Wingecarribee
SHIRE COUNCIL

Asset Management Plan – Water

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WINGECARRIBEE SHIRE COUNCIL

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Contents

1 Executive Summary

This Asset Management Plan (AMP) is part of a suite of Portfolio AMPs, which together sit under the Asset Management Strategy (AMS). It is to be read in conjunction with the AMS and Four Year Capital Works Program.

This AMP provides an overarching document of Council's management of, and investment in, the Water Asset Class over a 10-year planning period.

Council manages a water asset class of over 715km of water mains and 20,000 meters, plus other assets across a broad range of asset categories, worth a combined $463M. The average condition of these structures is 1.4, which is defined as therefore being in 'good' condition.

The level of service that Council provides through this asset class can be described within the three categories of: Provision, Renewal, and Maintenance and Operations. What Council delivers through these levels of service are driven by consideration of: Risk Management, Community Satisfaction and Strategies and Masterplans. But is constrained by funding and availability of resourcing.

Review of the 2022 Community Satisfaction Survey shows that community satisfaction for the quality and reliability of the water supply network has consistently been valued of high importance and high satisfaction by the community.

In accordance with these results, the Provision Level of Service details how the focus is to therefore to continue ensuring the resilience, performance and sustainability of the existing water supply network.

In order to provide an analysis of financial investment required across the planning period, calculation of forecast asset base growth must be completed. Asset base growth is calculated through consideration of the value of the asset class growing as result of new and upgrade projects, assets contributed through development, development contributions plans and indexation, as well as subtracting any known asset disposals.

It is forecast that across the planning period the asset base will grow by $246M.

Recommended financial investment for the Renewal Level of Service and Maintenance and Operations Level of Service is calculated at $87M and $100M respectively. These have been calculated through aligning renewals with annual depreciation, and ensuring maintenance and operational budgets increase in step with asset base growth.

The Long-Term Financial Plan is unfortunately not able to accommodate the entirety of this desired financial investment, largely as result of the funding model for the Water Fund not being structured such that asset renewal aligns with asset depreciation, and maintenance and operations funding not increasing in line with asset base growth.

This will therefore result in a lowering of levels of service and will prevent assets from reaching their desired useful life - which in turn increases renewal expenditure requirements. Future iterations of the Asset Management Plan will further investigate and identify potential solutions to this difficult situation.

Asset management is a journey of continuous improvement, and so the AMP concludes with a concise Improvement Plan detailing the asset management maturity tasks programmed for the years ahead.

2 Asset Systems & Structures

2.1 Asset Planning Framework

The Asset Management Planning Framework, as summarised in Figure 1, integrates into the wider IP&R Framework, and ensures Council performs the Asset Management functions of planning, coordinating, controlling, executing, monitoring, and improving the activities associated with managing its assets.

In accordance with the Integrated Planning & Reporting (IP&R) Framework, which all NSW Local Governments are subject to, Council is required to prepare a suite of strategic documents – one being the Resourcing Strategy. It is through the Resourcing Strategy that the Asset Management Framework of Council is defined and endorsed.

The Asset Management Framework has three primary components:

1. Asset Management (AM) Policy: defines Council's Asset Management objectives.
2. Asset Management Strategy (AMS): also known as a Strategic Asset Management Plan (SAMP), shows how Council will achieve the objectives of the AM Policy. It is a road map for the delivery of these asset management objectives in accordance with the principles set in the AM Policy. It is to be continually monitored and regularly reviewed, in alignment with the formulation of the Long-Term Financial Plan (LTFP) and the Delivery Program & Operational Plans adopted annually by Council.
3. Asset Management Plans (AMP): further explores the high-level summary contained in the AMS with a detailed analysis of inventory, risk, levels of service and sustainability undertaken. AMPs are developed for all major infrastructure asset classes, grouped by the type of function the assets serve – i.e., community assets or a specific business unit.
    a. Community assets
        i. Transport
        ii. Stormwater
        iii. Buildings & Aquatics
        iv. Open Space & Recreation
        v. Water
        vi. Wastewater
    b. Business units
        i. Cemeteries
        ii. Resource Recovery Centre
        iii. Southern Regional Livestock Exchange

The AMPs are continually reviewed, to ensure long-term sustainability of the Council services they support. They are informed by community consultation and will be used as core inputs into the development of Council's Long Term Financial Plan.

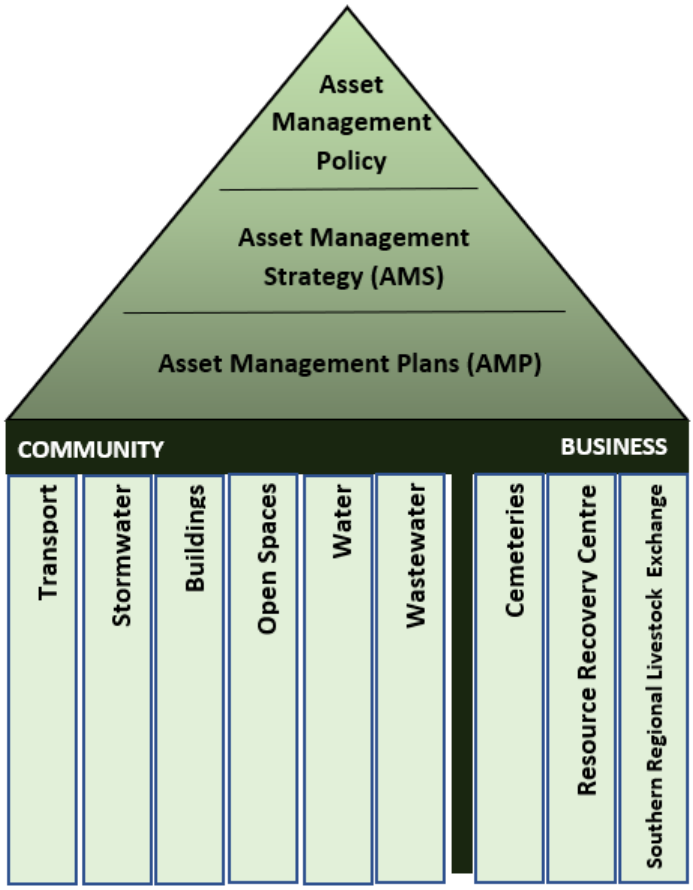


Figure 1: Asset management Planning Framework

2.2 Asset Planning Systems

Wingecarribee Shire Council utilises several databases and systems to deliver on asset planning requirements. These databases and systems are summarised in Table 1 below:

System / Database	Description / Purpose
Conquest	Asset register – inventory, condition & attributes
ArcGIS	Spatial data
Technology One – Finance	Budgeting, purchase orders, expenditure
Technology One – Enterprise Content Management (ECM)	Record keeping
Technology One – Customer Request Management (CRM)	Workflow management for customer requests
Pulse – Project Management	Scoping and project control for Capital Projects

Pavement Management System (PMS)	Road condition modelling software
Infoworks WS Pro & ICM	Water and wastewater modelling software

Table 1 - Asset Planning Systems

It is however acknowledged that Council has embarked on a digital transformation journey, with Council executing a 10-year contract at the 19 October 2022 Council Meeting with Technology One. This contract will see all Technology One modules and additional options being made available to Council and them being progressively implemented across the organisation. A 10-year roadmap for the implementation of the Technology One suite is currently being developed.

This will generate asset planning outcomes through modernisation and integration of the works management asset register and strategic asset modules. This will enable Council to model asset conditions that will result from 10 year funding scenarios, which will in turn enable data driven decision-making to achieve financial sustainability.

2.3 Organisational Structure

Council has adopted a centralised approach to Asset Planning with all asset management and network planning functions being consolidated within the Assets Team. Management of operations and maintenance, as well as capital project delivery, are primarily distributed across the teams of Shire Presentation, Water Services and Project Delivery.

The below figures detail the structure of these teams within the Service & Project Delivery Directorate, the Assets Team, as well as that of the Water and Wastewater Team.

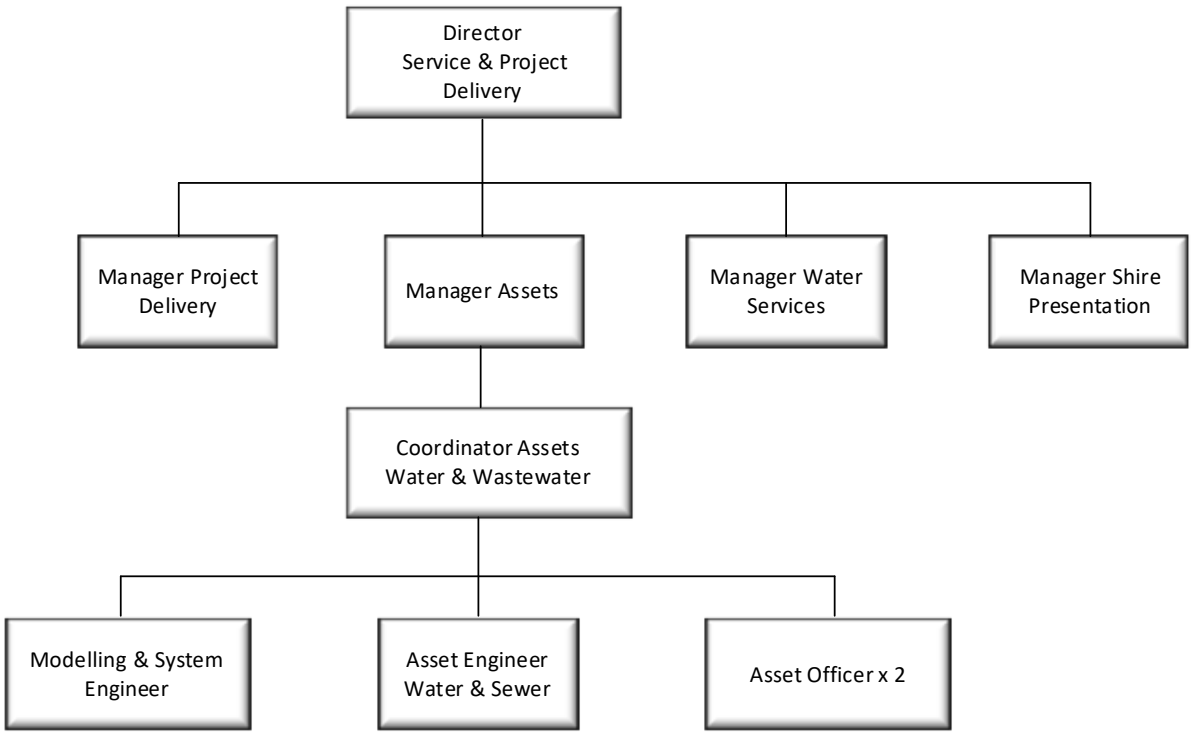


Figure 2: Service & Project Delivery Directorate

3 Our Assets

3.1 Overall Inventory

The water infrastructure assets included in this plan have a total replacement value of $462,519,092 and include the following major asset category:

Asset Category	Quantity/Length (Km)	Replacement Value ($)
Water Bulk Meters	52	$394,413
Water Source Dams	2	$24,372,386
Water Hydrants	8,181	$33,143,120
Water Meters	20,128	$7,673,153
Water Mains	715.5 km	$220,651,502
Water Pump Stations	17	$14,505,580
Water Reservoir	31	$47,356,365
Water Services	20,538	$46,169,252
Water Treatment Plants	2	$45,124,230
Water Filling Station	8	$205,723
Water Valves	5,178	$22,923,367
Total Replacement Cost		**$462,519,092**

Table 2 - Asset Category Inventory

An asset hierarchy provides a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions. The hierarchy includes the asset class and component used for asset planning and financial reporting and service level hierarchy used for service planning and delivery.

