

# GEOTHERMAL HEATING & COOLING: GREAT FALLS ELEMENTARY SCHOOL

**Great Falls Elementary School** is one of the few Maine public schools to be heated and air conditioned by a geothermal heat pump system—which uses the ground as a heat exchanger by circulating fluid through pipes deep in the ground. Although the pipes are called “wells,” no water is extracted from or returned to the aquifer. This technology saves significant fuel and operating costs and increases comfort.

The fluid enters the building at about 42 degrees in winter and 55 degrees in summer. During the winter, the heat in the fluid is concentrated by the heat pumps and transferred to air, which is blown into each room. During the summer, the process is reversed: the heat is transferred to the fluid, which carries it back to the field.

## Closed-loop geothermal heating and cooling systems:

- Save fuel and operating costs
- Do not burn fossil fuels
- Are cost-effective in cold climates
- Enable energy management systems (EMS) to control the temperature of individual spaces
- Do not contaminate the aquifer

Architect:

**PDT Architects**

Geothermal consultant:

**Mancini, Saldan Ltd.**

Mechanical engineer:

**Bennett Engineering**

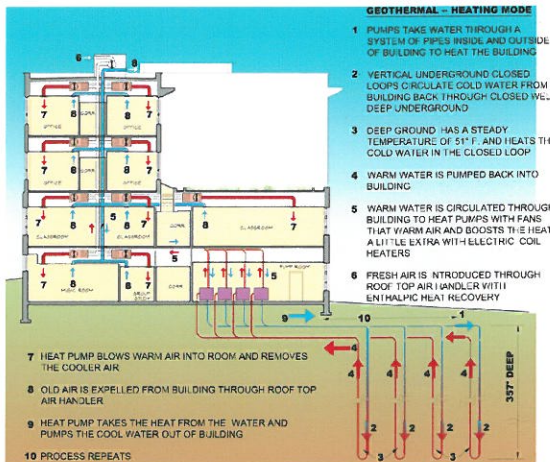


Diagram of typical geothermal heating and cooling system. This is not a diagram of Great Falls Elementary School.



1 Fifty-nine bore holes were drilled to a depth of 400 feet.



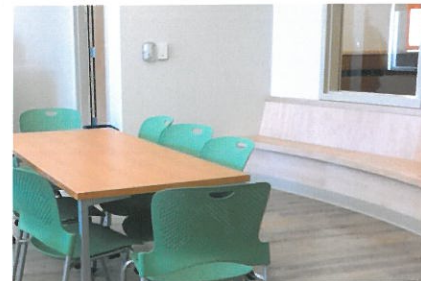
2 A loop of piping from each bore hole enters the building underground.



3 The loops are filled with fluid, which absorbs heat from the earth.



4 Heat pumps extract BTUs from the fluid and transfer it to air, which is blown through ducts into each room.



5 Energy-saving sensors in every room help the energy management system (EMS) control temperature and fresh air.



6 The bore field is now the soccer field.



**ARCHITECTS**