

CASE STUDY

McQuay Self-Contained Systems Contain Benefits for Historic Building

When it comes to restoring historical buildings, history shouldn't always repeat itself. The challenge lies in maintaining the look and feel of an historic landmark while replacing outdated equipment with systems that were not envisioned decades ago.

The city of Fayetteville, Ark., faced this challenge when officials decided it was time to update the air conditioning systems at the City Hall, a vintage building from the early 1900's. They quickly learned that HVAC systems are among the most complicated modifications to make because of the size of the equipment and the ducting, piping and additional infrastructure today's systems typically require.

Located in Northwest Arkansas, with views of some of the tallest peaks of the Ozark Mountains, Fayetteville is a scenic and historic city. While respectful of its past, it is also a fast growing community with a promising future. Home to many national companies and an important university, Fayetteville has experienced nearly a 70 percent increase in population since 1980.

City officials strive to provide the community with the highest quality services, and they understand that achieving this goal requires a modern and efficient municipal center. Nevertheless, the city hall is one of a collection of picturesque



The Fayetteville City Hall is one of a collection of picturesque brick buildings situated in the historic town square. Maintaining its original historic character, while providing modern, efficient air conditioning, was a primary reason for selecting a McQuay SWT vertical self-contained system.

brick buildings situated in the historic town square, so it was important for such a landmark to keep its original character during renovation. In fact, city officials were adamant about maintaining the building's historical look and feel.

Mike Green with Green Anderson Engineering in Fayetteville was called upon to find a solution – and a new HVAC system. When Green assessed the building, he found a poorly performing heat pump system that had been added during a previous renovation. He also observed cooling tower piping, a

boiler on the roof and all the related piping for the heat pumps, while also noting that space at the site was very limited.

The city hall had a basement; however, it was a cramped room with a low ceiling that would not accommodate much ductwork or equipment. So, while the piping in place could be used to support a chiller system, there was no place to put the machine. Green considered rooftop units as well, but these raised the concern that large pieces of equipment for all to see would not be in keeping with the historic character of the

building. Such considerations led Green to look at another option: a vertical self-contained system.

"Self-contained systems are floor-by-floor, water-cooled, VAV air conditioning systems," Green explained. "They are an excellent choice for retrofit replacement of heat pumps because the existing chilled water piping can be used for the condenser water supply."

Knowing the type of system he wanted, Green needed to find equipment that could meet the specifications of the Fayetteville City Hall. "We had to find units that could be knocked down in sections to fit into the building," he said. "And because self-contained units reside in occupied spaces, noise is a major concern. This was especially true at the Fayetteville city hall because officials had taken great care to maintain the building's original hard wood floors.

What Green found was the SWT vertical self-contained system from McQuay International. Specifically designed for renovations and retrofits, the SWT disassembles into three separate sections to negotiate hallways, elevators and even three-foot doorways. Acoustically, the systems can achieve sound levels as low as NC-35 and have been recognized by renowned acoustic consultants for their low noise levels.

As an added benefit, the systems boast design efficiencies of 0.65

KW/ton and unit EERs of 14.0. Green was able to further refine each unit to the needs of the application by selecting from several pre-engineered component options and sizes. For example, the units were available with up to six compressors, each of which could be selected from 5 different horsepower sizes to achieve even greater part load efficiencies.

Mark Jorris, division manager for Air Works in Fayetteville, was the HVAC contractor on the project. He was impressed with how simple it was to install the new system. "The McQuay units break down to a two-piece base and a separate top-mounted fan section. We were able to take them up in the elevators and through four-foot doors in the building," he said. Inside, existing storage rooms located behind the elevator shaft on each floor were converted into mechanical rooms to house the units. "It was a tight fit at times, but the unit sections made it in," said Jorris.

Next, the re-assembly began, and Jorris was impressed with several features of the SWT that made the job go quickly and easily. "The SWT is designed with the refrigerant lines contained in one section so that none are broken. This eliminates the need to braze, evacuate, and charge the system with refrigerant in the field," he explained. "Quick connect victaulic couplings attached to the existing cooling tower piping. Likewise, the wiring is quick connect. All these

features allowed the units to be up and running in no time."

Modifications to the building to accommodate the new system were very minor, Jorris said. New primary ducting was added and connected to the existing low pressure ductwork. The old heat pumps were replaced by mixing boxes and the branch water piping converted to hot water for reheat. Finally, to accommodate the extra weight of the self contained units, some steel framing was added.

Maintenance personnel are pleased that most critical components that require routine maintenance and service, including the compressors, are placed out of the air stream, enabling access while the unit is running. They can now take care of their work without disrupting anyone else in the building. Removable panels and adjustable latches provide easy access and further facilitate maintenance.

Now the offices in the historic Fayetteville City Hall are comfortable all year, and the McQuay units operate so quietly and with so little vibration, no one can tell they are present. When everything old is new again, it is sometimes best when no one notices.