

# *Government Gazette*

of the State of

New South Wales

**Number 512–Electricity and Water**

**Friday, 3 November 2023**

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New South Wales  
Government

## **Temporary Water Restriction (Murrumbidgee I Water Source and Murrumbidgee II Water Source) Order (No. 4) 2023**

under the

### **Water Management Act 2000**

I, Allan Raine, by delegation from the Minister administering the *Water Management Act 2000*, in pursuance of section 324(1) of the *Water Management Act 2000* and being satisfied that it is necessary in the public interest to do so, make the following Order.

Dated 26 October 2023

**ALLAN RAINE**  
**Director, Water Planning Implementation, Water**  
**Department of Planning and Environment**  
**By delegation**

### **Explanatory note**

The purpose of this Order is to impose temporary water restrictions on the take of water under unregulated river access licences and unregulated river (high flow) access licences from Murrumbidgee I Water Source and Murrumbidgee II Water Source from 4 November 2023 to 31 January 2024, replacing temporary water restrictions currently in place from 4 November to 30 November 2023.

This Order is made under section 324(1) of the *Water Management Act 2000* to manage water released from Tantangara Dam for environmental purposes. Section 43(2) of the *Interpretation Act 1987* provides that the power to make an order under an Act includes the power to repeal the order.

PUB23/1106

# Temporary Water Restriction (Murrumbidgee I Water Source and Murrumbidgee II Water Source) Order (No. 4) 2023

under the

## Water Management Act 2000

### 1 Name of Order

This Order is the *Temporary Water Restriction (Murrumbidgee I Water Source and Murrumbidgee II Water Source) Order (No. 4) 2023*.

### 2 Commencement

This Order commences on 4 November 2023.

### 3 Duration

This Order will remain in force up to and including 31 January 2024 unless that date is amended, or this Order is repealed before that date.

### 4 Temporary water restrictions

This Order is a direction to restrict the take of water under unregulated river access licences and unregulated river (high flow) access licences from Murrumbidgee I Water Source and Murrumbidgee II Water Source in accordance with the restrictions specified in Schedule 1.

### 5 Interpretation

(1) In this Order:

**Director** means any of the following:

- (a) Director, Water Planning Implementation, Water Group for the Department of Planning and Environment,
- (b) Chief Operating Officer, Operations Division, Water Group for the Department of Planning and Environment,
- (c) any person who is for the time being acting or performing the duties and responsibilities of the role specified in paragraph (a) or (b).

**Murrumbidgee I Water Source** means the water source as described in the *Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012*.

**Murrumbidgee II Water Source** means the water source as described in the *Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012*.

(2) Unless otherwise defined, words and expressions that are defined in the *Water Management Act 2000* or in regulations made under that Act have the same meaning in this Order.

PUB23/1106

## **6 Repeal**

The *Temporary Water Restriction (Murrumbidgee I Water Source and Murrumbidgee II Water Source) Order (No. 3) 2023* is repealed.

## Schedule 1 Specified restrictions

- (1) The holder of an unregulated river access licence or unregulated river (high flow) access licence must not take water from the water source specified in Column 1 on the date specified in Column 4 of the corresponding row of the Table, unless
- (a) flows at the flow reference point specified in Column 2 of the corresponding row exceed the flow threshold specified in Column 3, or
- (b) the Director approves that take of water for a specified period in writing, being satisfied that such take would not have an adverse effect on the management of water released from Tantangara Dam for environmental purposes.

**Table—specified restrictions on take of water**

Column 1	Column 2	Column 3	Column 4
Water Source	Flow reference point	Flow threshold	Specified date
Murrumbidgee I Water Source	Murrumbidgee River at Mittagang Crossing gauge (410033)	155 ML/day	4 November 2023
		155 ML/day	5 November 2023
		220 ML/day	6 November 2023
		220 ML/day	7 November 2023
		220 ML/day	8 November 2023
		175 ML/day	9 November 2023
		175 ML/day	10 November 2023
		175 ML/day	11 November 2023
		140 ML/day	12 November 2023
		140 ML/day	13 November 2023
		140 ML/day	14 November 2023
		160 ML/day	15 November 2023
		160 ML/day	16 November 2023
		160 ML/day	17 November 2023
		140 ML/day	18 November 2023
		140 ML/day	19 November 2023
		140 ML/day	20 November 2023
		145 ML/day	21 November 2023
		145 ML/day	22 November 2023
		145 ML/day	23 November 2023
		125 ML/day	24 November 2023
		125 ML/day	25 November 2023
		125 ML/day	26 November 2023
		90 ML/day	27 November 2023
90 ML/day	28 November 2023		
90 ML/day	29 November 2023		
75 ML/day	30 November 2023		
50 ML/day	1 December 2023		
50 ML/day	2 December 2023		

		50 ML/day	3 December 2023
		80 ML/day	4 December 2023
		80 ML/day	5 December 2023
		80 ML/day	6 December 2023
		75 ML/day	7 December 2023
		75 ML/day	8 December 2023
		75 ML/day	9 December 2023
		80 ML/day	10 December 2023
		80 ML/day	11 December 2023
		80 ML/day	12 December 2023
		80 ML/day	13 December 2023
		80 ML/day	14 December 2023
		80 ML/day	15 December 2023
		115 ML/day	16 December 2023
		115 ML/day	17 December 2023
		115 ML/day	18 December 2023
		85 ML/day	19 December 2023
		85 ML/day	20 December 2023
		85 ML/day	21 December 2023
		80 ML/day	22 December 2023
		80 ML/day	23 December 2023
		80 ML/day	24 December 2023
		85 ML/day	25 December 2023
		85 ML/day	26 December 2023
		85 ML/day	27 December 2023
		105 ML/day	28 December 2023
		105 ML/day	29 December 2023
		105 ML/day	30 December 2023
		90 ML/day	31 December 2023
		80 ML/day	1 January 2024
		80 ML/day	2 January 2024
		80 ML/day	3 January 2024
		70 ML/day	4 January 2024
		70 ML/day	5 January 2024
		70 ML/day	6 January 2024
		65 ML/day	7 January 2024
		65 ML/day	8 January 2024
		65 ML/day	9 January 2024
		65 ML/day	10 January 2024
		65 ML/day	11 January 2024
		65 ML/day	12 January 2024
		35 ML/day	13 January 2024
		35 ML/day	14 January 2024
		35 ML/day	15 January 2024
		35 ML/day	16 January 2024

