



# CASE STUDY



## Hawthorn Mall

# CONTROLS UPGRADE HELPS REDUCE ENERGY COSTS AND ENSURE SHOPPER COMFORT

## CARRIER COMMERCIAL SERVICE UPGRADES CHILLER PLANT TO DELIVER EFFICIENCY AND PRECISE CONTROL



*Close collaboration between Carrier Commercial Service and Hawthorn Mall personnel resulted in a complete turnkey project which fully-automated Hawthorn Mall's chiller plant using high-efficiency Carrier chillers and advanced i-Vu® controls.*

## Project Objectives

Hawthorn Mall is a top Chicago shopping center located in the northern suburb of Vernon Hills. In 2015, as part of a \$50 million redevelopment project, the mall's owners determined that the existing, aging chiller plant needed to be upgraded. In addition, the entire chilled water system needed a modern controls solution to help reduce energy costs and increase operating efficiency.

*"Not only does our new chiller plant conserve energy, but it also helps provide a more comfortable shopping environment for our customers."*

— Jeffrey Rutzen  
General Manager,  
Hawthorn Mall

## The Solution

The management of Hawthorn Mall had a long service history with Carrier Commercial Service (Carrier) of Chicago and selected them to execute their chiller plant and accompanying system upgrade due to the trusted relationship with Carrier's sales and service staff. Carrier had been maintaining the existing three Carrier chillers for many years, and in 2013 began discussions to update the chillers and controls to help improve the operating efficiency of the mall's entire heating, ventilating and air conditioning (HVAC) system. As problems with the chillers developed—one chiller lost its full R12 refrigerant charge—plans accelerated to replace two of the mall's chillers and fully automate the plant with an i-Vu® control system.



It was determined that the entire retrofit project would be executed in phases. Phase one would replace the existing chillers, install new chilled water pumps with variable frequency drives (VFDs), add new condenser water pumps, and convert the chiller plant from constant flow to variable flow. In addition, i-Vu controls would be added to automate the plant. Phase two integrated other building systems (like AHUs and lighting) into the i-Vu control system. Phase three would optimize the entire chilled water plant.



## Synopsis

With Carrier's successful chiller plant and controls upgrade at Hawthorn Mall, its owners are now experiencing reduced energy costs, operational efficiencies, and precise comfort delivered to shoppers throughout the entire mall. This outcome was the result of a long-standing relationship with Carrier, which combined detailed consultations on their chiller plant, comprehensive maintenance programs, and ongoing support.

"For years, we've communicated closely with the owners of Hawthorn Mall regarding their chiller plant. We made sure that when the time was right for the upgrade, they were well informed as to the many benefits of combining Carrier chillers and i-Vu® controls, our Carrier ChillerVu™ chiller plant management system, and how to best optimize the entire HVAC system," said Susan Peters, Sales Specialist, Carrier.

The chiller plant upgrade began with the installation of two new Carrier high-efficiency, variable-flow AquaEdge® 1300 ton 19XRV chillers. Two new condenser and two new chilled water pumps with integral variable frequency drives (VFDs) were also installed. The three-way valves on the air handling units (AHUs) were converted to two-way valves.

Carrier's ChillerVu plant system manager was added to manage the chillers, pumps, AHUs, and cooling towers and to fully automate the mall's entire chiller plant for improved efficiency. "The chiller plant has a Carrier ChillerVu module with three expansion cards. There are also 16 air handlers, where each uses an i-Vu UCXP module for control of the economizer, chilled water valve, and VFDs for the supply and return fans. We also have an i-Vu UCXP with an expansion module to control the parking lot lights and the mall's interior lighting, providing Hawthorn with a fully automated i-Vu control solution," commented Eric Pederson, Engineering Technician, Carrier.

"We're very pleased with the Hawthorn Mall chiller plant upgrade project. Carrier's comprehensive knowledge of our entire system and their recommendations for, and subsequent installation of, the mall's new central plant and ChillerVu control system will improve efficiency and reduce our operating costs," stated George Barth, Hawthorn Mall's Chief Engineer.

After the new chillers, pumps, and plant controls were installed, Carrier's ChillerVu chilled water system optimizer was added, which fully optimized the chilled water system by closely managing the chilled water and condenser water supply temperatures to provide optimal energy usage for the mall.

"The new Carrier chilled water system optimizer has proven to run our plant more efficiently with a noticeable savings in energy usage. As a company that strives to be more sustainable and efficient, this was an important step towards achieving our overall goal," said Thomas Sheehy, Hawthorn Mall's Facility Manager.

For further peace-of-mind, Carrier monitors the electrical consumption of the mall's chiller plant equipment (chillers, pumps, fans, cooling towers, and air handler VFDs), using the i-Vu building automation system and provides insights to the staff at Hawthorn Mall. "Combining Carrier's i-Vu chiller plant controls, Carrier chillers, and the expertise of Carrier has enabled a winning solution that aligns perfectly with customer requirements," commented Brian Leduc, Product Manager, Carrier Commercial Controls.

Finally, Carrier's Susan Peters assisted Hawthorn Mall's management to apply for, and ultimately receive, \$204,000.00 of incentive money for the chiller plant upgrades from ComEd, the local utility.

## Project Summary

**LOCATION:** Vernon Hills, IL

**PROJECT TYPE:** Retrofit - Chiller Plant Upgrade

**BUILDING SIZE:** 1,295,915 ft<sup>2</sup>

**FACILITY USAGE:** Retail Mall

**OBJECTIVES:** Replace existing chillers, add VFD pumps and fans, and convert chiller plant from constant flow to variable flow. Implement a controls solution to automate and optimize entire chiller plant for increased energy savings and a more comfortable shopping environment.

**EQUIPMENT:** Two Carrier high-efficiency, variable-flow AquaEdge® 1300 ton 19XRV chillers

**TOTAL COOLING TONS:** 2,600

**CONTROLS:** Carrier ChillerVu Plant System Manager, UCXP control modules, and Carrier ChillerVu Chilled Water System Optimizer

**MAJOR DECISION DRIVERS:** Long standing relationship with Carrier Commercial Service, delivery of the total project, new system can easily be expanded to accommodate future addition of equipment and controls.

**INSTALLATION DATE:** Phased - 2017, 2019 and 2020

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