Meter Action Plan

June 2025

Goulburn-Murray WATER

gmwater.com.au

Acknowledgement of Country

Goulburn-Murray Water (GMW) recognises Aboriginal and Torres Strait Islander peoples as the First Peoples of Australia and as the proud representatives of the world's oldest living culture.

GMW respectfully acknowledges Elders past, present and emerging as the Traditional Owners of the lands and waters and the rich cultural connections First Peoples have across our region.

GMW recognises the Yorta Yorta, Wamba Wemba, Dja Dja Wurrung and Taungurung as the Registered Aboriginal Parties within the GMW service region and acknowledges their rights as the Traditional Owners of lands and waters, as outlined in their agreements with the state of Victoria.

GMW commits to building meaningful partnerships that create value for Traditional Owners and Aboriginal communities through genuine engagement and collaboration.

Version (s)

Version	Date	Author(s)	Notes
1	August 2020	Various	GMW's initial Meter Action Plan, which articulates steps to achieve compliance with the *Victorian Non-Urban Water Metering Policy (March 2020);* and improvement actions.
2	June 2025	Various	A major revision to the Meter Action Plan to update current status of GMW's metering fleet and to include actions to achieve compliance with the *Victorian Non-Urban Water Metering Policy (January 2025).*

Document Control

Version	Recipient(s)	Approved by	Position	Date
2	All Staff	Charmaine Quick	Managing Director	June 2025

Table of Contents

Glossary

AS4747 Standard	An Australian Standard for Meters for Non-Urban water Supply, which provides technical specifications for non-urban water meters and the requirements for installation, calibration, and maintenance to achieve pattern approval compliance.
AS4747-compliant meter	A water meter that conforms with AS4747, that has been either pattern approved or verified to meet the processes and procedures outlined in AS4747 – Meters for Non-Urban Water Supply (Standards Australia, 2013).
Bulk water meter	A meter for measuring the flow under the approved bulk entitlement metering program.
Domestic and stock use	the Water Act 1989 provides this definition of domestic and stock water use: *"'domestic and stock use,' in relation to water, means use for—* *(a) household purposes; or* *(b) watering of animals kept as pets; or* *(c) watering of cattle or other stock; or* *(d) in the case of the curtilage of a house and any outbuilding, watering an area not exceeding 1·2 hectares for fire prevention purposes with water obtained from a spring or soak or water from a dam; or* *(e) irrigation of a kitchen garden —* *but does not include use for dairies, piggeries, feed lots, poultry or any other intensive or commercial use."*
'Dozer'	A water licence that is regularly inactive for significant periods of time. The term is often used interchangeably with 'sleeper' water licences
Emplacement	is the structure on or other assets in which the meter is installed
Exempt meter	A water meter that does not conform with AS4747 or meet contemporary standards and has been exempt from metering upgrade requirements. A meter may be exempted in certain circumstances described in Victoria's non-urban water metering policy (e.g., small volume take, domestic and stock use, cost outweighs compliance benefit).
High-risk take	Defined as take that is more than 5,000 megalitres average annual usage for an individual service point, excluding take under bulk water metering.
Interim Standard (or Contemporary Standard)	Interim standard meters are water meters that are contemporary at the time they were installed. This means the meter installed is likely to meet the ±5% accuracy range set by the National Framework for Non-Urban Metering (2009) and which has a manufacturer's certificate of accuracy of ±2.5% and has been installed to manufacturer's specifications.

Licence volume	is the maximum volume that the take and use licence holder is authorised to take under that licence during a water season or during any shorter period of take stated in the licence.
Metrological Assurance Framework	is part of the National Framework for Non-urban Water Metering and sets out the key requirements to make sure there is an acceptable level of confidence in meter performance.
Murray-Darling Basin Compliance Compact or Compact	An agreement designed to improve consistency, transparency, and accountability in managing water resource compliance and enforcement across the Basin. All Basin states and the Australian Government committed to the Basin Compliance Compact in June 2018.
Non-compliant meter	A water meter that currently does not meet pattern approval, ±5% accuracy range or conform with AS4747 standards. These meters have not been exempted and need to be upgraded to conform with AS4747 requirements.
Pattern approval	is a process for verifying the accuracy of a water meter, where the National Measurement Institute examines the pattern (design) of a meter prototype against the requirements of AS4747.
Registration farm dam licence	A registration farm dam licence is an ongoing entitlement to take and use water from a catchment dam, spring, or soak. Registration farm dam licences were issued between 1 July 2002 and 30 June 2003 based on historical use of water.
Take and use licence (Section 51 Licence)	is a fixed term entitlement to take and use water from a waterway, catchment dam, spring, soak, or aquifer. Each licence is subject to conditions set by the Minister and specified on the licence.
Telemetry	A process involves automatically recording data and sending it electronically from the meter to another place for monitoring and recording.
Validation	Inspection and/or testing of the meter and installation by a certified validator to make sure there is enough confidence that it operates within the maximum permissible limits of error of ±5% allowed when installed.
Verification	A process or procedure for independently assessing the accuracy of a meter. This can be done in a laboratory to test the meter only, or in the field to test the meter performance in existing conditions.
Water accounting	The processes and procedures used to track water system inflows, outflows, and storage volume changes.
Water share	is an ongoing entitlement to a share of the water available in a declared water system.
Water take	Water extracted under a licence or entitlement granted under the *Water Act 1989*.

Winter-fill licence	A take and use licence that only permits taking water from a waterway during the winter months, typically July to October.
Works licence	A licence that authorises the construction, alteration, operation, removal or decommissioning of any works on a waterway, or a bore, or a dam belonging to a prescribed class of dams.

Executive Summary

Non-urban water metering has a vital role in Goulburn-Murray Water's (GMW) management of our precious and limited water resources. The water measurement provided by metering is essential to:

- account for the distribution and use of water;
- support planning and allocation decisions;
- enable compliance with water resource management laws and initiatives like the Murray-Darling Basin cap and sustainable diversion limits under the Basin Plan;
- levy use charges (where applicable); and
- safeguard compliance with entitlement volume, trade, or reporting obligations.

Since the introduction of our initial Meter Action Plan (MAP) in 2020, GMW has been implementing several actions to upgrade our metering fleet, which include the following key actions:

- updated the Asset Management Plan and developed an Asset Life Cycle Strategy for Customer Service Points (CSPs).
- Progressively upgrading the CSPs with compliant meters, for example, 690 new compliant meters were installed as a part of the Water Efficiency Project.
- Expanding the telemetry coverage including successful completion of a field trial of a new telemetry device that uses mobile communication network, hence reduces the capital and maintenance cost.

GMW delivers on average around 1,000GL of water via 38,550 CSPs across our service areas, of that:

- approximately 85% is delivered via either compliant (AS4747) or contemporary standard meters.
- approximately 74% is delivered via meters with telemetry.

A small number of CSPs are identified as requiring meter investment to meet AS4747 standard. The volume of water delivered via these CSPs is approximately 8% of the total volume delivered. This indicates that these are low water usage CSPs. A staged approach has been adopted to upgrade these CSPs using a cost-benefit for prioritisation of delivery over a period.