Asset Category	Asset Purpose
Water Bulk Meters	Demand management and active leakage control
Water Source Dams	Water supply
Water Hydrants	Access for firefighting and operational activities
Water Mains	Conveyance of water for bulk transfers and supply to water service lines
Water Meters	Usage monitoring of consumption for billing and modelling
Water Pump Stations	Bulk transfers and pressure management
Water Reservoirs	Storage of water for customers and fire fighting
Water Service Lines	Connecting water mains to individual property meters
Water Treatment Plants	Treatment of water to protect public health
Water Filling Stations	Commercial supply point for bulk water purchases

Water Valves	Operational control of the network

Table 3 - Asset Category Description

Asset inventory is maintained and updated through three primary means:

- Recognition of constructed assets – both through Council delivered capital projects, but also assets dedicated to Council through subdivision development.
- Ad-hoc Asset Inspections – inspections are regularly conducted in response to customer or internal requests, as well as part of project scoping phases.
- Scheduled Asset Inspections – all assets are to feature within a schedule of asset inspections. The frequency of inspection would be commensurate to the rate of degradation of the asset, as well as consequence of failure and cost of inspection.

The split of asset amounts across these asset categories is provided in Figure 5 below.

Assets are valued in accordance with the Detailed revaluations of asset classes are undertaken in accordance with Australian Accounting Standards and so a comprehensive revaluation of each asset class is undertaken at a minimum every five years. Outside of the comprehensive revaluation years, fair value assessments are to be undertaken on an annual basis for all asset classes. If the assessment identifies that a material change has occurred, the corresponding asset classes will be indexed with an industry accepted index.

A comprehensive valuation for water was performed in the financial year 2021/22. Next comprehensive valuation was scheduled for 2026/27.

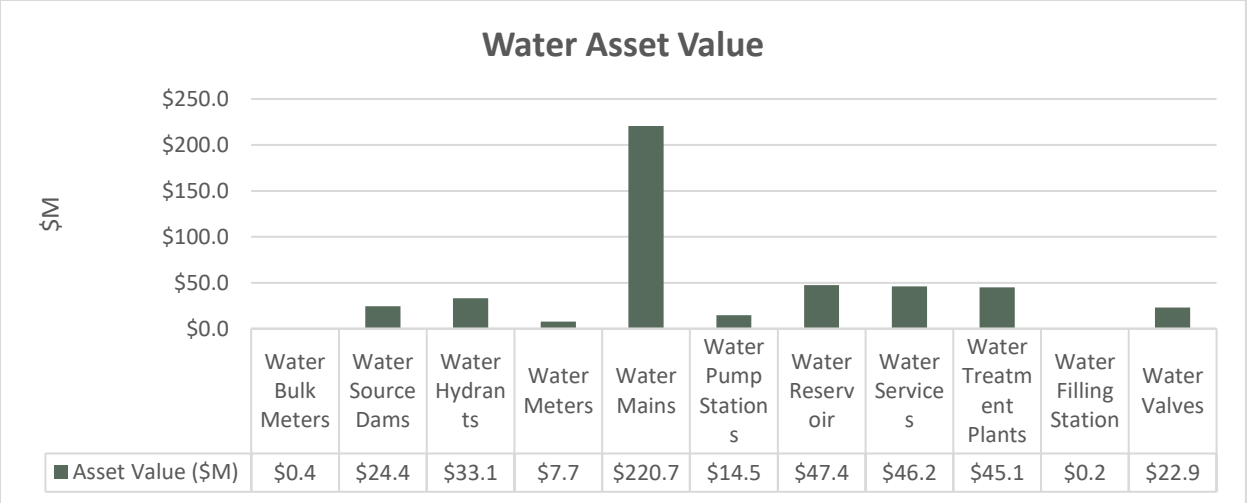


Figure 3 - Asset Category Value

3.2 Overall Condition

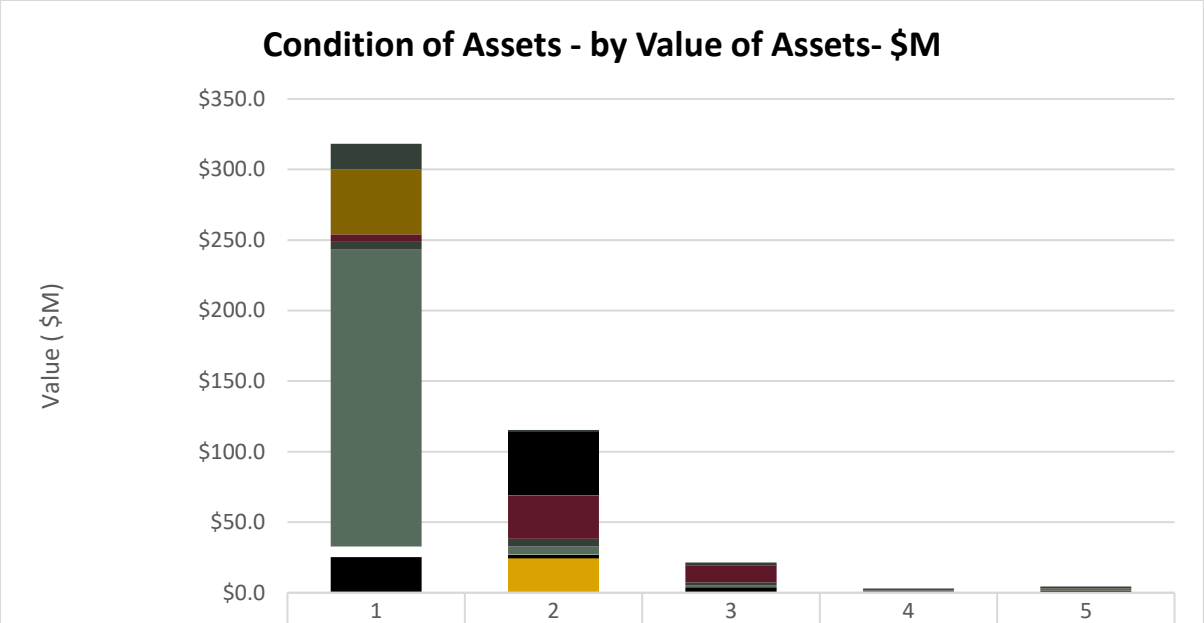
Asset conditions are assessed as part of comprehensive network inspections, conducted on a rolling program. These assessments are undertaken in accordance with the relevant Practice Notes issued by the Institute of Public Works Engineering Australasia. The condition rating scale is 1-5:

1. As new / excellent
2. Good / satisfactory
3. Fair / tolerable

4. Poor / intolerable
5. Very poor / reconstruction required.

With a vast network of underground water and sewer assets, obtaining good condition data is often difficult and expensive. The Council makes use of ad-hoc condition assessments of its underground assets during works that expose those assets. For example, during routine maintenance, excavating for new service connections or during emergency repairs, information such as pipe diameter, condition, wall thickness, consequence of failure and location should be recorded and entered the asset register for future reference.

Desktop method of condition assessments is carried out by analysing the asset inventory data such as age, material, useful life, burst history, risk and criticality.



	1	2	3	4	5
Water Valves	$17.9	$1.1	$2.3	$0.4	$1.1
Water Filling Station	$0.2	$0.0	$0.0	$0.0	$0.0
WTP's	$0.0	$45.1	$0.0	$0.0	$0.0
Water Services	$46.1	$0.0	$0.0	$0.0	$0.0
Water Reservoir	$4.6	$30.8	$11.7	$0.1	$0.1
Water Pump Stations	$5.8	$5.4	$2.2	$0.9	$0.3
Water Mains	$210.8	$5.8	$1.3	$1.2	$1.5
Water Meters	$7.5	$0.2	$0.0	$0.0	$0.0
Water Hydrants	$24.9	$2.5	$3.9	$0.5	$1.4
Water Source Dams	$0.0	$24.4	$0.0	$0.0	$0.0
Water Bulk Meters	$0.3	$0.1	$0.0	$0.0	$0.0

Figure 4: Condition by Value of Water Assets

The overall average condition of Council's water assets is good / satisfactory.

Average condition rating for water assets is 1.40.

However it is acknowledged that this condition rating may be overly optimistic and is further explored in Section 3.3.1.

3.3 Asset Category Inventory

3.3.1 Water mains

Council manages a water pipe network 715 kilometres. This network of water pipes is comprised of many different material types with, as result of the construction years of the water schemes, asbestos cement pipes comprising 51% of the network.

