

B2E CONSULTING ENGINEERS

B2E Consulting Engineers, P.C. is a service oriented engineering consulting firm based in the northern Virginia metropolitan area .

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PAINT BRANCH HIGH SCHOOL OPENS AFTER SIX YEARS OF DESIGN AND CONSTRUCTION *“The Largest Ground-Source Heat Pump System in the State of Maryland”*

B2E Consulting Engineers, P.C. has been designing ground-source heat pump systems since 1994. Our latest designs are for Montgomery County Public Schools, Stafford County Public Schools and Alexandria City Public Schools. Each of these clients prefer a different approach to the HVAC system design.

Montgomery County Public Schools - Paint Branch High School

This HVAC system serves a 390,000 square foot building. The design uses 600 wells, 500-feet deep with 4,200 gpm condenser water flow rate. This equates to 1,400 tons of cooling capacity. The system is arranged using three (3) 250 HP variable speed pumps which operate in parallel with a redundant standby pump. The large condenser water pump motors are driven using “Ultra-Low Harmonic Distortion AFD’s”. Each pump is supplied with a motor grounding ring to extend bearing life. The pumps are supported on a separate concrete foundation.

The systems use 100% dedicated outside air custom energy recovery units which serve neutral ventilation air to each space. These units are complex custom refrigeration heat pump systems. Packaged ducted and ductless heat pump units serving individual spaces are connected to the ground loop heat exchanger as well. There are numerous specialty spaces which have special system arrangements and controls.

The ground-loop heat exchanger (GLHX) is separated from the building using a valve house. Two (2) 14-inch diameter HDPE pipes run over 2,000 feet from the valve house to a building location on the site. One complete pass of the piping circuit is more than a mile long. The valve house contains 60 sets of 3-inch HDPE pipes which feed underground from the valve house

to the borefield. Each borefield uses one set of 1-1/4-inch HDPE pipe for the riser. Ten sets are connected to each 3-inch manifold header.



PBHS BUILDING UNDER CONSTRUCTION—LEED GOLD

The building is monitored and controlled using a full DDC electronic Energy Management System (EMS) to control scheduling and sequences to maintain comfort control throughout the building. The custom HVAC units are equipped with EMS components provided to the factory where they were installed and tested prior to shipping to the site.



PBHS Valve House Piping - During Construction