This Meter Action Plan identifies GMW's:

- current meter fleet profile relative to the measurement requirements;
- current processes to select, inspect, validate, maintain and replace/upgrade meters;
- steps to achieve compliance with the *Victorian Non-Urban Water Metering Policy* (January 2025); and
- improvement actions

The key actions committed in this MAP to support the objectives of the *Victorian Non-Urban Water Metering Policy* (January 2025) are:

No	Actions	Timeline	Reference
1.	Continue to review and validate meter fleet data to ensure data quality	2025 - 2028	Sec 3.1
2.	Ensure tamper evident seals are installed on newly commissioned meters and when an existing seal is broken.	As required	Sec 4.4
3.	GMW will continue to provide Certified Meter Installers (CMI) and meter type specific validation trainings to staff who undertake the validation of meters.	Ongoing with Annual Review	Sec 4.5.1
4a.	GMW will continue to implement annual inspection and validation programs.	Annually	Sec 4.5.1
4b.	Enhance the standardisation and capture of annual meter inspection data to inform the efficient management of our meter maintenance and compliance obligations.	2025 - 2026	Sec 4.5.1
5.	Develop a standardised process for selection of sites for addition of telemetry.	2025/26	Sec 4.6
6.	Continue to implement the annual meter replacement program.	Annually	Sec 5.1
7.	Develop and implement a meter upgrade program to achieve compliance through progressive prioritisation and delivery approach. Priority 1 – current regulatory period (WP6) Priority 2 – next regulatory period (WP7) Priority 3 – Beyond next regulatory period (WP8+)	 2025 – 2028 2029 – 2032 2033+	Sec 5.2

This MAP:

- is integrated with GMWs Corporate Strategy, Asset Management Maturity Program, Local water management plans, and GMW's Investment & Project Management Framework; and
- will be continually reviewed and updated. A major revision is proposed in 4 years, noting that minor updates will be undertaken as required.

1. Introduction

Our organisation

GMW exists to store and deliver water to sustain northern Victoria's agricultural sector, towns and environment.

By managing more than $5 billion in water assets and through facilitating efficient water management, we contribute to the health of the economy, environment and communities in northern Victoria. Our water services support the region to adapt to future challenges and opportunities, ensuring a sustainable water supply for agricultural, urban and environmental needs.

Water enhances the quality of life for our communities. We contribute to community health and wellbeing by providing recreational opportunities at our water storage sites. We aim to safeguard the long-term resilience of northern Victoria's water supply for current and future generations.

GMW manages storage, delivery and drainage systems for 70 per cent of Victoria's stored water resources, 50 per cent of Victoria's underground water supplies and 35 per cent of unregulated water resources. We service a region of 68,000 square kilometres, bordered by the Great Dividing Range to the south, the River Murray to the north and stretching from Corryong in the east to Nyah in the west. We provide more than 39,000 water management, storage, delivery, and drainage services to about 25,000 active customers by operating and maintaining 23 storages and thousands of kilometres of irrigation infrastructure.

Our Vision and Strategic Pillars

Our organisation's vision is "Water for a thriving northern Victoria" with a purpose of working together to deliver sustainable, efficient and adaptive water services.

We deliver our vision through the following strategic pillars:

I. **Working with our customers and communities**
To deliver reliable and affordable services for our current and future customers, while working with partners and stakeholders to influence and enhance regional outcomes.

II. **Adapting our services and leveraging our assets**
To support the needs of the region and our customers in the context of changing communities, markets and climate.

III. **Embracing Technology and Innovation**
To enhance customer experience, drive operational efficiency and productivity.

IV. **Investing in our People**
To drive a culture of achievement and innovation that fosters the workforce of the future and supports an ongoing focus on safety and wellbeing.

Water is a precious but limited resource. Our regional communities, industries, economy, land and waterways depend on water to support a healthy environment and for our region to grow and prosper.

Water measurement is essential to account for the distribution and customers' use of water. It supports planning and allocation decisions and enables compliance with water resource management laws and initiatives like the Murray-Darling Basin cap and sustainable diversion limits under the Basin Plan.

Meter data can also be used to levy charges and to safeguard compliance with entitlement volume, trade or reporting obligations. Meters used for water measurement need to meet design, installation and maintenance standards to make sure they provide accurate and reliable data.

This Plan is a living document, with ongoing review of timing and sequencing to incorporate changes in business requirements, technology advancements and ensure constant alignment with our Vision.

Plan Framework

Purpose

This GMW Meter Action Plan (MAP) identifies GMW's:

- current meter fleet profile relative to the measurement requirements
- current processes to select, inspect, validate, maintain and replace/upgrade meters
- actions to achieve compliance with the *Victorian Non-Urban Water Metering Policy,* January 2025 in a staged approach to align with GMW's Asset Investment Strategies, and
- other improvement actions.

GMW's Statement of Obligation (SoO) requires GMW to develop a MAP.

Statement of Obligations and the State policy

Section 7-4 of the Statement of Obligations (General) requires Victorian water corporations that undertake non-urban water metering to do so in accordance with the State's policies and plans. The *Victorian Non-Urban Water Metering Policy,* January 2025, details the metering requirements.

Metering objectives

GMW's metering objectives align with the Victorian *Non-Urban Water Metering Policy*, January 2025 (the policy).

Those objectives are:

- To encourage comprehensive metering of non-urban water extraction in a way that is consistent with risk to water resources
- Water take to be measured accurately and reliably
- Meters installed are accurate and well maintained
- The benefits of water measurement outweigh the costs
- To improve reporting by linking the meters compliance data with water use data in the Victorian Water Register (VWR), and
- Mandatory requirements and resources are targeted to higher risk users (that is those that have a greater capacity to take water) and high-risk water systems.

In addition to these objectives, GMW will monitor and analyse meter data using its Asset Management Information System (Maximo) to:

- ensure meters used to measure water take are auditable, verifiable and accurate

- capture information to support GMW's metering categorisation and compliance of the meter fleet
- identify measurement risks through the capture of maintenance and fault reporting, and
- develop investment strategies to prioritise failed and/or non-compliant meter replacement and upgrade programs.

The policy and the guidelines identify circumstances where the metering requirement can be varied. In summary, the primary circumstances where the metering requirement may be varied, relevant to GMW, include where:

- use is below a nominated 'low use' threshold
- Customer Service Points (CSPs) that are outside the scope of the policy (e.g. domestic & stock, storm water offtakes, bulk urban water offtakes etc.)
- the cost of metering is disproportionate to the benefits, and
- CSPs in an area where change or reconfiguration of the supply system is planned.

The policy provides further information regarding the circumstances where the metering requirement can be varied.

2. Business Context

Water resource management areas

GMW assesses our metering fleet across the following Water Resource Management areas.

Gravity & Pumped Irrigation

Gravity Irrigation includes 6 Gravity Irrigation Areas: Murray Valley, Shepparton, Central Goulburn, Rochester, Loddon Valley, and Torrumbarry. Figure 1 below shows the irrigation areas.

