A hydrogeological investigation at the Crane Mountain Landfill, Saint John, New Brunswick

M.P. Jacobs[1], T.A. Al[1], and K.T. MacQuarrie[2]

1. Department of Earth Sciences, University of New Brunswick, Fredericton, New Brunswick E3B 5A3
2. Department of Civil Engineering, University of New Brunswick, Fredericton, New Brunswick E3B 5A3

The Crane Mountain Landfill is located in southern New Brunswick and is operated by the Fundy Region Solid Waste Commission (FRSWC). Although 61 monitoring wells are located on and around the site, they have mostly been used for water-quality sampling, and the groundwater flow system is not well understood. This study, sponsored by the Fundy Regional Solid Waste Commission, was designed to develop a better understanding of the hydrogeology of the site. The landfill is an engineered system designed with clay and geomembrane barriers, and a leachate collection system. It is underlain by glacial till that may be up to 20 m thick, and the till overlies fractured tonalite with minor argillite. Outcrop is sparse, but from observations at ten

Atlantic Geology, 2013, Volume 49, Number 1

locations the bedrock is moderately to highly fractured.

Continuous monitoring of hydraulic head at 24 well locations over a period of ten months indicates a variety of hydraulic responses to precipitation and snowmelt. They include: (1) rapid response indicating a shallow, unconfined aquifer condition; (2) no response indicating the monitoring well is isolated in unfractured bedrock; and (3) a time lag indicative of a confined aquifer condition. Pump tests were conducted at three water supply wells, while continuously recording head in surrounding monitoring wells, to investigate the connectivity of the fracture network and its influence on groundwater flow. The data collected from these tests will be used to construct a site conceptual model to visualize the influence of geologic features such as lithology, fracture network, and distribution of glacial till on groundwater flow beneath and adjacent to the landfill.