



Greater Rochester International Airport

Building Management System and Chiller Replacement Project

Rochester NY

GRIA BMS and CRP

Scope: Building Management System and Chiller Replacement

Overview:

An outdated and failing building management system along with a large percentage of the mechanical equipment being pneumatically controlled yielded the need for a campus wide building management system. In addition to the existing building management system failing, the existing centrifugal chillers were far past the service life with no backup chillers available. The absorption chiller was no longer operational as the heat source at the airport was eliminated. VS Energy was a specialty subconsultant in the design of a new chilled water system and a facility wide building management system. VS Energy commissioned the building management system controls and the new 1800 ton chilled water plant, and performed construction administration for both projects.

Stated Objectives / Problems:

A new Primary/Secondary chilled water plant to be designed with the aid of VS Energy. Existing chilled water piping needed to be utilized to reduce construction costs.

A campus wide Building Management System to be designed to incorporate all major mechanical equipment including magnetic bearing chillers, VFD air handling units, make up air units, VFD pumps, over 250 VAV boxes, 9 lighting control panels and an energy monitoring dashboard.

VS Energy Process:

- Design:
 - CHA and VS Energy engineered and specified the upgraded chilled water plant to incorporate a new Primary/Secondary chilled water system to utilize highly efficient magnetic bearing chillers. The existing chilled water plant was designed as a chiller adder design with pumped primary loop. Innate weaknesses on the chiller adder design include primary chilled water temperature greater than optimal for dehumidification, and excessive pumping requirements at less than 100 percent of full load. The entire existing chilled water system was surveyed to determine where existing chilled water piping could be utilized to reduce the total construction costs. All new pumps and piping were sized appropriately to ensure adequate operation of all mechanical equipment, plus sufficient redundancy to assure uninterrupted cooling operation.
 - CHA surveyed the existing Building Management System for the Greater Rochester International Airport and engineered an extensive campus wide Building Management System to incorporate 4 magnetic bearing chillers, 4 gas boilers, 15 VFD Air handling Units, all chilled and hot water pumps, and over 250 VAV boxes.

- VS Energy aided in generating the sequence of operations for all HVAC equipment within the facility.
- VS Energy participated in 30, 50, and 70% meetings with stakeholders, and prepared project budgets.
- Contractor scope and selection
 - VS Energy and CHA prepared all scope and bid documents for the BMS and Chiller replacement projects.
 - Post receipt of bids, pricing and interviews of contractors were completed by VS Energy.
 - Submittal review and approval of all controls related items by VS Energy.
- Construction Management
 - Construction Administration and Site Safety was performed by VS Energy.
 - VS Energy maintained a QA manager and commissioning agent on site for the duration of construction.
 - VSE Responsibilities included daily contractor coordination, weekly project meetings, review of field changes and contract modifications.
 - During construction numerous controls changes were required to incorporate the constantly changing facility. VS Energy generated Informational Bulletins with scope descriptions and drawings to direct the work of the contractor. VS Energy provided field direction where existing site conditions and/or future work plans interfered with the installation of the new network infrastructure.
 - VS Energy provided design and scope documents for contractors to facilitate completion of the additional work by the contract completion date. Funds were reallocated from within the terminal renovations project.
- Commissioning
 - VS Energy developed and executed a comprehensive commissioning plan for the Building Management System controls at GRIA.
- Close Out
 - VS Energy reviewed contractor submitted as-built documentation including complete control drawings, piping drawings, wiring drawings, and made final approval of all hardware documentation for submission to GRIA as complete Building Management System and Chiller Plant as built packages.

Results:

- Building Management System
 - A campus wide building management system with BACnet integration and direct digital control (DDC) over 15 VFD AHU's, 2 Make Up air units, 4 Magnetic Bearing Chillers, 10 Chilled water pumps, 9 lighting control panels, and 256 VAV boxes is fully operational and accessible from the Monroe County facilities network.
 - All equipment communicating with the BMS is controlled to run at optimal efficiency utilizing variable frequency drives, differential pressure control for all pumps, parallel pumping for all VFD pumps, Demand Control Ventilation for all holding area VAV's, etc.

- Equipment failure alarms are available via the BMS at any operator workstation or via any facility network enabled device.
- Chiller Replacement Project
 - A new primary secondary piping configuration is fully operational at the Greater Rochester International Airport.
 - 42 Degree chilled water is supplied to all Air Handling Units to allow for design operation of all AHU's to maintain building dewpoint adequate for passive chilled beam
 - New variable speed pumps have been installed for all chilled water pumping applications.
 - Highly efficient magnetic bearing centrifugal chillers operate in parallel for peak operational efficiency and longevity of the system.