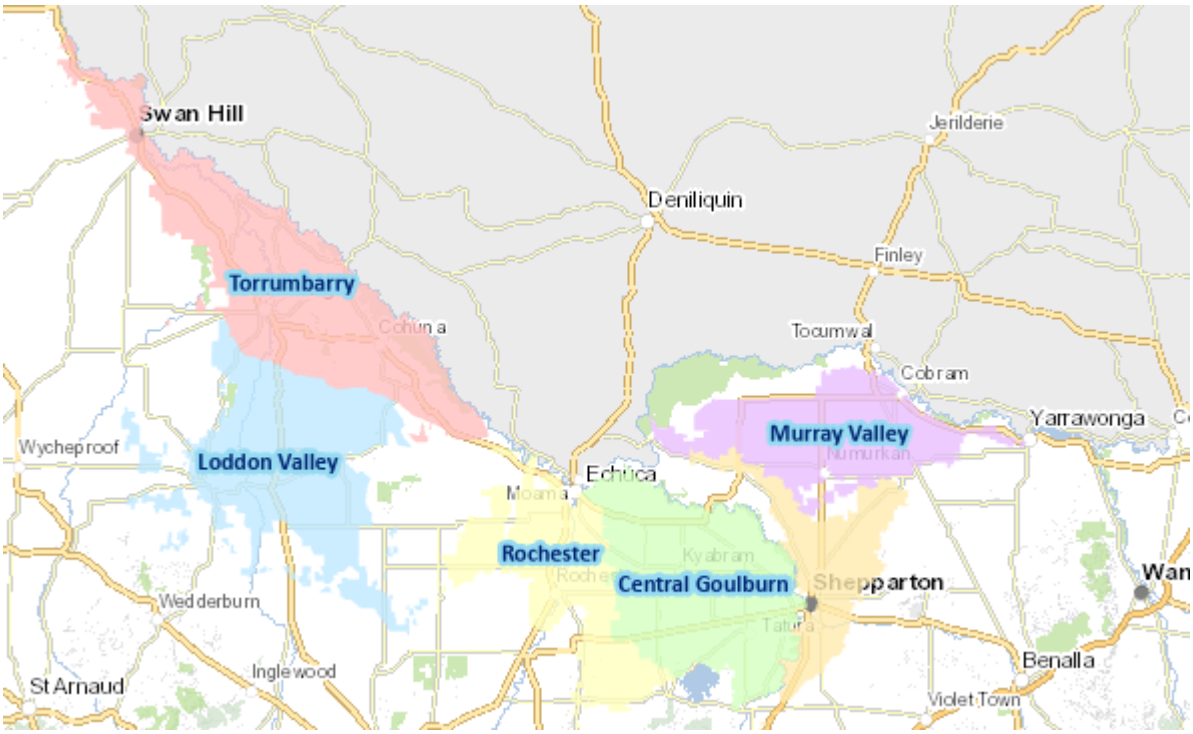

Figure 1 – Irrigation Areas

The gravity irrigation system has received significant investment in modernisation over the last 20 years through major externally funded programs including the Connections Project and the Water Efficiency Project.

Pumped Irrigation includes Woorinen, Tresco, and Nyah. Many sites within these Districts were the first to have modernised electronic meters installed. These are pressurised pipeline systems with main extraction points from either the Murray River or Torrumbarry gravity system.

The customers in the Water Supply Districts are supplied with water for domestic and stock (D&S) water use purposes. The water supply districts consist of two types of distribution systems. They are:

1. East Loddon (North) and West Loddon water supply districts are supplied via gravity distribution system.
2. East Loddon (South), Normanville, Mitiamo and Tungamah water supply districts are supplied via pipeline distribution system.

While most of the customer service points in the water supply districts are metered, they are exempted due to low water use and the outlets are small (i.e. less than 50mm) in size.

GMW also manages Natural Carriers which are Lakes, Lagoons, Swamps, Creeks within the gravity irrigation areas, where the water is diverted from these systems to supply customers.

GMW is responsible for the issuing of S.67 (works) and s.51 (take & use) licenses for customers who extract water from these systems.

Diversions - Regulated Surface Water

GMW's Diversions Business Unit (Diversions) manages extraction from all of the key major river systems within the 68,000 square kilometre footprint. These include the Ovens, King, Mitta Mitta, Goulburn, Broken, Murray, Campaspe, Loddon, and Bullarook regulated river systems, and the associated storages within.

GMW is responsible for the issuing of S.67 (works) and s.51 (take & use) licenses for customers who extract from regulated streams within its area of management.

The regulated system has a mixture of metering assets that range from local read mechanical meters through to contemporary electronic metering devices. While the works (pump/suction/delivery) associated with the extraction of water from regulated rivers and storages is owned by the customers, the meter and emplacement are the responsibility of GMW to maintain and operate. The costs to perform maintenance and replacement activities are recovered through annual customer fees and charges.

GMW is currently undertaking a major project to upgrade some of the meters with telemetry units to enable remote operation, monitoring, and reporting in the Murray River Zone 7 as they are identified as high-water use sites.

Diversions - Unregulated Surface Water

GMW is responsible for the issuing of S.67 (works) and s.51 (take & use) licenses for customers who extract from unregulated streams within its area of management.

GMW have developed Local Management Plans (LMP) that clearly articulate the rules that apply to extraction from unregulated streams. The LMP's articulate the specific attributes of each stream, the compliance points where monitoring occurs, and the various flow regimes at which rostering and restrictions are enforced.

Similar to that of the Regulated Surface Water and the Groundwater customer categories, the existing meter fleet is made up of a mix of interim standard mechanical, and contemporary electronic meters. Historically, the total annual extraction from the unregulated streams is around 30 percent of the total licence volume held.

Diversions - Groundwater

GMW issues S.67 (works) and s.51 (take & use) licenses to customers who extract groundwater resources within GMW's operational area.

There are 17 groundwater areas that are intensely managed within Water Supply Protection Areas (WSPAs) or Groundwater Management Areas (GMAs). Customers who hold licences outside these areas are considered unincorporated. Figure 2 shows the groundwater management and water supply protection areas.

Figure 2 – Groundwater Areas

There are additional challenges in effectively metering groundwater extraction due to the varying water quality because of higher salinity levels and the presence minerals within the water. The life expectancy of metering assets within the groundwater customer group is less than similar assets in surface water installations.

The existing meter fleet is made up of both mechanical and electronic meters, with funding to replace and maintain the assets recovered fully from customer's annual fees and charges.

Average usage by Resource Area

The following table provides a summary of the average (calculated over last 5-year period) usage within each of the Water Resource areas described.

Table 1 – Source vs annual usage (5yr avg.) vs No. Service Points

Water Resource	Service Area	Usage Volume Avg (ML)	Number of Service Points
Surface Water	Goulburn Murray Irrigation Districts - Gravity Channel System	854,398	24,145
	Goulburn Murray Irrigation Districts – Pumped System	18,856	2,961
Surface Water (Regulated)	Diversion	66,192	4,128
Surface Water (Unregulated)	Diversion	28,398	4,048
Groundwater	Diversion	82,625	3,232
Surface Water	Data Validation required[1]	1,128	36
Grand Total		**1,051,530**	**38,550**

1. Note that the CSPs that require validation of appropriate service area will be reviewed and updated by December 2025.

Strategic Plans/Projects affecting metering

Irrigation modernisation plans

Water Efficiency Program

GMW with the assistance of the Victorian Government, have delivered further modernisation under the Water Efficiency Project (i.e. separate to the Connections Project). The project has been completed in October 2024. The project achieved 18GL water savings through asset upgrade, modernisation and rationalisation across GMW's gravity irrigation areas. As a part of the project 395 Customer Service Points (CSPs) were rationalised and 690 new compliant (AS4747) meters were installed. This has contributed to the improvement in GMW's metering fleet. Additionally, improvement in customer confidence and water resource management by enabling accurate measurement of water usage.

Local water management plans

As per the policy, Local Management Plans play an important role in determining the metering requirements.

