

COMPUTER MODELING

2-D and 3-D Ground Water Flow

Trans-Colorado Concrete - St. Barbara Sand and Gravel Mine

The proposed Saint Barbara gravel mine to be located in the Arkansas River alluvium east of Pueblo was sited such that it had the potential to impact both neighboring high capacity irrigation wells and an unlined ditch running along the north side of the alluvial valley. Martin and Wood initially carried out an analytical distance-drawdown calculation to make preliminary estimates as to the potential for any impacts on the wells and ditch. Subsequent to that work it was determined that a more detailed assessment was required.

Martin and Wood conceptualized, constructed

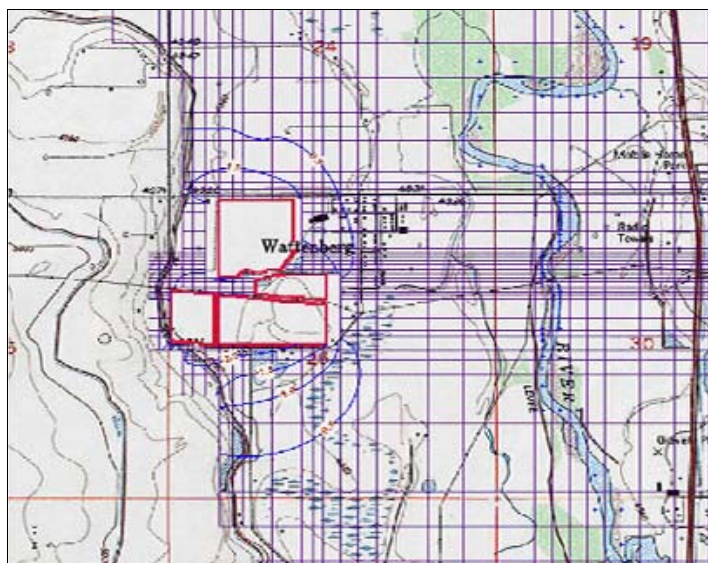
and ran a numerical ground water flow simulation of a significant portion of the alluvium that included the mine site, the irrigation wells, and the ditch. The Arkansas River was simulated, as was the local alluvial gradient. The model results indicated that the pit would have essentially no impact at all on the unlined ditch, but that there would be the potential for drawdown impacts to the closest wells resulting from the dewatered mining of the pit over time. This work allowed for formulation of remedial measures that would assist in preventing any negative impacts on the wells.

Asphalt Paving - Wattenberg Pit

Asphalt Paving was seeking to develop a gravel mining operation adjacent to the Town of Wattenberg in north-central Colorado. The pit was to lie west of the Town and along the western edge of the South Platte River alluvium. Immediately east of the Town was another previously mined pit that was now flooded. There were numerous water supply wells in the immediate area, and, given that Asphalt Paving was planning on conducting dewatered mining, it was necessary to determine whether the proposed mine operation presented any potential for drawdown-related impacts on the wells.

Martin and Wood constructed a numerical ground water flow simulation of the area and simulated the dewatered mining operations under both pre-existing conditions and with a slurry cut-off wall around the pit. The modeling results indicated that there would be a potential for

as much as 6 feet of drawdown at the closest wells if the slurry wall was not in place. This information was invaluable to Asphalt Paving in making its decision in the overall mine plans to construct a slurry wall to avoid drawdown in neighboring water supply wells.



Wattenberg Pit model grid

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