -
28	221316	New condensate drain piping	LF	600		\$ -
29	237433	New makeup air unit (MAU-1) and installation	LF	185		\$ -
30	233113, 233300	Large ductwork mains and connections to MAU-1	EA	1		\$ -
31	231123	New gas connection to MAU-1 and GH-1	LF	100		\$ -
32	238123.13	New CRAC-1 and installation	EA	1		\$ -
33	223416 or 233413	New lab exhaust fan (LEF-1) and installation	EA	1		\$ -
34	223416 or 233413	New general exhaust fan (EF-5) and installation	EA	1		\$ -
35	238126	New split systems and installation	EA	1		\$ -
36	220533	Heat trace	EA	1		\$ -
37	238413	Gas fired humidifer	LF	50		\$ -
38	Refer to M-601	Laboratory fume hood	EA	1		\$ -
39	230900	Controls	EA	1		\$ -
40	230593	Testing, Adjusting, and Balancing	EA	1		\$ -
41	230800	Commissioning	EA	1		\$ -
42	221316	Sanitary and vent piping	EA	1		\$ -
43	226700	DI water piping to sink and fume hoods	LF	120		\$ -
44	221116	DCW, DHW, DHWR to sink	LF	100		\$ -
45	226313	Argon piping to instrument	LF	300		\$ -
46	226213	Vacuum piping to hood	LF	75		\$ -
47	226313	Nitrogen piping to hood	LF	75		\$ -
48	226313	Helium piping to hood	LF	90		\$ -
49	226113	Compressed air to hood	LF	10		\$ -
50	P-601	Fixtures (emergency eye wash, emergency shower, floor drain,	LF	30		\$ -
51	FX101	Semi-recessed sprinklers	EA	1		\$ -
52	FX101	Dry Horizontal Sidewall	EA	2		\$ -
53	E-001 / E-002 / E-003	New ceiling-mounted occupancy sensor and associated control wiring	EA	2		\$ -
54	E-001 / E-002 / E-003	Demolition of existing light switch	EA	5		\$ -
55	E-001 / E-002 / E-003	New light switch and installation, 3-way	EA	13		\$ -
56	E-001 / E-002 / E-003	Demolition of existing receptacle / communications outlet	EA	3		\$ -
57	E-001 / E-002 / E-003	Relocation of existing lab power receptacles	EA	13		\$ -
58	E-001 / E-002 / E-003	New receptacle, quad	EA	4		\$ -
59	E-001 / E-002 / E-003	New receptacle, quad GFCI	EA	7		\$ -
60	E-001 / E-002 / E-003	New receptacle, duplex	EA	2		\$ -
61	E-001 / E-002 / E-003	New receptacle, duplex GFCI	EA	10		\$ -
62	E-001 / E-002 / E-003	New receptacle, duplex GFCI with in-use cover	EA	2		\$ -
63	E-001 / E-002 / E-003	New blank box, bushings, and conduit to ceiling for	EA	2		\$ -
64	E-001 / E-002 / E-003	New faceplate	EA	14		\$ -
65	E-001 / E-002 / E-003	New L5-20R Receptacle	EA	8		\$ -
66	E-001 / E-002 / E-003	New circuit breaker, 15A 3-pole	EA	2		\$ -
			EA	1		\$ -