GMW's Groundwater Management Plans are available by accessing the following link: https://www.g-mwater.com.au/water-resources/ground-water/management. Note that most (if not all) of GMW's plans refer to licensed bores being required to be metered to ensure compliance with customers' license entitlements and to manage water resource risks. However, there are some licensed bores within the areas covered by the plan that are not metered because the individual site uses <20ML annually or other considerations for varying the metering requirements in accordance with the policy.

GMW's unregulated Local Management Rules are available by accessing the following link: https://www.g-mwater.com.au/water-resources/surface-water/unregulated-local-management-rules

Unregulated catchments are experiencing some form of change because of climate variation. Each managed stream has Local Management Rules. These generally do not stipulate metering requirements but do identify the trigger flows at which rostering and restrictions are applied. Therefore, meters are used to ensure compliance with customers' license entitlements and to manage stream rostering and restrictions.

The Shepparton Irrigation Region Groundwater Management Area otherwise known as "Shepparton Shallow" has a dedicated resource management plan as it is exempted from the National Metering Standards. A copy of the Management Plan is available by accessing the following link: https://www.g-mwater.com.au/water-resources/ground-water/management/sheppartonirrigationregiongma.

Levels of Service for customers, government and regulators

GMW customers can access all their water license and usage details via the Waterline website customer portal. This service allows customer to see their usage statements, place orders, see pending or operating orders and contact GMW's planning staff for further assistance. This web service also provides customers with the ability to enter their own meter readings if they have a local read meter. Readings can be entered within a certain level of tolerance to protect against incorrect and/or false meter readings. Anything outside of a pre-set tolerance will be referred to GMW for a field verification reading.

GMW is required to comply with government reporting policy requirements that includes financial and performance reporting to a range of stakeholders. These reports include but are not limited to:

- GMW Annual Report
- Financial Management Act Attestation
- Asset Management Accountability Framework Attestation
- ESC Pricing Submission
- Water Planning and Management Information
- Bulk Entitlement Compliance

Water Resource Compliance

GMW continues to apply a consistent, transparent, and risk-based approach to manage compliance and enforcement of *the Water Act 1989*. We work closely with the customers to ensure adherence to extraction limits to manage water resource. This includes but not limited to the following:

- Providing compliance and enforcement related information including fact sheets on GMW's website (Compliance and Enforcement of Water Use - Goulburn Murray Water).
- Regular updates via newsletters and media (including social media) releases of key information.
- Customer/community forums.
- Customer service support via our call centre and front counter.
- Access to Waterline website customer portal to enable customers to manage their water usage effectively.
- Direct liaison with customers related compliance and enforcement matters as required.

3. Meter Fleet Profile

Meter fleet analysis

A detailed analysis of metering data was completed to determine the current status of compliance with the policy. The compliance status of the meter fleet is summarised in Table 2. Note that usage volumes presented in the table are based on the last 5 years average.

Table 2 – Meter Compliance Status by water resource

Meter Requirement Status by Water source	Ground Water		Surface Water		Total		
	Number	Volume (ML)	Number	Volume (ML)	Number	Volume (ML)	% Volume
Accurate Meters	**157**	**45,692**	**9,296**	**848,504**	**9,453**	**894,196**	**85%**
Compliant - AS 4747 (AS)	34	9,960	2112	221,503	2,146	231,463	22%
Contemporary (CO)	123	35,732	7184	627,001	7,307	662,733	63%
Accurate Meters Required (AM)	**43**	**8,914**	**1,197**	**76,944**	**1,240**	**85,858**	**8%**
Outside Contemporary Standard (OT)	6	1,342	866	50,373	872	51,715	5%
Unmetered	22	6,634	186	13,305	208	19,939	2%
Data validation required	15	938	145	13,266	160	14,204	1%
Exempted	**3,032**	**27,951**	**24,825**	**43,573**	**27,857**	**71,524**	**7%**
Compliant - AS 4747 (AS)	167	3,839	1331	3,558	1,498	7,397	0.7%
Contemporary (CO)	1273	17,890	5452	9,648	6,725	27,538	2.6%
Outside Contemporary Standard (OT)	347	852	1617	2,032	1,964	2,884	0.3%
Unmetered	1197	5,168	15,888	26,080	17,085	31,248	3.0%
Data validation required	48	202	537	2,255	585	2,457	0.2%
Total	**3,232**	**82,557**	**35,318**	**969,021**	**38,550**	**1,051,578**	

Note that:

1. “Accurate Meter” means a meter operates with the accuracy of maximum permissible error of ±5% under in-situ condition.
2. “Accurate Meter Required” means sites required to be upgraded with a meter that conforms with AS4747 standards.

Table 3 shows the telemetry coverage of the CSPs. Whilst the number of CSPs with telemetry is relatively low, water delivered via meters with telemetry is approximately 74% of the total volume. This indicates that most of the CSPs without telemetry are low water usage sites.

Table 3 – Status of telemetry coverage

	Ground Water		Surface Water		Total		
	Number	Volume (ML)	Number	Volume (ML)	Number	Volume (ML)	% Volume
Meters with telemetry	1944	69,265	10139	711,189	12083	780,454	74%
Meters without telemetry	1252	12,827	24458	240,524	25710	253,351	24%
Data validation required	36	465	721	17,308	757	17,773	2%
Total	**3,232**	**82,557**	**35,318**	**969,021**	**38,550**	**1,051,578**	

Table 4 provide details of the CSPs considered for exemption and circumstances for varying the metering requirement in accordance with the policy.

Table 4 – Summary metering compliance exemption

Water Resource	Reason for Exemption	Number of meters
Surface Water	Low water use (EXLU)[1]	4,445
	Outside the scope (EXOT)[2]	13,597
Ground Water	Low water use (EXLU)[1]	1,569
	Outside the scope (EXOT)[2]	23
Total		**19,634**

Note that:

1. Low water use CSPs were determined based on annual water use less than 10ML and 20ML for surface water and ground water, respectively.
2. Outside the scope CSPs were determined based on the supply type such as domestic & stock (D&S), diversion from drainage water and urban water offtakes with majority of them are D&S supply type.

As a part of the preparation of this report, CSPs data in the Asset Information Management System has been reviewed and updated. Through this, it was identified there are still gaps in the data, which require further review and validation to ensure the data quality. An action has been included to review and update GMW's metering data in an ongoing manner.

Action 1: *Continue to review and validate meter fleet data to ensure data quality.*

4. Meter Lifecycle Management

GMW's Asset Maturity Program is an overarching strategic priority that sets out a plan for improving our asset management practices to meet the current and future service challenges. A detailed asset management plan has been developed for each asset class within the GMW's portfolio of assets. The Asset Lifecycle Strategy (A4174391) for CSPs details how the organisation plans to manage and operate flowmeters and associated components at the agreed levels of service while optimising life-cycle costs.

Overview of lifecycle management of water meters

The following diagram shows the main steps involved in lifecycle management of water meters from asset creation to disposal. The diagram also shows links with national standards (Source: *Preparing Non-urban Water Metering Action Plans, January 2025*).

