National Framework for Non-urban Water Metering
Policy Paper
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Introduction

The National Water Initiative (NWI) Agreement provides a strategy for improving water resource management across Australia. In relation to water meters, paragraphs 87 and 88 of the Agreement specify requirements for national metering standards and a nationally consistent framework for water metering and measurement. In addition, paragraph 89 specifies open reporting requirements relating to metered water use and associated compliance and enforcement actions. As Council of Australian Governments (COAG) signatories, all state and territory (‘jurisdictional’) governments are committed to these objectives.

Recognising that requirements for urban and non-urban water meters differ due to highly variable installation configurations and operating conditions in non-urban environments, a national framework (the ‘Metrological Assurance Framework’) has been developed to enable implementation of new standards for non-urban water meters and to accommodate future trade measurement requirements.

This policy sets out the framework and arrangements agreed by jurisdictional government and industry representatives as members of the Metering Expert Group appointed by the Commonwealth Government.

The policy delivers the primary objective agreed by jurisdictional governments that the national metering standards should seek to provide an acceptable level of confidence that measurement performance under in situ conditions is within maximum permissible limits of error of ±5%.
1 Purpose and scope

The purpose of this policy is to provide a nationally consistent framework for non-urban water meters, enabling jurisdictional governments to implement national metering standards and achieve the overarching objective of the National Water Initiative - a 'nationally-compatible market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes'.

The policy applies to the metering of water access entitlements as set out in section 87 of the NWI Agreement:

“87. The Parties agree that generally metering should be undertaken on a consistent basis in the following circumstances:

i) for categories of entitlements identified in a water planning process as requiring metering;

ii) where water access entitlements are traded;

iii) in an area where there are disputes over the sharing of available water;

iv) where new entitlements are issued; or

v) where there is a community demand.’

This policy sets out the approach in response to, and satisfies the agreement set out in NWI section 88 (i) and (ii):

"88. Recognising that information available from metering needs to be practical, credible and reliable, the Parties agree to develop by 2006 and apply by 2007:

i) a national meter specification;

ii) national meter standards specifying the installation of meters in conjunction with the meter specification”

by providing for:

- a practical, credible and reliable approach that provides national standards for meter construction, installation and maintenance
- a Metrological Assurance Framework, and
- implementation of the national standards through national measurement and water legislation.

This policy also sets out auditing and reporting approaches that satisfy NWI Section 89 (i):
“89. The Parties agree to develop by mid-2005 and apply national guidelines by 2007 covering the application, scale, detail and frequency for open reporting addressing:

i) metered water use and associated compliance and enforcement actions”

This policy provides jurisdictions with confidence that metering is appropriate, is being undertaken nationally on a generally consistent basis and provides particulars on the scale, detail and frequency for open reporting consistent with reporting being developed by the Bureau of Meteorology (BoM) for other water accounting requirements set out in the balance of NWI section 89.

This policy applies to meters (including measuring systems, devices and their component parts) owned by entitlement holders, water service providers and jurisdictional governments and used for trade and/or related resource management activities in a non-urban setting.

Meters “used for trade” refers to where the measurement of water taken through the meter is used as the basis for levying a charge and/or monitoring compliance with an entitlement. “Trade” in this context is not related to the trading of water entitlements (although this may be the mechanism by which an entitlement holder has gained his entitlement).

The policy does not apply to:

• stream gauging stations or groundwater infrastructure used for resource monitoring purposes

• meters used within urban supply and distribution systems where treatment is to a potable standard.

Where no alternative is available other than the application of stream gauging techniques to the measurement of take, then such techniques will be applied in accordance with hydrographic best practice in the knowledge that such techniques may deliver an acceptable but lesser level of confidence that measurement performance is within the maximum permissible limits of error (±5%) under in situ conditions.

In response to NWI section 88 (iii):

“iii) national standards for ancillary data collection systems associated with meters”

Under this policy meters are to provide for pulse output and open access arrangements for telemetry as agreed with the BoM. The BoM will cater for all other ancillary data collection systems matters.
2 National and state implementation plans

Jurisdictional governments shall implement national standards for non-urban meters and the Metrological Assurance Framework in accordance with this policy.

Implementation shall be undertaken through state implementation plans for non-urban metering prepared by the relevant jurisdictional departments or agencies by 31 December 2009 and shared with all jurisdictions through the Water Sub-Group or its successor inter-jurisdictional committee.

Jurisdictions’ capacity to implement this National Framework may vary depending on resource availability and cost recovery arrangements.

In consultation with all jurisdictions, DEWHA will prepare a National Implementation Plan drawing on the jurisdiction plans and make this plan publicly available by 30 June 2010.

Priorities and targets for upgrading meters and installations will be documented in the respective State Implementation Plans. Such priorities will generally be guided by the priorities and timeframes set out in Chapter 4, meter replacement.
3 Metrological Assurance Framework

3.1 Key requirements

Non-urban meters shall comply with the following key requirements of the Metrological Assurance Framework to ensure an acceptable level of confidence in meter performance. All non-urban meters shall be:

- Pattern approved by the National Measurement Institute (NMI) where available
  - Where pattern approval is not available for meters or measuring devices (see section 3.6.5, Limitations of Pattern Approval), a contemporary meter or metering system approved by the relevant jurisdictional department or agency would be acceptable. Use of an approved meter must still provide an acceptable level of confidence that it will perform within the maximum permissible limits of error in field conditions (±5%).
- Laboratory verified by a Verifying Authority under the National Measurement Act 1960 (Cth), prior to installation
- Suited to the intended purpose, installation configuration and operating conditions
- Installed in compliance with the Pattern Approval certificate and the appropriate Australian Standards
- Validated by a certified validator after installation and before water is taken through the meter under an entitlement
- Maintained periodically in accordance with the Pattern Approval certificate and relevant Australian Standards or Technical Specifications (for example ATS 4747)
- Periodically validated by a certified validator on an ongoing basis
- Able to provide an acceptable level of confidence without in situ verification that performance of the meter is within the maximum permissible limits of error (±5%) in field conditions
- Re-verified (either in a laboratory or in situ when and where practical and preferred) by a Verifying Authority or certified licensee under the National Measurement Act 1960 (Cth) following maintenance affecting the metrological performance of the meter
- In situ re-verification may not be possible where very large meters or measuring systems are used in high capacity applications; or where physical access is a safety concern; or where adequate facilities are unavailable; or where costs are prohibitive. However, even where it is possible to undertake in situ re-verification, laboratory re-verification may be selected as the preferred option.
- Measurement Act 1960 (Cth) following maintenance affecting the metrological performance of the meter
• Audited on a regular basis by water service providers, government agencies or independent auditors in accordance with implementation plans.