		35 ML/day	17 January 2024
		35 ML/day	18 January 2024
		80 ML/day	19 January 2024
		75 ML/day	20 January 2024
		75 ML/day	21 January 2024
		75 ML/day	22 January 2024
		35 ML/day	23 January 2024
		35 ML/day	24 January 2024
		35 ML/day	25 January 2024
		35 ML/day	26 January 2024
		35 ML/day	27 January 2024
		35 ML/day	28 January 2024
		85 ML/day	29 January 2024
		85 ML/day	30 January 2024
		85 ML/day	31 January 2024
Murrumbidgee II Water Source	Murrumbidgee River at Billilingra gauge (410050)	125 ML/day	4 November 2023
		125 ML/day	5 November 2023
		190 ML/day	6 November 2023
		190 ML/day	7 November 2023
		190 ML/day	8 November 2023
		160 ML/day	9 November 2023
		160 ML/day	10 November 2023
		160 ML/day	11 November 2023
		125 ML/day	12 November 2023
		125 ML/day	13 November 2023
		125 ML/day	14 November 2023
		125 ML/day	15 November 2023
		125 ML/day	16 November 2023
		125 ML/day	17 November 2023
		130 ML/day	18 November 2023
		130 ML/day	19 November 2023
		130 ML/day	20 November 2023
		125 ML/day	21 November 2023
		125 ML/day	22 November 2023
		125 ML/day	23 November 2023
		115 ML/day	24 November 2023
		115 ML/day	25 November 2023
		115 ML/day	26 November 2023
		80 ML/day	27 November 2023
		80 ML/day	28 November 2023
		80 ML/day	29 November 2023
		65 ML/day	30 November 2023
		35 ML/day	1 December 2023
35 ML/day	2 December 2023		
35 ML/day	3 December 2023		

		65 ML/day	4 December 2023
		65 ML/day	5 December 2023
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		65 ML/day	7 December 2023
		65 ML/day	8 December 2023
		65 ML/day	9 December 2023
		65 ML/day	10 December 2023
		65 ML/day	11 December 2023
		65 ML/day	12 December 2023
		70 ML/day	13 December 2023
		70 ML/day	14 December 2023
		70 ML/day	15 December 2023
		95 ML/day	16 December 2023
		95 ML/day	17 December 2023
		95 ML/day	18 December 2023
		75 ML/day	19 December 2023
		75 ML/day	20 December 2023
		75 ML/day	21 December 2023
		70 ML/day	22 December 2023
		70 ML/day	23 December 2023
		70 ML/day	24 December 2023
		75 ML/day	25 December 2023
		75 ML/day	26 December 2023
		75 ML/day	27 December 2023
		85 ML/day	28 December 2023
		85 ML/day	29 December 2023
		85 ML/day	30 December 2023
		85 ML/day	31 December 2023
		75 ML/day	1 January 2024
		75 ML/day	2 January 2024
		75 ML/day	3 January 2024
		60 ML/day	4 January 2024
		60 ML/day	5 January 2024
		60 ML/day	6 January 2024
		55 ML/day	7 January 2024
		55 ML/day	8 January 2024
		55 ML/day	9 January 2024
		60 ML/day	10 January 2024
		60 ML/day	11 January 2024
		60 ML/day	12 January 2024
		30 ML/day	13 January 2024
		30 ML/day	14 January 2024
		30 ML/day	15 January 2024
		27 ML/day	16 January 2024
		27 ML/day	17 January 2024



		27 ML/day	18 January 2024
		60 ML/day	19 January 2024
		65 ML/day	20 January 2024
		65 ML/day	21 January 2024
		65 ML/day	22 January 2024
		35 ML/day	23 January 2024
		35 ML/day	24 January 2024
		35 ML/day	25 January 2024
		30 ML/day	26 January 2024
		30 ML/day	27 January 2024
		30 ML/day	28 January 2024
		65 ML/day	29 January 2024
		65 ML/day	30 January 2024
		65 ML/day	31 January 2024

## METERING EQUIPMENT STANDARDS 2023

under the

### WATER MANAGEMENT (GENERAL) REGULATION 2018

I, Ashraf El-Sherbini, Acting Chief Operating Officer, Water Group, by delegation from the Minister administering the *Water Management Act 2000*, approve the metering equipment standards listed in Column 2 of the table below, pursuant to the corresponding provisions of the *Water Management (General) Regulation 2018*, listed in Column 3 of the table below—

<b>Column 1</b> <b>Schedule</b>	<b>Column 2</b> <b>Name of standard</b>	<b>Column 3</b> <b>Provision</b>
1	Schedule 1 Storage Metering Equipment Standard	Clause 228 of the <i>Water Management (General) Regulation 2018</i>
2	Survey benchmark standard	Clause 228 of the <i>Water Management (General) Regulation 2018</i>
3	Storage curve standard	Clause 238L (9) of the <i>Water Management (General) Regulation 2018</i>
4	Secondary Metering Device Standard	Clause 228 of the <i>Water Management (General) Regulation 2018</i>

Dated 1 November 2023

Ashraf El-Sherbini  
Acting Chief Operating Officer, Water Group  
Department of Planning and Environment  
By delegation

#### **Explanatory note**

These standards are made under clauses 228 and 238L(9) of the *Water Management (General) Regulation 2018*. The object of these standards is to specify the metering equipment standards for particular water supply work approvals. Specifically, the standards relate to storage metering equipment, survey benchmarks, storage curves, secondary metering devices and storage metering equipment maintenance.

