

Prepared in cooperation with the
Naval Facilities Engineering Command

Simulation of Zones of Groundwater Contribution to Three Production Well Fields Southwest of the Naval Weapons Industrial Reserve Plant, Bethpage, New York

By using numerical groundwater flow modeling techniques, this USGS study will provide a better understanding of capture zones of wells.

Summary

The objective is to develop a steady-state groundwater flow model and calibrate it with available hydraulic gradient data to support the evaluation of the capture zones of production wells pumping at their rated capacity and in relation to the contaminant plumes (shallow and deep) in their vicinity.

The U. S. Geological Survey (USGS) will conduct simulations using existing aquifer data, including geologic logs from vertical profile borings (VPBs) and well installations, water levels, and pump test data available from the water districts for these production wells. Subsequently USGS will incorporate data from a groundwater pump test and additional data from new VPBs and monitoring wells. Using particle tracking maps, USGS will illustrate the spatial configuration of the capture zone and percentage of capture of the shallow and deep plumes in each production well. The model area will be limited to achieve these objectives and make maximum use of available sampling locations in the region.

USGS will also conduct three more simulations of changed conditions or configurations that will be based on the findings of the initial modeling. Examples of changed conditions could include a theoretical increase or decrease in the pumping rates of the production wells or a theoretical change in the screened interval of the production wells.

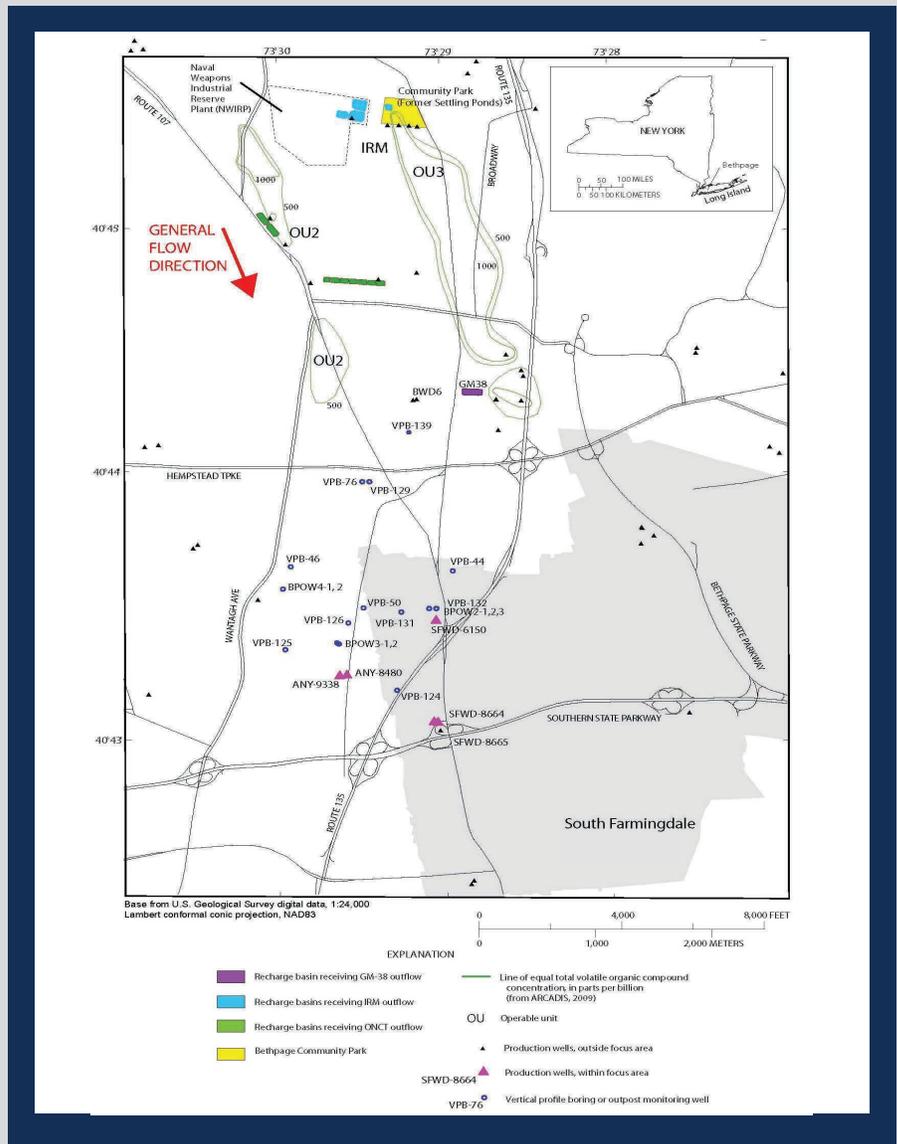


Figure 1. Map showing generalized groundwater- flow direction, production wells, recharge basins, mapped volatile organic compound plumes adjacent to the Naval Weapons Industrial Reserve Plant (NWIRP), and other local features