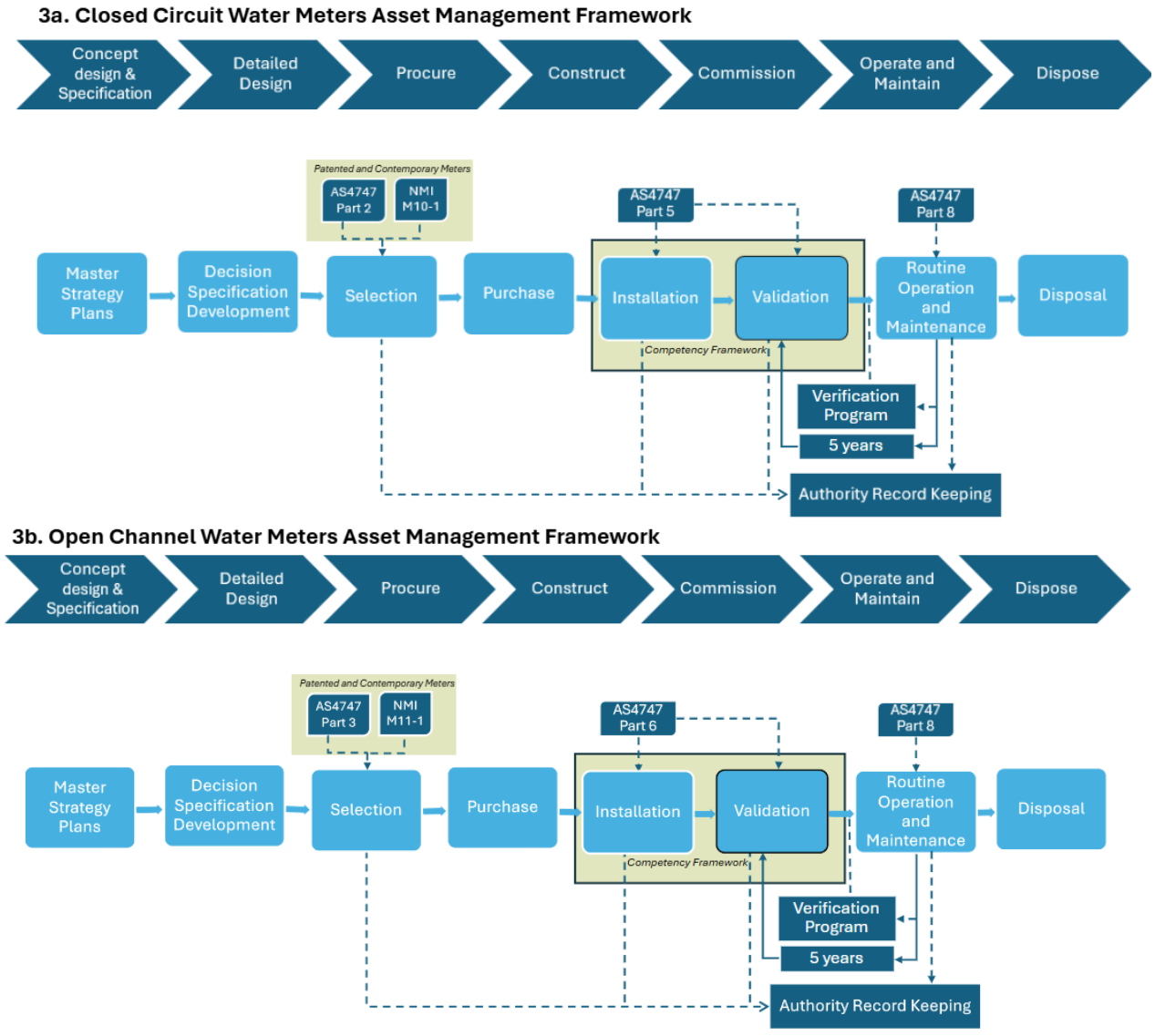

Figure 3 a & b – Water Meters Asset Management Framework

Meter selection

GMW has developed an approved list of commercially available flow meters to ensure the flow meters meet the AS4747 standards (including the use of a Pattern Approved Meter) and the measurement accuracy. The approved meter list (A1892981) is reviewed and updated regularly to ensure that we use flowmeters that:

- Meets accuracy requirement,
- Enhances operation and maintenance,
- Improves durability, and,
- Fit for purpose.

All the meters in GMW's approved meter list are NMI pattern approved meters.

The documents provided in Table 5 provide details and requirements related to selection and installation of flow meters for non-urban water metering.

Table 5 – Standards for selection and installation of flow meters

Requirement	Documents
Overall measurement requirement	Measurement Assurance Framework [2009]
Measuring instruments are fit for purpose	NMI M 10 for full flowing pipe meters [2010] and NMI M 11 for open channel meters [2009] Approved meters are called pattern approved
Measurements are made correctly.	AS 4747 – Sections 1, 2, 5 & 8 for full flowing pipe meters AS4747 – Sections 1, 3, 6 & 8 for open channel meters These standards include the requirement for duly qualified personnel for most tasks – called Certified Installers and Validators. AS4747 first edition was 2008 and the current 93rd) edition was in 2013]
Record-keeping to prove measurements are accurate	NMI retains records on meter testing for pattern approval. The Pattern Approved Meters for use in Australia can be found: https://www.agriculture.gov.au/sites/default/files/documents/mdb-pattern-approved-non-urban-meters.pdf

Each site is assessed individually to determine the most suitable metering solution based on a range of operational and technical factors. Table 6 shows the common factors considered in selection of a flowmeter.

Table 6 – Common factors considered in selection of a suitable flowmeter

Full flowing pipe meter sites	Open channel meter sites
• Connection pipe details (diameter, rating and length) upstream and downstream. • Proposed power supply source details: mains, battery, and solar (noting solar will require checking on shading and orientation). • Flow range • Water quality • Meter manufacture pattern approval installation requirements. • Telemetry requirements.	• Water level range upstream and downstream of the meter. • Flow patterns in the supplying channel, particularly cross flow relative to the meter inlet. • Proposed power supply source details: mains, battery, and solar (noting solar will require checking on shading and orientation). • Flow range

• Site access constraints and safety. • Other possible technical challenges.	• Water quality - including silt load, and algae. • Meter manufacture pattern approval installation requirements. • Telemetry requirements. • Site access constraints and safety. • Other possible technical challenges.

Meter installation

GMW has an annual capital works program to replace failed. Details of GMW's meter replacement program are provided in Section 5 – Meter Investment Programs. Additionally, new meters are installed at the request of customers to upgrade the existing outlet or to provide new outlets, which are usually completed by private contractors in accordance with GMW's specifications.

AS4747 – Part 5 covers the installation requirements for full flowing meters and AS4747 – Part 6 covers the installation requirements for open channel meters. GMW will ensure all new meter installations are completed in accordance with AS4747.5 & 6, noting that in some circumstances, it may not be practical to fully comply with the AS4747 standard due to site constraints. In those circumstances, the best technically feasible solution will be implemented. In order to ensure meters are installed as per the standard and good practice is applied, GMW has developed a set of standard meter installation plans. The meters will be installed by an accredited Certified Meter Installer (CMI). In the circumstances where meters are installed by a non-certified technician, validation of those meters will be undertaken by a CMI qualified technician as a part of the commissioning of the works.

Tamper evident seal

Tamper evident seals are to be installed on newly commissioned meters and when an existing seal is broken. The seals are to be installed by the CMI qualified technicians. This is a requirement of the policy and the Australian Standard (AS4747). GMW has approved seals with GMW logo and CMI number for installation by CMI qualified GMW staff. There are circumstances where contractors will be undertaking works such as meter installation, commissioning and validation. The seals purchased from the Irrigation Australia are to be used by the contractors, noting that the seals are to be installed by the CMI qualified technicians.

