



Oregon State University

MAGRUDER HALL MID-LIFE RENEWAL STUDY

RFP #2024-013812

ADDENDUM NO. 1

ISSUE DATE: December 11, 2023

CONTRACT ADMINISTRATOR:

Matt Hausman, Construction Contract Officer

Construction Contracts Administration

Email: ConstructionContracts@oregonstate.edu

This Addendum is hereby issued to inform you of the following revisions and or clarifications to the above-referenced RFP and/or the Contract Documents for the Project, to the extent they have been modified herein. Any conflict or inconsistency between this Addendum and the Solicitation Document or any previous addenda will be resolved in favor of this Addendum. Proposals shall conform to this Addendum. Unless specifically changed by this Addendum, all other requirements, terms and conditions of the Solicitation Document and or Contract Documents, and any previous addenda, remain unchanged and can be modified only in writing by OSU. The following changes are hereby made:

MANDATORY PRE-PROPOSAL CONFERENCE:

Item 1 Attendees at the 12/11/2023 Virtual Mandatory Pre-Proposal Conference included representatives from the following firms:

- | | | | |
|-------------|----------------|-------------------|----------|
| - Emerio | - Integrus | - SRG Partnership | - RWDI |
| - Solarc | - Systems West | - Soderstrom | - Glas |
| - Mackenzie | - Pivot | - PAE | - Oh P+D |
| - Sazan | - McKinstry | - Rowell Brokaw | - BRIC |
| - MCA | - EEI | - Hennebery Eddy | |

SUPPLEMENTAL INFORMATION:

Item 2 Included with this Addendum is the annotated version of the Building Systems Assessment as shared during the Pre-Proposal Conference.

END OF ADDENDUM NO. 1

EXHIBIT 1

Scope Number Linked to OSU detailed building systems assessment	Building System	Scope	Part 1 Services	Part 2 Services
	Roof			
1		Original 1979 Roof	Review and identify potential design issues and key considerations.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
2		2006 Addition Roof	Review condition and provide recommendations for replacement in coordination with AHU-3 recommendations.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Mechanical			
3		Original 1979 Mechanical Equipment	Review condition all original 1979 air handling equipment. Including to but not limited to motors, bents, filter racks. Provide recommendations for renewal or replacement.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
4		Original 1979 Mechanical Equipment	Review and compare differences and recommendation for use of heating water or steam for this equipment	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final

				direction based on OSU's review.
5		Original 1979 Mechanical Equipment	Provide recommendations for modification necessary to allow for DDC controls instead of pneumatics	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
6		SU-10	Provide review of air flow and pressure for rooms served by this unit. Review need for additional exhaust. Propose options for modifications if needed	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
7		AHU-3	Review condition of equipment. Provide recommendations for refurbishment if needed. Review room 102 hot call issues and provide recommendations.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
8		AHU-3	Review vibration issues and water intrusion concerns for the lab directly below this unit.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.

9		AHU-8	Review possibility of removing AHU-8 from heating water loop. Review power available for AHU-8 alternate heating. Review and identify potential design issues and key considerations.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
10		MZU-20	Work with OSU team to develop customer goals and needs for these critical spaces	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Exhaust			
11		Original 1979 Equipment on Upper Mechanical Roof	Review usage of exhaust fans and propose options for refurbishment or replacement.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
12		Original 1979 Equipment on Upper Mechanical Roof	Review the potential for combining exhaust fan systems and potential of additional VPDs and energy efficiency metrics.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Cooling			

13		Chiller cross connections	Review the feasibility of cross connecting CH-3 to other chillers. Review the condition of the chilled water pumps serving CH-3	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
14		Cooling coils	Review and propose potential solutions to the chilled water coil condensation issues.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
15		SU-2, SU-5, SU-1, AHU-7	Review the status and condition of night flushing in the large animal area served by SU-2, SU-5, SU-1, and AHU-7	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
16		SU-2, SU-5, SU-1, AHU-7	Provide creative solutions for tempered cooling in the large animal area served by SU-2, SU-5, SU-1, and AHU-7	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
17		Room 122A	Review condition of DX Cooling unit	Confirm recommendations