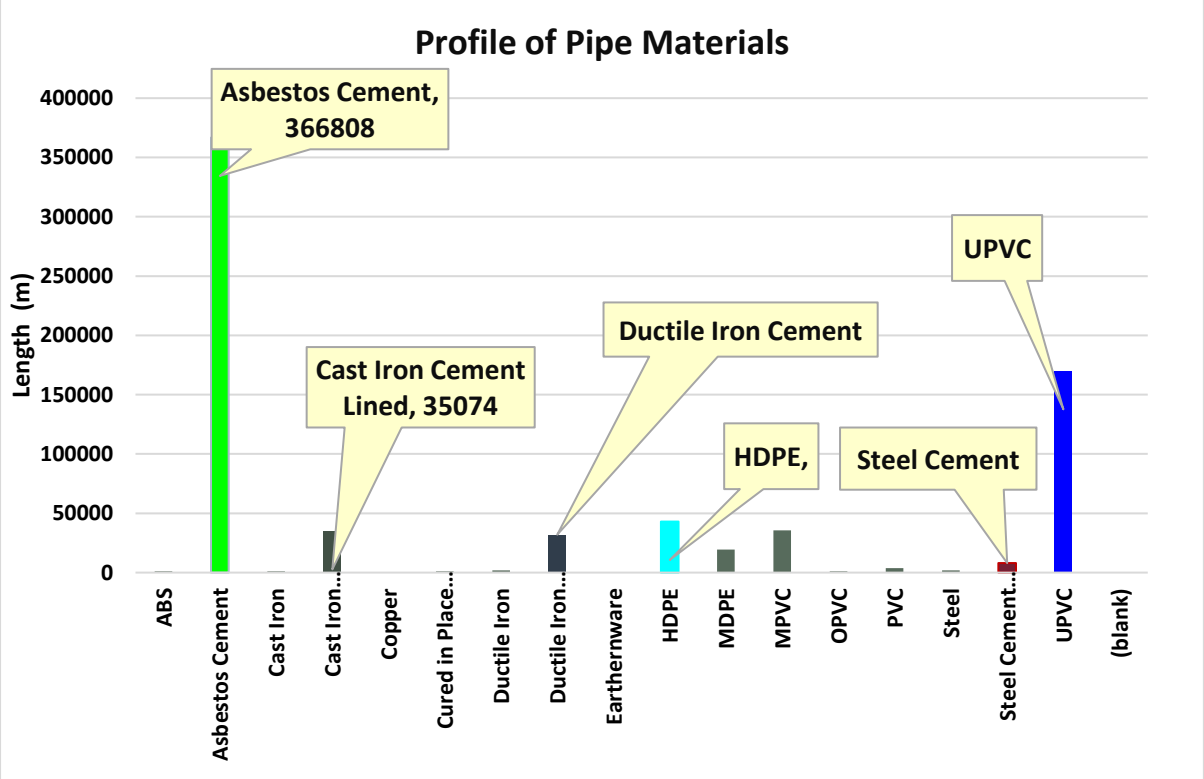


Figure 5 - Water Main Material

At network level, condition ratings are therefore estimated based upon construction age, useful life and an accepted deterioration curve. It is however acknowledged that Council has limited detailed condition data on these underground pipes, beyond burst history where mains have been reported as Soft AC or severely corroded cast iron.

The figure below displays the current spread of condition values across the water main network, with 95% of the network currently recorded as being of Condition 1, ie As New / Excellent condition.

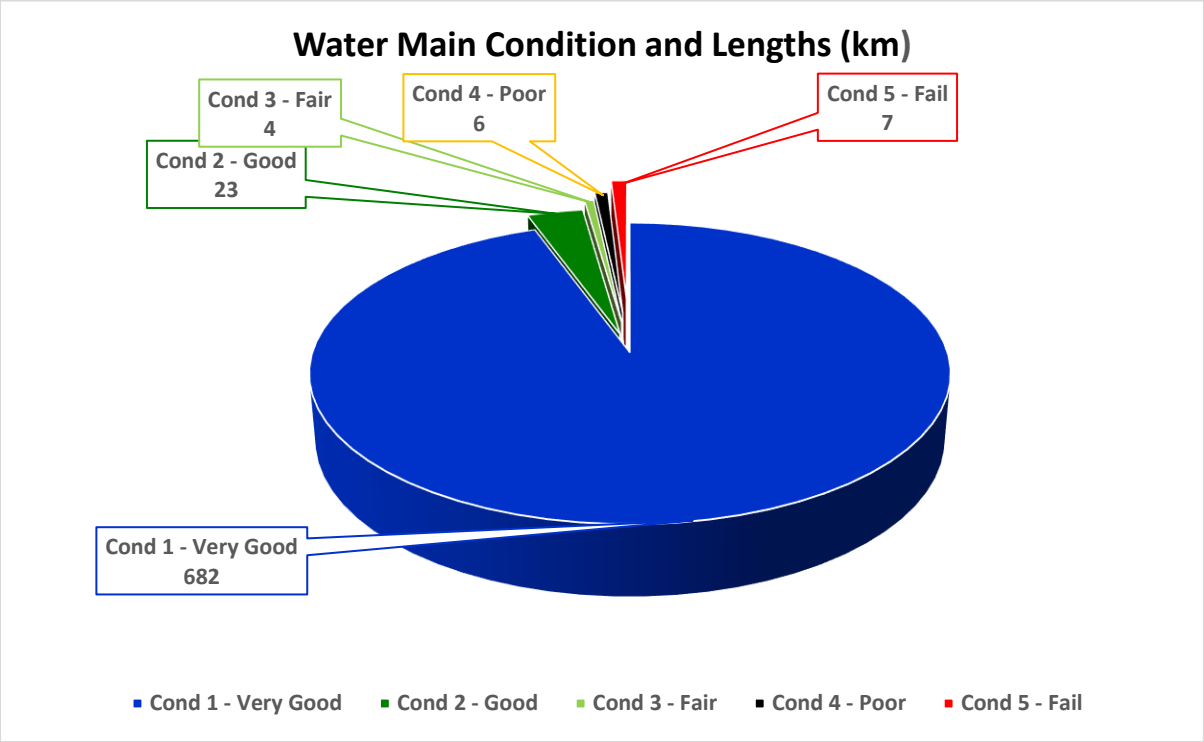


Figure 6 - Water Main Condition

This unfortunately does not appear to align with the water main age data, from which it would be expected that a more even distribution of asset condition ratings would be applied. A reapplication of age based condition rating for the water main network is therefore identified as a future improvement within the Improvement Plan of Section 8.

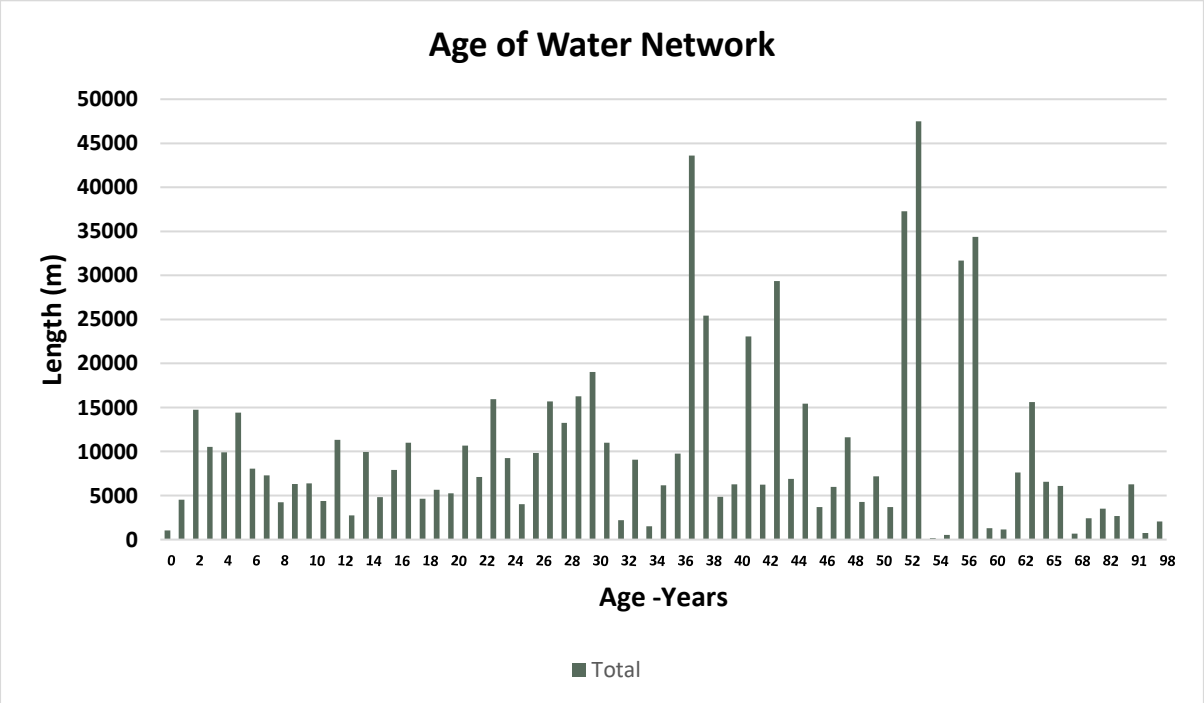


Figure 7 - Water Main Age

3.3.2 Water Reservoirs

The water supply network of the Wingecarribee Shire is supported by 29 water reservoirs.

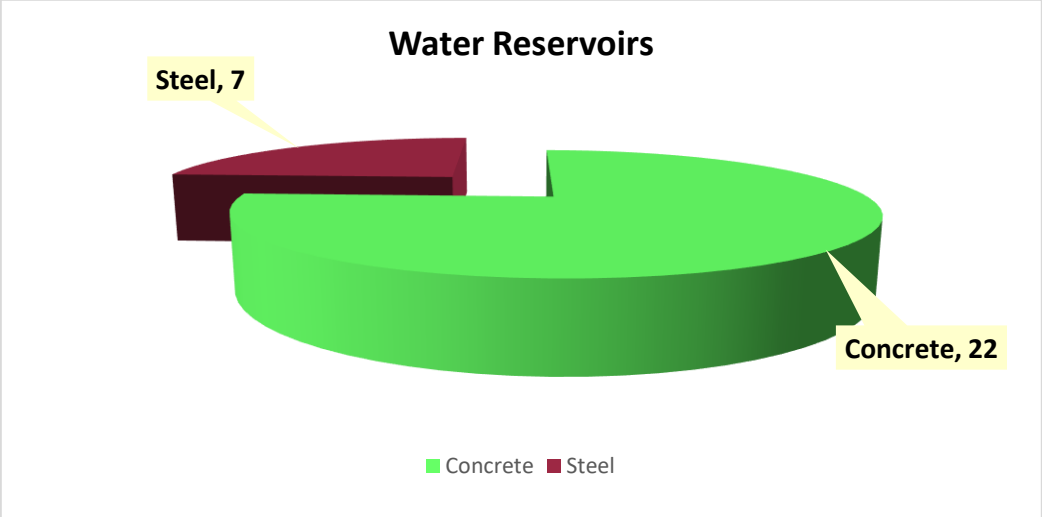


Figure 8 - Reservoir Material

3.3.3 Bulk Water Meters

Council has a network of 52 bulk water meters distributed across the water supply network to assist with demand management and active leakage control. These meters range in size from 100mm to 750mm.

