ADELAIDE METROPOLITAN MODEL 2008

Purpose

The purpose of the Adelaide Metropolitan model 2008, as described in Zulfic et al. (2008), are to:

- determine the hydrogeological features, characteristics and factors affecting the responses of the Metropolitan Adelaide sedimentary aquifer system to stresses (extraction and injection) by compilation and analysis of relevant existing data
- provide a better understanding of groundwater flow in the T1 and T2 aquifers (particularly in the Fault Block zones)
- investigate groundwater flow path for the purposes of determining quantitatively inter-zone and inter-aquifer flows
- investigate the impact of future groundwater withdrawal from the T1 and T2 aquifers for better management of the resources
- provide a predictive tool to understand well interference under different groundwater use scenarios
- provide a tool to be use to optimise the allocation (distribution) of new wells and pumping volumes for sustainable use of the groundwater resources.

Background

From Zulfic et al. (2008), the demand for groundwater from the Adelaide Metropolitan Tertiary T1 and T2 aquifers was rising. Locally concentrated pumping had led to the development of cones of depression in areas to the north of the study area. It was therefore important for the groundwater resources of the Adelaide Metropolitan Area to be effectively managed for sustainable use. This groundwater model was constructed as a tool in managing the groundwater resources in the Adelaide Metropolitan area.

The model was built with Groundwater Modelling System (GMS) and is translated to Groundwater Vistas (GV).

Location

The location of the model domain is shown in Figure 1.

Model structure

Model domain and grid size

The model encompasses an area of approximately 1750 km^2 and extends 37 km (east to west) by 48 km (north to south). The bounding coordinates are 243393E, 6134247N (south-west) and 280132E, 6182003N (north-east) (GDA 1994, MGA Zone 54). The grid is rotated 315 degrees clock-wise so that the north and south boundaries are perpendicular to the regional groundwater flow direction.