GMW has developed a procedure that outlines obligations when sealing meters, who can seal meters, when seals are to be used, what seals are approved for use and where seals are to be placed. Standard design plans were developed for sealing to a consistent approach to applying seals to our meter fleet.

Action 2: *Ensure tamper evident seals are installed on newly commissioned meters and when an existing seal is broken as per the procedure.*

Meter Maintenance

Section 2.7 of AS4747 – Part 8 covers the maintenance requirements for both meter categories. Table 7 shows GMW's maintenance programs.

Table 7: Meter maintenance, compliance and accuracy testing standard programs

Program	Activity	Schedule / Timing
Annual Meter Inspection (ITP)	Preventative maintenance – general inspection of the CSPs.	Annually
Meter Validation	Preventive and reactive maintenance - Meter accuracy checks against manufacturers' validation procedure.	Every 5 years and when a corrective maintenance is completed on a meter it may affect the metrology of the metering device. Note that routine meter validation will be undertaken as a part of the annual validation program, which aims to validate 20% of metering fleet.
Insitu Reverification (REVS)	Infield volumetric accuracy testing as detailed in AS4747.8 and Metrological Assurance Framework (MAF)	As required.

Inspection and Validation

GMW performs Annual Meter Inspections as a part of approved preventative maintenance programs. This annual maintenance program is captured in the Asset Information Management System (Maximo) via work orders containing standard Inspection Test Plan (ITP), which includes a questionnaire to prompt the operation staff to check all relevant aspects and to capture consistent information.

Section 2.4 of AS4747 – Part 8 covers the validation requirements. A validation program is implemented to validate the electromagnetic meters in accordance with the manufacturer/supplier's recommended procedure to ensure that the meter is operating within the manufacturer's tolerance, hence the measurement accuracy. The validation program is incorporated with the inspection program (i.e., validations are undertaken for the selected CSPs while completing the inspection). The program aims to complete validation of approximately 20% of the metering fleet each year. Note that meters will be monitored within Maximo to schedule a meter validation within a 5-year period if corrective maintenance has not triggered a meter validation within this period.

A reactive validation will be triggered if a corrective maintenance occurs. A meter must be re-validated if the tamper evident seal is broken by maintenance or if the tamper evident seals on the meter are broken or removed. However, minor maintenance such as battery replacement where removal of the battery does not alter the meter totaliser or cleaning of the external parts of the meter does not require validation if the tamper evident seals remain in place.

The validation shall only be undertaken by the CMI qualified staff. Given that GMW's metering fleet consists of various types of meters (makes and models), meter validation will be undertaken in

accordance with the manufacturer's recommendations. GMW works closely with the suppliers to seek guidance on validating their meters.

All meter validation work will be captured within Maximo and form part of GMW's standard compliance reporting.

GMW's annual maintenance program:

- supports the identification of failed flow meters.
- enables GMW to prioritise the replacement of meters that have reached end of life, are not operational or have deteriorated to the point that the meter warrants significant attention.
- enhances our Asset Management practices.
- helps to update asset data in our Asset Information Management System. This enables GMW to monitor and analyse the cost of maintaining and replacing CSPs. This information will inform future maintenance programs and operating budgets. Note that GMW has recently reviewed the data structure of the CSPs in the Asset Information Management System to standardise and enhance data capture.

Action 3: *GMW will continue to provide CMI and meter type specific validation trainings to staff who undertake the validation of meters, noting that these trainings are already being underway and will be conducted as required.*

Action 4: *a) GMW will continue to implement annual Inspection and Validation programs, which aim to validate 20% of the meters.*
b) Enhance the standardisation and capture of annual meter inspection data to inform the efficient management of our meter maintenance and compliance obligations.

Meter verification

Section 2.5 and 2.6 of AS4747 – Part 8 covers the in-situ volumetric measurement and verification requirements for both meter categories. These are non-mandatory sections of the standard; these tests only apply to a single flow supply situation (as all variables must be maintained during the test) and can be costly to complete.

GMW may undertake either in-situ or laboratory test where required to verify the permissible limits of error. The permissible error of ±2.5% and ±5% can be determined by verification completed in the laboratory and in the field respectively. Note that in situ verification is complex and costly intervention, therefore reverification will be undertaken in the circumstances where cost outweighs the benefit of undertaking the test.

Telemetry

Telemetry may be added when the meter is first installed or be retrospectively added to installed meters. GMW will aim to enhance the telemetry coverage of our metering fleet to meet the requirements of the policy, noting that approximately 74% of the total volume of water delivered is currently telemetered (Table 3). The addition of telemetry to a CSP will be determined based on the factors such as water resource risk (i.e., high water use sites), compliance, operation needs, site constraints and cost. The details of the current investment in telemetry are provided in Section 5.4.

GMW has completed a pilot trial of a mobile telemetry solution (i.e., Capitis telemetry units), which is relatively low cost compared to the traditional telemetry solution. The new technology has been adapted as an approved solution and is being implemented for new telemetry installations.

Action 5: *Develop a standardised process for selection of sites for addition of telemetry.*

Disposal and decommissioning plan

The CSPs need to be disposed when:

a) Meter is at end of life,
b) Meter faulty and cannot be repaired,
c) not required to provide a service due to Landowner wants to exit or no intention to irrigate the site.

Note that decommissioning of a meter usually occurs when a meter is replaced. The decommissioning is undertaken in accordance with the GMW Asset Disposal Procedure (A3922690). The decommissioning process involves the following key steps:

a. All assets recognised on the CSP that are planned to be disposed must have change of operation in the Asset Information Management System and asset record updated as "Decommissioned".
b. If the CSP asset or structure is to be removed and not replaced, all relevant systems such as SCADA, GIS and water registry must be updated.
c. Notify other relevant teams regarding decommissioned asset to facilitate any other administrative processes to be followed.

5. Meter Investment Programs

Meter renewal/replacement program

Over time, meter performance degrades and eventually exceeds the permissible error margin of ±5% under in situ conditions. This deterioration is typically caused by long time wear and tear, accumulation of sediment and debris, vandalism, natural disasters, electrical/signal issues or in some cases manufacturing defects. The meters not performing to the required accuracy are considered as "failed meters". The failed meters are usually identified through the following ways:

1. Inspections (ITPs)
2. Meter validations
3. Meter Reads
4. Meter trends via telemetry
5. Customer complaints/requests

The meters identified as "failed meters" that require repair or replacement are recorded in the Asset Information Management System by creating work orders. The recent data indicates that failure rate of meters is in the order of 100 – 200 per year.

GMW implements an annual capital program aimed at replacing failed meters that are no longer functioning accurately. As a part of the annual capital works planning, the failed meter list is reviewed and prioritised for replacement.

- The meters are prioritised based on multiple factors including water resource risk (i.e., water usage), operation and maintenance requirements, compliance (i.e., exemptions) and budget.
- The meters selected for replacement or repair are removed from the list (i.e., the "failed meter" work orders are closed). During this process telemetry requirement is assessed and included in the scope of the meter replacement program as required.

All metering capital works follow the GMW's Investment and Project Management Framework (A5181790). Figure 4 describes the processes involved in the meter replacement program.