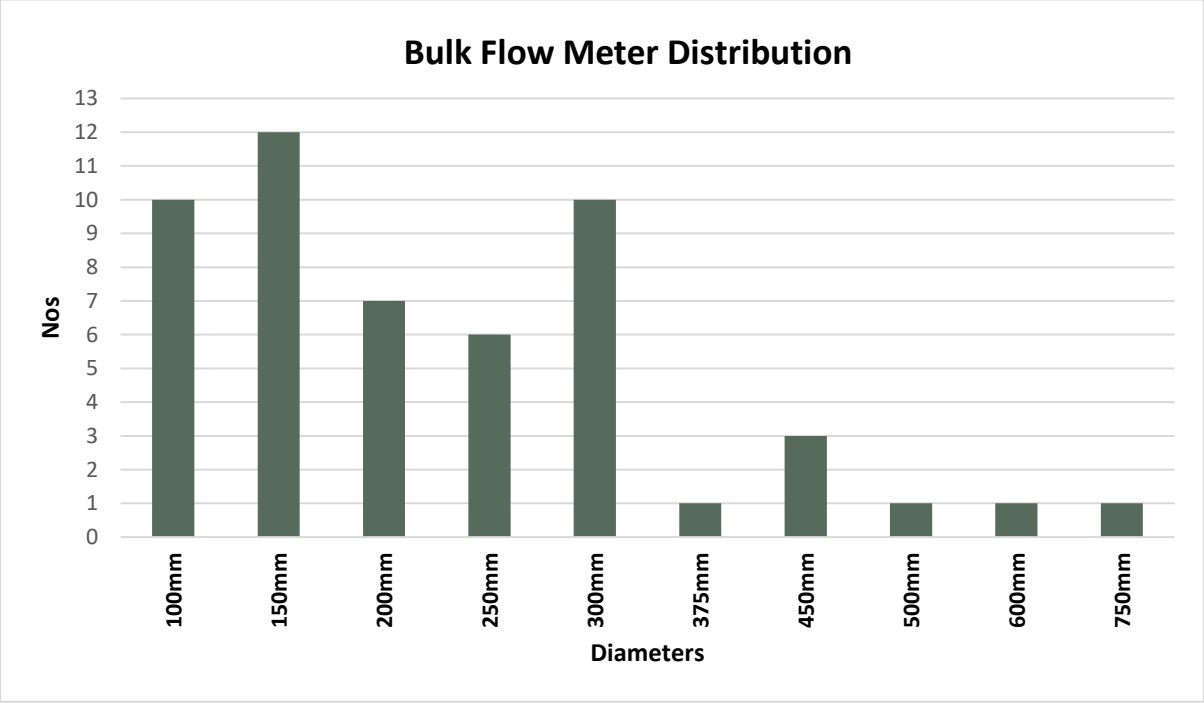


Figure 9 - Bulk Water Meter Sizes

4 Drivers of Level of Service

Levels of Service (LoS) are comprised of four components: provision, renewal, maintenance, and operations. Each LoS is constrained by funding & resource availability, however the fundamental drivers of LoS can be identified in three categories:

- Risk Management
- Community Satisfaction
- Strategies & Masterplans

4.1 Risk Management

Risk is the effect of uncertainty on Council's ability to achieve its objectives. Risk Management is the process of systematically identifying, monitoring, treating, and reporting these risks.

A Risk Assessments has been completed for the asset class, covering generic hazards that are typical across the entire asset network and consideration of Critical Assets.

4.1.1 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified and along with their typical failure mode, and the impact on service delivery, are summarised in Table 6.1. Failure modes may include physical failure, collapse or essential service interruption.

Table 6.1 Critical Assets

Critical Asset(s)	Failure Mode	Impact
Water dams and storages	Loss of supply due to drought, water quality or other Structural failure of dams	Loss of supply, health
Water treatment plants at Wingecarribee and Bundanoon	Power supply, process (water quality), mechanical or electrical	Loss of supply, health (e.g. algal toxins, insufficient disinfection)
Reservoirs	Leak, overflow, water quality, structural failure	Loss of supply, damage to property, reputation
Pumping stations	Power failure, pump electrical or mechanical failure	Loss of supply
Trunk water mains	Main break	Loss of supply, water loss (NRW), reputation
Control valves	Power failure, communications failure	Overflow, pressure and flow increase/decrease, damage to property

Table 4: Critical Assets

4.1.2 Risk Assessment Framework

The below risk matrix categories the risk that Council is exposed to, depending on the consequence, and the likelihood the risk.

Risk (R) Matrix		Consequence (C)				
		Severe	**Major**	**Moderate**	**Minor**	**Insignificant**
Likelihood (L)	**Almost Certain**	Extreme	Extreme	High	High	Moderate
	Likely	Extreme	Extreme	High	Moderate	Moderate
	Possible	Extreme	High	Moderate	Moderate	Low
	Unlikely	High	High	Moderate	Low	Insignificant
	Rare	High	Moderate	Low	Insignificant	Insignificant

Table 5 - Risk Assessment Framework

4.1.3 Risk Assessment

Hazard	Risk	Inherent Risk			Treatment	Residual Risk			Implementation Status	Responsibility	Level of Service
		C	L	R		C	L	R			
Loss of Electricity Power Supply	Wingecarribee Water Treatment Plant stops operation	MAJ	POS	H	Power generators installed at WTP	MIN	POS	M	Current	Assets	Provision
	Water Pump Stations stop operating				Reservoirs should have at least 12 hours reserve MDD storage at their lowest operating range under normal conditions. Fixed generators are installed at critical pump stations: Evans Lane and Oldbury Road. Remaining pump stations have generator connection points for trailer mounted generators				Current	Assets	Operations
Poor condition, asset life and performance data availability.	Poor results as result of non-evidence based decision making	MOD	LIK	H	Adopt approach of continuous improvement, with progressive implementation of Improvement Program (see Section 8)	INS	POS	L	Current	Assets	Operations
Water supply shortage as result of drought conditions	Water supply services compromised	MOD	POS	M	Implement Drought Management Policy (ie water restrictions)	MIN	POS	M	Current	Water Services	Operations
					Review and update Drought Management Policy in collaboration with Water NSW				Future	Assets	Operations
Disruption of water supply due to catastrophic failure of Wingecarribee Dam	Water supply services compromised	SEV	ULIK	H	Prepare Water Supply Resilience Plan to identify a suitable 'Plan B'	MOD	POS	M	Future	Assets	Provision

Hazard	Risk	Inherent Risk			Treatment	Residual Risk			Implementation Status	Responsibility	Level of Service
		C	L	R		C	L	R			
Wingecarribee Water Treatment Plant requires manual operation/intervention for critical components of treatment process. (Requires manual intervention to adjust chemical dosing for any changes in raw water quality, which can often be 24 hours after the change occurred)	Critical steps of treatment process are not completed in accordance with requirements.	MAJ	POS	H	WWTP Upgrade Project. Treatment process will be updated to current standards, including increased automation and flow-based dosing. Treatment capacity increased to 60ML/day to cater for population growth. - 23/24: Options Study - 24/25: Concept Design - 25/26: Detailed Design - 26/27 & 27/28: Construction	MIN	POS	M	Current	Assets	Provision / Renewal
Disruption of water supply due to catastrophic failure of Wingecarribee Water Treatment Plant	Water supply services compromised										
Demand for water supply exceeds treatment capacity	Water supply services compromised										
Residual chlorine exceeding public health guidelines	Public health	MOD	LIK	H	Develop and implement Water Quality Improvement Plan	MIN	POS	M	Current	Assets	Operations
					Undertake water quality modelling				Current	Water Services	Operations
					Install data loggers and on-line monitoring at reservoirs				Future	Assets	Provision
Deferred maintenance (i.e. works that are identified for maintenance activities but unable to be completed due to available resources)	Asset and/or treatment process failure	MOD	LIK	H	Review Water Fund Model and allocation of financial and workforce resources to scheduled maintenance.	MOD	LIK	H	Future	Assets	Maintenance

Hazard	Risk	Inherent Risk			Treatment	Residual Risk			Implementation Status	Responsibility	Level of Service
		C	L	R		C	L	R			
Aging and poor condition critical water mains	High number of critical mains ageing and increased occurrence of breaks – which halts operation of the water supply network	MOD	LIK	H	Update age based condition ratings of water mains	MOD	UNL	M	Future	Assets	Operations
					Implement rolling program of detailed condition assessment on critical water mains				Future	Assets	Operations
					Align investment in asset renewal with annual depreciation.				Future	Assets	Renewal

Table 6: Risk Assessment

4.2 Community Satisfaction

Council's community satisfaction survey is undertaken biennially and tracks Council's performance in service delivery, identifies priority areas and evaluates community attitudes towards customer services, communication and Council as an organisation.

The objectives of the community satisfaction survey process are to:

- Measure the importance of, and satisfaction with, services and facilities provided by Council
- Compare levels of satisfaction for Council's services and facilities with similar councils
- Assist Council in identifying service priorities for the community
- Evaluate Council's customer services and communication

The survey covers facilities and services provided by Council identifying both importance and satisfaction on a 5-point scale, with 1 = low and 5 = high.

The most recent community survey was conducted in 2022, with the results of the prior years also provided for comparison. The following table contains the items relevant to this asset management plan.

	Importance			Satisfaction			2022 Performance gap
	2019	2021	2022	2019	2021	2022	
Town drinking water quality (taste, smell and colour)	4.73	4.72	4.64	3.79	4.07	3.91	14%
Reliability of town water	4.68	4.72	4.70	4.19	4.26	4.18	10%

Table 7: Comparison of Importance and Satisfaction over 2019, 2021 and 2022.

In the table above, the 2022 Performance Gap is the difference between community importance and community satisfaction.

Quality and reliability of the water supply network has consistently been valued of high importance by the community. And the results also show that community satisfaction with this matter is consistently high.

The focus is therefore primarily on maintaining existing service provision.

4.3 Strategies & Masterplans

The third driver of Levels of Service can be broadly grouped as Strategies and Masterplans. Council prepares strategies and masterplans across all asset classes to ensure that network planning, implementation and maintenance is being conducted in a wholistic, considered and effective manner.

A non-exhaustive list of strategies and masterplans that impact the levels of service for the asset base of the Shire is provided in Table 8.

Strategies /Masterplans	Asset Category	Level of Service Influenced	
Integrated Water Cycle	Water dams and storages	Provisional	Planning for Water Treatment Plant and network capacity

Management (IWCM) Strategy	Water treatment plants at Wingecarribee and Bundanoon		improvements to meet future demands. Planning for the extension of water services for new developments and subdivisions
Water Supply Master Plan	Water dams and storages Water treatment plants at Wingecarribee and Bundanoon Reservoirs Pumping stations Water mains Valves & Hydrants	Provisional	Planning for Water Treatment Plant Capacity Improvement to meet future demands. Planning for the extension of water services for new developments and subdivisions
Dam Safety Management Plans	Water dams and storages	Maintenance & Operations	Managing the risk of dam failure
Drinking Water Quality Management (DWQM)	Water dams and storages Water treatment plants at Wingecarribee and Bundanoon Reservoirs	Maintenance & Operations	Implementing a proactive and reactive maintenance program to operate the water supply system, ensuring the supply of safe drinking water in compliance with ADWG (Australian Drinking Water Guidelines)
Risk Management Strategy	Water treatment plants at Wingecarribee and Bundanoon Reservoirs Pumping stations Water mains	Renewals	Ensuring a reliable water supply service by mitigating the risk of failure of critical water infrastructure assets
Asbestos Management Plan	Water mains	Renewals	Ensuring a healthy and safe environment for the community in handling asbestos in water assets
Condition Assessment Strategy	Water treatment plants at Wingecarribee and Bundanoon Reservoirs Pumping stations Water mains Valves & Hydrants Water meters	Renewals	Conducting aged, condition, and risk-based assessments on critical water assets to renew them before reaching the run-to-failure mode.