Holders of water supply work approvals subject to a mandatory floodplain condition imposed under clause 238B of the *Water Management (General) Regulation 2018* must comply with these metering equipment standards.

# METERING EQUIPMENT STANDARDS 2023

under the

## WATER MANAGEMENT (GENERAL) REGULATION 2018

### 1 Name of this instrument

This instrument is the *Metering Equipment Standards 2023*.

### 2 Commencement

This instrument commences on the day on which it is published in the NSW Government Gazette.

### 3 Repeal

The *Metering Equipment Standards 2022* published in Government Gazette No 454 of 30 September 2022, page 1 is repealed.

### 4 Definitions

(a) In this instrument—

**accredited facility** means National Association of Testing Authorities accredited laboratory.

**Act** means the *Water Management Act 2000*.

**AHD** means Australian Height Datum which is the datum surface approximating mean sea level that was adopted by the National Mapping Council of Australia in May 1971, as prescribed by the *Surveying and Spatial Information Regulation 2017*.

**AHD 71** means the Australian Height Datum 1971 and is the official national vertical datum for Australia

**approval holder**, for an approved work, means the holder of the water supply work approval relating to the approved work

**approved data logging and telemetry specifications** means the data logging and telemetry specifications approved by the Minister under clause 10 of Schedule 8 of the Regulation, as in force from time to time.

**approved work** means a water supply work for which a water supply work approval has been granted.

**AS/NZS** means Australian/New Zealand Standards developed by Standards Australia.

**AUSPOS** means Geoscience Australia's free online Global Positioning System processing service that uses the International GNSS Service network station data and products to compute precise coordinates.

**CORSnet-NSW** means the network of Continuously Operating Reference Stations (CORS). This network of permanent GNSS stations enables subscribers to obtain precise positioning across NSW.

**Class LC levelling** means the same as the definition in the Standards and Practices for Control Surveys (SP1) Version 1.7, Section 3.2.1 published by the Intergovernmental Committee on Surveying and Mapping.

**DAS** means the NSW Government's data acquisition service that acquires data from metering equipment.

**Department** means the NSW Department of Planning and Environment.

**GNSS** means global navigation satellite system.

**installation Type 1 storage meter** means an approved storage meter with a radar sensor or level measurement sensor that measures the water level from above the storage surface, constructed on an elevated platform with an approved LID.

**installation Type 2 storage meter** means an approved storage meter with a vented submersible pressure sensor or a level sensor that measures the water level from below the storage surface, constructed on an elevated platform with an approved LID.

**installation Type 3 storage meter** means an approved level measurement sensor that is constructed in a method approved by the Minister and is listed on the Department's website with an approved LID.

**LiDAR** means Light Detection and Ranging technology used to determine distance to a surface using laser pulses. Distance is computed by measuring the time delay between transmission and detection of the reflected signal.

**LID** means a local intelligence device, such as a telemetry enabled data logger, or other telemetry-capable field device, which is able to connect to a meter and telemeter data to the DAS.

**mAHD** means the elevation in meters with respect to the AHD.

**MGA** means Map Grid of Australia and has the same meaning as it has in clause 5 of the *Surveying and Spatial Information Regulation 2017*.

**measuring point** means the point where a sensor sends or receives measurement information. For example, for radar sensors the measuring point is the 'face' or 'head' of the radar sensor.

**PSM** means permanent survey mark.

**PVC** means polyvinyl chloride.

**Regulation** means the *Water Management (General) Regulation 2018*.

**SCIMS** means the Survey Control Information Management System.

**storage** means any purpose-built dam or reservoir or natural basin that is nominated on a floodplain harvesting access licence to take water.

**storage metering equipment**, for a water supply work, means metering equipment that measures the surface level of water in the work.

**storage gauge board** means a board used to indicate the depth of water in a storage.

**uPVC** means unplasticised polyvinyl chloride.

**UV** means ultraviolet.

- (b) Unless otherwise defined in this instrument, words and expressions that are used in the Act or Regulation have the same meaning in this instrument.

**Note—**

The terms **adopted storage curve**, **point-of-intake metering equipment**, **secondary metering device**, **storage curve** and **storage metering equipment** are defined in the Regulation. The term **duly qualified person** is defined in the Act and further defined in the Regulation.

- (c) Unless otherwise defined in this instrument, words and expressions that are used in the *Surveying and Spatial Information Act 2002* and the *Surveying and Spatial Information Regulation 2017* have the same meaning in this instrument.

## 5 Standards

- (a) The storage metering standard is set out in Schedule 1.

- (b) The survey benchmark standard is set out in Schedule 2.
- (c) The storage curve standard is set out in Schedule 3.
- (d) The secondary metering device standard is set out in Schedule 4.