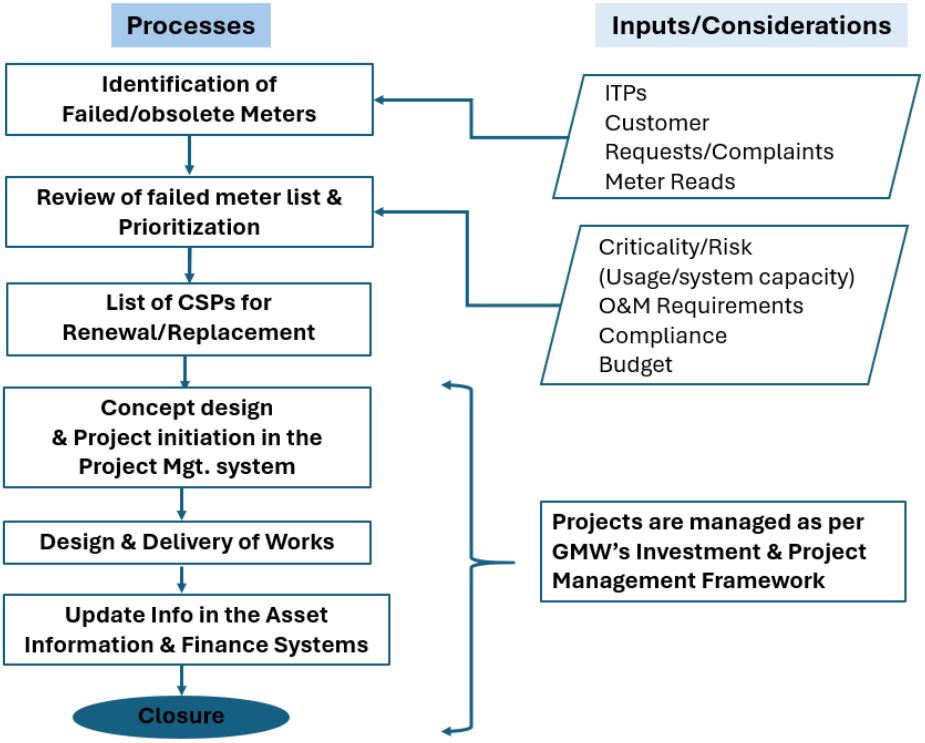

Figure 4 – Meter Replacement Process Flow Diagram

Action 6: *Continue to implement annual meter replacement program.*

Meter Upgrade Program

As a part of the development of the MAP, GMW has completed a data analysis of the metering fleet. Table 2 in Section 3.1 shows the current compliance status of the metering fleet. The data analysis revealed that 1,240 CSPs require meter investment to meet AS4747 standards, which includes meters assessed as 'Outside contemporary standard' and 'Unmetered' sites. Based on the last five years' water use data, water delivered via these CSPs is approximately 8% of the total volume delivered.

GMW has adopted a staged approach to comply with the Policy using a cost-benefit assessment to prioritise the investment in metering upgrade in consideration to the water resource management risk and the potential supply system changes under the Australian Government's water purchase program.

Figure 5 shows the number of CSPs to be upgraded versus percentage reduction in water take via CSPs require meter investment and respective meter installation cost. Based on the cost-benefit assessment, between 2025 and 2032 approximately 263 CSPs will be upgraded to conform with AS4747 standards.

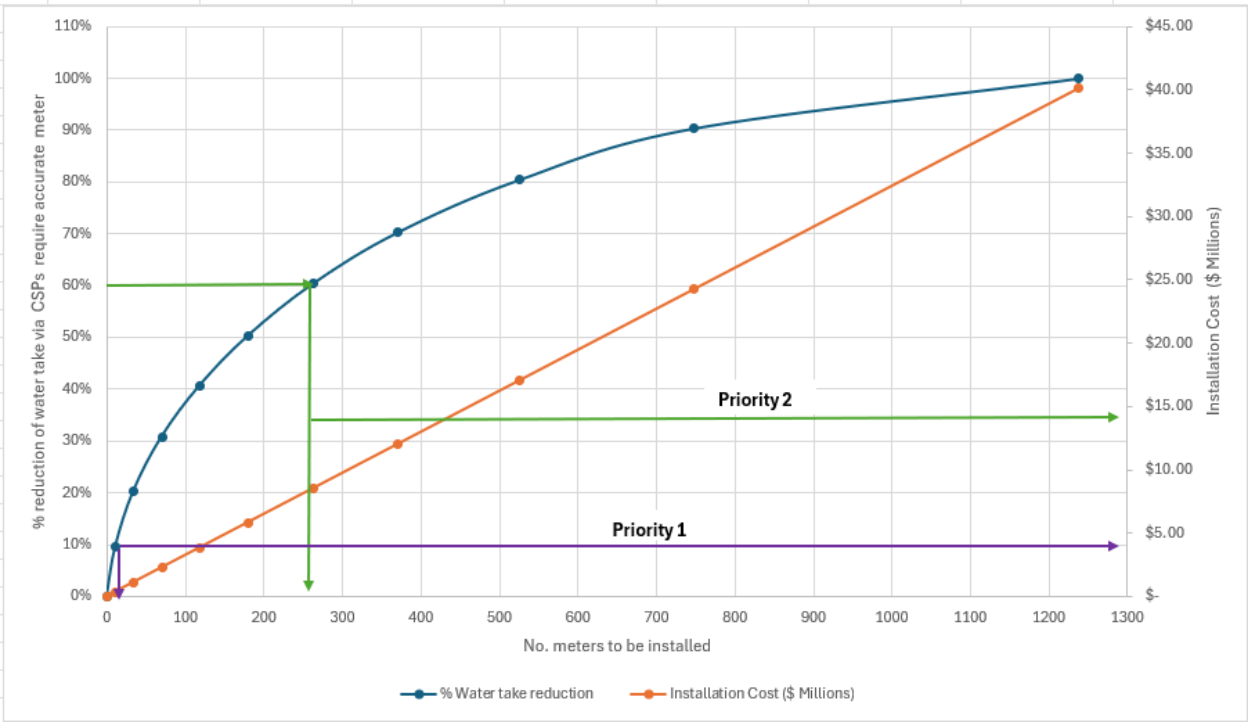

Figure 5 – Cost-benefit analysis.

As can be seen from Figure 5, the benefit with respect to water resource management diminishes beyond 60% reduction in water take. Accordingly, the staged implementation of the meter upgrade program includes the following priorities:

- Priority 1 - 2025-2028 (Water Plan 6): Achieve 10% reduction in water take via CSPs require meter investment by installing 13 meters.
- Priority 2 - 2029-2032 (Water Plan 7): Achieve an additional 50% reduction in water take via CSPs require meter investment by installing at least 250 meters, noting that a review of impacts due to Australian Government's water purchase program will be undertaken when investments are to be made.
- Priority 3 – Beyond Water Plan 7: Evaluate and prioritise the remaining sites to determine appropriate level investment.

Meter upgrade program will follow the same capital project governance processes discussed in Section 5.1.

Action 7: *Develop and implement a meter upgrade program to achieve compliance through progressive prioritisation and delivery approach.*

Operational and capital budgets

Meter maintenance budgets have been included in GMW's Operational budgets where operational and maintenance staff are to deliver these programs managing operational and compliance risk to delivery best outcomes for our customers. Operational budgets are developed at an activity level (e.g. maintenance) not an individual program level. GMW will continue to track expenditure against meter maintenance and compliance activities through the effective use of our Asset Management Information System.