2023 Economic Review	Water treatment plants at Wingecarribee and Bundanoon Pumping stations Water mains	Provisional /Renewals	Planning Water Treatment Plant Capacity Improvement to meet the 2031 demand targets set in IWCM and ensuring a water supply of 60 ML/DAY to support growth beyond 2051.

Table 8: Strategic plans and Masterplans driving the Level of Service.

5 Levels of Service

Levels of Service (LoS) are comprised of three components: provision, renewal, and maintenance & operations. These three components are best understood in isolation, but an adjustment to one level of service results in changes to others, so they must be considered together.

5.1 Provision Level of Service

The Provision LoS concerning to what standard or ideal Council will endeavour to provide the assets and its function to the community. This LoS will primarily influence decisions around Council's provision to new infrastructure, or in the upgrade of existing infrastructure which fails to meet the provision benchmarks set.

Council's current provision of Water assets is worth a combined $462.5M and provides services for 20,151 dwellings.

Extent of Water Supply Scheme

In accordance with the resolution of Ordinary Council Meeting 17 May 2023, Council will not pursue an extension of the water supply network to areas currently not serviced.

The focus is to therefore continue ensuring the resilience, performance and sustainability of the existing water supply network.

Raw Water Supply

To this end at Ordinary Council Meeting 19 April 2023, Council resolved the following deliverables, which relate to the provision level of service, for the water supply network:

1. *Implementation of Wingecarribee Water Supply Augmentations continue unchanged.*
2. *Operation and maintenance of the Bundanoon water supply system, minor upgrades and renewals at the Bundanoon Water Treatment Plant (WTP) and Werai Water Pump Station (WPS) are continued to be undertaken until such time that the following projects are completed:*
    a. *Wingecarribee WTP Process Improvement and 2031 Augmentation;*
    b. *Wingecarribee WTP to Moss Vale pipeline;*
    c. *Moss Vale Reservoir Duplication; and*
    a. *Renewal of transfer pipeline Moss Vale to Exeter.*
3. *Upon completion of the above projects the Bundanoon raw water supply, treatment plant and Werai WPS are decommissioned.*
4. *A qualified and experienced consultant is engaged to prepare a contingency plan in the unlikely event of total failure of Wingecarribee Dam.*

Water Supply in New Developments

The Provision LoS for new subdivisions & development is that which is stipulated in the documents which govern it, namely Council's:

- Local Environmental Plan
- Local Housing Strategy
- Local Strategic Planning Statement
- Development Control Plans
- Engineering Design and Construction Specifications
- Developer Contribution & Servicing Plans
- Water and wastewater Modelling Design Standards

Performance of Water Supply Scheme

Council has adopted the performance standards for the Water Supply network as detailed within the Modelling Design Standards – which are available on the Council website.

These standards provide a design criteria for:

- Demand factor to used within models
- Operating Pressures
- Minimum Pipe Diameters
- Fire Flow
- Flow velocity and head loss
- Reservoir Storage

Properties for which Council cannot meet these operating pressures, a 50% rebate on the water access charge is available.

5.2 Renewal Level of Service

The Renewal LoS defines how often Council intends to replace existing assets with a Modern Engineering Equivalent Replacement Asset (MEERA), including disposal of the existing asset.

This renewal frequency is termed 'useful life' and adjusting this value has significant implications for annual depreciation, with asset useful being a direct factor in its calculation. Annual investment in the capital renewal of assets should ideally equate to the value of annual depreciation. Although asset degradation and failure will not follow a straight line across financial years, failure to maintain asset renewal at the rate of annual depreciation will result in an overwhelming volume of renewal works in later years.

Adjustments to asset useful like also has impacts on required maintenance and operations expenditures. Shorter useful lives generally result in less required maintenance, all other factors being equal and vice versa.

The below table includes the asset renewal lives for assets in the water Asset Class. These useful lives are currently stored in the Conquest Asset Management System

Asset Category	Useful life (Years)
Water Bulk Meters	15
Water Source Dams	3-80
Water Hydrants	60
Water Mains - AC	80
Water Mains - DI	100
Water Mains - CI	60
Water Mains - PVC	100
Water Meters	15
Water Pump Stations	20
Water Reservoirs	3-80
Water Service Lines	60

Water Treatment Plants	3-80
Water Filling Stations	20-70
Water Valves	50-60

Table 9: Water Asset Useful Lives.

The intent is therefore that water assets will be renewed prior to exceeding their designated useful life. However, renewal works will also be based on asset condition. When an asset is found to be of Condition 4 or 5 it will then be programmed for renewal within the Capital Works program.

The following charts provide a comparison of asset category and their respective useful life.

