

## **Analysis of cutoff effect on groundwater seepage of underground structures in Aquifers of Shanghai**

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### **Summary**

With the process of urbanization, a large amount of infrastructures, e.g. metro tunnels, underground path, and building basement, is constructed in underground along coastal mega-cities, e.g. Shanghai, Tianjin, and Guangzhou etc. The existence of underground in aquifers within the urban region obstructs the behavior of seepage and results in the raise of groundwater level at the upper side and draw-down of groundwater level at the lower side of the structure. Therefore, rebound at the upper side and settlement at the lower side of underground structures may occur due to consolidation in long-term and redistribution of land subsidence in urban area may happen in a certain region. In order to verify the aforementioned phenomenon, a series of numerical analyses based on 3D-groundwater flow model and 1D-consolidation model was conducted to analyze behavior of seepage and land subsidence via considering the impact of understructures in the multi-aquifer-aquitard system (MAAS) of Shanghai. The whole aquifer with underground structures is assumed as a uniform material with a method of so-called effective hydraulic conductivity method. This method changes the aquifer with underground structures into another material with lower coefficient of hydraulic conductivity. The results revealed that the cutoff behavior of underground structures causes the average rate of subsidence in the urban area increase.