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For Additional Information

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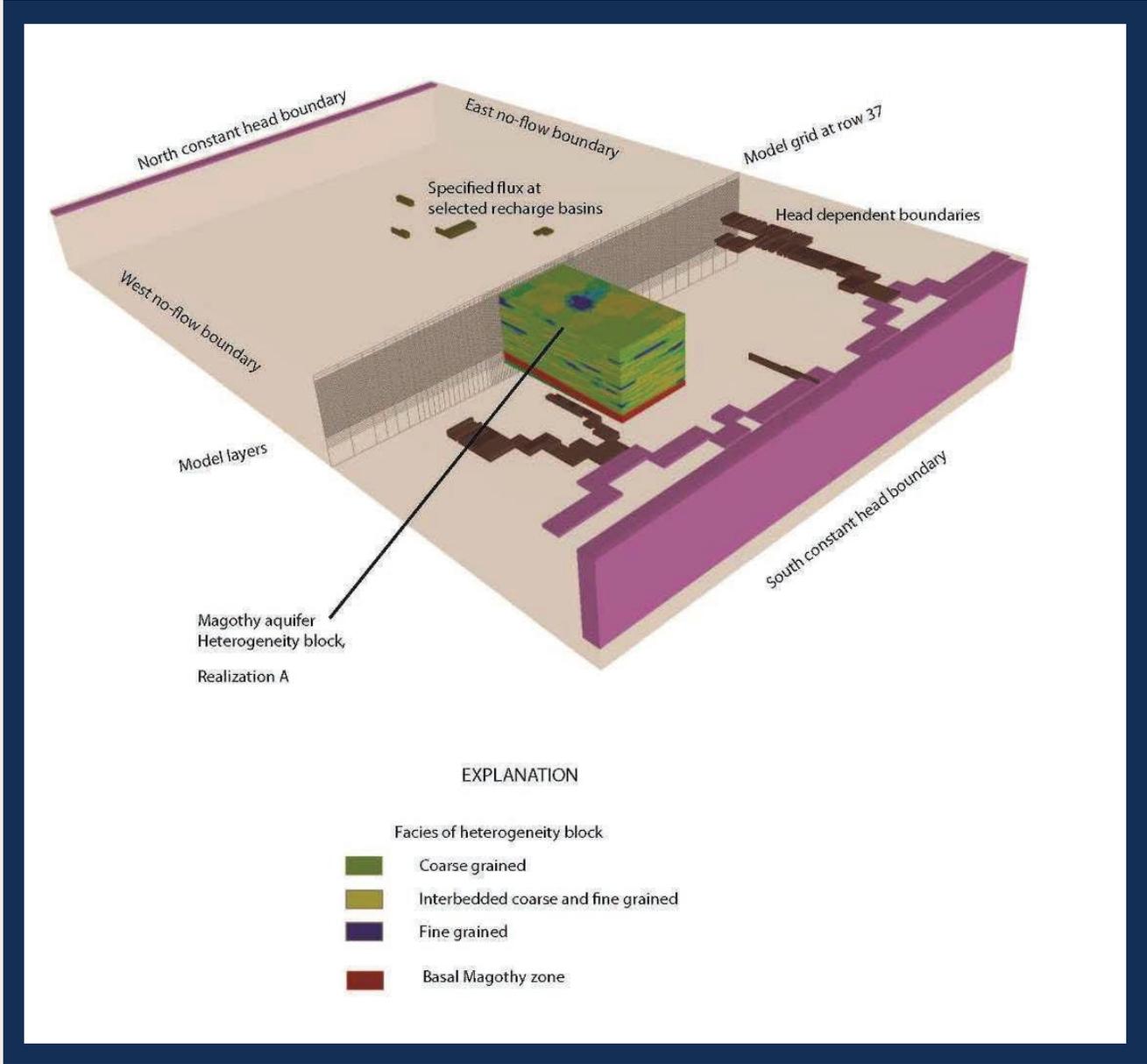


Figure 2. Block diagram showing conditional realization of Magothy aquifer heterogeneity within regional groundwater flow model with boundary conditions and model grid