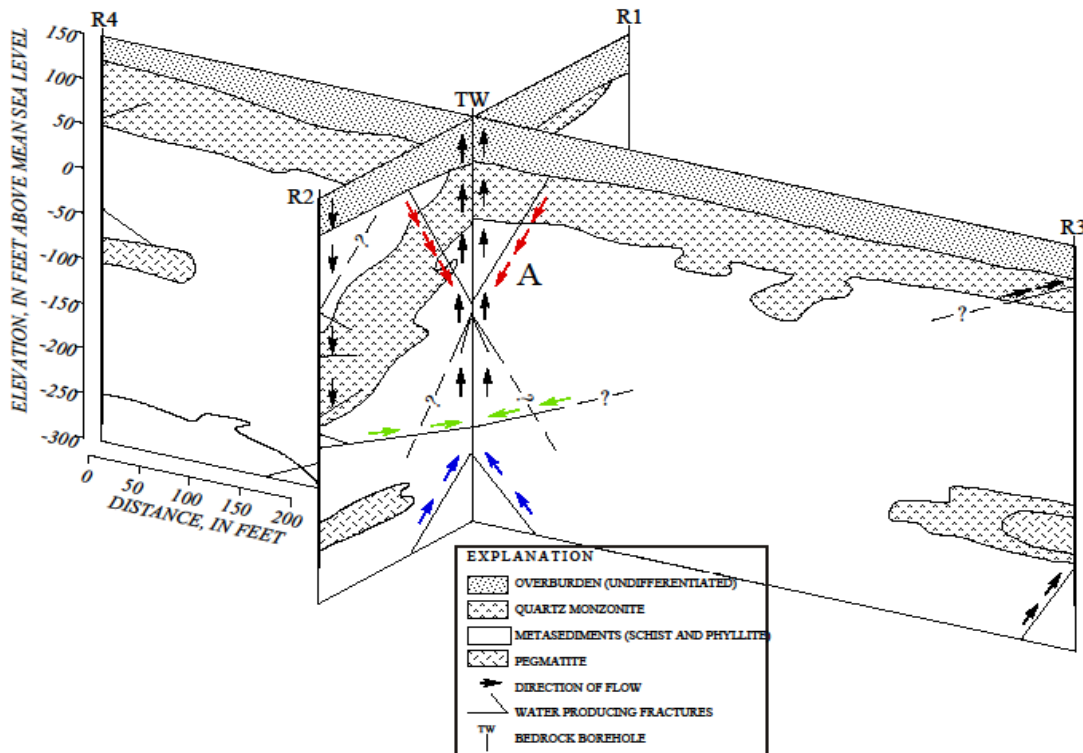


USING HYDROPHYSICAL AND GEOPHYSICAL LOGGING FOR WATER SUPPLY & WELLHEAD PROTECTION AREA DELINEATION

Borehole hydrophysical and geophysical log data can be analyzed to refine the conceptual model of an aquifer. In this case (Vernon, et al., 1993) borehole logging data provided important and useful information about the flow system of a fractured crystalline bedrock aquifer in the vicinity of a proposed water supply well. These results played an important role in refining the conceptual hydrogeologic model for the site.

The geophysical logging suggested that the wells at the site were intersected by many moderately to steeply dipping fractures. The flow data suggested direct fracture connection between two and possibly more of the wells at the site, which explains the rapid flow in the north/northwesterly direction documented during the pumping and dye tracing test. While it is impossible to know if these fractures extend beyond the wellfield, all the results provided information that was used to test and improve models of aquifer response to groundwater production from the water supply well and to assess the potential for contamination in the wellhead area.

The hydrophysical logging allowed for characterization of water quality parameters and profiling with depth in the wellbore. In addition, this information indicated conditions such as stratification of water with different characteristics in boreholes, cross connection of boreholes, or probable connection of certain fractures to overlying, saturated surficial deposits. The borehole data, including the image data (acoustic televiewer) and the hydrophysical logging methods in combination, indicate direct fracture connection between two and possibly more of the wells at the site, which explains the rapid flow in the north/northwesterly direction documented during the pumping and dye tracing tests.



Fence diagram with interpretation of source areas for identified water bearing fractures. Interpretation based on results of acoustic televiewer and hydrophysical logging.