

A Strategy for Modeling Soil & Fractured Bedrock to Produce a Hydraulic Conductivity Model

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Abstract

Creating a geologic model from a borehole database (Figure 1) that includes unconsolidated materials overlying fractured layered formations can be challenging. Specifically, three-dimensional modeling of unconsolidated overburden such as glacial outwash requires 3-D block-modeling algorithm that accounts for units that are not laterally contiguous (Figure 2). Conversely, modeling sedimentary bedrock layers is best performed with 2-D grid interpolation algorithms (Figure 3). These 2-D grids are then used to create a 3-D block model and combined with the unconsolidated overburden model in order to produce a 3-D geology model (Figure 4). Fractures are then modeled (Figure 5) and added to the geology model (Figure 6). This fractured geology is converted to a hydraulic conductivity model (Figure 7) which is subsequently filtered based on a minimum K-factor to produce a BPI (Boolean Permeable / Impermeable) model (Figure 8) that serves as a constraining model for subsequent geochemical modeling (Figure 9).