3.2 Metrological Assurance Framework pathways
Jurisdictional governments shall adopt one or more of the pathways illustrated in the diagrams contained in Attachments 1 (a) and (b).

In adopting these pathways jurisdictional governments shall ensure adequate rigour during meter establishment and operational phases to achieve:

• An acceptable level of confidence in meter performance and accuracy, such that meters operate within the maximum permissible limits of error (±5%) allowable under in-situ conditions

• Overall meter performance outcomes similar to other jurisdictions; demonstrated through the auditing process, and outlined in Attachment 2.

3.3 Use of certified installers, maintainers and validators
Where applicable, jurisdictional governments and water service providers shall ensure appropriately certified and/or trained installers, maintainers and validators are used for meter installation, maintenance and validation activities.

Where jurisdictional governments allow meters to be installed and maintained by non-certified persons, a certified validator must inspect and approve the work prior to the meter being accepted for use.

Certified installers, maintainers and validators shall hold certification issued by a nationally recognised, industry-based certification scheme. Certification will be competency-based and will recognise qualifications and/or equivalent experience.

Where an entity engages a contractor or sub-contractor to carry out installation and maintenance activities, the contractor or sub-contractor must be certified or be supervised by a certified person.

Not all persons who work on, or in the vicinity of, a water meter, must be certified. There are many simple tasks which cannot affect the metrological performance and which can be undertaken by an uncertified person. But where a non-certified person is engaged, they must work under the direction and supervision of a certified person and/or in accordance with work practices and/or maintenance plan established by a certified person. The certified person shall bear responsibility for the work undertaken by the uncertified person, and thereby shall be required to certify the work is to the necessary standard.

Entitlement holders may also undertake simple tasks which are external to the meter and associated pipework and which cannot affect the metrological performance. In such cases, jurisdictional governments will implement in accordance with this policy strict validation and compliance regimes which periodically check the integrity of these meters and their installations.
3.4 Jurisdictional water legislation provisions

Jurisdictional governments shall ensure the key requirements of the Metrological Assurance Framework are adequately provided by state or territory water legislation, including subordinate instruments. Provisions shall cater for non-urban meters owned by governments, water service providers and entitlement holders.

Examples of legislative provisions required in Acts, Regulations, water sharing or operations plans, or licence conditions may include, but are not limited to:

- Compulsory use of pattern approved and laboratory verified meters, as determined by the NMI under the National Measurement Act 1960
- Selection of a meter which under the expected application will operate in accordance with the pattern approval certificate
- Installation in accordance with the pattern approval certificate and relevant Australian Standards or Technical Specifications
- Maintenance on a regular basis, such that the meter’s ongoing operation is not compromised
- Validation by a certified validator after initial installation and ongoing maintenance or replacement
- Testing meters in response to complaints relating to accuracy
- Providing information about meters for inspection and/or auditing purposes
- Cost recovery from users of state or water service provider-owned meters
- Offences and penalties for failing to comply with the listed requirements.

Jurisdictional water legislation shall provide for the listed requirements through the relevant Act, Regulation, water sharing or operations plans, or licence conditions, or through a combination of these mechanisms. Water legislation shall mandate the use of “approved” meters and installations, including:

- pattern approved, laboratory verified meters marked with a verification mark in accordance with national measurement legislation and installed in accordance with the Australian Standards or Technical Specifications

and where necessary:

- contemporary meters that meet the performance and installation specifications of the relevant department or agency (i.e. where there is no meter suitable for the site which is pattern approved and laboratory verified - see section 3.6.5, Limitations of Pattern Approval).

Water legislation shall provide for mandatory use of “approved” meters and installations through suitable means, such as requiring these meters to comply with specifications approved by the chief executive or his/her delegate. The specifications shall include:

- relevant NMI standards (NMI M10 and NMI M11)
• relevant Australian Standards or Technical Specifications
• any additional requirements of the relevant department or agency (for example, data logger compatibility, testing points, contemporary performance requirements in the absence of pattern approved meters, etc).

Where necessary, water legislation and/or the specifications approved by the chief executive may refer to relevant sections of national measurement legislation, NMI standards, Australian Standards or Technical Specifications and where applicable, any additional requirements of the relevant department or agency.

3.5 Meter ownership and control
Non-urban meters may be owned and controlled by jurisdictional governments, water service providers and entitlement holders in accordance with the relevant state or territory metering policy.

3.5.1 Entitlement holder-owned meters
Where meters are owned, installed and maintained by entitlement holders (and thus control over meter, installation and maintenance quality is limited), jurisdictional governments shall ensure adequate safeguards are in place to address potential uncertainty in relation to meter performance. These safeguards shall include:

• Mandatory conditions – enforcement of minimum installation, maintenance and validation requirements under the entitlement holder’s licence conditions and/or through water legislation; and

• Internal check and/or Volumetric check – post-installation validation of the meter and pipe internals by a certified validator by inspection; and/or the use of an approved and certified reference meter or proving vessel; and

• General compliance inspections – routine or random checks by jurisdictional authorities or their delegates.

3.5.2 Water service provider-owned meters
Where a water service provider (such as a local government, utility company, rural board or other authority) owns the meter, they shall ensure meters are installed, maintained and validated by qualified, competent persons. The level of validation required shall reflect the qualification and competency of the persons undertaking installation and maintenance:

• Meters installed and maintained by staff with non-approved training shall be validated by a certified validator. Where training is not nationally recognised, competency is unknown. Therefore, the use of a certified validator provides confidence that the work complies with Australian Standards or Technical Specifications.

• Meters installed and maintained by staff with nationally approved training or certification may be self-validated by a certified installer or maintainer if they also hold certified validator status. Where certification of nationally approved training is formally recognised, confidence in competency is high. Therefore self-validation
is permitted, providing the person undertaking self-validation is a certified validator.

Nationally approved training is recognised within the Australian Qualifications Framework (AQF), delivered by a Registered Training Organisation and recognised as an equivalent to certification.

3.5.3 Government-owned meters
Jurisdictional agencies and departments shall ensure meters are installed, maintained and validated by qualified, competent persons. The level of confidence in the operation of government-owned meters is high (due to direct management, certification of installers and maintainers, sign-off procedures for completed installations and regular condition inspections as part of ongoing maintenance activities). Therefore, government-owned meters may be self-validated by a certified installer or maintainer if they also hold certified validator status.

Note: In this policy, "government" refers to state and territory governments, but not local governments which are considered as water service providers.

3.6 Patter approval and verification
3.6.1 General
All non-urban meters used by entitlement holders, water service providers and jurisdictional governments shall comply with the requirements of the National Measurement Act 1960 and National Measurement Regulations 1999 (Cth) relating to pattern approval and initial laboratory verification prior to installation.

