

Coastal groundwater

Test pumping groundwater assessment guidelines for bore licence applications

A pumping test to determine the possible yield of the subject bore and of the potential drawdown impacts is required to assess bore licence applications for the purpose of irrigation, industrial, recreation or commercial extraction from a groundwater source in the coastal groundwater area of NSW.

All **proponents** of groundwater licence applications greater than 20 ML/year are requested to engage a *groundwater consultant* to manage a pumping test and report the results in accordance with the following guidelines. For all low yield bore licence applications seeking a volumetric entitlement of less than 20 ML/year (i.e. low volume uses) an assessment of the application details will be undertaken by WaterNSW without the need for a pumping test.



APPLICATIONS FOR A LICENCE WITH A VOLUMETRIC ENTITLEMENT OVER 20 ML/YEAR

These guidelines apply if you are seeking a groundwater licence with a volumetric entitlement in excess of 20 ML/year (i.e. medium, high or very high volume uses) in coastal areas, where test pumping of the proposed water supply bore is mandatory. A test bore licence (currently under the *Water Act 1912*) is required from WaterNSW in order to investigate the safe yield of the bore as part of the entitlement assessment.

All pump tests are to be conducted in strict accordance with Australian Standard AS 2368 – 1990 Test Pumping of Water Wells. Pumping tests of durations between one day and 70 days are to be conducted depending on the volume of groundwater sought (see table 1).

A site specific *hydrogeological investigation report* is required in support of the application for medium, high or very high volume licences that includes:

- technical analysis of the pumping test information
- identification of the potential drawdown impacts of the proposed operation on neighbouring users and surrounding sensitive environmental assets.

The pump test program and reporting should be prepared and managed by a suitably qualified groundwater consultant experienced in irrigation or commercial water supply assessments.

The hydrogeological investigation report is to follow the standardised table of contents (see table 2), and is to include, but not be limited to, all of the aspects specified to allow a reasonable assessment of the proposed water supply operation to be undertaken. Failure to supply a detailed hydrogeological assessment of suitable quality will be taken into consideration in determining the entitlement to be authorised by the licence and will be capped at a maximum of 20ML/year.

For all pumping tests conducted, the annual volumetric entitlement will be calculated based on the rate at which the bore was tested.

All aspects of the bore installation and testing must comply with distance and operating rules as set by the test bore licence condition and water sharing plans where applicable. In some instances observation bore measurements will be required by WaterNSW as part of the pumping test analysis. All raw data and the specialist report interpreting the results are to be provided to WaterNSW in support of the licence application. The entitlement volume requested may not be granted if it cannot be demonstrated that the bore is capable of yielding the required volume or if the amount sought will have significant impact on nearby users, including groundwater dependent ecosystems.

PUMPING TESTS

Table 1: NSW coastal pumping test assessment for application entitlement categories

Entitlement category	Assessment of application
LOW 0-20ML/year	<ul style="list-style-type: none"> ■ Production bore licence obtained from WaterNSW before drilling. ■ Entitlement allocated on basis of average bore yields in the area and demonstrated need (i.e. required water usage). ■ Drawdown impacts of pumping on neighbouring areas considered. ■ Requested entitlement subject to reduction if insufficient information provided. ■ Entitlement review allowed with provision of additional information ■ Driller - conducted airlift of minimum 1 hour duration clearly reported on Form 'A' – Particulars of Completed Bore ■ Entitlement validated on receipt of Form 'A' completed to reasonable standard.
MEDIUM 21-50ML/year	<ul style="list-style-type: none"> ■ Test bore licence to be obtained prior to drilling. ■ Constant rate test (greater than or equal to operating rate) or constant rate and step test to be completed to a reasonable standard. ■ 1 day pumping duration (minimum) ■ 1 day recovery (unless full recovery achieved earlier) ■ Drawdown and recovery measurements from observation bores may be required. ■ Specialist hydrogeological consultants report required completed in accordance with standardised table of contents. ■ Entitlement allocated on basis of demonstrated need. ■ Requested entitlement subject to reduction if insufficient information provided. ■ Entitlement review allowed with provision of additional information
HIGH 51-100ML/year	<p>As above with the following modifications:</p> <ul style="list-style-type: none"> ■ 7 day pumping duration (minimum) ■ 7 day recovery (unless full recovery achieved earlier).
VERY HIGH >100ML/year	<p>As above with the following modifications:</p> <ul style="list-style-type: none"> ■ 70 day pumping duration (minimum) ■ 70 day recovery (unless full recovery achieved earlier) ■ Drawdown and recovery measurements from observation bores are mandatory.

In preparing for and conducting the pumping tests, attention is to be paid to the following:

- Additional permits or authorisations may be required to allow ancillary activities associated with the test pumping to be undertaken (section 3.1 of the Australian Standard AS 2368–1990 Test Pumping of Water Wells).
- The duration of the test is to be of sufficient length to identify the presence of recharge or barrier boundaries that may influence the long-term yield of the bore (section 3.3 of the Australian Standard AS 2368–1990 Test Pumping of Water Wells).