ITEM NO.	SPEC NUMBER	ITEM DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	AMOUNT
77	E-001 / E-002 / E-003	New 1-pole non-fused disconnect	EA	1		\$ -
78	E-001 / E-002 / E-003	New 3-pole fused disconnect and required fuses	EA	7		\$ -
79	E-001 / E-002 / E-003	New 2-pole fused disconnect and required fuses	EA	5		\$ -
80	E-001 / E-002 / E-003	New roof penetration	EA	9		\$ -
81	E-001 / E-002 / E-003	New variable frequency drive	EA	2		\$ -
82	E-001 / E-002 / E-003	New #12 copper wire	LF	2,859		\$ -
83	E-001 / E-002 / E-003	New #10 copper wire	LF	1,680		\$ -
84	E-001 / E-002 / E-003	New #8 copper wire	LF	941		\$ -
85	E-001 / E-002 / E-003	New #6 copper wire	LF	450		\$ -
86	E-001 / E-002 / E-003	New #4 copper wire	LF	2,463		\$ -
87	E-001 / E-002 / E-003	New #3 copper wire	LF	285		\$ -
88	E-001 / E-002 / E-003	New #1 copper wire	LF	60		\$ -
89	E-001 / E-002 / E-003	New 1/0 copper wire	LF	525		\$ -
90	E-001 / E-002 / E-003	New 1/2" conduit and fittings	LF	588		\$ -
91	E-001 / E-002 / E-003	New 1" conduit and fittings	LF	1,126		\$ -
92	E-001 / E-002 / E-003	New 1-1/4" conduit and fittings	LF	105		\$ -
93	E-001 / E-002 / E-003	New 1-1/2" conduit and fittings	LF	30		\$ -
94	E-001 / E-002 / E-003	New 100A MLO panelboard	EA	1		\$ -
95	E-001 / E-002 / E-003	New 125A MCB panelboard	EA	1		\$ -
96	E-001 / E-002 / E-003	Demolish existing circuit breaker	EA	9		\$ -
97	E-001 / E-002 / E-003	New cable tray and associated installation / mounting equipment	EA	1		\$ -
98	E-001 / E-002 / E-003	Installation of server rack	EA	2		\$ -
99	E-001 / E-002 / E-003	New strut rack mounting	LF	10		\$ -
100	E-001 / E-002 / E-003	New surge arrestor	EA	2		\$ -
101	Refer to S-001	2-L3X3X1/4 beams	LF	17		\$ -
102	S-001	W8X10 beams	LF	28		\$ -
103	S-001	W8X18 beams	LF	26		\$ -
104	S-001	W14x26 beams	LF	11		\$ -
105	S-001	1"x1/8" galvanized bar grating	SF	240		\$ -
106	S-001	1-1/2" rooftop handrail	LF	140		\$ -
107	Detail 4/A-102	Roof curb support	LF	120		\$ -
108	Detail 4/A-102	Piping through roof	EA	5		\$ -
109		Restriction to construction sequencing	EA	1		\$ -
110	012100	Owner Allowance	ALLOW	1	\$ 10,000.00	\$ 10,000.00
<b>SUBTOTAL:</b>						\$ 10,000.00

**PROPOSAL**  
**PROJECT NO. TMUA-W 16-04**  
**AB JEWELL WTP LAB/OFFICE RENOVATION**  
**ADD-ALT NO. 1: CLEAN AGENT SUPPRESSION SYSTEM**

ITEM NO.	SPEC NUMBER	ITEM DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	AMOUNT
111	212200	Clean agent suppression system	EA	1		\$ -
112	E-001 / E-002 / E-003	New circuit breaker, 20A 1-pole with shunt trip	EA	7		\$ -
113	E-001 / E-002 / E-003	New blank box, bushings, and conduit to ceiling for	EA	2		\$ -
114	E-001 / E-002 / E-003	New circuit breaker, 15A 1-pole and associated conduit, fittings, and conductors	EA	1		\$ -
<b>SUBTOTAL:</b>						\$ -

**PROPOSAL**  
**PROJECT NO. TMUA-W 16-04**  
**AB JEWELL WTP LAB/OFFICE RENOVATION**  
**ADD-ALT NO. 2: SECOND FLOOR TRANSFORMER SYSTEM**

ITEM NO.	SPEC NUMBER	ITEM DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	AMOUNT
115	E-001 / E-002 / E-003	Demolition of existing circuit breaker in first floor MDP	EA	1		\$ -
116	E-001 / E-002 / E-003	New circuit breaker, 70A 3-pole, and phenolic label	EA	1		\$ -
117	E-001 / E-002 / E-003	New transformer, 45 kVA, and grounding	EA	1		\$ -
118	E-001 / E-002 / E-003	New #4 copper wire	LF	150		\$ -
119	E-001 / E-002 / E-003	New #8 copper wire	LF	50		\$ -
120	E-001 / E-002 / E-003	New 1" conduit and fittings	LF	50		\$ -
<b>SUBTOTAL:</b>						\$ -