3.6.2 Verification
Regarding "initial" or "laboratory" verification, the NMI has made provision to allow a verifying authority to use a sampling program for the verification of water meters. Any such sampling program must be approved by the NMI and the conditions and requirements noted on the pattern approval certificate under Test Procedure.

The use of a sampling program for the purposes of initial laboratory verification is highly dependent on many factors, such as the technology employed by the meter, compliance with NMI requirements, the numbers of meters produced, demonstration that metrological assurance is not compromised; and any such sampling program is entirely subject to NMI approval.

3.6.3 In-situ Verification
Requirements for in situ volumetric verification under national measurement legislation shall apply to non-urban meters only if:

- recognised technology and procedures are available; and
- jurisdictional governments consider in situ volumetric verification to be practical and cost-effective.

However, where maintenance or repair affects the metrological performance of the meter, laboratory re-verification (or in situ where possible) shall be undertaken to reinstate the verification mark.
3.6.4 Requirements of Pattern Approval

All non-urban meters shall comply with the relevant National Measurement Institute (NMI) documents prescribing mandatory metrological and technical requirements for pattern approval and initial verification. These documents are:

- NMI M 10 – Meters intended for the metering of water in full flowing pipes; and
- NMI M 11 – Meters intended for the metering of water flowing in open channels or partially filled pipes.

Prior to installation, meters shall be verified to ensure performance within the maximum permissible limits of error under controlled laboratory conditions (±2.5%). Initial verification shall be undertaken by a Verifying Authority appointed under the National Measurement Act 1960, using a laboratory accredited by the National Association of Testing Authorities (NATA).

Test results for meters tested overseas in ILAC signatory accredited laboratories may also be accepted for the purpose of pattern approval by the NMI. Further information can be obtained from the NMI.

3.6.5 Limitations of Pattern Approval

There exists a practical and legislative limit to the scope of pattern approval.

A meter can only be pattern approved if it can be empirically tested in accordance with NMI requirements. Some meters due to their size, maximum flow rate and other rated operating conditions may exceed the capacity of available testing facilities. This may result in a small percentage of large meters being unable to be pattern approved or being pattern approved (for use for trade) at a fraction of their maximum flow rate or other rated operating conditions.

In practice, pattern approval is granted to the design of a meter, not an individual meter itself. Therefore, a meter is said to comply with legislation if, among other requirements, it is of a pattern approved design.

As outlined in section 2, this policy applies to meters, including measuring devices, systems and their component parts. It is unlikely that a metering system, that may consist of a number of individual sensors, a calculation methodology (flow computer) and an emplacement (natural or man-made), would be constructed to exactly the same design in every instance. Channel dimensions, sensors and/or the overall geometry of the metering system will vary from site to site.

While components of a metering system, for example, height measurement devices and pressure sensors may be pattern approved, the metering system itself may not be pattern approved in the same way due to the variability of the design. It would also prove extremely difficult, if not impossible to verify a metering system.

The variability of design (even if only slightly) and the difficulties surrounding verification mean that a metering system may not be granted a conventional pattern approval in accordance with the National Measurement Act 1960 (Cth). However, whilst
the metering system may not be pattern approved, it will still need to comply with all relevant provisions of ATS 4747.

3.7 Meter selection and specifications
Jurisdictional governments shall ensure water service providers and entitlement holders are made aware of the:

- Types, classes and models of meters that are pattern approved and suitable for non-urban use
- Relevant Australian Standards or Technical Specifications relating to those meter types and classes and installation and maintenance specifications to achieve minimum performance requirements.

To ensure consistency across all jurisdictions, relevant departments or agencies shall refer meter owners to:

- A central list of pattern approved meters for use in non-urban applications (on the National Measurement Institute website www.measurement.gov.au)
- Relevant Australian Standards or Technical Specifications (supplied by Standards Australia)
- Any additional installation and maintenance specifications required by the jurisdictional government to accommodate local operating conditions.

3.8 Installation
All meters for non-urban use shall be installed in accordance with the relevant NMI documents, Australian Standards or Technical Specifications or manufacturer’s specifications (where these reflect NMI documents and Australian Standards), such that there is an acceptable level of confidence that the meters will operate within the maximum permissible limits of error (±5%) allowable under *in situ* conditions.

Where necessary, meters and installations shall also comply with additional specifications of jurisdictional governments to meet management, operating or safety requirements. Examples of additional specifications may include but are not limited to the fitting of:

- Dataloggers
- Telemetry
- Filters, screens and air separation devices
- Power sources
- Meter boxes and protection covers
- Access platforms and pits
- Testing points, T-junctions and additional pipe lengths to facilitate *in situ* testing, cleaning and internal inspection.
Where applicable, as outlined in the MAF, meters (including measuring devices, systems and component parts) must be installed by certified installers.

### 3.9 Post-Installation Validation

Post-installation validation shall apply to all non-urban meters to ensure there is an acceptable level of confidence newly installed meters operate within the maximum permissible limits of error allowable under *in situ* conditions (±5%).

Post-installation validation shall be undertaken by a certified validator or certified installer who also holds certified validator status.

To validate a meter after installation, the certified validator shall undertake the following best practice checks:

- Check the meter (or measuring system, including its component parts) to ensure it has a verification mark and is correctly installed in accordance with the relevant NMI documents, Australian Standards or Technical Specifications and manufacturer's specifications
  - For closed conduits, check the installation to ensure that the lead-in / lead-out pipe lengths are of the specified length
  - For open channels, calibrate weirs and height gauges and inspect upstream and downstream infrastructure to minimise potential obstructions impacting on the performance of the measuring device
  - For closed conduits, check the meter internals (via meter capsule removal or lead-in /lead out disassembly) and where necessary remove and clean pipe lengths to ensure they are straight, round and free from obstruction. (The checks which may be undertaken shall vary with the type of meter, eg the range of checks possible with an electro-magnetic meter differs greatly from those possible with a mechanical meter).
- Where appropriate, seal the meter with a seal that is approved by the relevant government department, agency or water service provider to prevent tampering.
- Approve the meter and installation for use and issue a validation certificate to the meter owner/user.

Where it is considered appropriate and practical, water service providers or jurisdictional governments may elect to undertake *in situ* volumetric testing in place of internal checks. *In situ* volumetric testing for the purposes of validating meter performance does not constitute verification under national measurement legislation.

### 3.10 Maintenance

#### 3.10.1 General

Maintenance of meters is required to provide an acceptable level of confidence that they continue to operate within the maximum permissible limits of error.

Maintenance is also required to ensure that the installation of the meter still complies with the pattern approval requirements and associated limitations of the installation conditions in accordance with ATS 4747.
Maintenance procedures shall comply with the Australian Technical Specifications and/or pattern approval certification.