**Schedule 1**  
**Storage Metering Equipment Standard**

**1 Storage metering equipment requirements**

Storage metering equipment must—

- (a) include a water level sensor. The range of this sensor must be, at a minimum, equal to the depth of the storage,
- (b) measure the level of water using the water level sensor. The accuracy of the water level measurement must be within  $\pm 10$  millimetres for the full range of water level within the storage,
- (c) have a signal output direct from the water level sensor. This output must be in a digital (SDI-12/Modbus) format,
- (d) be able to be tested against a reference meter from an accredited facility, being a reference meter with known measurement parameters,
- (e) contain a feature to enable the adjustment of the sensor's operational settings,
- (f) be able to record and report calibration factor adjustments,
- (g) operate on nominal 12-volt direct current supply,
- (h) operate on less than 20 milliamperes average current draw,
- (i) be DAS (data logger and telemetry unit) compatible. This compatibility must comply with—
  - (i) the relevant floodplain harvesting measurement parameters of the DAS, and
  - (ii) the approved data logging and telemetry specifications,
- (j) be able to operate in a temperature range of between -5 degrees Celsius to +50 degrees Celsius,
- (k) be an installation Type 1 storage meter, installation, Type 2 storage meter or installation Type 3 storage meter.

**2 Storage metering equipment materials**

Storage metering equipment must comply with all the following—

- (a) materials must have a life expectancy of at least 10 years,
- (b) fixings must be non-corrosive, including (but not limited to) screws, nuts, bolts, brackets, mounting poles, frames,
- (c) screws and bolts must have locknuts or spring washers,
- (d) commercially galvanised steel products which are cut, ground, or drilled must be coated in cold galvanising paint,
- (e) electrical insulating materials must be used to prevent contact between dissimilar metals,
- (f) materials must be suitable for the specific water type where those materials are partly or fully submerged in water,
- (g) materials and components must be suitable to operate in an ambient temperature range of -5 degrees Celsius to +50 degrees Celsius,

- (h) UV stabilised plastic style enclosures and fittings must be used,
- (i) heat shields must be used on all sides of metal enclosures, except on the bottom of the enclosures,
- (j) enclosures and components must have a minimum Ingress Protection Code of 65 water and dust rating,
- (k) enclosures supporting vented pressure sensors must use a water breather membrane and/or desiccant system to reduce possible moisture ingress to transducer vent,
- (l) anti-roosting devices must be installed on solar panels, sensor support arms, LID enclosures and other surfaces where birds may roost, but without posing work health and safety issues, and
- (m) conduits—
  - (i) must use heavy duty PVC for all electrical cabling,
  - (ii) must be supported by double sided galvanised steel saddles spaced at least 400mm apart, and
  - (iii) may be a uPVC conduit connecting the submersible pressure sensor to the enclosure.

### 3 Installation Type 1 storage meters

**Note—**

See Figure 1 to this Schedule for a diagram of an installation Type 1 storage meter.

- (1) An installation Type 1 storage meter must have a radar sensor that—
  - (a) is installed as close as practical to the storage low point,
  - (b) where possible, installed such as to minimise the impact of waves,
  - (c) taking into account the radar beam angle, the radar head must be located to prevent beam interference at all depths from any structures or inlet/outlet water flow and turbulence,
  - (d) is enclosed to prevent tampering and damage,
  - (e) is installed clear of any debris that may flow from the inlet and outlet pipes,
  - (f) has arm hinges or arm support brackets designed to return the sensor measuring point to the exact original position following any maintenance,
  - (g) has a measuring point that is flush with the base of the protective covering Or at a known and specified distance from the protective covering.
- (2) An installation Type 1 storage meter must have a LID installation that—
  - (a) is housed in an enclosure which—
    - (i) is resilient to insect and water ingress,
    - (ii) has a mechanism to remove vapour from the enclosure such as a water membrane breather system,
    - (iii) has bird proof braiding on any exposed cables,
    - (iv) has heat shields installed, and
    - (v) has a door tamper-switch installed or a locking mechanism to which tamper seals can be fitted,
  - (b) is securely supported on a structure or post to minimise movement and vibrations,

- (c) if supported on a post the specifications for the post must be—
    - (i) constructed using a pipe with a hollow section with a width or diameter of at least 75mm,
    - (ii) made of a minimum 3mm thick heavy-duty galvanised steel, and
    - (iii) mounted outside of the walkway to allow both safe and unobstructed pedestrian movement And safe and unobstructed access to the enclosure,
  - (d) has a uPVC conduit protecting the cable that connects the radar sensor to the enclosure, which is supported by double sided galvanised steel saddles spaced at least 400mm apart.
- (3) An installation Type 1 storage meter must have tamper evident seals installed—
- (a) through the padlock provision on the LID enclosure door, and
  - (b) where the radar sensor arm support bracket first meets the elevated platform.

