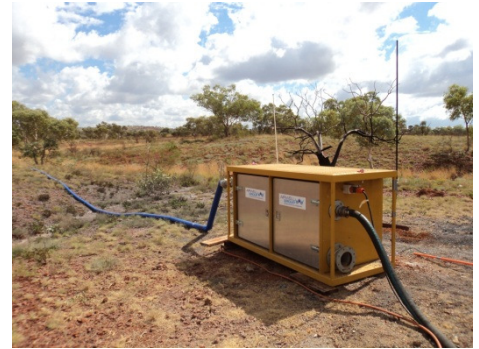


Airwell Group Flow Testing Case Study

The Project

A very popular Western Australian tourist attraction had been unable to keep up with their water needs due to the increasing number of visitors. They were carting 40,000 litres of water twice per week to meet current demands. After drilling 2 new bores, Airwell was contracted to undertake flow testing on the bores and provide data to assist the hydrogeologist in determining the quantity and reliability of water from this new water source.



Airwell flow testing skid unit set up on site

The Job

The bores to be tested were confirmed to be 6" class 12 PVC casing and were between and 30 and 50 metres deep. For these specifications Airwell selected a 37 stage 4" inch Lowara pump with a shroud to allow for variable flow and protect the electric pumping equipment. This pump was capable of 3.5 litres a second at the nominated depths which was more than adequate for the expected flow rates of the bores.

Bore Test 1

The flow test requirements and parameters were advised as:

- Step test consisting of 5 x 60 minutes steps with the pumping rate being increased by 0.7 litres per second at each step.
- Bore recovery stage, monitor and record recovery water levels until the level has returned to 95% of its original starting point.
- Refer the step test data to the hydrologist who would set the flow rates for the 24 hour constant flow test.
- Commence 24 hour constant flow test.
- All data was to be electronically logged and recorded.



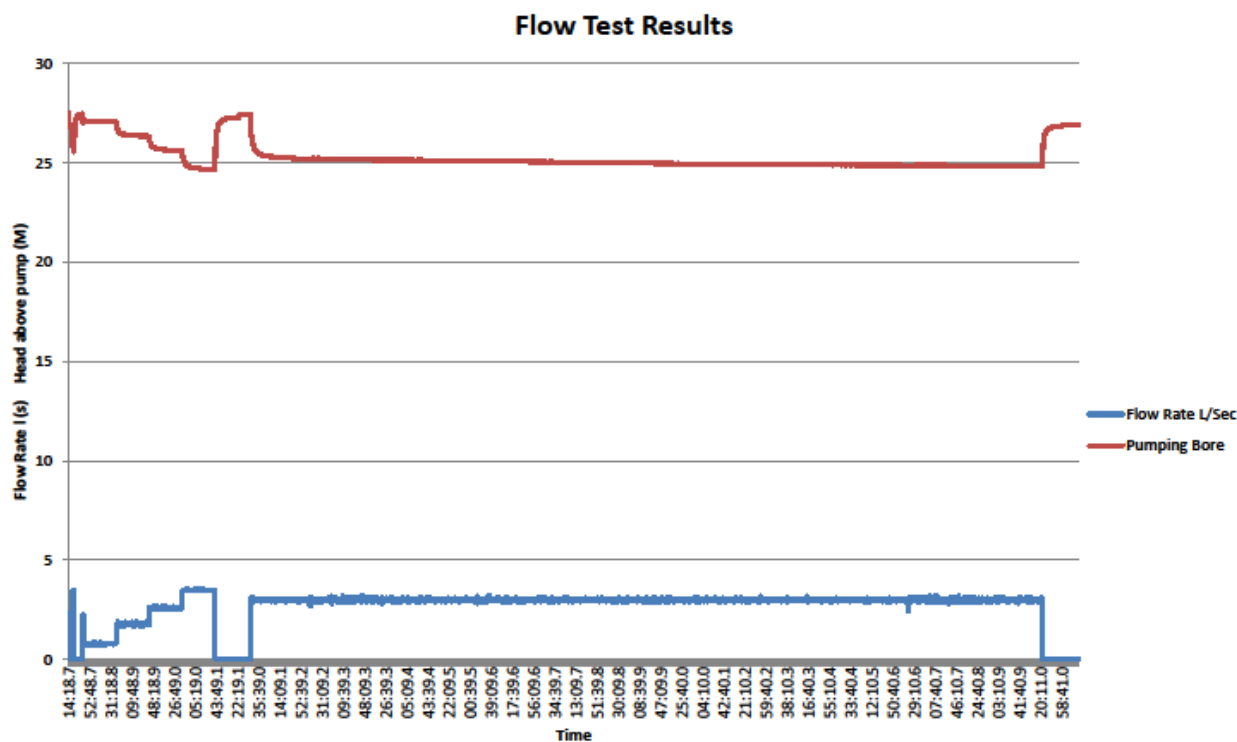
Airwell flow testing skid and truck setup on site