SUBTOTAL BASE BID	\$ <u>10,000.00</u>
ADD-ALT NO. 1	\$ _____
ADD-ALT NO. 2	\$ _____
<b>TOTAL BASE BID + ADD-ALT NO. 1 + ADD-ALT NO. 2</b>	<b>\$ <u>10,000.00</u></b>

Enclosed is a ( ) Bidder's Surety Bond, ( ) Certified Check, ( ) Cashier's Check for  
 \_\_\_\_\_ Dollars (\$ \_\_\_\_\_ )  
 \_\_\_\_\_ Figures

which the City of Tulsa may retain or recover as liquidated damages in the event that the undersigned fails to enter into contract for the work covered by this proposal., provided the Contract is awarded to the undersigned within thirty (30) days, or within ninety (90) days if Federal funds are utilized, from the date fixed for opening of bids and the undersigned fails to execute said Contract and furnish the required bonds and other requirements as called for in these Contract Documents within thirty (30) days after award of Contract.

Dated at Tulsa, Oklahoma, this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_\_\_\_.

Respectfully submitted,  
**SAMPLE ONLY**  
**LEAVE PAGE BLANK**

\_\_\_\_\_  
 (Complete legal name of company)  
 \_\_\_\_\_  
 (State of Organization)

By: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_

ATTEST: \_\_\_\_\_  
 Title: Corporate Secretary  
 Printed Name: \_\_\_\_\_  
 (SEAL)

Address: \_\_\_\_\_  
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Telephone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_

By signing above bidder acknowledges receipt of the following Addenda (give number and date of each):

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Revised 10/06/09

**PROPOSAL  
PROJECT NO. TMUA-W 16-04  
AB JEWELL WTP LAB/OFFICE RENOVATION  
BASE BID**

ITEM NO.	SPEC NUMBER	ITEM DESCRIPTION	UNIT	PAY ITEM NOTES	QTY
1	011000, 015000	Mobilization	EA		1
2	024119	Protect existing - 2nd Floor	EA		1
3	024119	Interior Demolition - 2nd Floor	EA		1
4	092216	Interior Partition Walls and Soffits - 2nd Floor	SF		800
5	099123	Prep and Paint Interior Walls and Soffits - 2nd Floor	SF		3,360
6	081416, 081213, 087110	Interior doors / frames / hardware - 2nd Floor	EA		6
7	095123	Acoustical ceiling and suspension system - 2nd Floor	SF		900
8	096813	Flooring - 2nd Floor	SY		78
9	024119	Protect 3rd floor equipment	EA		16
10	024119	Interior Demolition - 3rd Floor	EA		1
11	092216	Interior Partition Walls and Soffits - 3rd Floor	SF		800
12	099123	Prep and Paint Interior Walls and Soffits - 3rd Floor	SF		800
13	081416, 081213, 087110	Interior doors / frames / hardware - 3rd Floor	EA		1
14	095123	Acoustical ceiling and suspension system - 3rd Floor	SF		360
15	123216	Institutional Casework and Countertops - 3rd Floor	LF		33
16	096519	Flooring - 3rd Floor	SY		40
17	087110	Floor-mounted doorstop	EA		1
18	Refer to M-102	Demolition of makeup air unit	EA		1
19	Refer to M-102	Demolition of lab exhaust fan	EA		1
20	Refer to M-102	Demolition of general exhaust fan	EA		1
21	Refer to M-102	Demolition of associated ductwork on roof	LF		100
22	Refer to M-401	Demolition of exhaust and supply ductwork in plenum	LF		400
23	233113, 233300	New general use ductwork	LF		350
24	233713	New diffusers: perforated, high flow, low velocity	EA		16
25	233713	New diffusers and grilles: general use	EA		16
26	232300, 230719	New refrigerant piping (Line set lengths)	LF		600
27	221316	New condensate drain piping	LF		185
28	237433	New makeup air unit (MAU-1) and installation	EA		1
29	233113, 233300	Large ductwork mains and connections to MAU-1	LF		100
30	231123	New gas connection to MAU-1 and GH-1	EA		1
31	238123, 13	New CRAC-1 and installation	EA		1
32	223416 or 233413	New lab exhaust fan (LEF-1) and installation	EA		1
33	223416 or 233413	New general exhaust fan (EF-5) and installation	EA		1
34	238126	New split systems and installation	EA		1
35	220533	Heat trace	LF		50
36	238413	Gas fired humidifier	EA		1
37	Refer to M-601	Laboratory fume hood	EA		1
38	230900	Controls	EA		1
39	230593	Testing, Adjusting, and Balancing	EA		1
40	230800	Commissioning	EA		1
41	221316	Sanitary and vent piping	LF		120
42	226700	DI water piping to sink and fume hoods	LF		100
43	221116	DCW, DHW, DHWR to sink	LF		300
44	226313	Argon piping to instrument	LF		75
45	226213	Vacuum piping to hood	LF		75
46	226313	Nitrogen piping to hood	LF		90
47	226313	Helium piping to hood	LF		10
48	226113	Compressed air to hood	LF		30
49	Refer to P-601	Fixtures (emergency eye wash, emergency shower, floor drain, etc.)	EA		1
50	Refer to FX101	Semi-recessed sprinklers	EA		2
51	Refer to FX101	Dry Horizontal Sidewall	EA		2

