

Aquifer test design – Self audit check sheet

The purpose of an aquifer test is the foremost consideration when designing an aquifer test. Common purposes include: measuring well interference effects; estimating stream depletion; determining aquifer parameters. Each type of test can benefit from customised design. Although an adequate aquifer test design may be constrained depending on its purpose, it is necessary that the results of any test be as reliable as possible. A test design should always attempt to minimise sources of external interference and maximise any observation response to reduce the corrections that may be required to the observation data, and thereby reduce uncertainty.

Document Purpose

This check sheet is intended as guidance to aid aquifer testing practitioners in designing aquifer tests to maximise the robustness of results derived. This check sheet is not a substitute for aquifer test literature, nor does it guarantee acceptance of any result outright.

Check List

Test purpose				
<input type="checkbox"/>	Well Interference			
<input type="checkbox"/>	Stream depletion			
<input type="checkbox"/>	Well yield & performance curves			
<input type="checkbox"/>	Aquifer parameters			
<input type="checkbox"/>	Other (Please specify):			
Expected hydrogeological environment				
Yes / No	Potential Boundary			
<input type="checkbox"/>	Flow boundary			
<input type="checkbox"/>	No-flow boundary			
Expected aquifer properties ⁱ				
T			m ² /day	
S				
K'/B'			day ⁻¹	
Pumping				
Duration ⁱⁱ			days	
Rate			L/s	
Discharge of water				
		mE		mN
	Location			
<input type="checkbox"/>	Irrigator			
<input type="checkbox"/>	Stream			
<input type="checkbox"/>	Irrigation race ⁱⁱⁱ			
<input type="checkbox"/>	Other (Please specify):			
Methods of measurement				
		Method	Frequency	Location
<input type="checkbox"/>	Pump rate			
<input type="checkbox"/>	Depth to water level			mE mN
<input type="checkbox"/>	Barometric pressure			
Yes / No	Rainfall			
Yes / No	Stream flow Site 1			
Yes / No	Stream flow Site 2			

Pumping well details	1	2	3	4	5	6
Well number						
Easting (mE)						
Northing (mN)						
Depth (m)						
Screened interval (m bgl)						
Measuring point (eg ToC or GL)						
Static water level (m below MP)						
Observation well details	1	2	3	4	5	6
Well number						
Easting (mE)						
Northing (mN)						
Distance from pumped well (m)						
Depth (m)						
Screened interval (m bgl)						
Measuring point (eg ToC or GL)						
Static water level (m below MP)						
Predicted drawdown (m)						
Will be pumping Yes/No						
Background well details	1	2	3	4	5	6
Well number						
Easting (mE)						
Northing (mN)						
Distance from pumped well (m)						
Depth (m)						
Measuring point (eg ToC or GL)						
Static water level (m below MP)						
Static water level (m)						
Predicted drawdown (m)						
Will be pumping Yes/No						
Legal requirements^{iv}						
<input type="checkbox"/> Permitted						
<input type="checkbox"/> Consent required						

I have considered the preceding check list and regard my resulting test design to be as robust as practicable.

Signature: _____

Name (print): _____

Recommended reading

Aitchison-Earl, P. and M. Smith 2008: *Aquifer test guidelines (2nd Ed)*; Environment Canterbury Technical Report R08/25
<http://www.ecan.govt.nz/Plans+and+Reports/Water/Groundwater/AquiferTestGuidelines.htm>

Kruseman, G.P., and de Ridder, N.A., 1990. *Analysis and evaluation of pumping test data (2nd Ed)*. International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands.
<http://www.alterra.wur.nl/NL/publicaties+Alterra/ILRI-Publicaties/Downloadable+publications/>

ⁱ Initial estimates derived from nearby aquifer tests and/or well performance.

ⁱⁱ The default minimum duration is 3 days.

ⁱⁱⁱ If discharge is to a stock/irrigation water race or stream, ensure that the water body capable of receiving the volume of water. Additionally the local district council or race manager may need to be informed of the test discharge.

^{iv} Aquifer testing is a permitted activity under Rule WQN15 if the pumping rate is less than 100 L/s and the duration is not more than 72 hours, however, all test information must be supplied to Environment Canterbury. Also See Rule WQL1