GMW's capital plan is outlined in our Water Plan 6 (Pricing Submission) which is reviewed and approved by the Essential Services Commission. Table 7 shows allowances made in Water Plan 6 for capital metering programs to progress with objectives of the MAP. Note that budget figures provided in Table 8 are in 2023/24 values, which are adjusted each year for inflation using the Consumer Price Index (CPI).

Table 8 – Budget allocations for the capital metering programs

Service/Water Resource	2024/25	2025/26	2026/27	2027/28	Total
Gravity Irrigation/ Surface water	$978, 500	$978, 500	$978, 500	$978, 500	$3,914,000
Pumped Irrigation/ Surface Water	$638,350	$600,900	$600,900	$579,600	$2,419,750
Diversion/Surface water	$165,630	$165,630	$165,630	$165,630	$662,520
Diversion/Ground water	$134,370	$134,370	$134,370	$134,370	$537,480
Total	**$1,916,850**	**$1,879,400**	**$1,879,400**	**$1,858,100**	**$7,533,750**

Under the 2024/25 capital metering program around 165 failed/obsolete meters will be replaced. It was identified through implementation of the 2024/25 capital metering program that the cost of meter replacement has notably increased from the cost assumed during budgeting for Water Plan 6, which is primarily attributed to the increase in supply of materials and labour costs.

As a part of the next pricing submission (Water Plan 7: 2029 -2032), GMW will make appropriate budget allocation for metering maintenance and capital works to progress with achieving compliance with the policy and other actions proposed in the MAP. GMW is conscious that our investments in maintenance and capital programs (customer funded) are required to be recovered from our customers through price. Hence, ensuring that these programs are delivered as effectively and efficiently as possible to minimise pricing impacts to the customers, whilst achieving compliance obligations is a key focus for GMW.

Other investments in metering

GMW has been working with the Victorian and Commonwealth Governments and other potential external agencies to obtain funding to upgrade GMW's metering assets to meet the expectations of the policy and provide better service to our customers. The following are the externally funded metering projects currently being delivered:

1. 70 – 100 meters in the Murray River Zone 7 diversion area will be added with telemetry under the Zone 7 telemetry upgrade project funded by the Victorian Government. The project will also upgrade 70 meters with a compliant (AS4747) meter. The project budget is $2.5 million.
2. 695 existing meters in the Water Supply Protection Areas (WSPAs) and in other service areas will be installed with telemetry under the Murray Darling Basin telemetry uplift project funded by the Commonwealth government via the Victorian Government. The project budget is $3.3 million.

On completion of the above projects, the total volume delivered via telemetered CSPs will increase from 74% to approximately 82%.

GMW will continue to explore funding opportunities for metering upgrade to enhance water resources management, operation and customer service via accurate and remote water measurement, while minimising impact on customer pricing.

Financial measures

GMW's Water Plan 6 (Pricing Submission) has been reviewed and approved by the Essential Services Commission (ESC). This document establishes a revenue cap for GMW for the 2024-2028 period. The document outlines GMW's forecast for Operating and Capital Expenditure over this period. When submitting our next Water Plan in 2029, GMW is required to provide data to assess performance against the expenditure profile.

On an annual basis GMW develops our Corporate Plan that is approved by the GMW Board and Minister for Water. The Corporate Plan contains our 5-year financial forecast and identifies key organisational objectives and projects. GMW is required to submit an Annual Report that outlines our performance against the Corporate Plan.

The GMW Board approves our annual Operating and Capital budget. The establishment of the Capital budget is supported by individual Project details. On a monthly basis the GMW Board receives capital works performance reporting which identifies material budget and/or scope variances.

GMW staff are held accountable to allocated budgets and/or projects.

6. Data management, analysis and reporting

Status of current data management

GMW produces a monthly Reconciliation Report that cross-references all Customer Service Point data sets located within GMW's data warehouse, which is linked to the following data management systems:

- IPM – Irrigation Planning Module (SCADA System)
- SAM – Customer Billing System
- Geocortex – GIS System
- Maximo – Asset Information Management System
- VWR – Victorian Water Register

This report identifies any inconsistencies enabling the data to be cleansed on a routine basis. Note that there are gaps in the data recorded in the Asset Information Management System. GMW will review and validate the data in an ongoing manner, which has been considered in Action 1 discussed in Section 3.1.

Annual Reporting

An annual report is prepared using the information in the Asset Information Management System and the other systems listed above, which covers all aspects of meter fleet analysis. The meter compliance tables presented earlier in this report are generated from this reporting process. The annual report is used for reporting compliance with the policy to the Department of Energy, Environment and Climate Action (DEECA) and also to track meter program progress, prioritise investment plans and monitor compliance targets. DEECA utilises this information to report at a state-level each year placed on the DEECA website: Non-urban water metering reports.

Meter Reads

Meter Reads are undertaken at different frequencies depending on the service area and the water resource risk. Note that meter reads are completed online where CSPs have telemetry. Table 8 shows the frequency of meter reads for each service area.

Table 8 – Meter read frequency

Water Resource	Service Area	Frequency	Comment
Surface Water	Goulburn Murray Irrigation Districts (Gravity & Pumped)	Twice annually	Reads are undertaken at the start and end of the irrigation season.
	Diversions (regulated and unregulated)	Once annually	Reads are undertaken at the end of the irrigation season.
Ground Water	Diversions (Ground Water)	Once annually	Reads are undertaken at the end of the irrigation season.
	Water supply protection area	Twice annually	Reads are undertaken at the start and end of the irrigation season.

7. Metering Improvement Plan

Table 9 summarises the improvement actions.

Table 9 – Improvement actions

No	Actions	Timeline	Reference
1.	Continue to review and validate meter fleet data to ensure data quality.	2025 - 2028	Sec 3.1
2.	Ensure tamper evident seals are installed on newly commissioned meters and when an existing seal is broken.	As required	Sec 4.4
3.	GMW will continue to provide CMI and meter type specific validation trainings to staff who undertake the validation of meters, noting that these trainings are already being underway and will be conducted as required.	As required	Sec 4.5.1
4a.	GMW will continue to implement annual Inspection and Validation programs.	Annually	Sec 4.5.1
4b.	Enhance the standardisation and capture of annual meter inspection data to inform the efficient management of our meter maintenance and compliance obligations.	2025 - 2026	Sec 4.5.1
5.	Develop a standardised process for selection of sites for addition of telemetry.	2025/26	Sec 4.6
6.	Continue to implement the annual meter replacement program.	Annually	Sec 5.1
7.	Develop and implement a meter upgrade program to achieve compliance through progressive prioritisation and delivery approach. Priority 1 – current regulatory period (WP6) Priority 2 – next regulatory period (WP7) Priority 3 – Beyond next regulatory period (WP8+)	 2025 – 2028 2029 – 2032 2033+	Sec 5.2

8. Appendices

Appendix A: Victorian Non-Urban Water Metering Policy, January 2025.
Accessible via the DEECA website (Non-urban water metering)

Appendix B: Meter Asset Management Plans

1. Asset Management Plan for the modernised delivery assets (A3839252).
2. Asset Life Cycle Strategy for the customer service points (A4174391)

Appendix C: GMW Approved Meter List (A1892981)

Appendix D: GMW's Tamper Evident Seal Procedure (A4940517)

Appendix E: GMW's Investment and Project Management Framework (A5181790)

Appendix F: Standard Plans for metering (A4659997)