

# NORTH SYRACUSE CENTRAL SCHOOL DISTRICT – BEAR ROAD ELEMENTARY SCHOOL NET ZERO ENERGY



## DESIGN SERVICES PROVIDED:

- Mechanical
- Electrical
- Plumbing
- Fire Protection

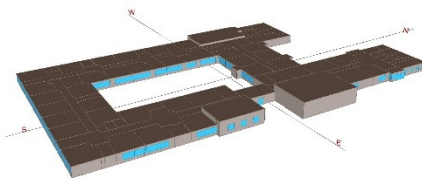
## BACKGROUND

The Bear Road Elementary School at North Syracuse Central School District needed renovation and expansion to meet the needs of their community. The district officials also decided to use this design as a statement of their support of the environment and their community by achieving Zero Net Energy and optimizing the building infrastructure for occupant comfort. This led the design team utilize Integrated Performance Design process that includes the Performance Modeling approach to achieve all the district's goals.



## APPROACH

The mechanical and electrical systems design approach for this project begins with the Performance Modeling at the earliest stages in the design process. The team started with a building energy model of the baseline design parameters as set by building code. The team then analyzed each building system with a primary goal of reducing the Energy Use Intensity (EUI) of the building. Other project goals include equipment life cycle cost, maintenance requirements, utility costs and thermal comfort. Multiple iterations of the model have been completed to capture the integrated aspect of each design decision. The modeling process analyzed various components of the envelope, the lighting system, domestic water heating system, and the HVAC system. Multiple design options were analyzed for each system, focusing on the EUI reduction of the whole building. Specifically, the use of natural gas was analyzed in fine detail.



## RESULTS

The Integrated Design Process was proven to be highly successful, meeting the energy goals while achieving reduced utility costs, reduced expected maintenance costs and creating a high level of thermal comfort. The measures that were utilized for this project included:

- High performance Envelope
- High efficiency lighting systems, including daylighting controls and occupancy sensors
- High efficiency domestic water heater with supplemental solar water heating
- Variable speed hot water and chilled water pumping
- Variable speed fans
- Demand controlled ventilation
- Energy recovery ventilation
- High efficiency boilers and chillers
- Radiant perimeter heating strategies
- Displacement Ventilation Diffusion

Projected Energy Use Intensity (EUI)	
Baseline (Code Minimum)	73.0
Full Electric Heating	28.2
Natural Gas Heating	29.4

Projected Savings of Design (VAV)	
Electric	35%
Natural Gas	64%
Utility Cost	46%

This building design has been approved for an incentive of \$88,812 under the NYSERDA New Construction Program. IBC Engineering was the energy modeling partner commissioned to perform the incentive analysis of the building in addition to the Performance Modeling required for the ZNE design goals.