Secondary Metering Devices

This guideline provides advice on secondary metering devices for floodplain harvesting measurement.

Introduction

The NSW Government is implementing a framework to licence and measure floodplain harvesting to ensure this take occurs within legal sustainable limits.

An important part of this framework is that floodplain take is measured by accurate, auditable and tamper-proof metering equipment.

The NSW Government has developed a series of implementation guidelines to assist water users and duly qualified persons (DQPs) in understanding their compliance obligations under this framework.

When is a secondary metering device required?

A secondary metering device is required to take water under a floodplain harvesting access licence in the following circumstances:

1. where the primary metering equipment is faulty and awaiting repair[1] or
2. the storage does not need to be fitted with primary metering equipment until 12 months after floodplain harvesting access licences are issued and the landholder wishes to floodplain harvest during this 12-month period.

What secondary metering devices can be used?

Only secondary metering devices approved by the Minister as being appropriate can be used. A list of all approved devices will be maintained at www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/measurement.

The *Market Engagement Policy For Metering and Telemetry* includes further details on the requirements for secondary metering devices for storage metering equipment and the process for approval. Secondary metering devices must be validated by a DQP in accordance with the standards specified by the Minister for the device or type of device.

[1] Under the Measurement Policy, landholders must also notify the Minister if their primary metering equipment is faulty.

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This guideline addresses the use of a storage gauge board, as it is likely to be the most commonly used secondary metering device.

What are the equipment requirements for gauge boards?

1. The gauge board must comply with the requirements of *Australian Standard AS 3778.6.5*, Section 7.1.
2. The gauge board must be constructed from durable material resistant to corrosion in alternating wet and dry environments with legible, unambiguous markings resistant to wear and fading. The material shall have a low coefficient of thermal expansion commensurate with the accuracy requirement.
3. Gauge boards must have measurement increments as follows to allow a full reading to be undertaken: 0.01 m (10 mm), 0.1m (100 mm) and 1.0 m increments.
    a. Existing gauge boards (those installed prior to the initial release of this guideline—1 November 2020) with 100 mm increments are acceptable, provided they meet all other requirements of this guideline.
    b. A registered surveyor, registered professional engineer or other class of person approved by the Minister (see below) must assess and certify that an existing gauge board with 100 mm increments meets all other requirements of this guideline.
    c. If an existing gauge board with 100 mm increments is accepted, when taking readings, the landowner must estimate to the nearest 10 mm (for example 5.63 m).
4. New gauge boards (those installed after the initial release of this guideline—1 November 2020) must have:
    a. 10 mm increments
    b. Numbered values for 0.1 m (100 mm) and 1.0 m increments.
5. Each successive 0.01 m (10 mm) increment is to alternate black and white 0.01 m (10 mm) strips, on a white, reflective background for ease of reading in low light environments.
6. The gauge board width increment markers and numbering must be of a size that can be visually read from a safe location—that is from an elevated platform or storage embankment.

Who can install, level and validate a gauge board?

Secondary metering devices can be installed by anyone, including landowners. However, a DQP must validate and confirm that the device has been installed correctly and in accordance with this guideline.

For the purposes of validating a secondary metering device, a DQP must:

1. be a registered surveyor
2. hold a bachelor's degree in surveying
3. hold a Diploma of Surveying

4. work under the supervision of a person listed above
5. be registered professional engineer.

How must gauge boards be installed?

The gauge board, either in single or sectional configuration, must be installed as follows:

1. The base gauge board must be set at the lowest accessible (floor level) in the storage. This location must be consistent with the storage curve for the storage. The gauge board must not be in any localised low points — that is, the low point must be reflective of the floor level of the storage.
2. The location must be easily accessed safely for maintenance and readings during wet weather and/or flooding events. The DQP engaged to certify the installation can provide guidance for the most appropriate installation location and configuration.
3. The bottom of the first gauge board should ideally be set at 0.00 m (gauge height).
   a. There is flexibility for the lowest reading to be a value other than 0.00 m given the requirement for calibration to the storage benchmark (see below).
4. The gauge board(s) must measure from the lowest accessible level to the top of the storage embankment level.
5. The gauge board may be mounted on a single structure or comprise sectional boards mounted sequentially on the inside batter of the storage (Figure 1 and 2).
   a. If the gauge board is fixed to a structure — such as an inlet/outlet, elevated platform, headwall — the fixing must be secure, stable and not allow any movement.

Figure 1. Depth Gauge Board installed on a concrete storage wall

Figure 2. Image depicting flood gauges on a riverbank, looking down from the high point toward the river.

