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Application of a hydrogeological conceptual model, south-central Ontario

Gerber, R.E. and Holysh, S., *Oak Ridges Moraine Groundwater Program, 101 Exchange Avenue, Vaughan, ON L4K 5R6, rgerber@owrc.ca*

Often political and public perception is that we don't know enough about our groundwater flow systems to make effective decisions. Scientists also express frustration with the lack of readily available data and information. Perhaps the problem is simply that we as scientists have not done an adequate job of disseminating the wealth of hydrogeologic knowledge in a readily digestible format. This is illustrated through water resource management decisions and infrastructure installation problems that proceed seemingly unaware of the historical lessons learned regarding the hydraulic function of the flow system setting.

A regional three-dimensional geologic and hydrogeological understanding of subsurface conditions can be a very powerful tool to apply not only to regional initiatives such as water resources management but also to more local site specific investigations. A regional understanding of the hydrogeologic architecture (i.e. the conceptual model) should ideally draw upon subsurface information (e.g. borehole geology, hydraulic properties, water levels and chemistry) generated from historical projects. To effectively draw upon a wide pool of available information and to synthesize the information into a defensible conceptual model, a management and analysis system is necessary.

The philosophy for developing a regional conceptual model is that information and knowledge gained from previous projects can benefit future projects. This information allows specific sites under investigation to be placed into context within the regional flow system, and also to perhaps benefit from the knowledge gained from other similar hydraulic settings. For example, is the site in an area with high groundwater pressures? How extensive is the aquifer that occurs beneath the site? Such information has ramifications to the construction methods proposed and also to the types of investigative methods that will need to be employed.

This presentation discusses the development and current state of the study area hydrogeological conceptual model, and how it can assist us in our future endeavours. Specifically discussed is the status of 'groundwater problem area' mapping that seeks to disseminate hydrogeologic knowledge in a format useful to public works, planning and scientific practitioners. A key feature of the conceptual model is that it is continuously subject to refinement as new data and information becomes available.