Checklist for installing non-urban metering equipment

This checklist provides guidance for the most common non-urban metering equipment installations.

The standard drawings and checklist are designed to support installers of meters and local intelligence devices, including duly qualified persons and water users, by recommending industry best practices that should be considered for typical closed conduit metering installations.

Please note, this checklist does not address site specific or unique installation requirements. These drawings are not to scale, and any installation will need to be modified to meet site conditions.

General requirements

Site and meter design

Item	Complete? (Y/N)
Confirm water access licence (WAL), Extraction Site ID (ESID) and works approval are in place and ensure correct meter & LID location and application, particularly for sites with multiple meters, WALs, ESID and so on. (Refer to & complete WaterNSW Installation test plan (ITP); further checklist details below.)	
Confirm location of meter emplacement is suitable to minimise WHS risks in access, construction, operation and maintenance, as per Best-practice guide to installing, validating and maintaining non-urban water meters in NSW 2019, the *Work Health and Safety Act 2011* and Work Health and Safety Regulation 2017.	
Confirm that the meter installation complies with the Best-practice guide to installing, validating and maintaining non-urban water meters in NSW, 2019 and (in order of priority) with manufacturer specifications, meter pattern approval, AS4747 Parts 2, 5 and 8 and approved meter emplacement design.	

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Item	Complete? (Y/N)
Confirm that an assessment has been completed of environmental and heritage impacts associated with meter installation, including potential effects on water, air, soil, vegetation, fauna and cultural heritage.	
Confirm adequate site accessibility for meter reading and maintenance.	
Confirm the site has adequate remote communications access suitable for connection to the data acquisition service (DAS). Adjust site design, antenna height and direction as needed to optimise connectivity.	

General site layout

Site design – General site layout

Item	Complete? (Y/N)
Confirm metering site is located away from roads and farm access tracks and is protected from livestock and wildlife. Install suitable fencing with a personal access gate. If fencing is not feasible, install bollards to safeguard against vehicle impact.	
Ensure the site is cleared to maximise solar panel efficiency, provide easy access to the LID and maintain clear telemetry connectivity.	
Include a hard stand area (gravel or concrete compliant to the Australian Standard for Concrete Structures AS 3600) for all-weather access and facilitate easier weed control.	
Confirm the site has proper drainage to prevent pooling and ground subsidence.	

Buried works installation

Site design – Buried works installation

Item	Complete? (Y/N)
Conduct a Before-You-Dig search on byda.com.au to identify existing buried underground services before site design.	
Assess and manage construction safety risks including confined spaces, trench depth and stability and potential wildlife entrapment.	
Ensure pits and pit lid/s have sufficient structural strength for the location, including traffic load where applicable.	
Install thrust blocks for buried meters and pipework according to Australian Standards and Water Services Association of Australia (WSAA) specifications with standard drawing WAT-1205.	
Use backfill material that is appropriate for purpose, complies with Australian Standards for the pipe material and is compacted to specification.	
Install marker posts to identify buried pipework locations. Posts should comply with WSAA standard drawing WAT-1300, blue in colour, at least 900 mm high and corrosion resistant.	

Completion

Completion and site restoration

Item	Complete
Ensure all installed components are securely fixed and resistant to theft and vandalism.	
Confirm the site is fully restored upon completion, with all construction waste removed and the area left clean and tidy.	

Meter installation design

Meter configuration

Item	Complete? (Y/N)
Confirm meter installation complies (in order of priority) with manufacturer specifications, meter pattern approval, AS4747 Parts 2, 5 and 8 and approved meter emplacement design.	
Meter internal diameter must match the internal diameter of the pipework or be within allowable tolerance limits to comply with the specifications (as listed above)	
Assess expected water quality, chemistry and temperature to ensure they are within pattern approval meter limits. Apply mitigations as required such as screens, filters, site selection, buried pipework and so on.	
Incorporate design provisions for in-situ accuracy testing, as per In-situ meter accuracy procedures guide Aug 2022.	
Confirm meter body orientation (horizontal/vertical) is within manufacturer specified limits. Horizontal orientation is preferred.	
Ensure flow velocity does not exceed 2 m/s.	
Assess hydraulic performance for friction losses. If losses are excessive due to multiple valves, bends or flow velocity is higher than 2 m/s, increase meter emplacement diameter to minimise pressure loss.	
Confirm all materials comply with Australian Standards and are resistant to corrosion. Isolate dissimilar metals using rubber gaskets if necessary.	
Confirm straight upstream pipe length meets minimum requirements.	
Confirm straight downstream pipe length meets minimum requirements.	
Ensure no flow disturbances such as valves, bends, flanges, offtakes, changes in pipe internal diameter, sensors or tappings are present within the required straight pipe lengths upstream and downstream of the meter.	

