



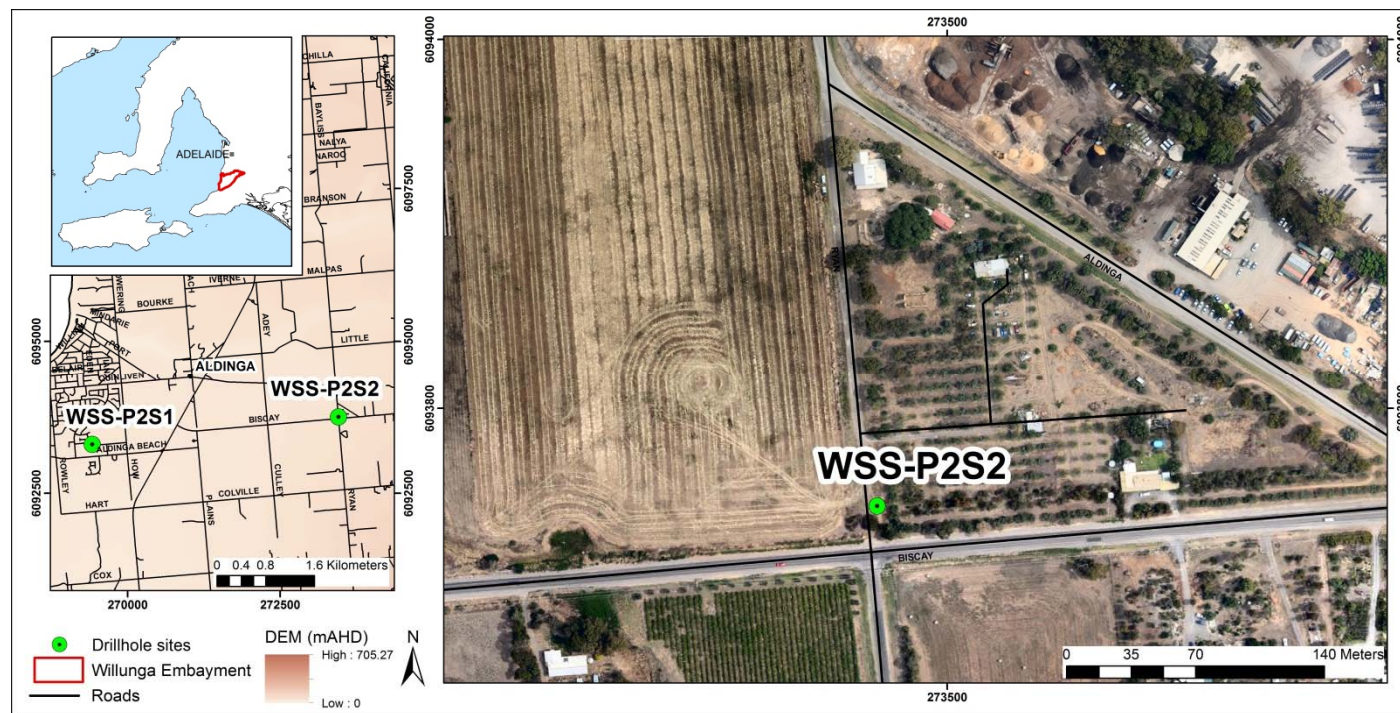
An Australian Government Initiative

# Groundwater Education Investment Fund Project

## Borehole Infrastructure Report

| Borehole Type                                     |                     | Piezometer Monitoring Bore | Location                  | Willunga Super Science Site |
|---|---------------------|----------------------------|---------------------------|-----------------------------|
| Unique Well ID                                    |                     | WSS-P2S2-6                 | Installed By              | Kangarilla Drilling         |
| Completion Date                                   |                     | 5/10/2012                  | Depth Installed           | 34 mBGS                     |
| Drilled By  |                     | Kangarilla Drilling        | Depth Drilled             | 34 mBGS                     |
| Monument Type                                     |                     | Concrete gatic cover       | Drilled Diameter/Method   | 200 mm (min)/RTA+RTM        |
| Monument Diameter/Width                           |                     | 365 mm                     | Screen Depth              | 32-34 mBGS                  |
| T.O.M. offset from G.L.<br>(Top of Open Monument) |                     | 0.125 m                    | Screen Size/Aperture/Type | 100 mm/ 0.5 mm/ PVC         |
| PVC Casing to T.O.M offset                        |                     | -0.095 m                   | Level of Cement/Bentonite | 0-31 mBGS                   |
| Ground Elevation (mAHD)                           |                     | 39.923                     | Casing Size/Type          | 100 mm/ PVC                 |
| GPS Easting                                       | (MGA-94<br>Zone 54) | 273460                     | SWL after Development     | 17.56 mTOC                  |
| GPS Northing                                      |                     | 6093769                    | Development Details       | Airlift                     |

**Project Comments:** WSS-P2S2-6 is a single completion piezometer completed in the Port Willunga Formation. Six additional piezometers are completed at shallower depths at this site. This is site 2 of seven sites in a transect across the Willunga Basin.



Map of Willunga Super Science Basin Transect Sites

Note\* Appendix includes Lithology and Well Completion Logs, Geophysical Logs, Hydraulic Test and Chemical Analysis.

|                                    |  |                                |
|------------------------------------|--|--------------------------------|
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# Lithology Log