The following **principles** will apply to meter maintenance:

- All maintenance shall be undertaken such that there is an acceptable level of confidence the meter continues to operate within the maximum permissible limits of error allowable under in situ conditions (±5%);
- A meter must be re-verified if its metrological performance has been affected by maintenance of the meter;
- The metrological performance of a meter is considered to have been affected by maintenance (and hence re-verification is required) if the seals on the meter are broken or removed by a person who is not a certified maintainer or by a person unknown;
- The metrological performance of a meter is not considered to have been affected by maintenance (and hence re-verification is not required) if the seals on the meter are not broken, and no other modification to the meter has been made subsequent to the most recent certified validation.
- The metrological performance of a meter is not considered to have been affected by maintenance (and hence re-verification is not required) if the seals on the meter are broken during maintenance of the meter by a certified maintainer and the only maintenance undertaken is as specified in the pattern approval certificate as not affecting the metrological performance. If maintenance is undertaken which is not addressed in the pattern approval certificate, the maintenance must be assessed by a certified validator. Following assessment, re-verification is not required if in the judgement of the certified validator, the metrological performance has not been affected to the extent that there is no longer an acceptable level of confidence that the meter continues to operate within the maximum permissible limits of error allowable under in situ conditions (±5%). (The certified validator may also be the certified maintainer undertaking the maintenance);
- Where the maintenance undertaken is as specified in the pattern approval certificate as affecting the metrological performance or the certified validator otherwise determines maintenance undertaken by a certified maintainer or WSP trained maintainer is likely to have affected the metrological performance of the meter, laboratory re-verification (or in situ verification where possible) shall be undertaken to reinstate the verification mark. Following removal for re-verification and re-installation, the installation must then be re-validated.
- Re-validation of the installation is required if maintenance interferes with the installation (eg where the meter has been removed for laboratory re-verification, or the meter has been shifted to a new location; or in the case of a metering system, where the configuration has been altered or one or more components of the system have been altered or replaced). Re-validation must be carried out by a certified validator. (The certified validator may also be a certified maintainer undertaking the maintenance);
• Neither re-verification nor re-validation is required where maintenance does not interfere with the meter and its installation;

• “certified maintainer” includes a person with equivalent recognised training.

It is expected that the pattern approval certificate shall provide guidance for common types of meter maintenance activities which:

• Do not and cannot affect the metrological performance (and therefore can be undertaken by an uncertified person operating under established work practices and/or maintenance plan)

• Do not affect the metrological performance when undertaken by a suitably trained certified maintainer (and therefore trigger re-verification when undertaken by an uncertified maintainer)

• May affect the metrological performance even when undertaken by a certified maintainer (and therefore trigger re-verification).

3.10.2 Types of maintenance

Maintenance consists of corrective, preventive and predictive maintenance.

Corrective maintenance shall be undertaken as soon as practical after a fault is discovered.

Preventive maintenance includes regular inspection of meters and installations to identify any departures from those requirements stipulated in the meter’s pattern approval certificate.

Predictive maintenance includes the analysis of meter/usage data either to establish an optimal replacement frequency based on economic objectives or to establish whether meters should be replaced as the result of an evaluation of a sample of meters.

3.10.3 Maintenance plan

A maintenance plan shall be developed by each WSP and jurisdictional government agency to deliver the necessary elements of the Metrological Assurance Framework. The plan shall include the following:

• Details of compliance checks as required by auditing, and readings programs

• Details of corrective, preventive and predictive maintenance schedules, budgets and associated procedures

• Details of predictive maintenance methods, lifecycle analysis techniques and associated procedures

• Identification of the resources that will undertake the maintenance, such as approved designated personnel or subcontractors, and the certifications held by team members and supervisors.

The maintenance plan shall identify, and apply to the following meter types:

• Priority meters – including meters with a capacity of 5000 ML/yr or greater, or otherwise identified as a priority meter for management purposes (for example,
meters on offtakes in areas at risk of resource depletion, meters on headworks and critical system distribution points)

- **Other meters** – including meters with a capacity less than 5000 ML/yr and not identified as priority meters.

For both priority and other meter types, the following measurement categories shall be adopted. While there is some overlap on meter types between categories, maintenance schedules will be developed for meters used within each category.

- Headworks and river operations
- Gravity irrigation networks
- Regulated (supplemented) and unregulated (un-supplemented) offtakes
- Groundwater bores.

### 3.11 Ongoing Validation

Ongoing validation shall be undertaken periodically, after maintenance in accordance with the principles detailed in Section 4.10, or as part of auditing processes to ensure there is a continuing acceptable level of confidence that the meter is operating with an accuracy within the maximum permissible limits of error allowable under *in situ* conditions (±5%). Ongoing validation includes the same best practice checks undertaken at post-installation validation (refer section 4.9).

Where it is considered appropriate and practical, water service providers or jurisdictional governments may elect to undertake *in situ* volumetric testing in place of internal checks. *In situ* volumetric testing for the purposes of validating meter performance does not constitute verification under national measurement legislation.

Water service providers or jurisdictional governments may also elect to remove and re-verify meters to confirm performance within the maximum permissible limits of error allowable in laboratory conditions (±2.5%). Re-verification shall be undertaken in a NATA accredited laboratory by a verifying authority appointed under the National Measurement Act 1960. Following re-verification and re-installation, the certified installer or validator shall carry out the best practice checks required for post-installation validation.

### 3.12 In situ Verification

When and where it is considered practical and cost effective, jurisdictional governments may require meter owners to undertake *in situ* verification in place of internal checks or testing undertaken during post-installation and ongoing validation.

*In situ* verification shall only be undertaken by verifying authorities or certified licensees appointed under national measurement legislation and shall be carried out using NATA accredited testing facilities and NMI verification procedures.

Meters verified *in situ* are deemed compliant where they operate within the maximum permissible limits of error allowable under *in situ* conditions (±5%), as required under the National Measurement Act 1960 and National Measurement Regulations 1999.
Compliant meters shall display a verification mark placed on the meter by the verifying authority or certified licensee.

Ongoing research and development of *in situ* verification technology and procedures is being undertaken by Commonwealth and jurisdictional governments and industry. As this technology becomes available, jurisdictions shall implement *in situ* verification programs when and where it is considered feasible.

### 3.13 Compliance, Auditing and Reporting

#### 3.13.1 Purpose

The purposes of the compliance, audit and reporting requirements under the Metrological Assurance Framework include:

- Ensuring metering activities achieve the objectives of the NWI relating to paragraphs 87, 88 and 89 (i) regarding consistent metering, national meter specifications and open reporting on metered use and related compliance activities respectively;
- Ensuring there is an acceptable level of confidence in meter performance and similar outcomes within all jurisdictions;
- Providing benchmarks for, and monitoring the progress of introducing the national standards – including installing new pattern approved, laboratory verified meters and the upgrade / replacement of non-compliant meters and installations;
- Providing the opportunity to judge the effectiveness of certification schemes;
- Identifying areas of improvement required through analysing information about installation, maintenance, validation and (where applicable) verification and certification activities.