			<p>serving this area, review and provide recommendations for hot issues in this room.</p>	<p>based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.</p>
18		Room 101A/101B	<p>DX Cooling unit serving this provide recommendations for refurbishment or replacement</p>	<p>Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.</p>
	Electrical			
19		Lighting	<p>Provide recommendations and options for LED lighting Retrofits, provide cost opinions for each option</p>	<p>Confirm recommendations and provide updated pricing based on OSU's review.</p>
20		Lighting Controls	<p>Review and confirm lighting controls from 2018 addition. Confirm functionality and what the extent of the lighting control is. Provide recommendations for relocation of LCP</p>	<p>Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.</p>
21		Lighting Controls	<p>Review and propose alternate location of 2006 addition lighting control panel. Identify potential design issues and key considerations</p>	<p>Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections</p>

				and confirm final direction based on OSU's review.
	Solar			
22		Structural and Electrical	Review structural and electrical and confirm feasibility of the proposed solar plan.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Plumbing			
23		Hot Water Return	Provide destructive testing and review of Hot Water return line. Provide a report of the condition and provide recommendations for replacement or repair.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
24		Toilets	Review toilets that have reports of hot water and identify potential causes of this issue.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
25		Hot Water Heater	Review functionality of existing Electric Hot Water heater, determine current functionality and propose alternate solutions if needed.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections

				and confirm final direction based on OSU's review.
	Hydronics			
26		Heating Water Flush Locations	Review, analyze and propose locations for isolation valves and flush locations for all heating water lines.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
27		Heating Water System	Confirm what locations are served by each of the heating water loops. Provide a list of equipment served by each loop and a map	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
28		Heating Water System, Isolation and Treadmill	Review the potential to eliminate the heating water lines that serve the treadmill and isolation rooms. Identify potential design issues and key considerations.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
29		Heating Water System, Filters	Review the existing filter in the North Mechanical room and provide recommendations for the Upper South Mechanical room.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final

				direction based on OSU's review.
30		Heating Water System, Chemicals	Review the potential to have automated chemical monitoring/test stations added for both loops and provide cost estimate.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
31		Heating Water System, Chemicals	review the potential to have automated chemical injection stations and provide cost estimate.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
32		Heating Water System, Coil Kits	Complete design package for coil flush kits including control valves, circuit setters, flush points and 3 way valves for each coil size.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
33		Heating Water System, Auto Air Bleeds	Review and Identify current auto air bleed locations, provide recommendations for additional air bleeds.	Provide a complete design package for addition and replacement of recommended auto air bleeds.
34		Heating Water 2009	Provide a destructive review of the heating water line in the 2009 addition to confirm current conditions and	Confirm recommendations based on OSU's review. Add detail as needed for

			provide recommendations for corrections if needed.	clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Steam			
35		North Mechanical Heating Water Heat Exchanger	Review and provide recommendations for the incorporation of a redundant heating water heat exchanger. Review of a flooded cell heat exchanger	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
36		Upper South Mechanical Heating Air Handler Coil	Review and provide recommendations for changing from steam to heating water. Identify potential design issues and key considerations.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Steam Turbine			
37		Steam Turbine	Review and identify potential design issues and key considerations for Magruder Hall with the interconnection of a steam turbine. Review in detail the steam and electrical connections	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
38		Steam Turbine	Review proposals and documents provided by the OSU Energy Center and provide comments	Confirm recommendations based on OSU's review. Add detail

			on efficiencies, reliability and electrical and steam connections to Magruder Hall.	as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Add Alternate 1:			
39		RO Water	Review RO water usage and propose options from a new full system replacement or point of use system.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Add Alternate 2:			
40		Cooling in Rooms 0118A, 0122	Propose options for providing cooling to rooms 0118A, 0112. Include ROM costs.	Confirm recommendations based on OSU's review. Add detail as needed for clarify based on OSU's review. Modify sections and confirm final direction based on OSU's review.
	Full Cost Opinion			
41		All Scope of Work included in OSU Detailed Building Systems Assessment	Review and comment on the provided work breakdown structure for the estimate. Update the structure if your firm sees missing scope items. Where requested in the study for options provide ROM costing for each proposed	Provide a detailed cost opinion for the full project scope of work. Include cost opinions only for the final recommendation as noted in the response from OSU that should be

			option and note these in the breakdown.	incorporated into part 2 of the study.
--	--	--	---	--