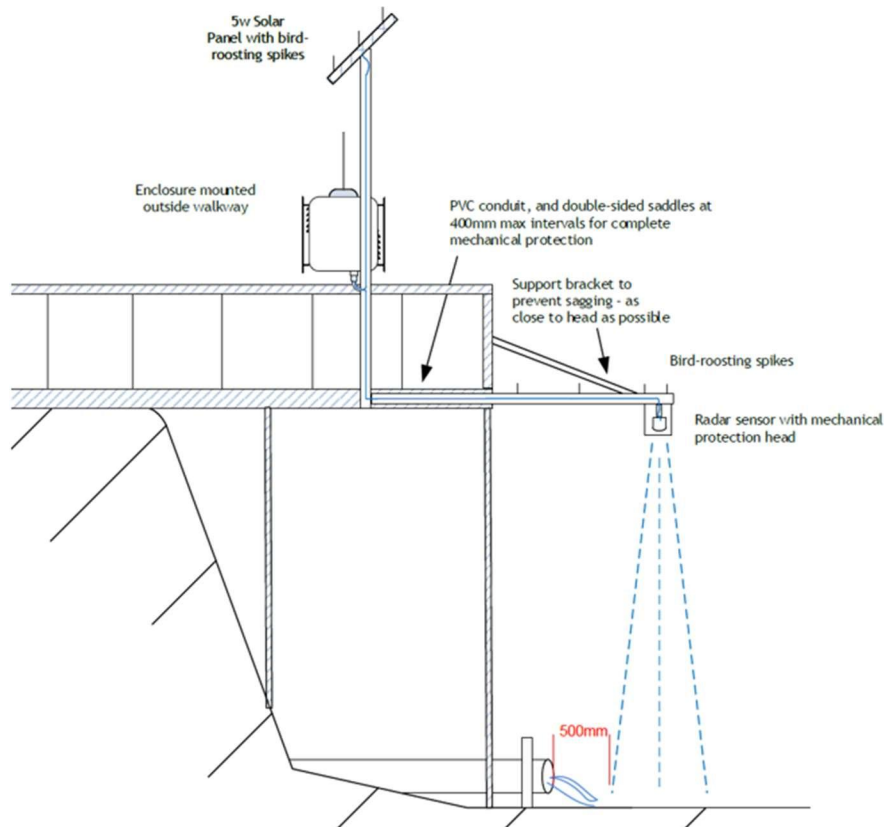


Figure 1— Installation type 1 storage meter - elevated platform with a radar sensor for storage metering.

#### 4 Installation Type 2 storage meters

**Note—**

See Figure 2 to this Schedule for a diagram of an installation Type 2 storage meter.

- (1) An installation Type 2 storage meter must have a submersible pressure sensor that is installed—
  - (a) as close to the storage low point as practical,
  - (b) clear of storage inlet and outlet pipes,
  - (c) clear of any debris that may flow from the inlet and outlet pipes,



- (d) in a position to minimise the impact of waves,
  - (e) with no sharp bends in the sensor cable that might restrict air flow in the vent tubes,
  - (f) with no low points in the sensor cable line where moisture may pool in the vent tubes,
  - (g) within a stillage pipe that—
    - (i) is secured to an elevated platform post,
    - (ii) is secured vertically,
    - (iii) terminates 50mm from the storage floor, and
    - (iv) has a vented endcap to allow the free flow of water, and
    - (v) has a minimum of 6.0 mm drainage holes at least every 300 mm for the lower 2.0 m of the stillage pipe to permit the free passage of water through the pipe.
- (2) To establish the level of the pressure transducer, an installation Type 2 storage meter must be able to be placed (and replaced) at an identifiable location within the stillage pipe, as close as possible to the lowest expected water level.
- (3) An installation Type 2 storage meter must have a LID installation that—
- (a) is housed in an enclosure which—
    - (i) is resilient to insect and water ingress,
    - (ii) uses water membrane breather and/or desiccant systems to reduce the chances of ingress of moisture to the vent tube,
    - (iii) has bird proof braiding on any exposed cables,
    - (iv) has heat shields installed, and
    - (v) has a door tamper-switch installed or a locking mechanism to which tamper seals can be fitted,
  - (b) is securely supported on a structure or post to minimise movement and vibrations,
  - (c) if supported on a post the specifications for the post must be—
    - (i) constructed using a thick heavy-duty galvanised steel tube with a minimum 3mm thickness,
    - (ii) have a width/diameter of at least 75 mm, and
    - (iii) mounted outside of the walkway to allow safe and unobstructed pedestrian movement whilst also allowing access to the enclosure,
  - (d) has a uPVC conduit protecting the cable that connects the submersible pressure sensor to the enclosure supported by double sided galvanised steel saddles spaced at least 400mm apart.
- (4) An installation Type 2 storage meter must have tamper evident seals installed—
- (a) through the padlock provision on the LID enclosure door,
  - (b) through the top endcap and bottom endcap of the stillage pipe, and
  - (c) where the conduit meets the elevated platform.

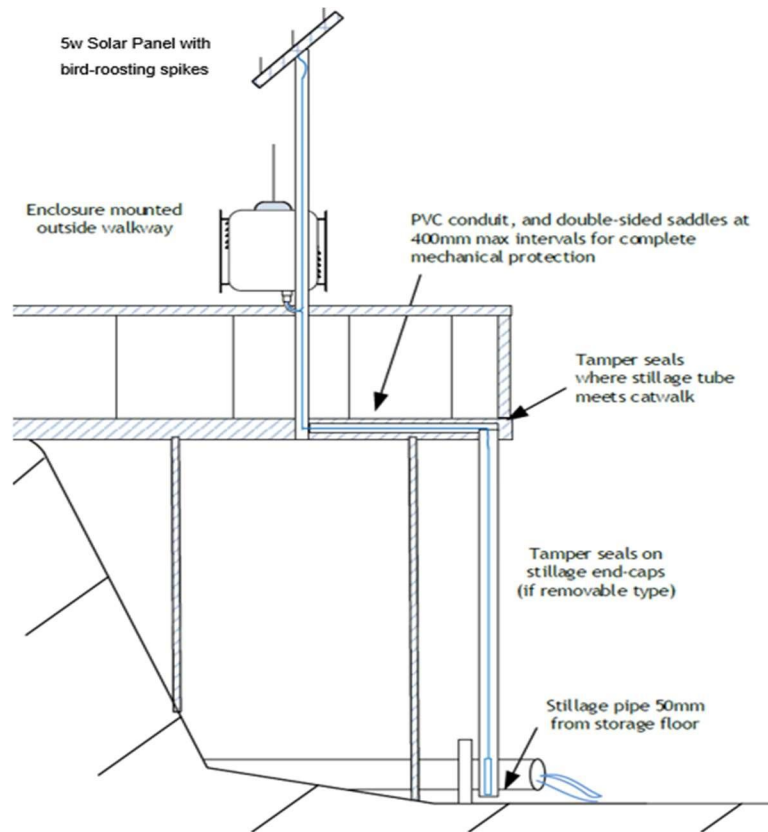


Figure 2— Installation Type 2 storage meter - elevated platform with a submersible pressure sensor for storage metering.