#### 3.13.2 Requirements

Jurisdictions shall ensure compliance, auditing and reporting activities are undertaken in accordance with:

- The NWI objectives (as listed in section 3.13.1)
- Licence Conditions or other statutory instruments requiring entitlement holders and WSPs to provide audit information to state and territory Governments.

Auditing and reporting arrangements under the Meteorological Assurance Framework are outlined in Attachment 3.

#### 3.13.3 Compliance

Compliance actions and processes (including field inspection, checks and reporting) shall be undertaken to ensure that individual meters satisfy the requirements of the national water metering policy.

Entitlement holder-owned meters are subject to the following requirements:

- All priority meters (with capacity of 5000 ML/yr or more or otherwise identified as priority meters for management purposes) are to be self-audited by the entitlement
holder twice per year. These meters shall be subject to ongoing compliance checks by the jurisdictional government agency at least once per year.

- All other meters (with capacity less than 5000 ML/yr or otherwise not identified as priority meters) are to be self-audited by the entitlement holder annually. These meters will be subject to ongoing compliance checks by the jurisdictional government agency at least once every five years (i.e. approximately twenty percent to be checked annually).

- Entitlement holders will provide annual meter statements to the jurisdictional government agency.

**WSP-owned meters are subject to the following requirements:**

- All priority meters (with capacity of 5000 ML/yr or more or otherwise identified as priority meters for management purposes) are to be self-audited by the WSP based on ongoing operations. These meters will be subject to ongoing compliance checks by the jurisdictional government agency at least once every year. However WSPs may undertake more frequent auditing if they choose to do so.

- Other meters (with capacity less than 5000 ML/yr or otherwise not identified as priority meters) are to be self-audited by the WSP based on ongoing operations and meters actioned during the year.

- WSPs will provide annual audit reports to the jurisdictional government agency.

**State / territory Government-owned meters are subject to the following requirements:**

- All priority meters (with capacity of 5000 ML/yr or more or otherwise identified as priority meters for management purposes) are to be self-audited by the jurisdictional government agency based on ongoing operations. These meters will be subject to ongoing compliance checks by the jurisdictional government agency at least once every year.

- Other meters (with capacity less than 5000 ML/yr or otherwise not identified as priority meters) are to be self-audited by the jurisdictional government agency based on ongoing operations and meters actioned during the year.

Field compliance checks may include, but not be restricted to:

- external visual check, check of seals, corrosion, serial number, register, flanges or tail nuts, etc to ensure the integrity of the meter.
- check for leaks
- check correct version of software is installed
- check materials and lining of the pipe and propeller condition
- internal visual check (only such that there is no possible impact on the metrological performance) of pipes, corrosion, propeller condition, etc

### 3.13.4 What is an Audit?

In the context of this policy, an audit refers to the collection and review of information relating, but not limited to:
• Meter details (numbers of licences/works, regions, meter types, sizes, ages, primary uses)
• Installation, condition inspections, corrective and preventative maintenance, reading, validation and verification (laboratory and in situ) activities
• Compliance activities
• Progress relating to complying with national standards
• Use of certified / trained personnel (where applicable)
• Compliance with documentary requirements of ATS 4747 (where applicable)
• Costs relating to new meters, existing meters and metering program management.

An audit does not include the undertaking of metering activities such as compliance inspections, maintenance, validations, or verifications themselves – an audit is a review of the metering activities undertaken during the audit period.

Audits apply to non-urban meters and measuring systems used to measure water taken from regulated/supplemented and unregulated/unsupplemented sources.

An audit collates information which may be submitted by an entitlement holder, WSP or State / territory Government. It may include but not be restricted to:

• Details of corrective and preventive maintenance schedules, budgets and associated procedures;
• Details of any volumetric checks or calibrations;
• Listing of any alterations or maintenance undertaken in the preceding period, and whether such work required re-verification; and
• Listing of any alterations or maintenance undertake in the preceding period, and whether such work required re-verification.

Attachment 4 provides a more complete outline of the information expected to be included in an audit report.

3.13.5 Audit Sources
The source documents on which audits will be based will vary depending on the provider, i.e. entitlement holders, WSPs or state / territory Governments. Therefore, audits may include information taken from, but not limited to, the following sources:

• Meter statements
• Meter installation forms / certificates
• Maintenance plans
• Condition inspection, reading and maintenance reports
• Compliance reports
• Validation certificates issued by certified validators
• Verification reports issued by testing authorities
- Asset registers
- Databases
- Registers of certified / trained personnel
- Process documents (manuals, forms etc).

3.13.6 Reporting Outputs, Reviewing and Publishing

- State / territory Government Audit Reports and water service provider meter statements will be made public.

- Where required by a state / territory Government, the water service provider meter statements will be provided to the jurisdictional government department or agency for collation and submission as part of the state / territory Government Audit Report.

- The two-year state / territory Audit Reports will provide an overview of metering activities based on the collection and analysis of information listed in section 3.

- The two-year state / territory Audit Reports will report on progress in implementation of and compliance with the national standards, will identify operational issues, and will address areas requiring improvement.

- The Bureau of Meteorology will maintain and publish information from these reports and statements on its Water Resources Website and will in the future consider the inclusion of this information in the suite of water information the Bureau will receive under the Water Act 2007.

A template for state / territory Audit Reports is included in Attachment 4. The template is framed around two bases for reporting, being Unsupplemented / Unregulated and Supplemented / Regulated. However, at least one jurisdiction has a third category, namely “Groundwater”. Jurisdictions should amend the template in accordance with their specific resource management approaches to the extent necessary for them to fully report their metering activities.
4 Meter replacement

Jurisdictional governments and water service providers shall ensure replacement programs are put in place to enable existing meters and installations to be upgraded to comply with the new standards.

The retention of existing meters for a period following introduction of the new standards is known as “grandfathering”. Food exports

4.1 Grandfathering rules
The grandfathering of meters is to be provided through state / territory water legislation and/or subordinate instruments as necessary. The rules to apply are as follows:

• All non-urban meters shall comply with the national metering standards by 1 July 2020, unless otherwise exempted by the relevant jurisdictional government department or agency;

• Any meter installed after 30 June 2010 must comply with the national metering standards; and

• Any meter installed prior to 1 July 2010 shall be replaced with a compliant meter by 1 July 2020. Replacement shall be undertaken at the earliest opportunity, such as when major maintenance is required on the non-compliant meter

Notwithstanding the replacement strategy, the following exemptions may apply:

• Any meter installed in good faith to interim standards deemed acceptable by the jurisdictional government department or agency with a useful life exceeding the ten-year replacement period may continue to be used until the end of its life or lesser period as determined by the jurisdictional government department or agency, and

• Any meter approved by the jurisdictional government department or agency and designed for a specific purpose (for example, high capacity, large scale applications) for which no compliant meter is available, may be used in lieu of a compliant meter until such time as a compliant meter is available.

