

Bentworth Middle School

Bentleyville, PA



Kyle Courtney | Mechanical Option

Statistics

Building Size:

83,800 Square Feet

Number of Stories:

3 Stories Above Grade

Project Competition Date:

January 2009

Overall Project Cost:

\$18 Million

Project Delivery Method:

Design-Bid-Build



Conceptual Sketch

New Bentworth Middle School

Project Team

Owner:

Bentworth Middle School

Architect:

Hayes Large Architects

Construction Manager:

Oxford Development Co.

MEP Engineer:

Hayes Large Architects

Structural Engineer:

Atlantic Engineering Services

Civil Engineer:

The EADS Group

Geotech Consultant:

CMT Laboratories, Inc.

Food Service Consultant:

McFarland Kistler &
Associates, Inc.

Architecture

The entrance of the building focused around a central hexagonal lobby which acts as a node separating the academic wing from the rest of the building. Therefore, areas such as office space, music and physical education rooms, cafeteria, and gymnasium are located in a separate, single story wing where the noise associated with these spaces will not disturb the learning process. The academic wing consists of three floors, all of which are arranged in an "L-shape". This design allows the classrooms located to either side of a central corridor to be provided with natural light and excellent views of the surrounding suburban area.

Mechanical

A geothermal system consisting of 96 six inch diameter wells, each of which are 350 feet deep, allows for the building to either gain or reject heat to the ground depending on the building's heating and cooling needs. The loopfield then feeds the building's heat pumps which provide heated or cooled air to the building spaces. There are six roof top heat pump units which provide ventilation air to the classroom, library, and administration area heat pumps or service large single zones such as the cafeteria, stage, gymnasium, and kitchen.

Electrical/Lighting

The main switchboard in the building is a three sectioned 2000A, 277/480V, 3 phase, 4 wire board and the second switchboard, which stems off of the first, is a 1600A 120/208V, 3 phase, 4 wire board. Emergency power is provided by an 85KW generator and provides power to two separate automatic transfer switches. Classrooms spaces are primarily lit by T5 luminaires while hallways makes use of T8's and compact fluorescence lamps. The gymnasium makes use of metal halide luminaires.

Structural

The academic wing's foundation is a continuous concrete wall footing which supports a 4" slab on grade. This foundation supports load bearing, reinforced concrete masonry walls and floors made of precast planks with a 2" reinforced concrete topping. The second wing of the building has the same foundation and not only makes use of load bearing, reinforced concrete masonry walls, but also steel beams and K-joists. The prefinished standing seam metal roofing system is supported by light gauge metal trusses and walls.