Lithology was logged for WSS-P2S2-1, adjacent to WSS-P2S2-6, by Nico Kruger, Department of Environment, Water and Natural Resources.

## WSS-P2S2-1

mBGS

0.0

Silty Sand: Red brown, minor clay, recent sediments, soil horizon

Gravel: Varicoloured, medium to coarse gravel to 50 mm, rounded to well rounded, stream bed alluvium, brown clayey matrix

Clay: Light brown, mildly plastic and rollable, wet

10.0

Sand: Cream to white with depth, quartz, medium grained, sub angular to sub rounded, well sorted, held in minor silty matrix

Sandy Clay: As above. Mottled cream, transition to hard clay

Clay: Grey cream/ orange, rollable, highly plastic, stiff

Sand: White to off-white, predominantly medium grained, minor fine sand to silt matrix, well sorted, angular to sub-rounded

20.0

Sand: Light brown to fawn, fine to medium grained, quartz dominant, well sorted, angular to sub-rounded

Sand: Brown, fine to medium grained, quartz dominant, well sorted, angular to sub-rounded, hard thin consolidated laminates of red/ brown sand

Sand: Varicoloured, medium to coarse grained, minor ferruginisation, hard Fe stained & cemented nodules, sub-rounded, semi-sorted

30.0

Sand: Orange to cream/ white, medium to coarse grained, minor cementation, sub-rounded, semi-sorted to well sorted at depth

Sand: Orange, fine to medium grained, well sorted, uniform, <1 % mica

40.0

Sand: Sandy Limestone. Cream, light orange to fawn, medium grained, medium sorting and consolidation, minor goethite dark stained pellets, frequently cemented in friable (?) siliceous matrix, minor Fe stained quartz sands, minor quartz mineral alteration to 1%, Fossil remains preserved to <5%, ((?) Bryozal Limestone)

Sand: Sandy Limestone. Orange to brown, little cementation

50.0

Sand: Sandy Limestone. Cream, light orange to fawn, medium grained, medium sorting and consolidation, minor goethite dark stained pellets, frequently cemented in friable (?) siliceous and/ or calcareous matrix, minor Fe stained quartz sands, minor quartz mineral alteration to 1%, Fossil remains preserved to <5%

60.0

Sand: Sandy Limestone. Olive green, minor clay matrix, highly glauconitic,

Sand: Sandy Limestone. Cream, light orange to fawn, medium grained, medium sorting and consolidation, minor goethite dark stained pellets, frequently cemented in friable (?) siliceous matrix, minor Fe stained quartz sands, minor quartz mineral alteration to 1%, Fossil remains preserved to <5%, ((?) Bryozal Limestone)

70.0

80.0

90.0

Silty Sand: Silty Sandy Limestone. Dark grey, silty in sections, well preserved gastropods/ bivalves/ fossil remains, frequent hard (?) siliceous cherty (?) laterite, fine to medium sand. Glauconitic rich section 103 – 105 m. Note: Frequently hard drilling encountered throughout.