52	Refer to E-001 / E-002 / E-003	New ceiling
53	Refer to E-001 / E-002 / E-003	
54	Refer to E-001 / E-002 / E-003	
55	Refer to E-001 / E-002 / E-003	Demolition
56	Refer to E-001 / E-002 / E-003	Reloc
57	Refer to E-001 / E-002 / E-003	
58	Refer to E-001 / E-002 / E-003	
59	Refer to E-001 / E-002 / E-003	
60	Refer to E-001 / E-002 / E-003	
61	Refer to E-001 / E-002 / E-003	New rec
62	Refer to E-001 / E-002 / E-003	New blank
63	Refer to E-001 / E-002 / E-003	
64	Refer to E-001 / E-002 / E-003	
65	Refer to E-001 / E-002 / E-003	
66	Refer to E-001 / E-002 / E-003	
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76	Refer to E-001 / E-002 / E-003	
77	Refer to E-001 / E-002 / E-003	New 3-pol
78	Refer to E-001 / E-002 / E-003	New 2-pol
79	Refer to E-001 / E-002 / E-003	
80	Refer to E-001 / E-002 / E-003	
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95	Refer to E-001 / E-002 / E-003	Der
96	Refer to E-001 / E-002 / E-003	New cable tra
97	Refer to E-001 / E-002 / E-003	
98	Refer to E-001 / E-002 / E-003	
99	Refer to E-001 / E-002 / E-003	
100	Refer to S-001	
101	Refer to S-001	
102	Refer to S-001	
103	Refer to S-001	
104	Refer to S-001	
105	Refer to S-001	
106	Refer to Detail 4/A-102	
107	Refer to Detail 4/A-102	
108		Restric
109	012100	

**PROPOSAL  
PROJECT NO. TMUA-W 16-04  
AB JEWELL WTP LAB/OFFICE RENOVATION  
ADD-ALT NO. 1: CLEAN AGENT SUPPRESSION SYSTEM**

ITEM NO.	SPEC NUMBER	ITEM DESCRIPTION	UNIT	PAY ITEM NOTES	QTY
110	212200	Clean agent suppression system	EA		1
111	Refer to E-001 / E-002 / E-003	New circuit breaker, 20A 1-pole with shunt trip	EA		7
112	Refer to E-001 / E-002 / E-003	New blank box, bushings, and conduit to ceiling for communications	EA		2
113	Refer to E-001 / E-002 / E-003	New circuit breaker, 15A 1-pole and associated conduit, fittings, and conductors	EA		1

**AB JEWELL  
ADD-ALT NO. 2: SECOND**

ITEM NO.	SPEC NUMBER	
114	Refer to E-001 / E-002 / E-003	Demolition of ex
115	Refer to E-001 / E-002 / E-003	New circuit bre
116	Refer to E-001 / E-002 / E-003	New trans
117	Refer to E-001 / E-002 / E-003	
118	Refer to E-001 / E-002 / E-003	
119	Refer to E-001 / E-002 / E-003	Ne