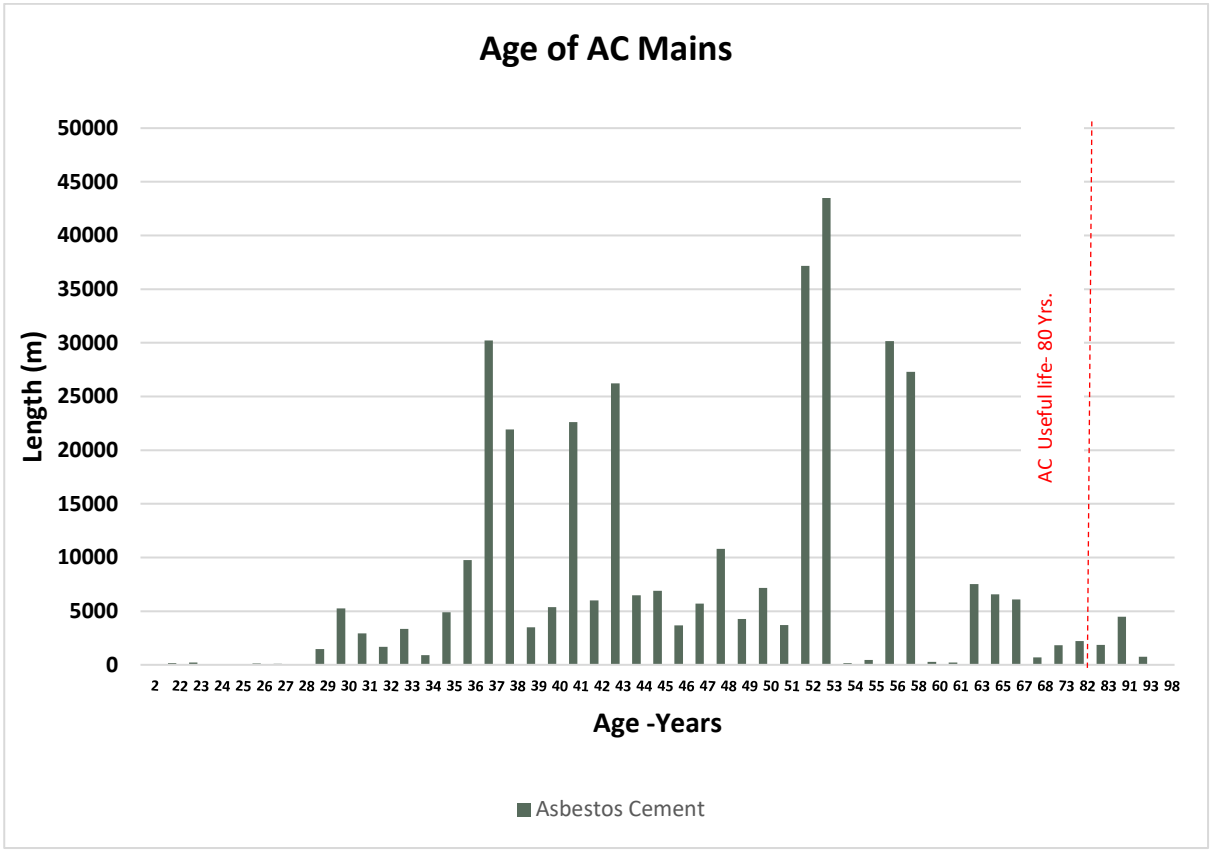


Figure 10 - Analysis of AC Main Useful Life

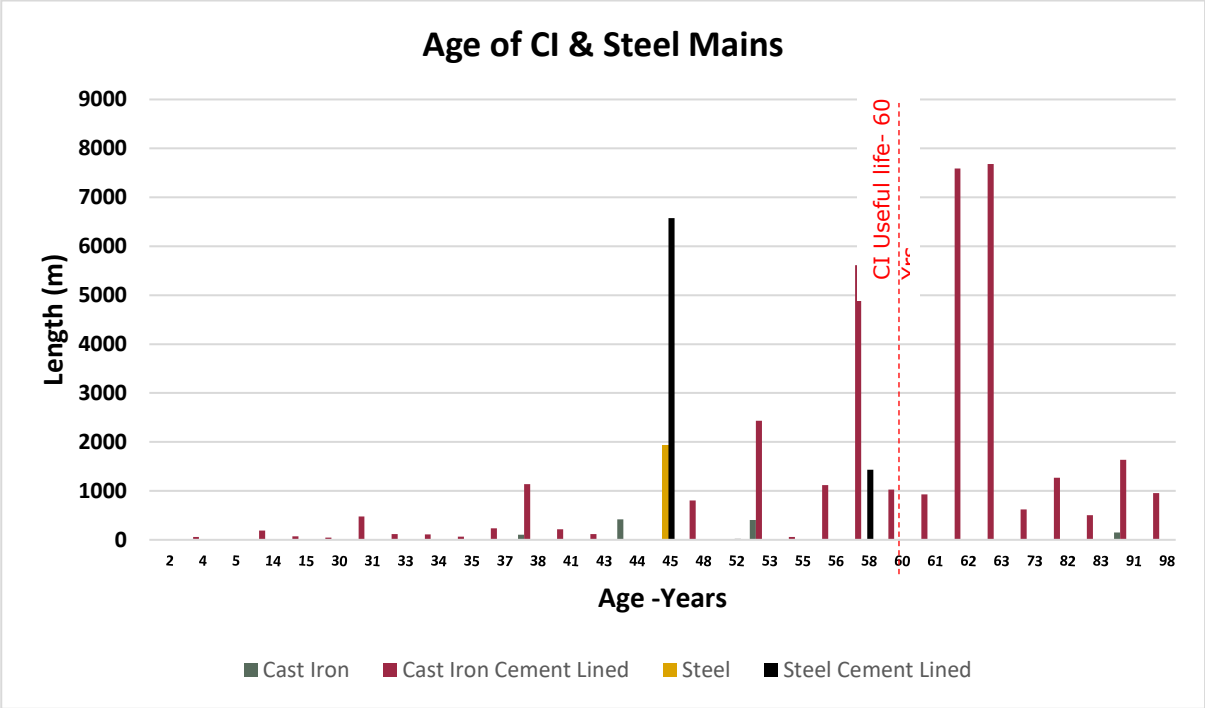


Figure 11 - Analysis of Steel Main Useful Life

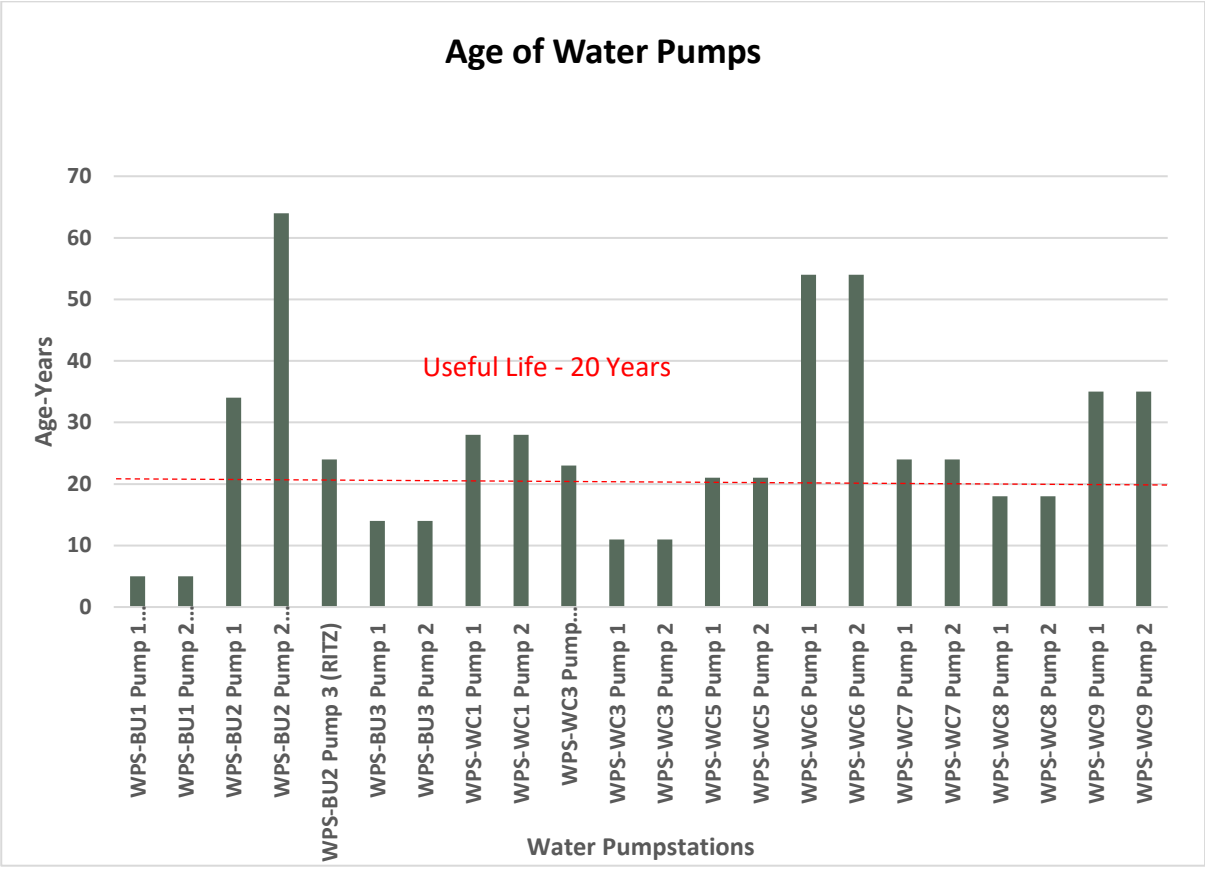


Figure 12 - Analysis of Water Pump Useful Life

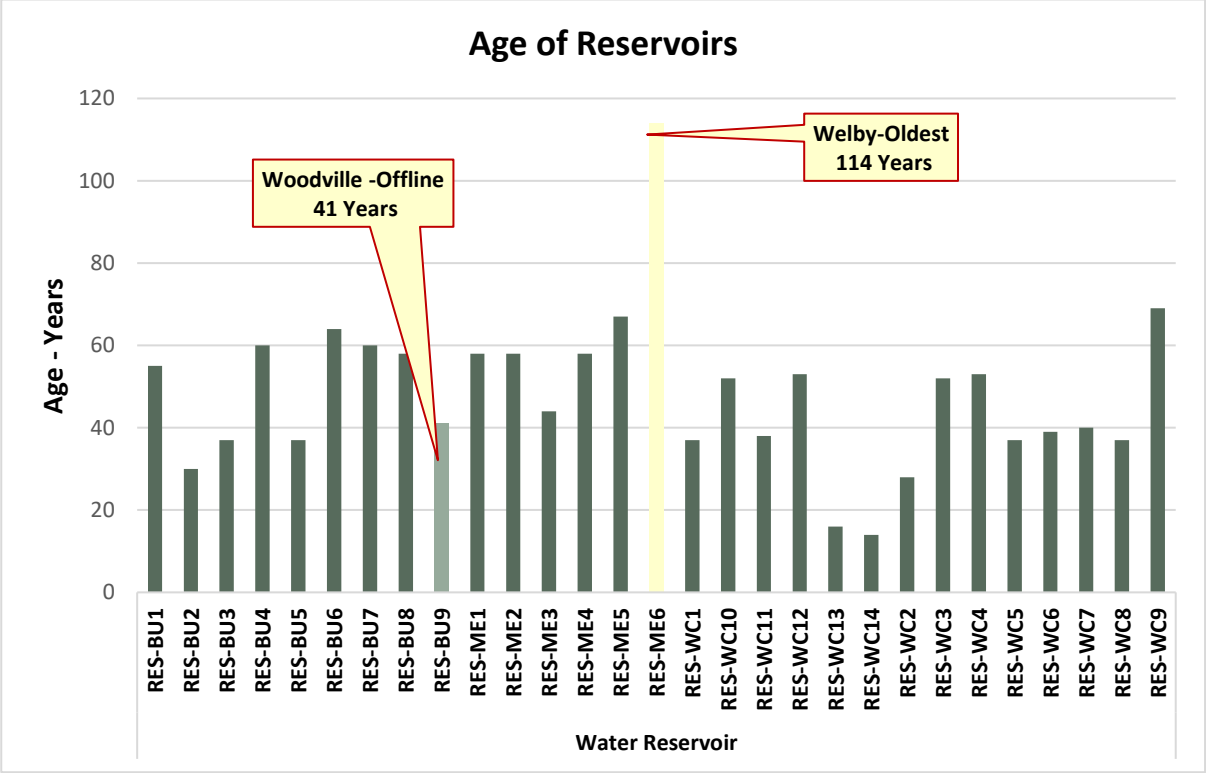


Figure 13 - Analysis of Water Reservoir Useful Life

5.3 Maintenance & Operations Level of Service

Maintenance and operation activities are completed in both a proactive and reactive fashion across the asset network. Many operational activities by their nature are more readily able to be scheduled and completed in a timely & controlled way. Maintenance activities are more difficult to deliver in scheduled fashion, with mature systems and full resourcing required to do so.

Maintenance and operations level of service will be provided under two categories: inspections and maintenance.

5.3.1 Inspections

Asset condition assessments involve periodically monitoring assets and utilizing the collected inspection data to determine their condition align with Council's Condition Assessment Strategy – April 2020. Appendix-A. Analysis of this data may reveal the need for preventative maintenance to ensure that assets meet their expected useful life or require replacement if they have reached the end of their lifespan.

- **Dams**

  Council-owned dams are managed in compliance with the Dam Safety Regulations 2019. All periodic inspections and condition assessments are conducted in accordance with the Council's Dam Safety Management System (DSMS), which is adopted by Dam Safety NSW.

- **Reservoirs**

  All reservoirs are inspected in every 4 years. This includes identifying maintenance,

structural intervention and safety and security priorities in accordance with the Council's Drinking Water Management System (DWQMS).

- **Bundanoon WTP**

Asset System	12 M	3 M	3M	6 M	6M	9 M	Reactive	Grand Total
Backwash System	8	12		7				27
Chemical Dosing	11	31		13		1	4	60
Clear Water Processing		2		2			1	5
Compressed Air		11		7			1	19
DAF System	6	8	3	5	2			24
Filter	2	2		5				9
Laboratory		1					13	14
Pump Station - WPS BU4 Clear Water	6	12		5			1	24
Raw Water Headwork's	1	10	1	7				19
Site	1	2		5			5	13
Sludge Lagoon	1	8		1				10
Structures	1							1
Telemetry Unit	3			3				6
Treatment Plant Controls	12						6	18
WPS-BU3 Bundanoon #3, Green Hills Rd Raw Water	9	13		6			1	29
WTP Power Lines, WPS-BU3 Bundanoon #3, Green Hills Rd Raw Water	1							1
WTP Transformers, WPS-BU3 Bundanoon #3, Green Hills Rd Raw Water	3							3
Grand Total	**65**	**112**	**4**	**66**	**2**	**1**	**32**	**282**

Figure 14 - Bundanoon WTP Inspection Schedule

- **Wingecarribee WTP**

Asset System	1 M	12 M	3 M	6 M	9 M	Reactive	Grand Total
All Systems						1	1
Backwash System		10	7	25			42
Chemical Dosing		5	18	55	1	2	81
Clear Water Processing		1	2	1		2	6
Compressed Air		6	3	19			28
DAF System		6	6	24			36
Drying Beds			11				11
Filter		2	4	5		1	12
Laboratory		4	1			9	14
Raw Water Headwork's		1	1	19			21
Site	1	2	2	12		2	19
Sludge Lagoon		2	8	2			12
Telemetry Unit		2		3		1	6
Treatment Plant Controls		10				4	14
WPS-WC10 Clear Water		5	6	15			26
WPS-WC9 Wingecarribee #9, Treatment Plant Raw Water		8	8	14		2	32
Grand Total	**1**	**64**	**77**	**194**	**1**	**24**	**361**

Figure 15 - Wingecarribee WTP Inspection Schedule

- **Water Pumpstations**

Water Pumpstat	12M	Grand Total
Bundanoon Network	1	1
Medway Network	1	1
WPS-BU1	1	1
WPS-BU2	1	1
WPS-BU3	1	1
WPS-BU4	1	1
WPS-ME1	1	1
WPS-WC1	1	1
WPS-WC10	1	1
WPS-WC11	1	1
WPS-WC2	1	1
WPS-WC3	1	1
WPS-WC4	1	1
WPS-WC5	1	1
WPS-WC6	1	1
WPS-WC7	1	1
WPS-WC8	1	1
WPS-WC9	1	1
Grand Total	**18**	**18**

Figure 16 - Pump Stations Inspection Schedule

- **Mains**
  Critical water mains are reviewed annually, with programming of condition assessment determined by the number of pipe failures in recent years, including pipe breaks and leaks at joints. These inspections involve field tests on the pipeline to assess its condition and identify known features and anomalies, such as blockages, air pockets, and wall thickness deterioration.
- **Valves**
  Valves are currently inspected on a reactive basis due to a lack of resources, but plans are underway to establish a proactive inspection regime for critical valves on a priority basis.
- **Hydrants**
  Currently, inspections and flushing are carried out on a reactive basis due to a lack of resources, but plans are underway to establish a proactive inspection and flushing regime for critical hydrants.

