

The Harbour School HVAC System Renovation



About The Harbour School

The Harbour School opened in 1982 with the mission to provide a supportive, caring and individualized education to students with learning disabilities, autism, speech language impairments and other disabilities like ADD/ADHD by assisting each child to attain academic and personal achievement and success commensurate with the child's abilities. Personal achievement includes success in social, physical and vocational skills.

Harbour School Challenges

There were three key points of frustration that Harbour School were experiencing with the existing system which comprised 27 water sourced heat pumps and a cooling tower connected by underground piping.

- Unreliability
- Lack of comfort within the building
- Cost of operation & maintenance

The existing equipment failed regularly and even when working, was not delivering the comfort heating and cooling required by the students and faculty. There were constant complaints about the lack of controllability within the various classrooms and open areas throughout the school. The high costs of operation, in terms of utility costs, were exacerbated by the need to maintain multiple pieces of equipment that had outlived their useful life.

The GMS Solution

The breaking point for the customer came after the existing underground piping disintegrated, allowing debris and dirt to enter into the condensing loop. This clogged the pumps causing continuous failures and furthermore, de-rated the pumps due to contamination. Although temporary piping was installed as a stop-gap measure, it was decided that continuing to patch repair the failing HVAC system was not a good investment for the school.

GMS worked with the Harbour School to select a more efficient solution that meets their needs and helps to maintain best management practices in energy conservation as part of an ongoing commitment to a healthy school environment. As a MODEL Green School within the award winning Maryland Green Schools Program from the Maryland Association for Environmental and Outdoor Education (MAEOE), it was extremely important that the chosen system would significantly reduce energy use.

Benefits of Daikin System

- Quietness of the system
- IEER in the 20's
- Zoned heating/cooling
- Simultaneous heating and cooling capabilities
- Lower operating costs – estimated 44%



Major Milestones

- Above ground temporary piping installed April 2013
- New GMS solution approved June 2013
- Complete installation finalized in September 2013

More Information

Please visit our Website at www.gms-hvac.com



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Cont. After looking at several options, GMS recommended the installation of a completely new HVAC system manufactured by Daikin. This type of solution is known as a VRF System and is considered one of the most efficient mechanically driven air conditioning systems on the market with Integrated Energy Efficiency Ratios (IEER)* in the 20's. The system works by distributing heating and cooling into different "zones" each with its own thermostat to afford more control of the temperature throughout the building. For example, a zone that houses the facility's servers and telecommunications equipment, by necessity, should be kept cooler than an active classroom.

Technical Implementation

The main challenge facing GMS during the implementation was the need to install the solution while the building was fully occupied. GMS used a phased approach which meant switching the installation crew over to working nights for the duration of the project; and ensuring that each zone was completed in a timely manner so that the rooms could be quickly re-occupied.

The system installed by GMS is comprised of three (3) 18-ton and one (1) 16-ton condenser units which are linked outside with refrigerant piping that comes in from roof penetrations to the inside of the school. This translates to considerably less refrigerant piping overall than a regular HVAC system. The condenser units link into branch selector boxes which are located in each zone, as discussed and agreed during the planning process.

The branch selector boxes are placed upstream of all distribution units (wall and ceiling cassettes) within the zones and control the mode, i.e. heating or cooling. Each zone is controlled separately by a wired controller and can be set at the required temperature for each individual space.

A unique aspect to this implementation was how GMS enhanced the system by providing additional redundancy. This means that even if one of the condenser units on the roof fails, the school can still maintain heating & cooling as required.

Results & Benefits

The installation process ran smoothly from both the perspective of the customer and GMS. The project was completed on time and on budget and resulted in a final rebate check, post installation, from Baltimore Gas & Electric for over \$40,000.

Ultimately, the Daikin system was considered ideal for the school because it solved two of their biggest challenges: maintaining a comfortable climate for students and faculty; and lowering their energy usage and utility costs by an estimated 44%. An additional benefit of the zoned solution was the ability for GMS to provide a "staggered" installation process which allowed the school to operate close to normal while the project was carried out. One final unforeseen benefit of the system was the "quietness".

"Many of our students have difficulty with change and the continuing disruption of heating and/or air conditioning failures was very upsetting to them and increased learning challenges."

"We are so pleased with GMS' performance on this project that The Harbour School has hired them for two other projects and we are considering them for a third."

Elizabeth Dellow, Building Engineer & Security Officer, The Harbour School

Evaluation Criteria at The Harbour School

- Ability to control temperature within the different school areas
- Installation costs
- Fast delivery & installation outside of school hours
- Service & maintenance costs
- Energy costs



Benefits to Harbour School

- Increased reliability
- Simultaneous heating & cooling
- Significantly lower cost of operation
- Significantly lower energy costs – estimated at 44%
- Greatly improved comfort within the school for students and faculty
- Noise reduction

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* IEER is intended to be used as a representation of part load performance for energy comparisons of similar systems to Variable Refrigerant Flow (VRF) Multi Split systems. With 11.00 EER being on the low end of the efficiency scale and 23.00 EER on the high end, the Daikin solution is one of the most efficient systems currently on the market.