

ADELAIDE PLAINS MODEL 2011

Purpose

As described in RPS Aquaterra (2011), the aim of this project is to provide a groundwater flow and solute transport modelling platform which will assist with future management of the groundwater resources of the Adelaide Plains by providing information essential to the creation of the Central Adelaide Water Allocation Plan (WAP). This model is known as the Adelaide Plains Numerical Groundwater Model 2011 or AP2011.

Background

Groundwater from sedimentary aquifers has been a major source of water for agricultural and industrial use within the Northern Adelaide Plains (NAP) and Central Adelaide (CA) regions (Figure 1). Approximately 18 GL per year of groundwater is currently extracted in the regions and this degree of usage is believed to be in excess of the long-term sustainable limit.

There have been several groundwater models developed for the NAP PWA and for CA (particularly over the past decade) and while these models had been developed for specific purposes, the models had not been completed to the level of complexity required by the Department for the future management of the groundwater resource.

The model was built with Visual MODFLOW version 2009.1.

Location

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

Model structure

Model domain and grid size

- The model domain is bound by the coordinates 294700E, 6196000N and 251500E, 6118000N (GDA 1994, MGA Zone 54) resulting in an area of approximately 3370 km² (78 km × 43 km).
- The model domain includes both the Northern Adelaide Plains (NAP) and Central Adelaide (CA) PWAs. The active model area is bounded to the south by the Eden-Burnside Fault, to the east by the Para Fault, to the west by Gulf St Vincent and to the North by the Light River.
- The grid size is 200 × 200 m regionally.
- A total number of 589,680 model cells are used to construct the model, with 301 889 model cells existing in the active model domain (i.e. total number of cells that are not 'no-flow' or 'inactive' cells).