In regard to approved non-compliant meters, the jurisdictional government department or agency must only approve meters that are contemporary meters installed in accordance with known best practice. In approving such a meter, the jurisdictional government department or agency must document the basis for such approval. Meters which are being used for a specific purpose for which no compliant meter is available and which are known to be of doubtful accuracy, must be replaced by an approved meter by 1 July 2020.

A meter shall be deemed compliant under state / territory water legislation, if the meter:
• is of a design that has been subsequently pattern approved and the meter has been validated as being installed and working in accordance with the relevant pattern approval certificate; and

• has been installed under an interim standard that is deemed appropriate by the jurisdictional government department or agency; or

• is demonstrated to the satisfaction of the jurisdictional government department or agency to operate within the maximum permissible limits of error allowable in field conditions (±5%).

Jurisdictional governments and water service providers shall provide supporting information for the approval of an interim standard which forms the basis of the application of exemptions under the grandfathering rules. Jurisdictional governments shall provide this information in the respective State Implementation Plans. Exemption shall be provided to meters installed to interim standards which were developed in good faith to meet the emerging national standards.

Priorities and targets for upgrading meters and installations will be documented in the respective State Implementation Plans. Such priorities will generally be guided by:

• All new meters installed from 1 July 2010 will comply with the National Framework.

• Existing meters that are within the +/-5% tolerance limits may be deemed to be compliant.

• Unless otherwise provided for in the state/territory implementation plans, all existing non-compliant meters shall be upgraded progressively according to the significance of the metering installation, as follows:

  i) Largest bulk water meters: all non-compliant meters on river flow control works or offtakes to irrigation networks of 5000ML/year or more capacity to be replaced with compliant meters by 30 June 2014;

  ii) Smaller bulk water meters: all non-compliant meters on river flow control works, as defined in the Water Act 2008, or offtakes to irrigation networks of less than 5000ML/year capacity to be replaced with compliant meters by 30 June 2016;

  iii) Other meters not in irrigation networks: all other non-compliant meters used to extract water directly from rivers or aquifers (ie. not within an irrigation network) to be replaced by 30 June 2016;

  iv) All other existing meters: all other non-compliant meters to be replaced with conforming meters at the end of the expected life of the meter or by 30 June 2020, whichever occurs first.

A state or territory may adopt a different approach to prioritisation, such as to synchronise with infrastructure upgrading schedules or give precedence to areas under resource stress, provided that approach is designed to achieve comparable results and is fully described in the Implementation Plan.
5 Funding

Funding for implementing the Metrological Assurance Framework and undertaking key operational activities (such as installation, maintenance, validation and verification), shall be through the following mechanisms, taking into account jurisdictional metering policies:

- **User pays** – where costs associated with metering activities are recovered from users via charges set by the jurisdictional government or water service provider, or are the sole responsibility of the user
- **State or territory government funds** – where costs associated with supporting metering activities are deemed to be the responsibility of the relevant state or territory departments or agencies responsible for water and trade management activities
- **Commonwealth government funds** – where costs associated with supporting metering activities are deemed to be the responsibility the Commonwealth Government and/or specific funding has been set aside.
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Approved Training</strong></td>
<td>Training that is recognised under the Australian Qualifications Framework and meets the competencies identified by industry. Approved training includes accredited in-house training provided by water service providers or other registered training providers.</td>
</tr>
<tr>
<td><strong>Audit</strong></td>
<td>A review of meter installations and operations undertaken by a water service provider, state/territory agency or certified person. Audits report on meter numbers and types, validation activities and overall meter performance and reliability.</td>
</tr>
<tr>
<td><strong>Certification Scheme</strong></td>
<td>A national scheme for certifying meter installers, maintainers, validators and inspectors, ensuring minimum levels of competency to carry out activities critical for meter performance in accordance with Australian Standards and best industry practices.</td>
</tr>
<tr>
<td><strong>Certified Persons</strong></td>
<td>A person certified by an accredited organisation to undertake meter installation, maintenance and validation activities in accordance with best industry practices and Australian Standards or Technical Specifications. Certified persons may include but are not limited to water service provider staff, state / territory government officers and irrigation industry contractors.</td>
</tr>
<tr>
<td><strong>Contemporary Meter</strong></td>
<td>A meter or metering system that due to technical, practical and legislative limits is not of a pattern approved design, however still meets the performance and installation specifications of the relevant jurisdictional department or agency. To be used only when the metering requirements of a particular site are beyond the operating range and capacity of all available pattern approved meters.</td>
</tr>
<tr>
<td><strong>Expanded Uncertainty</strong></td>
<td>Degree of doubt associated with measurement accuracy. In relation to water meters and measuring devices or systems, this refers to the degree of uncertainty associated with measuring the volume of water passing through the device and the adequacy of that measurement for trade measurement and resource management purposes.</td>
</tr>
</tbody>
</table>
| **Grandfathering**           | The granting of an exception that allows an old rule to continue to apply to some existing situations, when a new
rule will apply to all future situations. It is used as a compromise, to effect a new rule without upsetting a well-established logistical situation, and to not retroactively apply the rule.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>In situ Volumetric Testing</td>
<td>Volumetric testing of the meter in its normal operating conditions by a certified person. Testing methods include in-line testing against a reference meter or in situ measurement using a known volume.</td>
</tr>
<tr>
<td></td>
<td>In situ testing for validation purposes must be undertaken by a certified person in accordance with approved guidelines.</td>
</tr>
<tr>
<td></td>
<td>In situ testing for verification purposes must be undertaken in accordance with approved guidelines by a verifying authority or certified licensee appointed under the National Measurement Act 1960.</td>
</tr>
<tr>
<td>Laboratory Testing</td>
<td>Removal and testing of the meter in controlled conditions by a certified person.</td>
</tr>
<tr>
<td></td>
<td>Laboratory testing for verification purposes must be undertaken in accordance with approved guidelines by a verifying authority appointed under the National Measurement Act 1960.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Periodic condition inspection and maintenance (or replacement) of the meter undertaken by a certified or non-certified person in accordance with Australian Standards or Technical Specifications and/or guidelines approved by the relevant state/territory Government.</td>
</tr>
<tr>
<td>Maximum Permissible Error</td>
<td>The maximum limits of error listed in Schedule 12 of the National Measurement Regulations 1999 for a particular class of water meter.</td>
</tr>
<tr>
<td>Meter</td>
<td>A measuring device or system (including its component parts) used to measure the volume of water passing through a closed conduit or open channel over a known period.</td>
</tr>
<tr>
<td>Regulated / Supplemented Supply</td>
<td>Supply in which water availability is influenced by instream infrastructure such as dams or weirs.</td>
</tr>
<tr>
<td>Seal (Anti-Tampering)</td>
<td>A device attached to the meter, couplings and pipe work to prevent the meter from being removed, interfered or tampered with by unauthorised persons.</td>
</tr>
</tbody>
</table>
The seal usually consists of stainless steel wire and ferrules joined by a sealing tool and marked with the name and/or logo of the relevant department or agency. The seal is not a verification mark.