Bore Test 2

The flow test requirements and parameters for bore 2 were advised as:

- Step test consisting of 5 x 60 minutes steps with the pumping rate being increased at approximately 0.8 litres per second at each step.
- Bore recovery stage, monitor and record recovery water levels until the level has returned to 95% of its original starting point.
- Refer the step test data to the hydrogeologist who would set the flow rates for the 24 hour constant flow test.
- Commence 24 hour constant flow test.
- All data was to be electronically logged and recorded.

Sample of Flow Test Graph.



The above table is a sample of the data electronically captured during the course of flow test 2. Periodical recording times and other parameters can be changed and set before or even during a flow test. The information contained on the above chart tells us:

- The standing water level in the bore was approx. 27 meters above the pump.
- The pump safety cut off point was set at 1 meter above the pump.
- Step test 1 was set at 0.8 l/s with little impact on the SWL (-0.5m)
- Step test 2 was set at 1.8 l/s with little impact on the SWL (-1m)
- Step test 3 was set at 2.6 l/s with some impact on the SWL (-1.5m)
- Step test 4 was set at 3.6 l/s with some impact on the SWL (-2.5m)
- Step test 5 was not completed as the maximum flow rate for the pumping equipment had already been achieved.
- Recovery period. Only a short period of time was required for the bore to recover to 95% of original water level.
- Hydrologist advised a constant flow rate of 3.0l/s is to be used in the 24 hour flow test.
- 24 hour constant flow test completed and shows the SWL dropping by 2m then stabilising at 25m above the pump depth.
- Final recovery period. Shows a quick recovery of the SWL back to the original level.

One of the many features with the Airwell Flow Testing system is the ability to fully monitor and control the flow test from a remote location through either radio or internet connection. Once the pumping system, control unit and the level monitoring equipment for observation bores had been set up on the bore site and the test commenced, Airwell staff were able to control, monitor, log results and if required adjust the flow test parameters from the safety of their accommodation.

There is no need to return to the pump site unless they encountered an issue with the test. This eliminates or greatly reduces the need to have staff remaining and monitoring the flow test at the bore site during the night. Eliminating this OH&S issue is highly regarded at many mining sites.

As a foot note the maximum potential flow rate for the second bore could have been as high as 5 l/s but the flow was limited by the pump capabilities that was selected for the 6" casing size. While technically a 6" pump will fit in a 6" bore casing it leaves no room for a protective shroud on the pump and very little space between the bore casing and the pump for water circulation to keep the pump from burning out. We do not believe that this combination makes for reliable long term pumping solution.

Airwell always recommends to clients or consultants that close consideration be given to the bore casing size when having a bore drilled as this is likely to be the single biggest restricting factor as to how much water can be pumped from the bore (assuming there is sufficient water in the bore). Airwell is always happy to assist clients determine appropriate casing and pump sizes to achieve their desired flow rates.

Overall the project was completed within the estimate of time given and Airwell was pleased to be able to produce accurate and meaningful flow testing results for the project Hydrologist, Jeremy Bower of RPS Aquaterra.

He commented "The Airwell crew were a delight to work with, providing accurate and professional data, utilising state of the art flow meters and telemetry systems".

To find out more about Airwell's flow testing equipment and services click [here](#) or call the Airwell Office on 08 9209 3355 or email sales@airwellgroup.com.au



Airwell flow testing skid setup on one of the testing bores