The condition assessment of other aboveground water treatment plant and pump station assets is carried out every 5 years during the asset revaluation process. The condition of underground assets such as water mains, valves, and hydrants are assessed annually based on age during asset valuation.

5.3.2 Maintenance

Maintenance concerning the essential activities required to keep existing assets functioning to their design capacity and performance. This LoS will combine activities which are either proactive (i.e. scheduled, cyclical activities) that are carried out before service delivery is compromised, or reactive which are carried out after service delivery is compromised due to wear, malfunction or breakage.

The operation concern to the day-to-day activities that are required to ensure the asset is kept in a functional state so that it can provide its service delivery to community. Operational activities are often active processes of utilising an asset which will consume resources such as manpower, energy, chemicals and materials.

Activities are completed in both a proactive and reactive fashion across the asset network. Many operational activities by their nature are more readily able to be scheduled and completed in a timely & controlled way. Maintenance activities are more difficult to deliver in scheduled fashion, with mature systems and full resourcing required to do so.

Asset Class	Annual Maintenance & Operations Budget
Pumping Stations	$284,012
Reservoirs	$256,071
Reticulation Network	$2,707,553
Treatment	$771,039
Treatment - Bundanoon Dam	$527,016
Treatment - Medway Dam	$93,564
Treatment - Wingecarribee Dam	$2,426,910
Total	*$7,066,165*
Annual Maintenance as % of Asset Value	*1.5%*

Table 10 - Asset Class Maintenance

6 Asset Base Growth

Council's asset base will expand over the next 10 years through committed and expected new & upgrade expenditure, assets contributed by development through conditions of consent, and the Developer Contributions & Servicing Plans. This growth can be decreased through asset disposals; however, no significant disposals are currently committed.

In this analysis, all future asset values, as well as planned and recommended expenditures, assume indexation rate of 3.0% per annum.

6.1 New & Upgraded Assets and Developer Contribution

The new and upgrade asset projects category covers those projects resourced by Council or grant funding that involve existing assets being enhanced or new assets being constructed.

An important funding source for new infrastructure are Development Contributions collected under Section 64. These contributions fund a significant proportion, though not all, of the infrastructure required by new development.

Council currently primarily levies contributions through the following Plans:

- Southern Highlands Innovation Park (SHIP) Plan
- Water & Sewer Development Servicing Plan

The Integrated Water Cycle Management Plan (IWCM) provides guidance as to the expenditure of the overall Water Fund and Section 64 contributions and forms the starting point for the 2024/25 to 2027/28 Capital Works Program.

The following table provides a summary of the new/upgrade components of projects within the 2024/25 to 2027/28 Capital Works Program and the works program within the IWCM has been used for the remaining years of the planning period.

Financial Year	Project Name	New/ Upgrade Component
2024/25	Water pump station renewals or upgrades	$50,000
2024/25	Water private works - new meters and connections	$200,000
2024/25	WWTP Major improvements	$300,000
2024/25	Master Plan - East Bowral PMA inlet and elec actuated control valve upgrade	$500,000
2024/25	Master Plan - Bowral to Moss Vale 450mm duplication	$400,000
2024/25	Water SCADA System minor works	$75,000
2024/25	Moss Vale Hill Road Reservoir Duplication	$2,000,000
2024/25	Water Supply Zone Control Valves	$500,000
2024/25	Reservoir Gas chlorination	$300,000
2024/25	Eridge Park Booster WPS	$350,000
2024/25	Northern Villages Distribution Main Duplication - Stage 1A	$800,000
2024/25	Water reticulation and service improvements	$50,000
2024/25	Critical Water Main Renewal Design	$150,000
2024/25	Moss Vale Hill Road Reservoir Duplication	$3,000,000
2025/26	East Bowral PMA inlet upgrade and zone control valve	$500,000
2025/26	Moss Vale Trunk Main Duplication (Master Plan)	$9,000,000

2025/26	Private works - meters and services	$200,000
2025/26	Water Main Duplication - Yerrinbool	$300,000
2025/26	Water reticulation improvements	$50,000
2025/26	Wingecarribee WTP augmentation 60ML	$3,750,000
2026/27	Northern Villages Distribution Main Duplication - Stage 3	$1,398,481
2026/27	Water Main Duplication - Yerrinbool	$4,124,612
2026/27	Moss Vale Trunk Main Duplication (Master Plan)	$6,700,000
2026/27	Wingecarribee WTP augmentation 60ML	$7,500,000
2027/28	Northern Villages Distribution Main Duplication - Stage 1B	$2,756,000
2027/28	Water Main Duplication - Hill Top	$300,000
2027/28	Wingecarribee WTP augmentation 60ML	$11,250,000
2028/29	Integrated Water Cycle Management Plan	$2,806,250
2029/30	Integrated Water Cycle Management Plan	$3,193,750
2030/31	Integrated Water Cycle Management Plan	$1,193,750
2031/32	Integrated Water Cycle Management Plan	$1,193,750
2032/33	Integrated Water Cycle Management Plan	$1,193,750
2033/34	Integrated Water Cycle Management Plan	$1,833,750

Table 11:New and Upgraded Assets

6.2 Assets Contributed by Development through Conditions of Consent

As development occurs, particularly within the new living areas identified within the Wingecarribee Local Housing Strategy, it is intended that infrastructure be provided at a rate consistent with the Provision LoS in existing parts of the Wingecarribee Local Government Area.

With the Wingecarribee Local Housing Strategy setting an objective of a 50:50 split of infill and greenfield development, it is therefore forecast that annual asset base growth from greenfield development will be 50% of the annual population growth.

Reviewing the rate of contributed assets across 2021/22 and 2022/23, it is observed that the value of contributed assets is equivalent to 30% of this forecast population growth from greenfield development. Which is understood to be the result of assets contributed through this method generally being of a non-major nature. (eg sewer pipelines will be contributed through a development, but not another sewage treatment plant).

Financial Year	Population	Population Growth (from previous year)	Forecast Asset Base Growth
2023/24	53,700	0.9%	0.16%
2024/25	54,270	1.1%	0.16%
2025/26	54,913	1.2%	0.16%
2026/27	55,521	1.1%	0.16%
2027/28	56,145	1.1%	0.17%
2028/29	56,789	1.1%	0.17%
2029/30	57,439	1.1%	0.16%

2030/31	58,101	1.2%	0.16%
2031/32	58,762	1.1%	0.16%
2032/33	59,425	1.1%	0.18%

Table 12 - Forecast.ID Population Growth

6.3 Asset Disposals

Asset disposals entail the removal of an existing asset without replacing it with a similar asset.

In accordance with the resolution of Ordinary Council Meeting 19 April 2023, the following assets are noted within the Asset Base Growth assessment as disposal:

Financial Year	Asset Description	Value
2032/33	Bundanoon Water Treatment Plant and Raw Water Main	$13M
2032/33	Water Main - Bundanoon Water Treatment Plan to Werai Pump Station	$10M

In accordance with the resolution of Council and water supply source strategy, Bundanoon WTP and water main from Bundanoon Dam to Werai Pump Station will not be renewed. And so their depreciation does not need to be offset with asset renewal expenditure.

It will however be determined at a later date as it if these assets are to be demolished onsite or, similar to the approach adopted for the old Medway Dam Water Supply, the usage of the assets just halted.

6.4 Asset Indexation

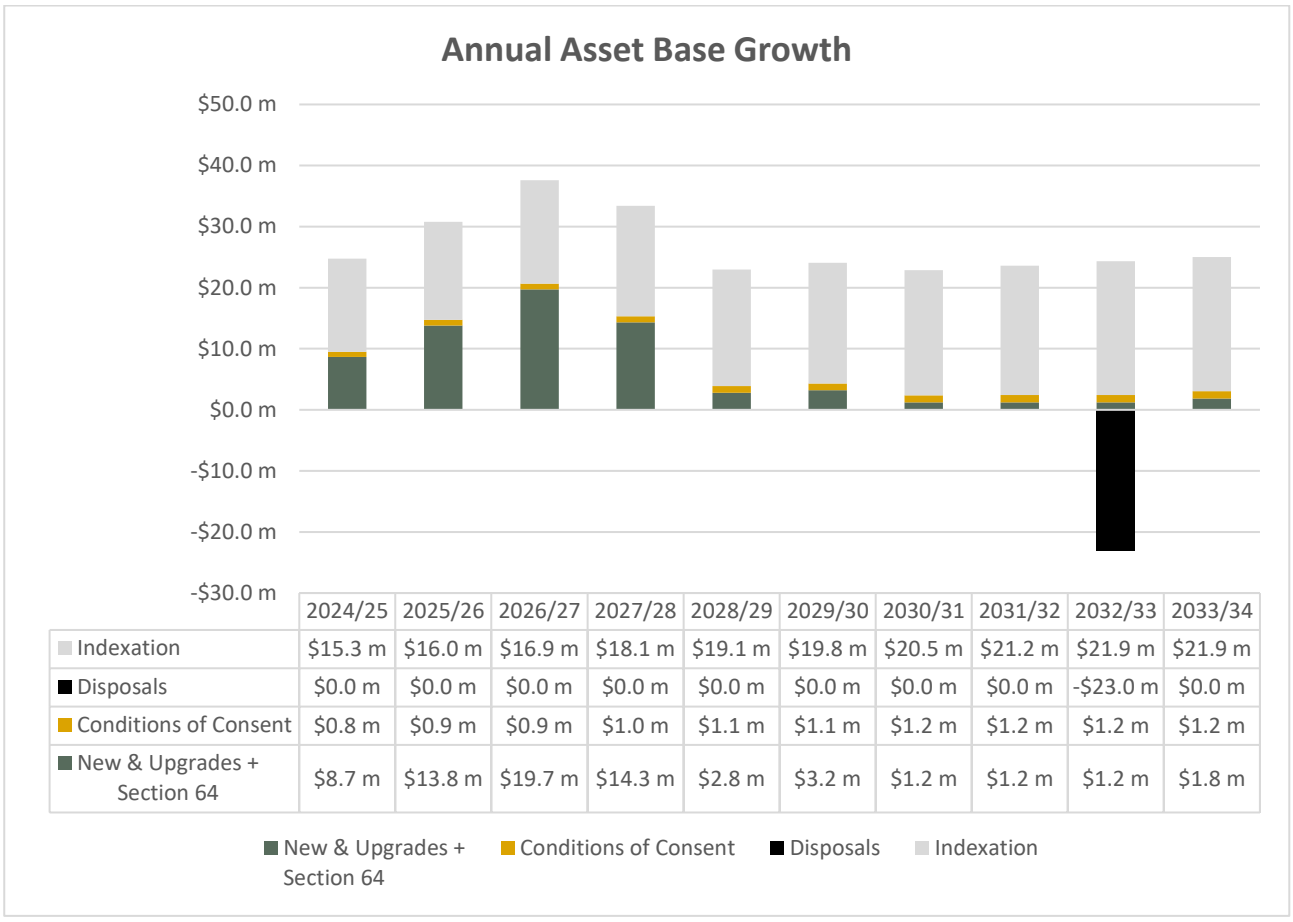
Indexation rate of 3.0% p.a has been applied across the 10-year forecast period. This aligns with the indexation rate adoption in the LTFP. The same rate has been adopted in this AMS to ensure that lifecycle costs and associated budgets are comparable in future financial years.