Magruder Hall Midlife Renewal

OSU Detailed Building Systems Assessment

Roof:

The area over the large animal area is new PVC installed in 2019. The areas over the original lecture hall is EPDM installed in 2004. The EPDM roofing over the additions is consistent with the year of the addition, 2006, 2009 and 2018 respectively. The Roof over the original South section has not been updated and is past its life and should be replaced with a new EPDM Roof. The study¹ will review this roof and identify any potential design issues and key considerations. The Roof over the 2006 additions is in good condition but the condition will need to be reviewed as part of the study², if extensive work is completed on these roof areas for mechanical renewals more consideration towards replacement should be given as there are current leak issues present on this roof.

Original roof needs replaced, 2006 roof has interesting issues.

Controls:

The original control system was Johnson Controls. In 2004 this was upgraded to Alerton. The two chillers added in 2006 were Alerton. 2009 addition was Alerton. 2018 system was also Alerton. Additional building controls should maintain an Alerton System. The new lecture hall was also connected to the Alerton System. The design team will be asked to review current programming for this system review monitoring and alarms. Rework, clean up and organizing of the system will need completed with guidance from OSU controls shop to simplify the navigation and update the alarm settings.

Controls will stay Alerton, front end needs clean up.

There are many point systems where electronic controls are converted to pneumatics. Project scope will include removal of all pneumatic controls and replaced with DDC controls. All necessary equipment needing pneumatics shall be replaced. In the attached documentation is a list of all 48 pneumatic controlled devices to be replaced. In addition there is pneumatic controls for various damper actuators, these will be replaced.

Remove and Replace all pneumatics.

Controls programming shall be updated by the design team to include a series of automated and manual sequence of operations to flex open control valves to 100% to allow full flow through coils to help circulate contaminated water out of the coils and to the filter stations. Depending on water pressure and zoning this may need to be completed in a staggered sequence.

Control sequences that hope to help heating water system.

Thermostat Controls AHU-8 located in Treadmill room A0101 need to be reconfigured and relocated to the Isolation Room.

OSU Detailed Building Systems Assessment

Mechanical:

Air handling equipment service areas have been provided for reference see attached file.

Original:

SU-1 Located in Upper south mechanical with steam heating coil.
SU-2 Located in Upper south mechanical with steam heating coil.
SU-5 Located in Upper south mechanical with steam heating coil.
SU-8 – Located in Upper south mechanical with steam heating coil. Also has cooling coil.
SU-10 Located in Upper south mechanical with steam heating coil. The study⁶ shall review requirements for air flow and pressure in the areas served by SU-10, Formaldehyde laboratory. The study⁶ shall test the room's air flow and pressure to determine if modifications are needed. The study⁶ shall review if additional exhaust is needed in this space. If modifications are needed the study⁶ shall provide propose options. Specific space analysis.

SU-16 Located in Upper south mechanical with steam heating coil.
SU-54 Located in Upper south mechanical with steam heating coil.
MZU-20 – Hot water coil and cooling coil. Critical surgery suit. The study¹⁰ is to confirm condition is in good shape and recommend refurbishment or replacement as needed. Study¹⁰ is to review the ability to add system redundancy to this critical system. The Study¹⁰ shall work with OSU team to develop customer goals and needs for these critical spaces. Critical space, need confirmation of system longevity.

The study⁴ is to review all original equipment and analyze the potential to use heating water instead of steam. The study⁵ is to provide recommendations to modify all equipment to allow for DDC controls instead of pneumatics. The study³ is to review all motors, bents, filter racks and other parts and provide recommendations for refurbishment or replacement. Review of all original mechanical equipment, heating water vs steam, DDC controls, refurbish or replace.

2006 Addition:

AHU-1 Heating water, chilled water coils with heat recovery coils in exhaust ductwork (Serves surgery suites)

AHU-2 Heating water, chilled water coils with heat recovery coils in exhaust ductwork.

