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RADIANT HYDRONICS CASE STUDY:

“THE STATION”

A beautiful banquet venue deep in the pine forests of Shepherd's Hollow built overlooking a lake. The venue's main hall features 5000 ft² of space heated using in-floor radiant hydronics. The site also features a snow and ice melt system beneath the patio and surrounding walkways.

Deep in the pine forests of Shepherd's Hollow, overlooking a lake and the golf course's 18th hole, sits a stunning glass banquet venue called "The Station." This aptly-named building was designed in the style of 19th-century European train stations and can accommodate events with up to 325 guests.

The venue's 5,800 ft² main hall is comprised of 5,000 ft² of heated floor space with beautiful white and black marble floors, high ceilings, and expansive windows. The walls of the main hall are made entirely from double-pane glass, providing an unencumbered view of the pines and the lake beyond. Glass doors offer direct access to the lovely adjacent outdoor patio surrounded by the beauty of the natural landscape.

During the early stages of the project, the architect and builders were faced with two unique challenges: the first of which was ensuring that guests would be comfortable in the banquet space year-round. Both marble floors and glass walls are naturally cool to the touch, and the high ceilings meant that keeping a consistent temperature could prove difficult using conventional forced air systems.

Project : Details

Name : The Station at Shepherd's Hollow

Location : Clarkston, Michigan

Venue Website : www.ShepherdsHollow.com

Architects : David Peterhans & Michael Bylen

Mech. Contractor : Johnson & Wood Mechanical

Project Manager : Brian Johnson

Project Foreman : Eric Merriam

Supply House : ETNA Supply of Wixom, MI

Project Size : 5,800 ft² Interior Banquet Space
14,400 ft² Exterior Ground Space

Products Used : M-8330 Stainless Steel Manifolds
M-8220 High-Capacity Manifolds
5/8" LegendFlex® PEX Tube
3/4" LegendFlex® PEX Tube
QuickTherm® Under-Slab Panels
Tube Mounting Rails, Plastic

In large open spaces, HVAC systems can suffer from uneven temperature distribution created by the natural rising of hot air. Additionally, the vast network of ducts and blowers required for large projects can create ample opportunity for heat loss before the air reaches its intended destination. Unlike forced air systems, Legend's radiant heating system transports hot water from a boiler through a network of tubes arranged beneath the floor, warming surfaces and creating uniform temperatures to ensure maximum comfort.

The second challenge that needed to be addressed was how to keep all the pathways free from snow and ice during the long Michigan winter. Ideally, the client wanted to achieve this without needing labor-intensive shoveling or potentially harmful deicing agents that guests could track into the building and onto the hall's marble floors as they enter the venue.

Initially, the site was slated to use traditional forced-air heating, but Dave Younker, the project supervisor at Shepherd's Hollow, had previously been aware of radiant



heating as an alternative. To find a solution, Mr. Younker reached out to the team of expert engineers at Legend Valve for more information, kicking off the radiant project's first steps. Staff included Legend's engineering and sales teams, Legend's rep agency, J.W. Sales, and ETNA Supply of Wixom, who served as resources to the project owner, answering questions and supplying materials as needed.

The quick-response capability of Legend's on-site team and warehouse staff allowed them to step into both design and support roles for the project. Legend's engineering team was assigned to project outlay and mocked up an initial radiant system design layout, and from there, could specify materials that would meet the project's specs. The team designed radiant floor plans for the glass banquet hall and snow and ice melt (SIM) plans for both the vehicle drop-off area and paths leading to the banquet hall. Original plans had called for the banquet hall to be divided into six zones. However, to better meet the site's needs, Legend reviewed and redesigned the entire floor to function as one zone. This would allow for a less complicated tube run and reduced material and installation costs.



In total, three M-8330 stainless steel manifolds were used to control interior water distribution. Two manifolds connected tube runs to supply the high-output perimeter areas near the glass, which required 9" centers on the runs. The third manifold served the complete interior area, which required a lesser output, utilizing 12" centers. The interior portion of the project used 6,640 linear feet of 5/8" diameter LegendFlex oxygen barrier (O₂) tube for the main banquet facility floor, which linked up the manifold stations to the mechanical room.

The Johnson & Wood contractors installed over 750 QuickTherm panels (R-5) before the slabs were poured. These interlocking panels expedited tube installation, saving time and providing thermal insulation. In addition to insulating properties, the QuickTherm poured-floor system allows tube runs to be walked into place while standing, reducing the strain on installers. The knobs on each panel hold the tube in place and eliminate the need for staples and ties. It also made it easy to verify that the tube was laid according to the plans created by Legend.





The site's SIM system's design concept underwent several changes to its shape and boundaries throughout the project's course, notably including a new heated pathway from the hall's main entrance through the trees. Shepherd's Hollow desired to see all of the covered exterior patios heated. This idea was ultimately scrapped in favor of patio heaters, which would provide greater comfort to guests standing under the pergolas on windy days. Legend's engineering team updated drawings to accommodate the various other project changes as they arose.

In the end, four M-8220 high-capacity manifold stations were installed into ground vaults to distribute heated water from the mechanical room to the 14,400 ft² exterior areas. These manifolds were connected using 6,700 linear feet of 3/4" LegendFlex for the runs, which included 26 total loops that required an average flow rate of 3.5 gpm. Because of the high flow rate requirements, the M-8220 manifolds, which offers flow rates of 10 to 15 gpm per circuit, were an optimal choice to handle these runs. The tube runs were laid with the aid of Legend's tube mounting rails, which kept the tube evenly spaced while it was fastened to the underlayment before paver stones were set. Legend's team of experts was able to nimbly respond to all changes in project requirements, keeping the project's timeline on track, with exceptions for state-mandated COVID-19 shutdowns that affected the entire crew.

Shepherd's Hollow officially opened The Station's banquet hall and adjoining patio areas for various functions at the end of 2021.

