

STATEMENT OF WORK

Date: February 9, 2024

Project #: 24-032

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A. PROJECT INFORMATION:

1. PROJECT TITLE: Keystone Boiler Replacement
2. PROJECT LOCATION: University of Colorado Colorado Springs
Keystone House
1420 Austin Bluffs Parkway
Colorado Springs, Colorado 80918
3. Cost of Work Estimate: \$400,000

B. BASIC SCOPE OF WORK:

1. Purpose: The purpose of this project is to remove and replace the existing Heating Hot Water Systems servicing Keystone, Breckenridge and Monarch Houses and to upgrade existing pneumatic controls to DDC.
2. Rationale: Existing Heating Hot Water system is original to the building from 1995. It is past its useful life and uneconomical for continued repairs.

C. GENERAL REQUIREMENTS:

1. All work must conform to the University of Colorado Colorado Springs Planning, Design & Construction Contractor Construction Standards. Required State Building Forms are available on the UCCS PDC website. SOW will take precedence if there conflicts.
 - a. <https://pdc.uccs.edu/>
2. All design work must conform to the OSA requirements:
 - a. <https://osa.colorado.gov/>

D. SPECIFIC PROJECT REQUIREMENTS:

1. Base Bid: Plan and execute the removal and replacement of the existing Heating Hot Water and Domestic Hot Water Systems; including all existing components, but not limited to boilers, venting, combustion air, chimney fans, pumps, piping, boiler room unit heater/s, and all associated controls and control devices. The new system shall consist of high efficiency Heating Hot Water systems, equipment, and controls capable of handling the existing loads. The Heating Hot Water system shall allow redundancy in case of failure.
 - a. The new boilers shall include automatic control valves for individual isolation.
 - b. Removal and replacement include related building automation control systems panels and devices. The new automation will be with the latest DDC

controllers and devices and shall be able to interface directly with the existing campus building automation system. The GUI interface will consist of updated graphics representing new systems and equipment, scheduling, trending, archiving, and alarming.

- c. The new Heating Hot Water system shall include 30% inhibited polypropylene glycol freeze protection and a glycol feeder system that automatically maintains pressure in the loop by adding glycol solution to make up for losses which may occur.
- d. The new system design shall be of the highest possible efficiency within budget constraints and UCCS standards.
- e. The new systems shall include all safety features, devices, and materials, as required by UCCS and building and fire codes.
- f. Identify any fire suppression repairs or alterations necessary due to the new systems and include, if necessary.
- g. Identify any fire alarm repairs or alterations necessary due to the new systems and include, if necessary.
- h. Identify any electrical infrastructure repairs or alteration necessary due to the new systems and include, if necessary.
- i. Identify any structural infrastructure repairs or alteration necessary due to the new system and include if necessary.
- j. All newly installed piping shall be properly insulated and labeled.
- k. Installation of new system shall include all offsets, fittings, etc. as required to route system components.
- l. All areas affected by the removal of the existing systems, or the installation of the new system shall be repaired, patched, and painted to match the existing building conditions.
- m. Hazardous materials are not anticipated. If found, immediately stop work and report to UCCS Project Manager for removal by owner.
- n. Contractor shall provide all labor, supervision, material, equipment, tools, hoisting, scaffolding, freight, unloading, traffic control, parking, material and labor escalation, overhead, clean-up, trash removal and other miscellaneous costs in order to provide a complete and working system.
- o. Contractor shall remove and properly dispose of waste generated on a daily basis.
- p. Contractor shall provide all materials and equipment for temporary protection of existing facilities and surrounding work, and also all temporary heat, cooling, lighting and weather protection.
- q. Contractor is responsible for field verification of materials prior to installation.
- r. Contractor shall be responsible for fully coordinating all work, including shutdowns and disruptions to service for the building. Contractor shall schedule any shutdown or disruptions with the UCCS Project Manager a minimum of 72 hours prior to work.
- s. Contractor shall provide all necessary framing, hangars, inserts, racking, suspension systems, backing/blocking, bracing, sleeves, fasteners, caulking, fire-caulking for a complete system.
- t. Contractor shall provide miscellaneous patching and repair due to work, including repairs to existing structures or equipment caused by the contractor during the course of the project.
- u. Contractor shall provide minimum of 4 hours of on-site Owner training. Training shall occur after substantial completion and functional testing is completed and shall be scheduled with the UCCS project manager.

