

Application of Distributed Value Property Zones Approach on the Hydraulic Conductivity for Real Site Located in Al-Najaf Region, Iraq to Investigate the Groundwater Resources

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Abstract : Groundwater accumulated at geological formations constitutes a worldwide vital water resource component which can be used to supply agriculture, industry, and domestic uses. The subsurface environment is affected by human activities; consequently, planning and sustainable management of aquifers require serious attention, especially as the world is exposed to the problem of global warming. Establishing accurate and efficient groundwater models will provide confident results for the behavior of the aquifer's system. The new approach, 'Distributed Value Property Zones,' available in Visual MODFLOW, is used to reconstruct the subsurface zones of the Al-Najaf region aquifer, and then its effect is compared with those manual and automated (PEST) approaches. Results show that the model has become more accurate with the use of the new approach, as the calibration and results analyses revealed. The assessment of the Al-Najaf region groundwater aquifer has revealed a degree of insufficiency of the required pumping demand, which reflects dry areas in both of the aquifer's layers. In addition, with pumping, the Euphrates River loses water of 7458 m³/day to the aquifer, while without pumping, it gains 28837 m³/day from the rainfall's recharge. The distributed value property zones approach achieves a precise groundwater model to assess the state of the Al-Najaf region aquifer.

Keywords : Al-Najaf region, distributed value property zones approach, hydraulic conductivity, groundwater modelling using visual MODFLOW

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