

PROGRAM STATEMENT

Henrion Hall
HVAC Improvements –
Phase 3 and 4
February 2023

Wichita State University
Office of Facilities Planning



WICHITA STATE
UNIVERSITY

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STATEMENT OF NEED

Over the past three years, Wichita State University has invested just under \$2 million in two separate projects to improve the health and safety of Henrion Hall by improving ventilation and dust collection in the ceramics, sculpture, and foundry areas in the building. This project includes the scope of work required to provide central heating, air conditioning, and ventilation to the remainder of the building (approx. 29,000 sf) to address the additional deferred maintenance HVAC items.

PROJECT SUMMARY

Henrion Hall was originally named Memorial Gymnasium and is approximately 37,500-square feet. It was originally constructed in 1921 to serve the physical education program and also to provide studio space for ceramics, sculpture, and painting programs. In 1983, the physical education program was permanently moved to Heskett Center which allowed this building to be solely dedicated to the School of Art, Design, and Creative Industries (ADCI).

Following the recent Phase 1 and 2 work in the building, a study was conducted by PEC in 2023 to outline the scope of work needed for this project. The recommendations have been separated into two phases to allow the overall scope to be separated out into two smaller phases if needed based on available funding.

Phase 3 would be contained to the west portion of the building and include:

- The Chilled Water plant
- The Architectural Chiller Enclosure
- Paving Modifications to the south drive to accommodate a fire lane.

- The Heating Water Boiler Plant
- AHUs and FCU/BCU serving West Gym 111
- Electrical Infrastructure Upgrades to support the proposed Phase 13 and Phase 4 HVAC equipment

Phase 4 would encompass the remainder of the non-central air-conditioned spaces.

- Airside HVAC upgrades.
- Dust Collectors and Make Up Air Units at east end of building.
- Electrical scope to support the HVAC upgrades.
- Removal and replacement of ceilings required to support the HVAC and Electrical work.

EXISTING SITE

The study recommends locating the new chiller plant in Phase 3 on the south side of Henrion Hall. Fire lane access is needed in this area, so the chiller plant would be sited to accommodate the width of the drive. Current building operations have the need for a dumpster to be located in this area as well. The chiller enclosure and access drive should be designed to incorporate an adjacent dumpster enclosure (with a brick veneer to match the building and adjacent structures). Relocation of existing light poles will be necessary to accommodate the widened fire lane and chiller/dumpster enclosure.

BUILDING SYSTEMS

HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS

The existing building's HVAC system is comprised of multiple systems. The two phased project that was recently completed, added central air conditioning and heating to approximately 8,151 SF. A variable air volume (VAV) AHU with split system

cooling and Hot Water heating delivers conditioned air to terminal reheat units that serve individual zones. This project also provided source capture exhaust and dust collection to zones housing processes requiring that level of ventilation. Heating hot water is generated by a steam to hot water converter utilizing plant steam at the Northwest corner of the building. Pumps in that location circulate hot water throughout the remodeled areas (approx. 8,200 SF).

The balance of the building is served by systems with varying capabilities.

- Window AC units.
- PTAC AC/Heating units.
- Heating only units.
- No HVAC at all.

A goal of the University is to provide central air conditioning to the non-central air-conditioned spaces in Henrion Hall in order to make the building more usable year-round. This amounts to approximately 29,000 SF of space in the building. Additionally, an overall campus utility goal is to remove Henrion Hall from the campus steam system. This frees up some capacity on the existing steam plant that could be used for redundancy or to serve another heating load elsewhere. To accomplish these goals, the proposed HVAC system for Henrion Hall is a four-pipe system with an air-cooled chiller plant and a gas-fired heating hot water boiler plant.

Chilled Water:

It is important to note that the School of Art, Design, and Creative Industries (ADCI), has plans for future ventilation upgrades to accommodate processes in the building. Detailed load analysis during design of the system will be critical to size the chiller plant appropriately.

Two air cooled chillers are proposed to provide chilled water to Henrion Hall. This equipment would be located outside of Mechanical Room 112B across the drive running east-west at the south of the building. To reduce the negative aesthetic impact of the chillers, an architectural screen wall would be built to screen the equipment. This wall would also be designed to house the roll off dumpster currently utilized by the building occupants.

Rough building loads indicate that two nominal 60 ton chillers sized for 2/3 capacity each would provide the necessary chilled water capacity for the building. Chilled water would be pumped throughout the building with a primary/secondary pumping strategy. Primary pumps would pump the primary loop with the chillers in a constant volume manner. Secondary pumps with variable frequency drives (VFD) would circulate water to the building loads. These pumps and their associated hydronic appurtenances (expansion tank, air/dirt separators, etc.) are proposed to be located in Mechanical Room 112B.

Heating Water:

Two boilers are proposed to accommodate the heating load for the building. A difference between the chilled water plant and the heating water plant is that the heating plant will be sized for the entire building. Rough building loads indicate two 1,400 MBH boilers each sized for 2/3 of the building load would provide the necessary heating hot water for the building. The pumping strategy for the heating hot water plant is proposed to be the same as the chilled water strategy. The boilers, pumps, and hydronic appurtenances would all be located in Mechanical Room 119 and 119B at the northwest corner of the building where the existing steam service is located. Natural gas is provided to the building at the southeast corner of the old gymnasium. Piping would extend from there to the boilers in 119.

Air Side:

Large open spaces in the building, such as West Gym – 111, Studio – 105, Studio – 106, and Studio – 110 would be conditioned by 4-pipe air handling units (AHU) mounted at the floor level or suspended from structure. The control strategy for these spaces would be single zone VAV.