Model layers

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

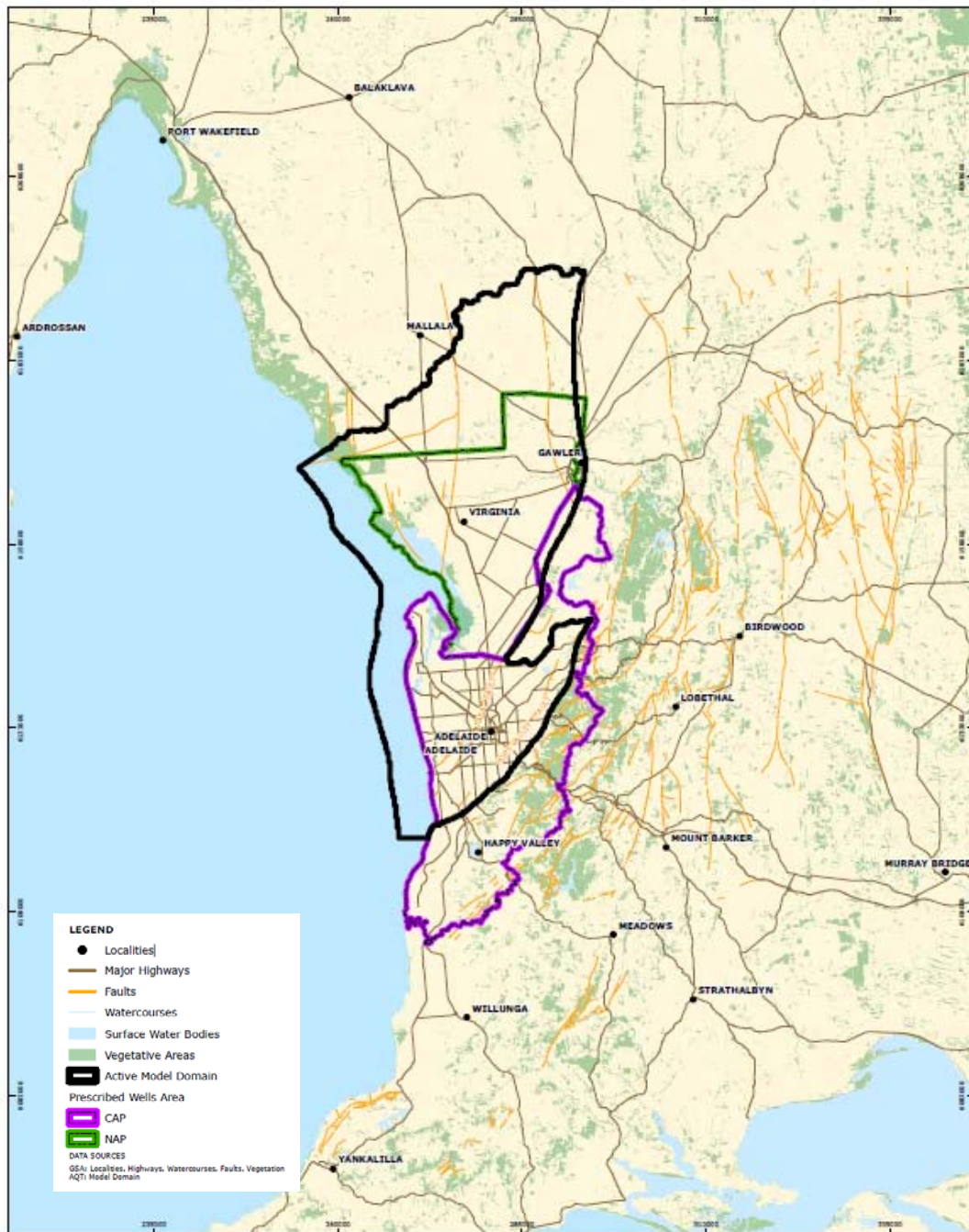


Figure 1. Adelaide Metropolitan model domain

Table 1. Model layers

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

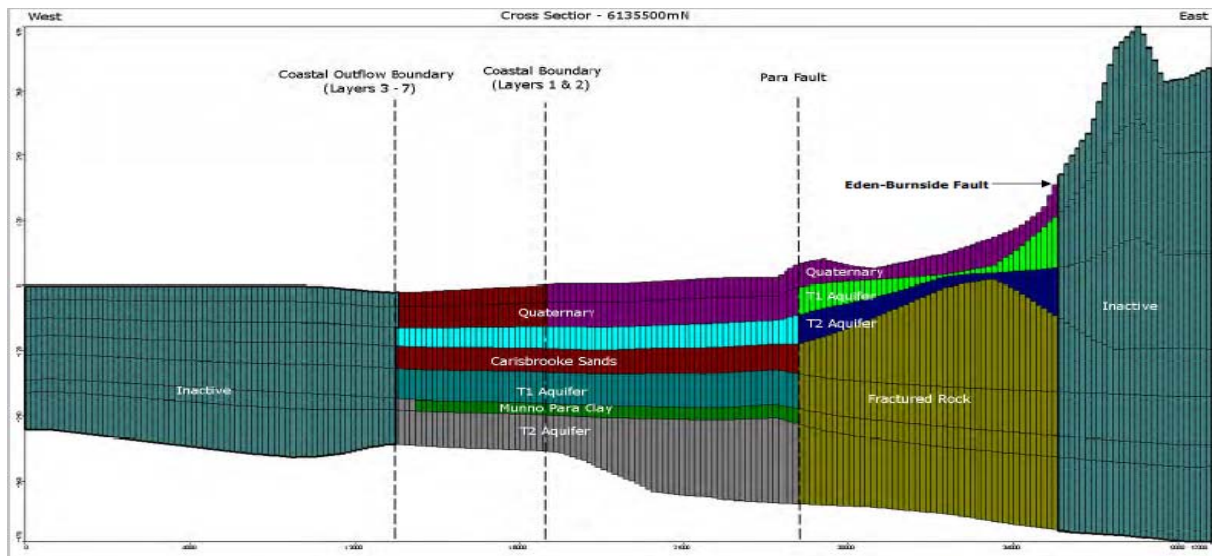


Figure 2. Cross-section

Report

RPS Aquaterra, 2011, Adelaide Plains Groundwater Flow and Solute Transport Model (AP2011), Prepare for Department for Water. Report A141B/R001e, 26 July 2011