**Stream Gauging**
Stream gauging refers to the measurement in accordance with AS3778 of stream discharge (flows) past a given point on a watercourse for a range of flow height conditions, enabling calibration of the site and establishment of a rating curve (height-discharge relationship). A stream gauging station is the site for which the rating curve is established, and is generally instrumented with a range of specialised equipment.

**Unregulated / Unsupplemented Supply**
Supply in which water availability is not influenced by instream infrastructure such as dams or weirs.

**Validation**
Mandatory inspection and/or testing of the meter and installation, undertaken by a certified validator to ensure the meter is pattern approved, laboratory verified, correctly installed and there is an acceptable level of confidence that it operates within the maximum permissible limits of error (±5%) allowable under in situ conditions. Inspection may include removal of the meter and an internal check of lead in / lead out pipes where necessary.

Post-installation validation is an initial in situ inspection undertaken after a meter is installed, and may also include in situ volumetric testing where appropriate.

Ongoing validation is undertaken at any time during the meter’s operating life and may include an inspection and/or in situ or laboratory volumetric testing where appropriate.

Validation does not constitute verification in the meaning of the National Measurement Act 1960 or re-verification under trade measurement legislation.

**Verification**
In situ volumetric testing after installation.

Verification is testing in accordance with NMI approved procedures and is undertaken by a person appointed as a verifying authority or certified licensee under the National Measurement Act 1960, to ensure the meter operates within the maximum permissible limits of error specified by the National Measurement Regulations 1999 and complies with the pattern approval certificate.
| Verification (Laboratory) | Initial laboratory testing of the meter prior to installation. Laboratory testing after maintenance affecting the metrological performance of the meter. The NMI has made provision to allow a verifying authority to use a sampling program for the laboratory verification of water meters. Any such sampling program must be approved by the NMI and the conditions and requirements be noted on the pattern approval certificate under Test Procedure. Laboratory verification is testing in accordance with NMI approved procedures and is undertaken by a person appointed as a verifying authority under the National Measurement Act 1960, to ensure the meter operates within the maximum permissible limits of error specified by the National Measurement Regulations 1999 and complies with the pattern approval certificate. |
| Verification Mark | A mark placed on the meter by a verifying authority or certified licensee to indicate the meter has been verified and complies with the pattern approval certificate in accordance with national measurement legislation. |
| Verifying Authority | A person appointed as a verifying authority under the National Measurement Act 1960. |
| Water Service Provider (WSP) | A person or entity which owns, operates or controls the operation of works for the supply and delivery of rural water services. |
Attachment 1(a): Metrological Assurance Framework (establishment phase)
Attachment 1(b): Metrological Assurance Framework (operational phase)
## Attachment 2: Key elements of assurance

<table>
<thead>
<tr>
<th>Key assurance elements</th>
<th>Pathway A Entitlement holder supplies, installs and maintains meter (no certified persons used)</th>
<th>Pathway B Entitlement holder supplies, installs and maintains meter using certified persons</th>
<th>Pathway C Water service provider supplies, installs and maintains meter using trained but uncertified persons</th>
<th>Pathway D Water service provider supplies, installs and maintains meter using nationally approved or certified persons</th>
<th>Pathway E Government supplies, maintains and installs meter using certified persons</th>
</tr>
</thead>
</table>
| Quality meter          | • Pattern approval and laboratory verification checked at validation  
  *Meter suitability not checked (may result in more frequent maintenance)*  
  Possible mitigating action:  
  • Government provides list of pattern approved and laboratory verified meters for use  | • Pattern approval and laboratory verification checked at validation  
  *Meter suitability not checked (may result in more frequent maintenance)*  
  Possible mitigating action:  
  • Government provides list of pattern approved and laboratory verified meters for use  | • Pattern approved and laboratory verified meters specified upfront  
  • Meter suitability determined upfront (selection via site assessment / performance history / research and design)  | • Pattern approved and laboratory verified meters specified upfront  
  • Meter suitability determined upfront (selection via site assessment / performance history / research and design)  | • Pattern approved and laboratory verified meters specified upfront  
  • Meter suitability determined upfront (selection via site assessment / performance history / research and design) |
| Quality installation   | • Lead-in / lead-out pipe length checked at validation  
  • Meter / pipe internals checked at validation  
  Or  
  • In situ volumetric test at validation  
  Possible mitigating action:  
  • Government provides installation guidelines  | • Lead-in / lead-out pipe length checked at validation  
  • Installation certificate provided at validation  
  Or  
  • In situ volumetric test at validation  | • Installed by trained installer  
  • Intensive installation check at validation  
  Or  
  • In situ volumetric test at validation  | • Installed by approved / certified installer  
  • Installation certificate provided at validation  | • Installed by certified installer  
  • Installation certificate provided at validation |
| Quality maintenance    | • Very intensive auditing / compliance (includes meter / pipe internals check or in situ volumetric test at re-validation)  
  • More frequent maintenance for less suitable meters  
  Possible mitigating action:  
  • Government provides maintenance guidelines  | • Maintenance by certified maintainer  
  • Intensive auditing / compliance  
  • Maintenance certificate provided at re-validation  
  • More frequent maintenance for less suitable meters  | • Maintenance by trained maintainer  
  • Sample auditing / compliance  
  • Maintenance certificate provided at re-validation  | • Maintenance by approved / certified maintainer  
  • Sample auditing / compliance  
  • Maintenance certificate provided at re-validation  | • Maintenance by certified maintainer  
  • Operational auditing / compliance  
  • Maintenance certificate provided at re-validation |
Attachment 3: Auditing and reporting arrangements
Attachment 4: State/territory audit report template

Statewide Non-urban Meter Audit Report

Year – Year
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Report Summary

Audit Period: Financial Year 01 July 08 – 30 June 09

Information Provision

<table>
<thead>
<tr>
<th>Information Provided</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reports from Water Service Providers</td>
<td></td>
</tr>
<tr>
<td>Meter Statements from Entitlement Holders</td>
<td></td>
</tr>
</tbody>
</table>

