

Geologic and Hydrogeologic Conditions beneath St. Patrick's Cathedral, Manhattan, New York City, NY

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The Archdiocese of New York City recently updated the heating and cooling system at St. Patrick's Cathedral in Manhattan, NYC, with a new geothermal, or "ground-source," heat pump system. Ten deep standing column wells were drilled to access the geothermal resource. Well depths ranged from 800 to 2,200 feet deep and depended on bedrock conditions and staying within the allowable property line limits. The drilling penetrated the Hartland Formation to a lower depth of about 800 to 900 feet, then extended into the Manhattan Schist Formation for the remainder of the well depth. Unexpected highly-fractured, water-bearing conditions were found at Cameron's Line, the boundary between the two formations at all ten well locations.

Testing on the well field was performed to establish baseline subsurface conditions and included inspection of drill cuttings, borehole geophysical logging, a pumping test with re-injection, and groundwater quality testing and thermal profiling. Borehole deviation was also monitored per NYSDEC drilling permit requirements to ensure the wells would not violate the drift limits.