- Multiple aquifer tests may be required to demonstrate that the identified yield of the bore can be sustained without adverse impacts on individual water bearing zones or groundwater sources (section 5.5 of the Australian Standard AS 2368–1990 Test Pumping of Water Wells). Seek advice from the NSW Office of Water if in doubt.
- Discharge of pumped water is to be controlled so that it does not generate a hazard or damage the environment (section 3.2 of the Australian Standard AS 2368–1990 Test Pumping of Water Wells).
- Specific information is to be presented to enable an assessment of the data collected (section 8.2 of the Australian Standard AS 2368–1990 Test Pumping of Water Wells).

GROUNDWATER CONSULTANCY REQUIREMENTS

Table 2: Information required for the assessment of a water licence application (Hydrogeological investigation report standardised table of contents)

Chapter	Section	Specifics
Certification		Groundwater consultant (qualified)
Introduction		Details of the property location, including the relevant cadastral information. Identification of the proposed development and the purpose for which the licence is being sought.
Geology		Geological description of the property and surrounding region, including the identification of any stratigraphic boundaries or structural features that may influence groundwater availability.
Hydrogeology	Setting	Description of the type of aquifer and a summary of typical water bearing zones encountered in test bores in the vicinity of the property.
	Licensed works	Details of licensed water supply bores within one kilometre of the property including purpose and likelihood of being impacted should the proposed development proceed.
	Environment	Identification of ecosystems likely to be groundwater dependent, surface water systems that could be affected by reductions in discharge with prolonged pumping, with particular identification of sensitive ecosystems of special conservation value.
Field work	Test bore establishment	Details of the drilling and construction of the subject bore, identifying the test bore licence under which it was authorised. A statement of compliance with the Minimum Construction Requirements for Water Bores in Australia – Second Edition 2003 or subsequent equivalent guideline.
	Test pumping and recovery	Measurements and graphical analysis documentation of drawdown and recovery data for pumping and observation bores. Calculated aquifer transmissivity and storativity values, together with bore efficiency estimates. Details of the water quality tests undertaken to demonstrate the groundwater is suitable for the intended purpose. A statement indicating that the test was conducted in compliance with Australian Standard AS 2368–1990 Test Pumping of Water Wells.
Impact assessment	Sustainability	Predictions of the impacts of pumping of the subject bore on neighbouring licensed users and potential groundwater dependent ecosystems based on the required controlled test pumping, together with the predicted effects on groundwater levels for the region surrounding the subject property and the potential to affect discharge to surface water systems.
	Trigger levels	Identification of the threshold drawdown levels adopted to prevent impacts on neighbouring bores or ecosystems, and estimations of the maximum drawdown impact on neighbouring bores, monitoring bores and ecosystems with and without trigger levels being active.
	Management responses	Actions to be taken if threshold levels are reached or exceeded, including reporting to regulatory authority, cease-to-pump conditions, and provision of water to affected users.

Table 2 continued: Information required for the assessment of a water licence application

Chapter	Section	Specifics
Operation	Schedule	Identification of the proposed operating regime including discharge rate and hours of pumping.
	Monitoring	Descriptions of the location of monitoring bores, the frequency at which monitoring is to be undertaken and the type of data to be collected.
	Reporting	Details of the timing of reports, the type of information to be reported to the regulatory authority, the number and nature of exceedances and response times between an occurrence and management actions being implemented, and methodologies to be adopted to mitigate impacts should they be ongoing.
Constraints		Identification of any consent conditions imposed by council or other regulatory authority that would prevent the requested entitlement being realised in full for the purpose for which the licence is being sought. In particular, conditions limiting the supply of water to other parties are to be identified.
References		Citations of all documentation referred to within the report.
Figures		All diagrams referred to within the report, including a locality map, a plan of the property identifying separation distances between the subject bore and site boundaries or other features (especially suspected groundwater dependent ecosystems, licensed works and surface water bodies), geological map and sections, together with a plan illustrating the extent of predicted drawdown during the proposed pumping operation. Specific inclusions as laid out in Australian Standard AS 2368–1990 Test Pumping of Water Wells.
Appendices		Raw data (spreadsheet data may be requested) and additional diagrams or text required to provide background or support to the findings of the investigation.

All water bores are to be installed by an appropriately licensed water bore drilling contractor and in accordance with the Minimum Construction Requirements for Water Bores in Australia – Second Edition 2003.

More information

Phone: 1300 662 077

Email: Customer.Helpdesk@waternsw.com.au

www.waternsw.com.au for information about water licensing and compliance.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (October 2017). However users are reminded of the need to ensure that the information upon which they rely on is up to date and to check currency with WaterNSW or with the user's independent adviser.

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