Item	Complete? (Y/N)
Eliminate the possibility of water offtake upstream of the meter by design or unauthorised modification.	
Confirm internal pipework is clear of obstructions.	
Confirm correct alignment of pipes and flanges.	
Ensure pipes are adequately supported without loading on the meter body.	
Confirm internal pipe surfaces are clean, undamaged and free of corrosion, flange gasket and weld bead intrusion.	
Ensure meter and pipework remain full during all operating conditions, considering meter orientation and sensor location.	
Verify correct placement and function of air release valves beyond minimum required straight pipe lengths upstream and downstream.	
Confirm the meter is electrically grounded as per manufacturer specifications or pattern approval conditions.	

Meter integrity

Meter verification and integrity check

Item	Complete? (Y/N)
Confirm tamper-evident seals are correctly applied on the meter as per as per Best-practice guide to installing, validating and maintaining non-urban water meters in NSW 2019.	
Verify that manufacturer metrological integrity verification seals are in place.	
Ensure internal pipe inspection can be carried out without removing tamper-evident seals such as via a downstream inspection port located outside the required straight pipe length.	

Item	Complete? (Y/N)
Purge air from meter and pipework, confirm the meter is not displaying a 'pipe not full' error.	

Local intelligence device installation

Site location and configuration

Item	Complete? (Y/N)
Position the LID to minimise cable lengths.	
Affix site and meter identification number plaque or sticker to the LID body, as close as practical to the read display.	
Orient the LID enclosure to face south and protect it from direct sunlight exposure.	
Use a corrosion resistant mounting pole and ensure it is securely earthed, including lightning protection.	
Mount the LID at an optimal height of 1.2 to 1.5 meters above ground level. If local flood conditions require, mount at least 500 mm above the 1% Annual Exceedance Probability (AEP) flood level. Ensure accessibility to the LID is considered if the unit is mounted higher than 1.5 metres.	
Install stainless steel bird spikes on the top edge of the solar panel to deter nesting or roosting.	

Environmental

Item	Complete? (Y/N)
Ensure the LID enclosure is securely sealed against insect, dust and water ingress, including protection from moisture condensation caused by temperature changes. Ensure the LID is protected from vibration, chemical and hydrocarbon exposure typically emitted from pumps or nearby infrastructure.	

Item	Complete? (Y/N)
Ensure cables are encased in sound conduit with ends secured and sealed to prevent pest, dust and water intrusion.	

Cabling and connections

Item	Complete? (Y/N)
Ensure power and signal cables are properly isolated or separated to prevent electromagnetic interference affecting signal transmission.	
Confirm that manufacturer wiring diagrams for both meter and LID are available and strictly followed for correct wiring connections. Maintain consistent wiring colour coding across all sites.	
Label all cables by function using durable identification tags.	
Adhere to the LID and meter manufacturers' specifications when connecting devices.	

LID verification and integrity check

Item	Complete? (Y/N)
Confirm tamper-evident seals have been correctly applied on the LID as per Best-practice guide to installing, validating and maintaining non-urban water meters in NSW 2019. Ensure all tamper-evidence features such as cable or case tamper alarms are correctly installed and functioning.	
Verify the display is scaled correctly as per manufacturer specifications and reports water flow in megalitres per day.	
Confirm satisfactory remote communications access to the data acquisition service.	

Table of measurement units, scaling factors and conversions

Design flow rate (L/second)	Design flow rate (kL/day)	Design flow rate (ML/day)	Minimum indicating range	Units (kL or ML)	Min. days of record for range
<0.5	43.2	0.0432	9,999	kL	231
0.5-5.0	432	0.432	99,999	kL	231
5.0-50.0	4,320	4.32	999,999	kL	231
50-500	43,200	43.2	9,999	ML	231
500-5000	432,000	432	99,999	ML	231
5000-50000	4,320,000	4,320	999,999	ML	231

Conversions

Litres (L)	Kilolitres (kL)	Cubic meters (m3)	Megalitres (ML)
1,000	1	1	0.001
10,000	10	10	0.01
100,000	100	100	0.1
1,000,000	1,000	1,000	1

WaterNSW DQP meter compliance

Compliance and documentation checklist

Item	Complete? (Y/N)
Confirm the WaterNSW How-To Guide: DQP Portal meter compliance process has been applied and completed	
Complete site registration and validation	
Complete the WaterNSW DQP Portal Installation Test Plan (ITP)	
Ensure understanding and application of other relevant WaterNSW How-to guides to support installation and site registration and validation	
Take and submit photos of the entire site installation, including meter emplacement and below-ground infrastructure (before backfilling) with the WaterNSW DQP Portal ITP submission	

Submission of supporting documentation

Item	Complete? (Y/N)
Pattern approval certificate	
Meter design drawings	
Manufacturer specifications, installation guides and operational manuals	
Site installation photographs	
Diagnostics records	
Configurable parameters records	
CMI accreditation certificate for the meter installer and certifier	