Individual rooms and classrooms would be conditioned by 4-pipe blower coil units (BCU) or fan coil units (FCU), typically suspended from structure. Depending on the room layout, the units would either be exposed below the ceiling, or concealed with ducted supply and return.

Ventilation for the air side systems would be via roof intakes ducted to the return side of the equipment. Where required by the energy code, free cooling economizer would provide cooling for spaces where cooling is required during cool/cold weather. Relief Fans with exhaust through the roof would provide building pressure control during economizer operation.

ELECTRICAL SYSTEMS

The proposed addition of the HVAC equipment above entails connection to the existing building electrical infrastructure. Currently, this building features a service entrance located at the northwest corner of the facility, on the main floor. This service is a 1200-Amp, 208Y/120-Volt, 3-Phase, 4-Wire served from main distribution panel 'MDP' that in turn, serves the remaining panelboards throughout the facility. It is anticipated that NO major electrical service infrastructure rework will be required for the connection of the proposed equipment. However, it has been observed that existing panelboards may need to be replaced to add additional physical space to allow for proposed connections of fan coils and other HVAC equipment. In other locations, an additional distribution panel or

branch circuit panelboards are proposed to be added to allow for more efficient connection of the equipment. Of the anticipated equipment, the chillers (CH-1 and CH-2) will be the largest loads to be connected to the existing distribution. However, based on our current understanding of this facility, service capacity will not be an issue.

In addition to the proposed cooling, it is also desired that the building is to be removed from the existing campus steam system. To allow for this, a boiler system will need to be designed/added to the building. It is anticipated that this new boiler equipment (boilers and corresponding primary/secondary pumps) will be located within the existing mechanical room on the north side of the building. This proposed boiler equipment will be connected to existing panel 'IPB1' and the main distribution panel 'MDP' located west of the mechanical room. The two boilers (each requires a 20-Amp, 1-pole breaker) as well as the two corresponding primary boiler pumps (1HP – each requires a 20-Amp, 3-pole breaker) will feed from the existing panel 'IPB1'. The two secondary boiler pumps (7.5HP – each requires a 50-Amp, 3-pole breaker) will feed from 'MDP'.

It is anticipated an 800-Amp distribution panel (to be named 'DP') will be added to the building at the south mechanical room to allow for connection of the following proposed pieces of HVAC equipment (at minimum): Chiller 1 and 2 (each requires a 300-Amp, 3-pole breaker), primary chilled water pumps 1 and 2 (2HP - each requires a 20-Amp, 3-pole breaker), and secondary chilled water pumps 1 and 2 (7HP - each requires a 50-Amp, 3-pole breaker). This distribution panel will be served from the main distribution panel with an 800-amp, 3-pole circuit breaker and corresponding feeder. Existing circuit breakers within MDP may need to be relocated (and associated feeders/branch

circuit conductors to be reworked) to create physical space for this proposed device.

In addition to the equipment identified above, it is also anticipated that air handlers and associated economizer relief fans will also be provided for specific studios. The studios are 105, 106, and studio 110, each space will require one air handler and a relief fan. The three air handlers (1HP – each requires a 20-Amp, 3-pole breaker) and associated relief fans (0.5HP – each requires a 20-Amp, 1-pole breaker) are to serve from existing panels as follows: air handler for Studio 105 will be from 'IPB2' and air handlers for Studios 106 and 110 will be from 'IPB3'.

To properly serve individual spaces and allow for controllability, the HVAC plan is to provide fan coil units throughout certain spaces. It is anticipated that these units will be 120-Volt, single pole loads that may be connected to existing branch circuit panels (if space allows). As stated above, in situations where physical space is an issue, the existing panelboard (if 30-space or smaller) may require replacement with a 42-space panel. Where the existing panel is already a 42-space, it may require that an additional branch circuit panel be added in the vicinity to allow for connections such as this.

Appropriate nameplates will be provided for all circuit breakers, disconnect switches, separately mounted starters/VFDs, and equipment provided. will be provided in normally occupied spaces and multiple zones will be provided in conference rooms or meeting rooms.

PROJECT FUNDING

The Henrion Hall Phase 3 and 4 HVAC Improvement Project will be funded with capital renewal initiative funding in FY24 and FY25. The construction cost for the Phase 3 HVAC improvements are approximately \$1.2 million and the Phase 4 HVAC improvements are approximately \$1.4 million. The total project cost for both phases combined is \$3.5 million. A detailed project budget is included at the end of this document.

PROJECT DELIVERY METHOD

A typical design-bid-build project delivery method will be utilized for the project – either combining both phases into one project or dividing the scope of work into two phases. If proceeding with one larger project rather than two phases, it is anticipated that some degree of construction phasing will be needed to minimize the disruption to classes in the building – the project schedule attached indicates an overall project duration of 27 months.

PROJECT BUDGET

HENRION HALL - HVAC IMPROVEMENTS, PHASE 3 and 4					
Project Budget					February 2023
1.0 Construction Costs:			quant.	cost/ea	BUDGET
					\$1,200,000
					\$1,400,000
				\$0.10	\$260,000
					\$2,860,000
2.0 Project Soft Costs:					
					\$0
					\$22,000
					\$0
					\$0
					\$0
					\$295,000
				allowance	\$35,000
1000					\$10,000
					\$362,000
3.0 Summary:					
					\$2,860,000
					\$362,000
				10% of construction	\$286,000
					\$3,508,000

PROJECT SCHEDULE