100.0

110.0

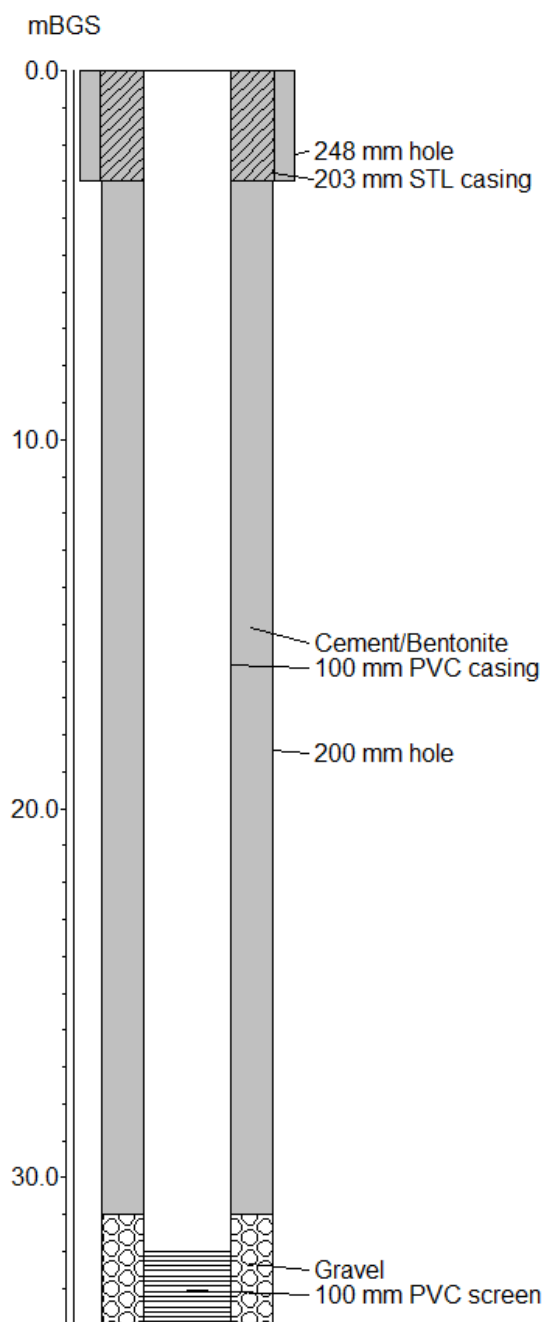
Quaternary

Port Willunga Formation

Blanche Point Formation

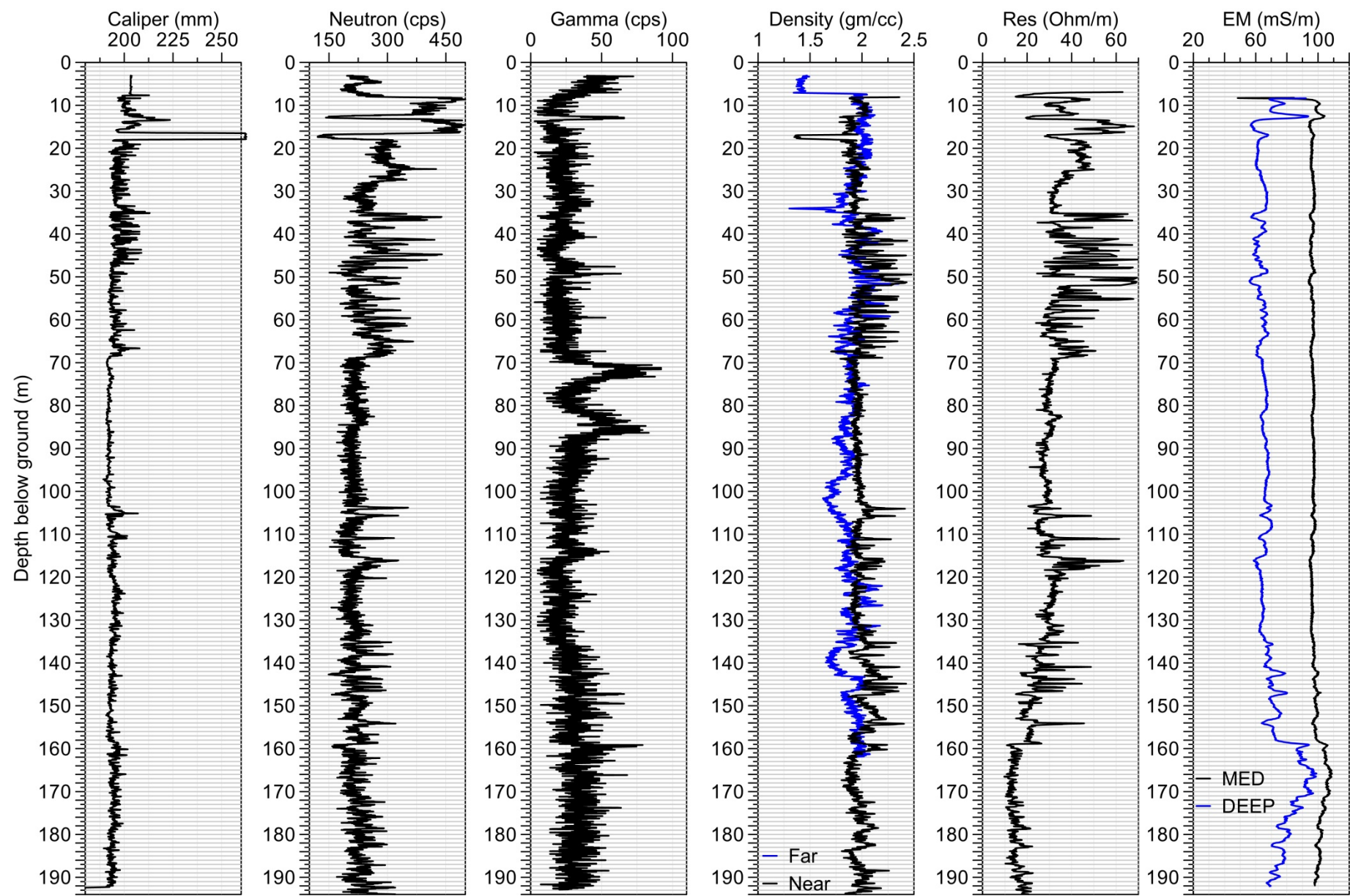
# Well Completion Log

WSS-P2S2-6



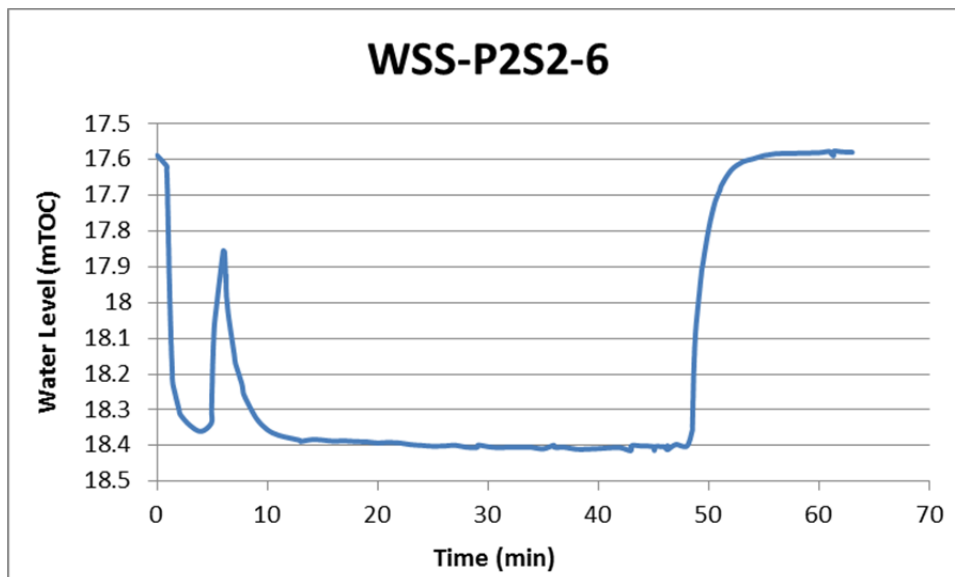
# Geophysical Logs

The Department of Environment, Water and Natural Resources conducted geophysical well logging on WSS-P2S2-1, adjacent to WSS-P2S2-6.



## Pumping Test

A pumping test was performed on piezometer WSS-P2S2-6 on 23/01/2013 with a water level logger and a submersible Grundfos SQ1 pump using a flow rate of 5 L/min. The results of the test are presented below. The pump stopped 6 minutes into the test and was immediately re-started. The report author may be contacted for the full data set.



## Chemical Analysis

The results of major ion chemistry on WSS-P2S2-6 are presented below, along with chemical parameters measured in the field.

| Well ID    | Date Sampled | SWL   | Field Parameters |       |       |            | Laboratory Analyses @ CSIRO ASU |       |                  |                |                 |                 |                              |                              |       |      |      |      |
|------------|--------------|-------|------------------|-------|-------|------------|---------------------------------|-------|------------------|----------------|-----------------|-----------------|------------------------------|------------------------------|-------|------|------|------|