AHU-3 Heating water, chilled water coils with heat recovery coils in exhaust ductwork. The study⁷ is to review the current condition of this unit. Provide recommendation for refurbish is necessary. Room 102 classroom served by this air handler has experienced several hot room calls. The study⁷ is to review the current situation and system and provide recommendations for correcting this issue. AHU- 3 review, we have not been able to maintain temp in room 102 (classroom)

The study⁸ is to review vibration issues that are impacting the lab below. The study⁸ is to review the water tightness of the AHU and surrounding roof connections.

AHU-5 Heating water, chilled water coils with heat recovery coils in exhaust ductwork. Vibrations and water issues for lab below this unit.

2009 Addition:

AHU-6 Heating Water and Cooling

AHU-7 Heating Water and Cooling

AHU-8 for the treadmill and isolation. The study⁹ is to review the potential for removing this AHU from the heating water loop and install a heat pump and backup electric heat, review and identify potential design issues and key considerations.. The study⁹ is to review if required power is available. The system currently has separate DX cooling and has evaporative cooling. Isolate the isolation area. Heating water. Do we have the power needed?

2018 Addition:

AHU-11 Heating Water and Cooling

AHU-12 Heating Water and Cooling

Exhaust:

There are 3 sets of exhaust fan system on the original 1979 section of Magruder Hall. These systems exit the building on the upper roof the south mechanical room. The **study**¹¹ shall review the usage of these exhaust fans and propose options for replacement or refurbishment of the units. The **study**¹² shall review the potential for combining exhaust fan systems, additional use of VFDs and other energy efficiency metrics.

All on original roof, condition is rough.

Cooling:

There are 4 main chillers at Magruder. CH-3 140 Tons (2009) Serves the south addition AHU-6, AHU-7, AHU8 and CH-4 140 tons (2018) servers the newest addition AHU-11 and AHU-12, are new and in good working condition. CH-1 53 tons and CH-2 53 tons (2006) are older and cross connected serving portions of the original and 2006 buildings serving SU-8, MZU-20, AHU-1, AHU3. These older two units are at life expectancy and should be replaced with proposed slightly larger 60 ton units, or a 120 ton unit. CH-1 and CH-2 are currently cross connected to CH-4. The **study**¹³ will review the feasibility of cross connecting CH-3 to the other chillers. The **study**¹³ will review the condition of the existing pumps serving CH-3

Cross connection of chillers, can we make this work?

There is a system issue with the cooling where cooling coils that condenses the supply air weep. The water from this process has nowhere to go and sits in a pan. These pans have rusted and leaked causing issues. The **study**¹⁴ is to propose a solution for humidity control, drainage or other needs to be implemented.

Condensate pans for cooling coils, looking for solutions.

AHU-7 is the only form of cooling to the large animal area. AHU-7 has a evaporative cooler which adds unwanted humidity. For the large animal area the **study**¹⁵ will review that night flushing is operating efficiently for SU-2, SU-5, SU-01, and AHU-7 and provide recommendations for corrections if need. The **study**¹⁶ will review creative solutions to provide tempering cooling to this area. The existing AHU-7 unit is in poor condition.

Looking for solutions, for tempering cooling, not full cooling.

Room 122A has a walk-in cooler that has a DX unit that is next to SU-8 it is about 6 years old. The **study**¹⁷ is to review the condition of this unit and review hot temperature issues in this room. The **study**¹⁷ shall provide recommendations for maintaining space temperature.

Room 292D- Mini Split on the original roof and is an old unit. – Should be replaced with the roof.

Room 296 - Mini Split on the original roof and is an old unit. – Should be replaced with the roof.

Room 251 D&C – environmental control room and is on old roof, unit is okay. – Should be replaced with the roof.

Room 274 A – Environmental Control (Rooms are fed by AHU 5 on roof directly above room)

Room 101A/101B – Refrigeration/ Server Room – On Roof (located on 2006 roof) this unit is not in good condition the **study**¹⁸ will review this unit for replacement or refurbishment.