Completed Operations

Priority Meters – Open Channel

<table>
<thead>
<tr>
<th>Financial year 08 - 09</th>
<th>Unsupplemented / Unregulated</th>
<th>Supplemented / Regulated</th>
</tr>
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<tbody>
<tr>
<td>New meters installed</td>
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<td></td>
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<tr>
<td>Existing meters replaced</td>
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<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>Compliance checks</td>
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</tr>
<tr>
<td>Faulty meters confirmed from tests in response to client accuracy complaints</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Meters End FY 08 - 09

Priority Meters – Closed Conduit

<table>
<thead>
<tr>
<th>Financial year 08 - 09</th>
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</table>
Compliance checks
Faulty meters confirmed from tests in response to client accuracy complaints

**Total Meters End FY 08 - 09**

<table>
<thead>
<tr>
<th>Other Meters – Open Channel</th>
<th>Unsupplemented / Unregulated</th>
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<td><strong>Financial year 08 - 09</strong></td>
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**Total Meters End FY 08 - 09**

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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Meters End FY 08 - 09**
Entitlements to be Metered
Estimated meter requirements for the financial year 2009-10.

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Total Entitlements</th>
<th>Entitlements to be Metered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
</tr>
</tbody>
</table>

**Total**

Implementation Progress
Meters in unregulated / unsupplemented areas
- Percentage of meters complying with pattern approval =
- Percentage of exempt meters (interim standards) =
- Percentage of priority meters (i.e. critical off takes) requiring replacement =
- Percentage of priority meters requiring upgrade / replacement =

Meters in regulated / supplemented areas
- Percentage of meters complying with pattern approval =
- Percentage of exempt meters (interim standards) =
- Percentage of priority meters (i.e. Dethridge wheels) requiring replacement =
- Percentage of priority meters requiring upgrade / replacement =
- Percentage of meters complying with pattern approval =

***End of Summary***
Introduction

- General overview of non-urban meters across the state, including meters in unsupplemented / unregulated and supplemented / regulated areas
- Background on NWI and national/state implementation plan objectives
- Round-up of work undertaken during the financial year
- Major achievements and areas requiring improvement
- Progress against NWI, national and state implementation plans objectives
- Provide the opportunity to judge the effectiveness of certification schemes.
Purpose and Scope

The purpose of this report is to:

- Provide an overview of metering activities undertaken during the audit period
- Review overall meter performance, compliance and data provision outcomes
- Review progress of metering activities against the objectives the National Water Initiative Agreement [paragraphs 87, 88 and 89 (i)], and national and state implementation plans
- Identify areas requiring improvement to ensure consistent meter performance outcomes
- Identify practical and cost-effective opportunities to implement in situ verification
- Identify resource requirements for future metering activities.

This report applies to meters (including measuring devices, systems and their component parts) owned by entitlement holders, water service providers and the _____ state / territory Government, used for trade and/or related resource management activities in a non-urban setting.

The report does not apply to stream gauging stations or groundwater infrastructure used for resource monitoring purposes or meters used within urban supply and distribution systems.
Overview of Metering Activities for Financial Year

Information Provision

- Overview of meter statements provided by entitlement holders (include localities / management areas)
- Overview of audit reports provided by water service providers and state / territory Government (include schemes / management areas, organisations’ names, etc)
- Include further details of entitlement holder and WSP information in appendices if required

National Certification Scheme

- Assessment of effectiveness/ feasibility of certification scheme in supporting MAF objectives (where information is readily available to reporting agency)
- Resource/certification/training gaps
- Snapshot of staff, contractors and organisations holding certification as installers, maintainers and validators

Meters in unsupplemented / unregulated areas

Existing Meters

- Area by area snapshot:
  - Total numbers of meters and total numbers of water licences/entitlements
  - Breakdown by type, size and age
  - Primary uses (e.g. irrigation, industrial etc)

New Meters

- Rollouts under metering programs

Area by area snapshot:
  - Total numbers of meters and total numbers of water licences/entitlements
  - Breakdown by type and size
  - Primary uses (e.g. irrigation, industrial etc)

Upgrade and Replacement

- Existing meters replaced and installations upgraded/reconfigured to comply with standards
  - either as part of rollouts or dedicated upgrade/replacement programs
- Replacement priorities
- Area by area snapshot:
  - Total numbers of meters and total numbers of water licences/entitlements
  - Breakdown by type and size
  - Primary uses (e.g. irrigation, industrial etc)
Maintenance

- Total number of maintenance activities requiring re-verification, meter size, type and primary use (e.g. irrigation, industrial etc)
- Total number of maintenance activities not requiring re-verification, meter size, type and primary use (e.g. irrigation, industrial etc)
- Total number of maintenance activities requiring re-validation, meter size, type and primary use (e.g. irrigation, industrial etc)
- Total number of maintenance activities not requiring re-validation, meter size, type and primary use (e.g. irrigation, industrial etc)
- Breakdown by types of maintenance (condition inspection, preventative, corrective, replacement)
- Outstanding maintenance

Validation Activities

- Total number of completed validations undertaken:
  - post installation
  - post maintenance
  - as compliance checks
- Results of collated validation certificates - meter size, type and primary use (e.g. irrigation, industrial etc).
- Outstanding validations

Verification Activities (where available)

- Total number of re-verifications (laboratory and/or in situ) in response to post-maintenance requests from entitlement holders or others - meter size, type, primary use (e.g. irrigation, industrial etc), errors found, possible causes, corrective work undertaken
- In-situ Verification – ad hoc / program, developments, opportunities, challenges, errors found, possible causes, corrective work undertaken

Compliance Activities

- Total number of compliance checks undertaken - external visual checks; checks of seals, corrosion, leaks, correct version of software, materials and lining of pipe; internal visual checks
- Number of non-compliant meters and installations

Meters in supplemented / regulated areas

- As for unsupplemented / unregulated meters

Entitlements to be metered

- Overview of numbers of entitlements by management area, percentage of entitlements metered and explanation of difference
• Overview of the volumetric or areal allocations of entitlements metered and not metered. These measures will provide an indication of the extent to which meter data reflect the total take of water.

**Operational issues**

• Data provision – overall outcomes for clients, resource management and NWI / BoM needs.
• Data issues requiring improvement
• Areas, meter types, installations and conditions requiring improved performance and reliability
• Outstanding Issues – outstanding validation, tests, replacements etc and reasons

**Resources and Costs**

• Overview of the resources used and the costs incurred across the state for on-ground metering activities and administrative / supporting activities for the financial year. If possible break cost components down for:
  – Base funded activities
  – User pays funded activities
  – Commonwealth funded activities

• Include only broad cost details such as:
  – Meter purchase, installation, maintenance, validation and verification activities
  – Project management and administration
  – Certification of personnel
Conclusion

- Do the metering activities indicate progress against the NWI, national and state implementation plan objectives?