|            |              |       | pH               | EC    | Temp  | Alkalinity | pH                              | E.C.  | Total Alkalinity | F <sup>-</sup> | Cl <sup>-</sup> | Br <sup>-</sup> | NO <sub>3</sub> <sup>-</sup> | SO <sub>4</sub> <sup>=</sup> | Ca    | K    | Mg   |      |
|            |              | mTOC  |                  | μS/cm | °C    | meq/L      |                                 | μS/cm | meq/L            | mg/L           | mg/L            | mg/L            | mg/L                         | mg/L                         | mg/L  | mg/L | mg/L | mg/L |
| WSS-P2S2-6 | 22/01/2013   | 17.59 | 6.99             | 1750  | 21.4  | 7.5        | 7.6                             | 1976  | 7.7              | 0.3            | 382             | 1.0             | 5.9                          | 44                           | 89.2  | 6.99 | 52.1 |      |
|            |              |       |                  |       |       |            | Na                              | S     | Al               | As             | B               | Cd              | Co                           | Cr                           | Cu    | Fe   | Mn   |      |
|            |              |       |                  |       |       |            | mg/L                            | mg/L  | mg/L             | mg/L           | mg/L            | mg/L            | mg/L                         | mg/L                         | mg/L  | mg/L | mg/L | mg/L |
|            |              |       |                  |       |       |            | 235                             | 13.6  | <0.05            | 0.12           | 0.224           | <0.05           | <0.05                        | <0.05                        | <0.05 | 2.17 | 1.25 |      |
|            |              |       |                  |       |       |            | Mo                              | Ni    | P                | Pb             | Sb              | Se              | Si                           | Sr                           | Zn    |      |      |      |
|            |              |       |                  | mg/L  | mg/L  | mg/L       | mg/L                            | mg/L  | mg/L             | mg/L           | mg/L            | mg/L            | mg/L                         |                              |       |      |      |      |
|            |              |       |                  | <0.05 | <0.05 | <0.1       | <0.05                           | <0.1  | <0.05            | 10.8           | 0.89            | <0.05           |                              |                              |       |      |      |      |