Room 130/124 – Server Room – Ground unit. In Good Condition

Room 119 – Single Ground Unit – Good Condition

Electrical:

The **study**¹⁹ is to provide recommendations to convert existing florescent lights to LED. Provide LED lamps instead of full fixture replacements. Provide recommendations for 2X2 U bend light fixture. All lamps shall be replaceable by janitorial staff and shall not need an electrician for lamp replacement. The **study**¹⁹ shall provide options and price examples with part 1 of the study and incorporate final recommendations with part 2.

LED Retrofit

The 2006 lighting control panel is needing to be replaced and relocated to a more accessible location. The **study**²¹ is to review and propose an alternate location, review feasibility and identify potential design issues and key considerations. This work to be completed by facilities prior to the start of the project but will be incorporated in the OSU project.

Needs a new Light control panel location

The **study**²¹ is to review potential lighting control issues in the 2018 addition. The **study**²¹ will include confirmation of what lighting controls for this area exist and what their current functionality is and provide recommendations for corrections if needed. LCP-1 in Room 2011 is currently not working.

Review functionality

Solar:

During this project the opportunity to incorporate the solar plan proposed in 2018 would be recommended. There are 3 proposed roofs where the existing solar plan has identified. The first is the horse riding arena with a metal roof. This roof is long lasting and has minimal chances of impacting use of the space over time. The second roof is over the large animal clinic. This roof was recently replaced in 2019 and has a 30 year life. This would be a good opportunity for a ballast roof system. The third roof is on the original build and is proposed to be replaced as part of this project. The **study**²² will review the solar plan and have a structural and electrical review to ensure that the proposed solar plans are feasible.

Structural and electrical based on solar plan.

Elevator:

There are two original elevators from the 1979 build. Both of these elevators have been well maintained and have served past life expectancy. They are in need of a modernization to make sure they conform to current standards. See portion of the elevator modernization study attached.

Alarms:

A New fire alarm panel was installed in 2020. Devices in the original build (1979) are original and have begun to fail. These should be replaced, where not already replaced by facilities.

New parts, already has new smarts

Plumbing:

The domestic hot water return has had a number of leaks. The total status is unclear, the study²³ is to provide destructive review to analyse condition of these pipes to see if full system replacement is needed or if point repairs is a viable option for the foreseeable future. The study²⁴ is to review reports of hot water in the toilets and identify potential causes of this issue. All remaining domestic hot water and cold water are original and in okay condition.

Hot water review.

South Mechanical DHW used to have an electric HW heater for when Steam DHW is down for Campus shutdown, but has failed and is now used as a buffer tank. The study²⁵ is to review current functionality of the electric HW heater and propose alternate solutions if needed.

Do we need this, is it helping anything?

Hydronics:

Heating water lines are in poor condition and are the most critical part of this project. Heating water lines have a buildup of debris and are causing many heating issues. Isolation valves need added to allow for strategic system flushing and cleaning by areas to minimize full system impacts. The study²⁶ will, review, analyze and propose locations for isolation valves and flush point locations. There are two sections of heating water, the exact locations that these serve is not clear. The original 1979 section and the smaller addition from 2006 are thought to run out of the Upper South Mechanical room. The 2006 addition, 2009 addition and 2018 addition are thought to run out of the North Mechanical Room. South Mechanical HW system feeds 43 VAV heating water coils, and 28 Convector units (recessed in wall radiators). A majority of the Large animal stall VAV's have old pneumatic 2 way HW valves and lack isolation capability for repair/replacement. Confirmation of exact locations of these systems will be needed as part of the study²⁷, provide a list of equipment served by each loop and a map. The study²⁸ is to review the potential to eliminate the heating water lines that serve the treadmill and isolation rooms, served from the North Mechanical Room, identify potential design issues and key considerations. These are in separate buildings added in 2009 and are served by AHU-8. A new filter and flush station was added to the North Mechanical Room in 2022. A similar system will need to be added to the system in the Upper South Mechanical Room, currently there is only a small bypass filter, the study²⁹ shall review the existing system in the North Mechanical Room and provide recommendations for the Upper South Mechanical Room. The study³⁰ is to review the potential to have automated chemical monitoring/test stations added for both loops and provide cost estimate. The study³¹ is to review the potential to have automated chemical injection stations, and provide cost estimate. These stations would then be tied into the existing BMS system.