## 5 Storage metering maintenance standard

- (1) The requirements specified in Table 1 are the maintenance requirements applying to an installation Type 1 storage meter or installation type 3 storage meter that measures water level from above the storage.
- (2) The requirements specified in Table 2 are the maintenance requirements applying to an installation Type 2 storage meter and installation Type 3 storage meter that measures water level from below the storage.
- (3) The requirements specified in Table 3 are the maintenance requirements applying to storage gauge boards.
- (4) Each maintenance requirement specified in Column 1 of Table 1 and Table 2 that is adjacent to a tick (✓) in Column 2 of those tables must be carried out when necessary to ensure that the metering equipment is operating accurately and correctly, by—
  - (a) the authority holder, except if the activity affects or will affect the metrology of the meter or requires the removal of a tamper evident seal, or
  - (b) a duly qualified person.
- (5) Each maintenance requirement specified in Column 1 of Table 1 and Table 3 that is adjacent to a tick (✓) in Column 3 of that Table must be carried out every 5 years by a duly qualified person to ensure that the metering equipment is operating accurately and correctly.

- (6) Each maintenance requirement specified in Column 1 of Table 2 that is adjacent to a tick (✓) in Column 3 of that table must be carried out every 3 years by a duly qualified person to ensure that the metering equipment is operating accurately and correctly.

**Table 1— Maintenance requirements for an installation Type 1 or installation Type 3 storage meter that measures water level from above the storage**

Column 1	Column 2	Column 3
Maintenance Requirements	Frequency	
	At any time when necessary (by the authority holder or a duly qualified person)	Every 5 years (by a duly qualified person)
1. General cleaning and housekeeping, sensor head clear of obstructions and insect nests, cleaning solar panel, clear away debris, excess soil, check for vermin issues/damage and check that site is weed free.	✓	✓
2. Check sensor mount, supporting brackets, anti-roosting spikes cabling and conduit and other fittings on the elevated platform for structural integrity.	✓	✓
3. Check that site is work health and safety compliant - ensure that the site is safe for employees, contractors or visitors to inspect or perform work at the metering site.	✓	✓
4. Externally check the telemetry cabinet for insect ingress and ensure vents are clear.	✓	✓
5. Internally check the telemetry cabinet for ingress of any bugs or insects and confirm breather is serviceable.		✓
6. Check integrity of the telemetry pole, solar panel, antenna, LID enclosure and the fence around it (if required).	✓	✓
7. Verify the integrity of tamper-evident seals on sensor, bracketry/bolts and LID enclosure.	✓	✓
8. Verify all system batteries and solar panel are working correctly and change batteries if required.		✓
9. Confirm level sensor is located at its calibrated height benchmark.		✓
10. Check condition of external electrical cables.	✓	✓
11. Record the water level reading AHD and compare it with- a. the level sensor reading in the DAS. b. the secondary level sensor reading in the cloud were applicable	✓	✓
12. Complete any other inspections and basic maintenance as per the level sensor and LID manufacturer's requirements (if specified).	✓	✓
13. Check LID tamper alarms are visible in the DAS - battery level, sensor level, communications signal strength, enclosure open tamper event.		✓
14. Electronic validation - check software version, electronic check against internal reference source that is set at the time of calibration (as per manufacturer's requirements).		✓
15. Check for signal transfer between sensor and data logger.		✓

16. Examine the data on the DAS for any sudden changes in level, unexplained spikes or discrepancies between the DAS data and manual readings	✓	
17. Perform level testing (in situ accuracy testing to ensure sensor is operating within +/-10mm).		✓
18. Check survey benchmarks to ensure that they have remained within their accuracy tolerance range.		✓
19. Produce a routine maintenance report that covers all items for this device.	✓	✓
20. Complete the storage meter validation certification form after completing all maintenance activities for this device.		✓

**Table 2— Maintenance requirements for an installation Type 2 storage meter and installation Type 3 storage meter that measures water level from below the storage**

Column 1	Column 2	Column 3
Maintenance Requirements	Frequency	
	At any time when necessary (by the authority holder or a duly qualified person)	Every 3 years (by a duly qualified person)
1. General cleaning and housekeeping, stillage tube not damaged and clear of obstructions and insect nests, cleaning solar panel, clear away debris, excess soil, check for vermin issues/damage and check that site is weed free.	✓	✓
2. Check stillage tube mountings and supporting brackets, cabling and conduit and other fittings on the elevated platform for structural integrity.	✓	✓
3. Check that site is work health and safety compliant - ensure that the site is safe for employees, contractors or visitors to inspect or perform work at the metering site.	✓	✓
4. Externally check the telemetry cabinet for insect ingress and ensure vents are clear.	✓	✓
5. Internally check the telemetry cabinet for insect ingress and confirm breather is serviceable.		✓
5. Check integrity of the telemetry pole, solar panel and anti-roosting spikes, antenna, LID enclosure and the fence around it (if required).	✓	✓
6. Verify the integrity of tamper-evident seals on stillage tube, bracketry, and LID enclosure.	✓	✓
7. Verify all system batteries and solar panel are working correctly and change batteries if required.		✓
8. Confirm level sensor is located at its calibrated height relative to the benchmark if the storage is low enough.		✓
9. Inspect the sensor desiccant and replace when required as specified by the manufacturer.		✓
10. Check the sensor head is clear of mud and silt and located correctly if the storage level is low enough.	✓	✓
11. Check condition of external electrical cables.	✓	✓
12. Record the water level reading AHD and compare it with the pressure sensor level reading in the DAS.	✓	✓

