



CASE STUDY

Government

Facility at a glance

Name

Federal Hall National Monument

Location

New York, NY USA

Facility size

60,000 ft² 19th century building

Issue

Historic preservation with limited space

Solution

(22) Daikin Vision[®] Air Handlers built to space requirements, (32) Daikin fan coil units

Federal Hall National Memorial 60,000-sq ft building in Manhattan, New York

Daikin Vision[®] Air Handling Units Selected for Historic Federal Hall National Memorial Renovation

The Federal Hall National Memorial celebrates our nation's history. George Washington was inaugurated at the original building in 1789, the nation's first capital and home of the Bill of Rights. A bronze statue of first-president George Washington preserves that heritage on the steps of the current structure, built in 1842. In December 2004, with structural issues threatening its integrity, Federal Hall was closed for a major renovation, totaling nearly \$16 million. Replacement of the building's HVAC system was included.

The historical status of the building presented challenges for the HVAC project. "Because there is no single area in the building to accommodate a central mechanical room, the design called for numerous indoor air handling units all over the building," explains Mike Van Oss, project manager with New Rochelle, New York-based JPR Mechanical, the mechanical contractor on the project. "And, due to architectural and structural concerns, there wasn't a lot of flexibility in sizing the air handlers."

Daikin Vision air handling units were chosen because they offer a custom-like solution at a standard production-unit price. According to Prem-Air New York, the Daikin sales representative for the project, the Vision air handler solution reduced the capital cost invested by the owner by more than 45 percent over the competitor's fully custom solution and significantly reduced equipment production and delivery times.



Preserving the unique structure of the historical landmark without compromise proved challenging.

Building Preservation

Federal Hall is tightly situated between two other buildings on less than half an acre at 26 Wall Street in lower Manhattan. It originally served as a Customs House and later a U.S. Sub-Treasury, forerunner to the Federal Reserve Bank. Built on a shallow foundation and silty soil, surrounding construction and subway vibrations have taken their toll. Located within blocks of the site of the World Trade Center towers, the September 11, 2001 terrorist attacks sent seismic shocks to the building, further exacerbating cracking in its foundation.

New underpinnings were a major focus of the renovation project. Mini caissons were drilled down to the bedrock and metal cylinders inserted, filled with concrete. As a result the building will now rest on bedrock instead of soil. A new air conditioning system was also a necessity. "The old HVAC system was broken down and beyond repair to the point of needing modernization and replacement of the entire system, except for existing chillers in the basement mechanical room," explains Mike Van Oss.

Project Challenges

Designing the air handlers to specification was crucial to the project, given the status of the building as a national landmark. Vision air handlers are produced on a made-to-order basis that allows engineers to size each unit's cabinet in two-inch increments for height and width.

"One of the benefits of the Vision air handlers is that you can order them modularly. We didn't have to disassemble them in the field. We just had to get them up to the spaces, some of which were very tight. The fact that the units were modular really helped our field personnel," Van Oss says. Some 22 Daikin air handlers were installed at Federal Hall, ranging in size from 4×4×4 feet to 8×4×7 feet with approximate capacity from 1800 cfm to 7500 cfm to accommodate the 60,000 sq. ft. building. The three-story building also includes a basement level and two separate attic areas.

Charles Asaro, project manager with Humphreys & Harding, the general contractor on the project, confirms the equipment required careful installation without compromise to the original interior which includes storage vaults, extensive marble and an impressive domed atrium. "Some of the air handlers had to be manufactured in smaller pieces and assembled on site in order to get through existing doorways and hallways. To provide cooling to the atrium, venting had to be cut through a six-foot thick section of existing brick arch from the second floor."

From the technical perspective, Van Oss says the job was fairly standard. "The Daikin units are part of a closed-loop hydronic system," he says. "We piped all of the air handlers off of the existing risers and provided new piping and connections and put in a new hot water plant." In addition, 32 Daikin fan coil units in two-pipe configurations were installed, primarily in offices located on the building's second and third floors.

Up and Running

The HVAC system went online in June 2006 and the building successfully reopened to the public in the fall of 2006. "Everything is working fine," says Hector Fonseca, facility manager of the Manhattan Sites for the National Park Service. The HVAC units are operated from a centralized control system in the basement level and by 30 thermostatic controls located throughout the building. Fonseca notes there's plenty of capacity in the system. "In early spring and late fall, we don't need as much from the system. I'll run with only the air handlers on or on fan coil only, or maybe the air handler with only a few fan coils."

Federal Hall is one of six Manhattan Sites by the National Park Service where park rangers lead tours and interpretive programs. The building also houses a visitor center, museum store and offices for National Park Service employees. Other galleries and museums also mount temporary exhibitions on the second floor. Looking ahead, more displays are planned, including a history of New York City and the nation in the basement level. Indeed, the Daikin system is ready to bring the 19th century national landmark well into the 21st century.



Space within Federal Hall was limited. The modular size flexibility of Vision air handlers allowed placement of 22 units throughout the building.