Many of the coils are clogged and have been flushed repeatedly. As part of the study³² a complete design package for coil flush kits including control valves, circuit setters, flush points and 3 way valves shall be completed. A packet shall be developed for each size coil in the building regardless of age. The design team will then complete an assessment of the current condition of each of these components to see if they are needing to be replaced. During design and preconstruction facilities will follow this design when coil flushing is needed to help ensure

that duplicate work is not needed. Facilities will report back to the OSU project delivery team with what coil locations and what parts have been updated. As part of the study³³ a complete design package for replacement of auto air bleeds in the system shall be provided. The study³³ shall identify current locations and propose recommendations for total replacement and potential additional air bleeds as necessary. There are concerns that the hydronic piping installed in the 2009 addition may not have been of high quality. A destructive review of the piping shall be completed as part of the study³⁴ to determine the current condition and the study³⁴ shall outline recommendations for corrections if necessary.

Steam:

There are two mechanical rooms in Magruder hall. The North Mechanical Room 0114 and the Upper South Mechanical Room 0237B.

North Mechanical Room:

There are two new domestic hot water heat exchangers in the north mechanical room (2023), these serve the North section of Magruder (2009, 2018 portions and potentially sections of 2006 renovation. The heating water heat exchanger located in the North Mechanical Room provides heating water to the same area and has had the bundle replaced in 2012. The study³⁵ is to review and provide recommendations on the potential to incorporate an additional heat exchanger for back up or provide alternate system for backup heating water. There is limited space in the North Mechanical Room for additional equipment. The study³⁵ shall also review if a Flood Cell Heat exchanger would be viable in this situation. The design team is to review the potential for the addition of insulation in this room to provide additional efficiency. The north mechanical room 114 has a power pressure pump system in the pit for the steam condensation return back to the Energy Center, and was installed in 2023. This room maintains a high temperature and has a small exhaust fan. The design team will specify an exhaust fan with increased CFM to ensure heat is pulled out of this room.

Upper South Mechanical Room:

There is a new heating water heat exchanger in the Upper South Mechanical Room that was installed in 2021. This unit needs insulation added, to be included in the design. All Air Handlers units in the Upper South Mechanical Room use steam coils, with AHU 4 being the only one utilizing heating water. The study³⁶ is to review the opportunity to update these to heating water. Potentially through a separate heat exchanger if the current one is not sized to accommodate. If the steam coils are to remain, the condensate traps to AHU steam coils need to be inspected by the design team as there are multiple trap failures. The domestic heat exchanger is 25 plus years old and will need replaced.

Steam Turbine Scope:

There is an opportunity to develop a new steam turbine complex that would provide a new primary power source to Magruder that would operate continually and serve all building loads. This steam turbine complex and associated piping would be provided in a separate project. Development of a separate housing enclosure and building would be needed on the North Side of the building, final location is to be determined. The turbine would be 1,100 KW and would

require new 12" stainless steel steam lines to serve the capacity. Parallel switchgear would be required to eliminate breaks in power. This study³⁷ is to review the potential design issues and key considerations with the interconnection of the steam turbine complex serving Magruder Hall. The Study³⁷ is to review and identify potential design issues and key considerations of the electrical and steam connections to Magruder Hall. The study³⁸ is to review proposals and documents provided by the OSU Energy Center and provide comments on efficiencies, reliability and electrical and steam connections to Magruder Hall.

Add Alternate 1: RO Water System

The current RO system has had a number of failures and is not the preferred RO system type for OSU. Plastic fittings and connections run throughout the area served. The study³⁹ shall review the usage of the current system and analysis whether a full system replacement would be necessary or if point of use systems would be preferred. OSU Design and Construction standards specify a ReSys brand RO water System.

Add Alternate 2: 0118A, 0122 Addition of Cooling

Rooms 0118A Teaching Lab and 0122 – Necropsy currently does not have cooling. The study⁴⁰ shall propose options for providing cooling for these areas, with ROM costs.