13. Complete any other inspections and basic maintenance as per the pressure sensor and LID manufacturer's requirements (if specified).	✓	✓
14. Check LID tamper alarms are visible in the DAS - battery level, sensor level, communications signal strength, enclosure open tamper event.		✓
15. Raise submersible sensor through the stillage tube and check condition and ensure stillage tube holes are clear.		✓
16. Change LID solar battery, if required.		✓
17. Electronic validation - check software version, electronic check against internal reference source that is set at the time of calibration (as per manufacturer's requirements).		✓
18. Check for signal transfer between pressure sensor and data logger.		✓
19. Examine the data on the DAS for any sudden changes in level, unexplained spikes or discrepancies between the DAS data and manual readings	✓	
20. Perform level testing (in situ accuracy testing to ensure pressure sensor is operating within +/-10mm).		✓
21. Check survey benchmarks to ensure they have remained within their accuracy tolerance range.		✓
22. Produce a routine maintenance report that covers all items for this device.	✓	✓
23. Complete the storage meter validation certification form after completing all maintenance activities for this device.		✓

**Table 3— Maintenance requirements for storage gauge boards**

Column 1	Column 2	Column 3
Maintenance Requirements	Frequency	
	At any time when necessary (by the authority holder or a duly qualified person)	Every 5 years (by a duly qualified person)
1. General cleaning and housekeeping; gauge board is not damaged, clear away mud/silt, debris, excess soil, check that site is weed free.	✓	✓
2. Check structural integrity of - - Concrete footing or foundation structure (such as an elevated platform or headwall) - Mounting fasteners and/or welds - Corrosion of board or support structure and other associated fittings within the installation.	✓	✓
3. Verify the integrity of tamper-evident seals.	✓	✓
4. Verify the legibility and deterioration of the gauge board markings and numbering, and discolouration of the board background.	✓	✓
7. Check gauge board is in reference to the benchmark.	✓	✓
8. Check survey benchmarks to ensure they have remained within their accuracy tolerance range.		✓
8. Recalibrate gauge board to survey benchmark if needed i.e., (water level differs by +/-10mm).		✓
9. Produce a routine maintenance report that covers all items for this device.	✓	✓

10. Complete the secondary equipment metering validation certification form after completing all maintenance activities for this device.		✓
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**Schedule 2**  
**Survey benchmark standard**

- 1 PSMs must be referenced to MGA2020 coordinates, MGA zone and AHD 71 heights.
- 2 At least three PSMs are required to be installed as close as practical to the on-farm storage—
  - (a) one primary PSM,
  - (b) two secondary PSMs.
- 3 The following GNSS observation methods may be used to establish the primary PSM—
  - (a) METHOD 1 – AUSPOS (preferred option)—
    - (i) minimum occupation 4.1 hours (or longer if deemed necessary until the stated accuracies are achieved in the resultant processing report),
  - (b) METHOD 2 - CORSnet–NSW post-processed static baselines—
    - (i) two or more CORSnet-NSW stations must be used to introduce redundancy into the survey,
    - (ii) alternate AUSPOS methodology must be used if the closest CORSnet-NSW station is greater than 15km from the storage location,
    - (iii) processing and adjusting the baselines being measured through GNSS processing and least squares adjustment packages respectively is required, and
    - (iv) be familiar with the user’s guide for CORSnet-NSW on Department of Customer Services Spatial Services website at:  
[https://www.spatial.nsw.gov.au/surveying/corsnet-nsw/user\\_guides](https://www.spatial.nsw.gov.au/surveying/corsnet-nsw/user_guides)
- 4 The secondary PSMs are to be established using the same methodology chosen to establish the primary PSM at each site.
- 5 PSM installation, survey and coordination must adhere to—
  - (a) the following legislation and documentation (current version in force at the date of survey—
    - (i) *Surveying and Spatial Information Act 2002*,
    - (ii) *Surveying and Spatial Information Regulation 2017*,
    - (iii) Surveyor-General’s Direction No.1 – Approved Permanent Survey Marks (SGD1),
    - (iv) Surveyor-General’s Direction No.2 – Preparation of Locality Sketch Plans (SGD2),
    - (v) Surveyor-General’s Direction No.12 - Control Surveys and SCIMS (SGD12),
    - (vi) Surveyor-General’s Direction No.12 –Control Surveys and SCIMS (Technical Specifications for NSW Secondary Control Surveys),
    - (vii) Surveyor-General’s Direction No.12 - Control Surveys and SCIMS (Resource Pack), and
  - (b) the following documentation—
    - (i) Intergovernmental Committee on Surveying and Mapping’s publication Standards and Practices for Control Surveys (SP1), Version 1.7, and

(ii) The Department’s Survey Benchmark Guideline 2023.