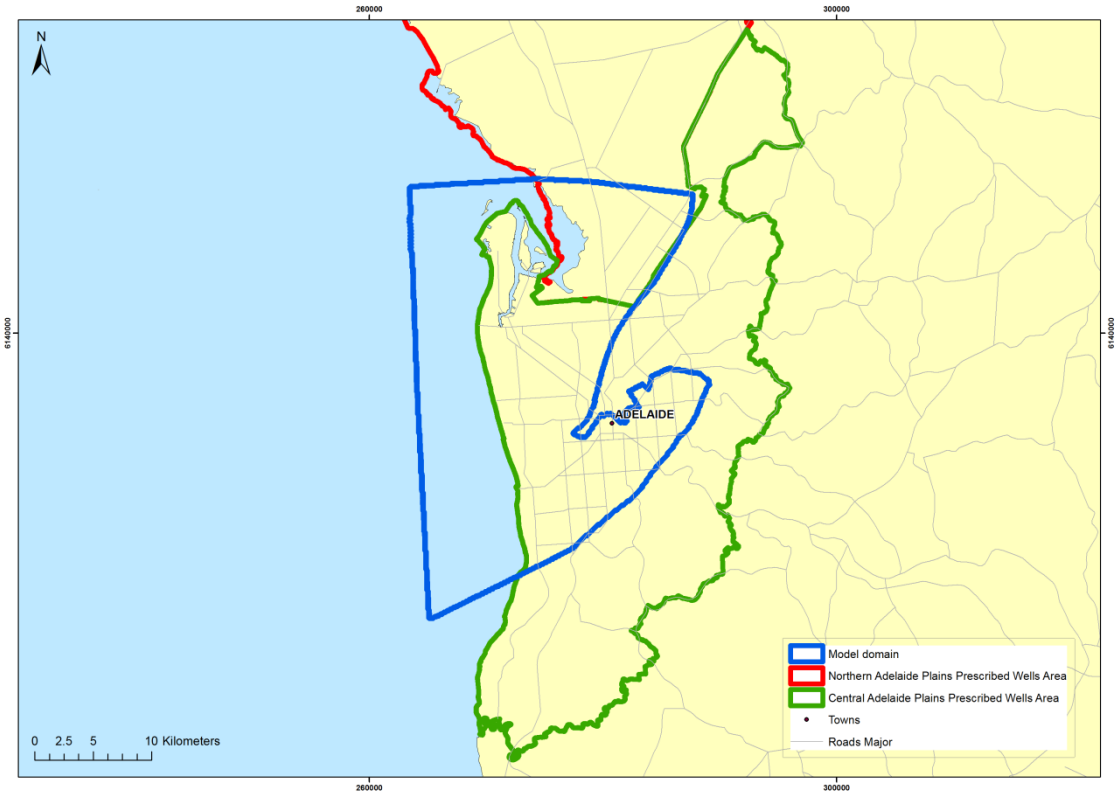

Figure 1. Adelaide Metropolitan model domain

There are 467 rows and 368 columns in each model layer. The model has a grid size of 100 m × 100 m at the centre rows and a uniform grid size of 100 m × 200 m elsewhere. There are a total of 687 424 cells, 246 273 of which are active.

Model layers

The regional aquifer system underlying the Adelaide Metropolitan area is conceptualised as four layers, including three aquifer layers and one aquitard layer (Table 1 and Figure 2).

Table 1. Model layers

Layer	Hydrogeological unit	Aquifer/Aquitard	MODFLOW layer
1	Quaternary Sediments	Aquifer	Type-1
2	T1 aquifer	Aquifer	Type-3
3	Munno Para Clay	Aquitard	Type-0
4	T2 aquifer	Aquifer	Type-3

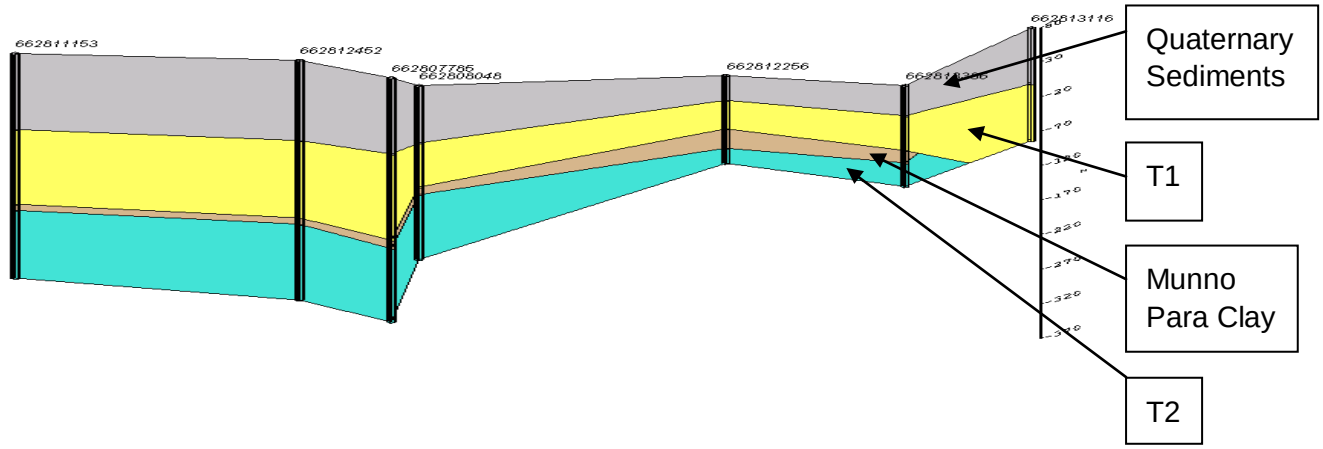

Figure 2. Model cross-section

Report

Zulfic, H., Osei-Bonsu, K. and Barnett, S.R., 2008. *Adelaide Metropolitan Area Groundwater Modelling Project. Volume 1 - Review of Hydrogeology, and Volume 2 - Numerical model development and prediction run*. South Australia. Department of Water, Land and Biodiversity Conservation. DWLBC Report 2008/05