6. If no structure is available, it is recommended that the gauge board be mounted on a 50 mm diameter galvanised steel post secured into a mass concrete (N25) footing(s) of:
   a. min. 1000 mm depth x 600 mm diameter (single board to 10 m maximum height)
   b. min. 600 mm depth x 450 mm diameter (sectional boards, each up to 2 m maximum height)
   c. or an alternative arrangement recommended by the DQP who validates the secondary metering device. All gauge boards must be vertically plumb.
7. Sectional boards must be located so that the highest, or last, increment is accurately levelled and aligned to the lowest, or first, increment on each successive (higher) board.
8. All gauge boards must be fitted with at least one tamper-evident seal on securing fasteners (not welds; refer to Figure 3 and 4). All tamper seals used must be NSW Government-approved seals. Only DQPs can purchase approved seals by logging in to the Irrigation Australia website using their membership details.
9. All fixings used — such as screws, nuts, bolts, brackets, mounting poles, frames — must be non-corrosive in a submerged environment such as galvanised iron, aluminium, stainless steel, or other non-corrosive alloys. Bolted connections shall use locknuts or spring washers to maintain torque. Where commercially galvanised steel products are cut, ground or drilled, cold galvanising paint shall be applied to restore the galvanising finish.
10. All gauge boards must be fitted with stainless steel anti-roosting spikes atop to minimise fouling of the gauge board by bird faeces.
11. All equipment and connections must be designed and arranged to minimise the risk of damage, impact by debris, tampering or impacts by wildlife and insects.

Work health and safety obligations

All people undertaking site-based work in NSW have obligations under the *Work Health and Safety Act 2011*. It is essential that all persons involved in the installation of metering equipment under this guideline are aware of and comply with these obligations.

Figure 3 Image shows a tamper evident seal fixed to a pressure sensor on a catwalk.

Figure 4. Image depicting a tamper evident seal on a fastening bolt.

How must gauge boards be levelled in?

Gauge boards must be referenced (levelled in) to the survey benchmark to allow a correlation of depth readings to the storage curve.

Surveying of the gauge boards, either in single or sectional configuration, must be as follows:

- The base of the first gauge board must be levelled to Australian Height Datum (mAHD). Where the storage floor is not set at 0.00 m on the gauge board, the lowest value of the gauge board must be recorded (this will be required for validation in the DQP Portal).
- The level (mAHD) of the gauge board must be recorded at an even 0.1 m (100 mm) mark of the gauge board.
- The (GDA20) coordinates (latitude and longitude) of the gauge board(s) shall be determined.
- A level (mAHD) shall be taken on the storage floor adjacent to the gauge board. The storage floor level shall be indicative of the storage floor level and not be taken in any localised low points — such as an inlet pipe erosion sump.

How must information be submitted?

The installation and calibration checklist must be completed, and each gauge board registered in the WaterNSW online DQP Portal (https://dqp.waternsw.com.au/) by one of the following people:

- A registered surveyor as recognised by the NSW Board of Surveying and Spatial Information (BOSSI)
- A registered professional engineer as recognised by Engineers Australia
- Another person or class of persons approved by the Minister.

An example of the information required in the installation and calibration checklist is provided in 5.

It is an offence to provide inaccurate or misleading information. A *Validation Certificate* will be generated when all necessary information is entered into the DQP Portal.

Figure 5. An example of the installation and calibration checklist

INSPECTION COMPLIANCE (Y = Yes, P = Photo taken, N/A = Not Applicable)				
SITE DETAILS	**DETAILS**			
Landholder name				
Storage ID - work approval number				
Date of installation				
Details of certifying DQP Details of qualified person (as defined in section **Error! Reference source not found.**) undertaking survey				
SITE PREREQUISITES	**Y**	**P**	**N/A**	**REMARKS**
Site selection:				
- Able to measure lowest accessible point in storage as confirmed by DQP	☐			
- Easily and safely accessed for reading and maintenance	☐			
- Resistant to damage, tampering or attack	☐			
Installation method:				
- Single gauge board affixed to existing structure	☐	☐		
- Single gauge board installed standalone	☐	☐		
- Sectional gauge boards affixed to existing structure	☐	☐		
- Sectional gauge boards installed standalone	☐	☐		
WHS Risk Assessment completed	☐			
GAUGE BOARD SELECTION	**Y**	**P**	**N/A**	**REMARKS**
Gauge board construction in accordance with specifications	☐	☐		
- Gauge boards increment 100mm (existing)	☐	☐		
- Gauge boards increment 10mm (new)	☐	☐		
Total height (single or sectional boards combined) allows for measurement from lowest accessible point in storage to embankment crest level	☐	☐		
GAUGE BOARD INSTALLATION	**Y**	**P**	**N/A**	**REMARKS**
Gauge height (0.00m) set to lowest accessible point in storage (consistent with storage curve)	☐	☐		
Securely mounted as per specifications for selected installation method	☐	☐		
Gauge board(s) are installed vertically plumb	☐	☐		

Securely mounted as per specifications for selected installation method	☐	☐		
Gauge board(s) are installed vertically plumb [Sectional boards only] Highest increment on lower board accurately levelled to lowest increment on higher board successively	☐ ☐	☐ ☐		
Non-corrosive fixings used	☐	☐		
Tamper-seals installed on fixing bolts by DQP	☐	☐		
SURVEY	**Y**	**P**	**N/A**	**REMARKS**
Reference survey benchmark ID	☐			
Reference survey benchmark level (mAHD)	☐			
Vertical height difference from 0.00m (gauge height) to survey benchmark (m)	☐			
Level of gauge height 0.00m (mAHD)	☐			
Level on the storage floor adjacent to the gauge board (mAHD)	☐			
GDA20 coordinates of the gauge boards (Latitude and Longitude)	☐			
CERTIFICATION	**Y**	**P**	**N/A**	**REMARKS**
Site registered on WaterNSW DQP portal by DQP	☐			
Details entered in DQP portal and validation certificate generated	☐			