6 All surveys carried out under this standard must use the survey codes set out in the following table—

	<b>Point description</b>	<b>Code</b>
(i)	PSM benchmark “xxxxx” = mark number from SCIMS	PMxxxxx, MMxxxxx, MMxxxxx
(ii)	Temporary benchmark “x” = next number available	TBMx
(iii)	Ground surface for LiDAR comparison. Four flat sites external to dam/storage	LGS1, LGS2, LGS3, LGS4
(iv)	Dam water level (current)	DWL1, DWL2
(v)	Dam wall top	DTOPGS
(vi)	Dam (full supply) top water level	DTOPWL
(vii)	Dam lowest point (near outlet)	DLP
(viii)	Dam meter primary (survey by class LC levelling)	DMETERLEV1
(ix)	Dam meter secondary (survey by class LC levelling)	DMETERLEV2

7 PSM coordinates and heights must achieve a positional uncertainty equal to, or better than (at the 95% confidence level)—

- (a) ± 30 mm horizontal, and
- (b) ± 50 mm vertical.



**Schedule 3**  
**Storage curve standard**

- 1 A storage curve must be developed from a volumetric or LiDAR survey of the storage that is referenced to AHD levels and MGA2020 coordinates.
- 2 A non-LiDAR based volumetric survey of a storage undertaken after 1 November 2020 must—
  - (a) use the survey codes set out in the following table—

	<b>Point description</b>	<b>Survey Code</b>
(i)	PSM benchmarks “xxxxx” = mark number from SCIMS	PMxxxxx, MMxxxxx, MMxxxxx
(ii)	Temporary benchmark (if needed)	TBMx
(iii)	Embankment internal crest	EMB_IC
(iv)	Embankment external crest	EMB_EC
(v)	Embankment internal toe	EMB_ITOE
(vi)	Dam (full supply) top water level	DTOPWL
(vii)	Dam lowest point (near outlet)	DLP
(viii)	Existing surface	ES
(ix)	Change of grade	CG
(x)	Borrow pit batter top	BPTOP
(xi)	Borrow pit batter toe	BPTOE
(xii)	Structure invert	IL
(xiii)	Dam meter primary (optional)	DMETER1
(xiv)	Dam meter secondary (optional)	DMETER2
(xv)	Dam water level current (at specified time and date)	WL1, WL2

- (b) be presented on a survey storage plan which must include all of the following—
    - (i) storage ID,
    - (ii) storage location,
    - (iii) survey benchmark ID,
    - (iv) north point,
    - (v) survey method,
    - (vi) ground surveyed point locations,
    - (vii) level annotation for key infrastructure levels (e.g., pipe invert),
    - (viii) contours of at least 0.5m intervals,
    - (ix) location of embankment longitudinal section,
    - (x) coordinates of the storage centroid – easting, northings and MGA zone, and
    - (xi) temporary local farm benchmarks.
  - (c) be presented on a longitudinal section which must include:
    - (i) embankment longitudinal section profile,
    - (ii) chainages at intervals of no more than 100m,
    - (iii) design freeboard,
    - (iv) storage full supply level,
    - (v) existing crest levels, and
    - (vi) design crest level.
- 3 The storage curve produced must show:
- (a) reduced level in mAHD in 10cm increments from storage base to storage crest level,
  - (b) storage volume in megalitres, and
  - (c) storage surface area in Ha.

**Schedule 4**  
**Secondary metering device standard**

- 1 The following devices are approved as secondary metering devices—
  - (a) a storage gauge board that meets the requirements of this standard,
  - (b) storage metering equipment, as approved on the Department’s website, that have been assessed to meet the requirements of Schedule 1, with the exception to requiring approved data logging and telemetry specifications.
- 2 A storage gauge board must—
  - (a) be in a single or in a multiple staged configuration,
  - (b) comply with the requirements in section 7.1 of Australian Standard AS 3778.6.5,
  - (c) be constructed from durable material resistant to corrosion in alternating wet and dry environments with legible, unambiguous markings resistant to wear and fading,
  - (d) have 0.01m (10mm), 0.1m (100mm) and 1.0m measurement increments to allow a full reading to be undertaken (except for gauge boards installed before 1 November 2020, which may have only 100mm measurement increments),
    - (i) boards installed before 1 November 2020 with 100mm measurement increments will need to be replaced with gauge plates that match the current standard by 31 December 2025,
  - (e) have successive 0.01m (10mm) incremental alternating black and white strips on a white background,
  - (f) have a width, increment markers and numbering of a size that can be read easily from a location that can be safely accessed on an elevated platform or storage embankment.
- 3 A storage gauge board must—
  - (a) dependant on storage conditions, be set at the lowest accessible level in the storage,
    - (i) gauge boards can be installed in increments as conditions permit until such time as the full range of water levels from storage floor to full supply level is covered,
    - (ii) be installed with a height range and lowest gauge board value such that there are no negative water levels produced,
  - (b) be in a location that can be easily and safely accessed for maintenance and readings during wet weather or flooding events,
  - (c) measure from the lowest accessible floor level in the storage to the top of the storage embankment level,
  - (d) be secure, stable, and must not be able to move without intervention,
  - (e) be levelled in and related to mAHD for each gauge board,
  - (f) be installed in a vertical position,
  - (g) be fitted with at least one tamper evident seal on securing fasteners on each gauge board,
  - (h) for multiple staged storage gauge boards—

- (i) 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, and
  - (ii) have the bottom of the gauge board at the floor of the storage set such that the lowest gauge height is greater than 0.00 m.
- 4 A storage gauge board must—
  - (a) be referenced to an AHD levelled survey benchmark,
  - (b) have the MGA2020 coordinates of the gauge board determined,
  - (c) for multiple staged gauge boards only—
    - (i) have as a minimum, the gauge board level reading on the topmost gauge board levelled to m AHD, all subsequent gauge boards must be levelled to this gauge board,
    - (ii) have the MGA2020 coordinates of the topmost gauge board determined,
    - (iii) have the topmost level on the top gauge board selected such that the level of bottom of the lowest gauge board will be greater than 0.00 m.