- v. Contractor shall provide all locates (public and private) necessary for areas that will be impacted by their scope of work.
 - w. All work shall be completed during normal business hours of operation, unless approved by owner.
2. Add-Alternates: The below items shall be included as add-alternates to the base bid.
- a. Alternate 1: Remove and replace existing Domestic Hot Water System.
 - b. Alternate 2: Remove existing equipment pads and replace with 6" concrete pads for new equipment footprint.
 - c. Alternate 3: Provide pulse meter on gas piping serving the boilers.
 - d. Alternate 4: Provide ultrasonic dual channel Btu meter for monitoring the Heating Water System and Domestic Hot Water System energy.
3. Equipment
- a. Heating Boilers: Lochinvar Crest or approved equal.
 - i. Must be capable of BACnet MSTP communication to existing Building Automation System.
 - b. Control Valves and Actuators: Belimo or approved equal.
 - c. BTU Meters: Dual Channel Ultrasonic unit.
 - d. Domestic Hot Water System:
 - i. Domestic Hot Water Boiler required to be high efficiency.
 - ii. Side-Arm Indirect Domestic Hot Water Tank off of heating hot water system.
 - e. Pumps: Grundfos - Magna 3 and CRE or approved equal.
 - i. Include integrated variable frequency drives.
 - ii. Pump head and base to be cast iron.
 - iii. All other wetted parts stainless-steel.
 - f. VFDs: ABB or approved equal.
 - i. To be approved if built-in to equipment unless noted above.
 - g. Controls:
 - i. Replace existing DDC controllers with latest Delta Controls or approved equal.
 - ii. All new controllers must report to existing enteliWEB front end server.
 - iii. Include BACnet MSTP integration with new equipment.
 - iv. Include all devices necessary to complete the systems including but not limited to those referenced on the points list.
 - v. For monitoring purposes there will be a BACnet MSTP integration to boilers, btu meters, and pump vfd's where available. BACnet points to be monitored will be determined by UCCS.

4. DDC Points List

Point Description	Digital Input	Digital Output	Analog Input	Analog Output	Alarm	Show on Graphics	BACnet Integration	Remarks
Boiler Enable Command		X				X		
Boiler Runtime Status	X					X		
Boiler Pump 1 Command		X				X	X	
Boiler Pump 2 Command		X						
Boiler Pump 1 Status							X	
Boiler Pump 2 Status								
System Pump 1 Speed (VFD)				X		X		
System Pump 2 Speed (VFD)				X		X		
Boiler Alarm					X	X		
System Pump 1 Command		X						
System Pump 2 Command		X						
System Pump 1 Status	X							
System Pump 2 Status	X		X					
Differential Pressure (flow)			X					
Heating Water Supply Temperature			X		X	X	X	1ea via Bas 2ea via BACnet integration
Heating Water Return Temperature			X			X	X	1ea via Bas 1ea via BACnet integration
Outside Air Temperature			X				X	1 local and 1 supplied with and connected to the boiler controller for reset operation.
Outside Air Humidity			X					
EPO Emergency Power Off Status	X							
Water Detection	X				X	X		Add floor water detector
UH1 Unit Heater Command		X				X		
UH1 Space Temperature			X			X		
UH1 Status	X					X		
UH1 Valve Signal				X		X		
Glycol Lo Alarm	X				X	X		
Glycol Pump Status	X					X		
Gas Meter Pulse	X							Add Pulse Meter

5. Warranties and Operation and Maintenance Manuals:
 - a. Included in the O&M manuals detailed on product warranties and procedures for warranty claims. Warranty must be a minimum of one year for all installed equipment, parts and labor included.
6. Utilities and Existing Space Requirements:
 - a. Field-verify and confirm existing space condition and utilities to be incorporated into new system.
 - b. Requirements of new equipment such as structural, electrical, natural gas, drainage, etc. to be included in project.
7. Project Meetings: Meetings shall be required for coordination to ensure the Contractor's conformance with the project SOW. The list below constitutes the minimum required meetings.
 - a. Site Survey: Site visit to document existing conditions to be performed upon award. This is to be completed prior to the pre-construction meeting.
 - b. Pre-Construction: Held within two weeks after the project is awarded. A site visit will be held in conjunction with the meeting. No on-site work may start until this meeting has been held.
 - c. Progress Meetings: Held every other week for duration of project for coordination of project planning, equipment layout and installation.
8. If the egress of the building will be affected during construction, an alternate egress path is to be approved by UCCS prior to start of work.
9. At close-out, provide as-built drawings of installation in CAD & PDF along with one (1) 24"x36" hard copy; as-built DDC control drawings in PDF; O&M Manuals in digital format and one (1) bound hard copy.