6.5 Asset Base Growth

Total asset base growth is comprised these components:

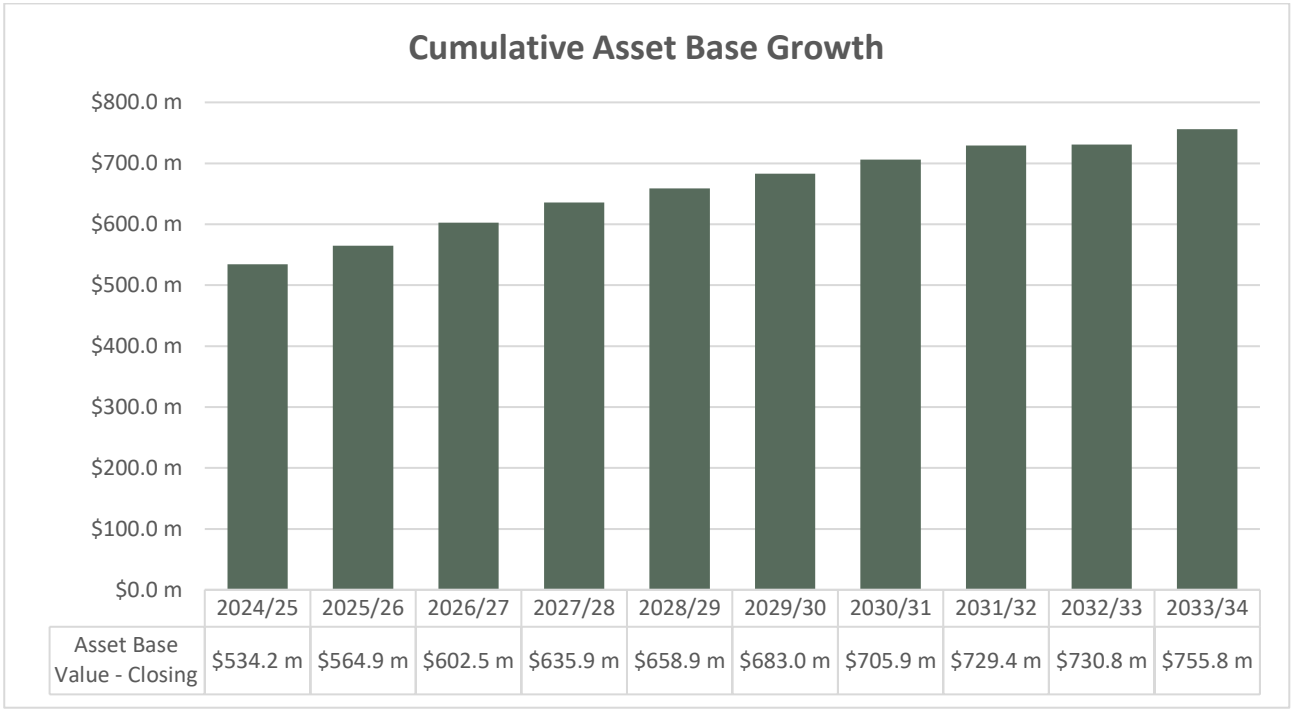
- Asset upgrades
- Assets contributed by development through conditions of consent.
- Development Contributions
- Subtracting asset disposals
- Indexation

Following graphs shows this forecast asset base growth of $246M over 10 years, with the majority of the growth attributed to indexation.



	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Indexation	$15.3 m	$16.0 m	$16.9 m	$18.1 m	$19.1 m	$19.8 m	$20.5 m	$21.2 m	$21.9 m	$21.9 m
Disposals	$0.0 m	$0.0 m	$0.0 m	$0.0 m	$0.0 m	$0.0 m	$0.0 m	$0.0 m	-$23.0 m	$0.0 m
Conditions of Consent	$0.8 m	$0.9 m	$0.9 m	$1.0 m	$1.1 m	$1.1 m	$1.2 m	$1.2 m	$1.2 m	$1.2 m
New & Upgrades + Section 64	$8.7 m	$13.8 m	$19.7 m	$14.3 m	$2.8 m	$3.2 m	$1.2 m	$1.2 m	$1.2 m	$1.8 m

Figure 17: Annual Asset Base Growth – Factors



	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Asset Base Value - Closing	$534.2 m	$564.9 m	$602.5 m	$635.9 m	$658.9 m	$683.0 m	$705.9 m	$729.4 m	$730.8 m	$755.8 m

Figure 18: Cumulative Asset Base Growth

7 Financial Lifecycle Forecast

The Council assets described in Section 3, with the asset base growth forecast in Section 6, require resourcing across their lifecycle in order to achieve the LoS contained in Section 5.

The two main components are renewal expenditure, and maintenance and operations expenditure, which sum together to give the recommended overall expenditure on Council assets over the next 10 years.

7.1 Renewal Forecast

To ensure that satisfactory condition is maintained across the asset base and the Infrastructure Backlog Ratio benchmark is achieved, capital renewal works should be undertaken when assets reach the end of their useful lives. These capital renewal works involve disposing of the existing asset and constructing the MEERA.

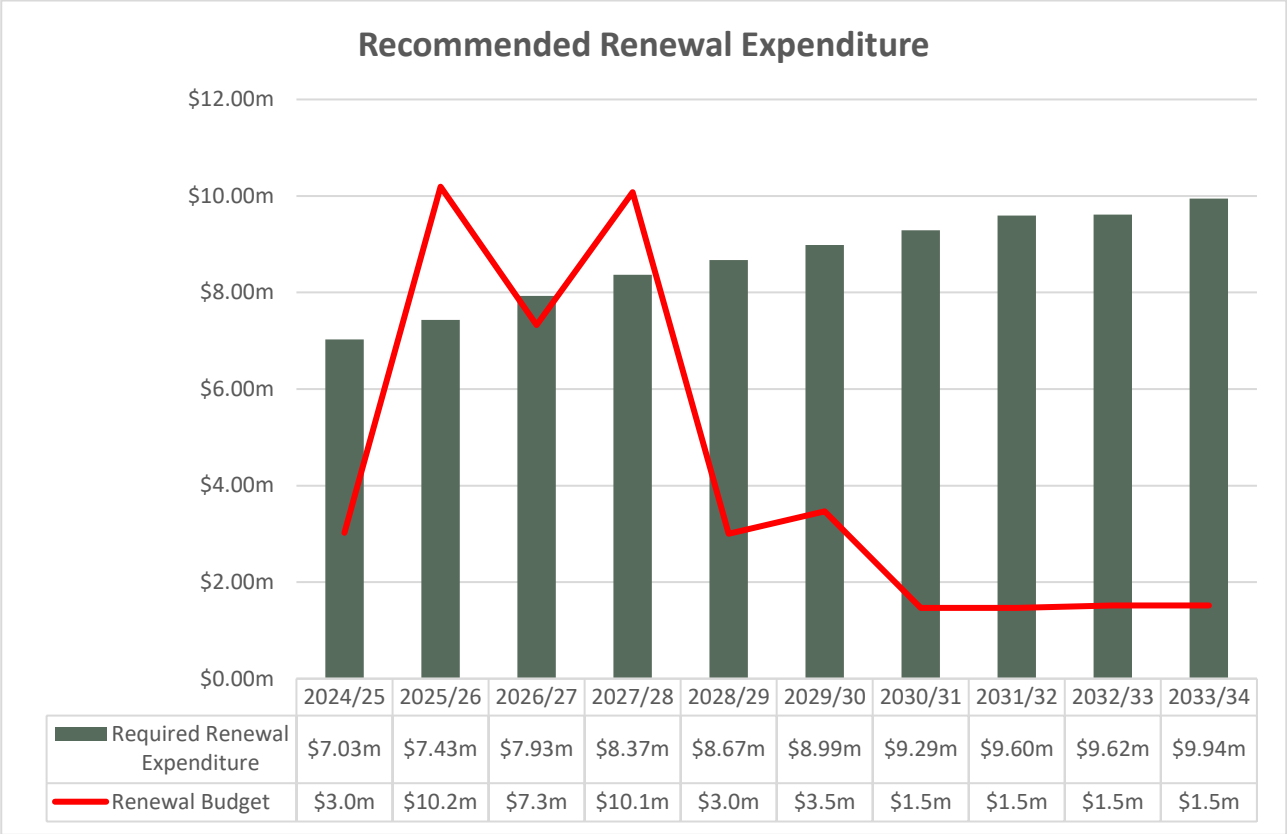
However, if the expiry of useful lives or asset conditions are solely relied upon to inform these recommended renewals, annual budgets fluctuate significantly, which creates difficulties from a resourcing perspective. Rather, it is better practice to average out the recommended renewal expenditure in order to reduce annual fluctuations. When future Delivery Programs are prepared, actual allocations to each asset class may vary depending upon the scale of individual projects.

The required renewal expenditure across the 10-year period is therefore forecast to be $87M. The Long Term Financial Plan is unfortunately not able to accommodate the entirety of this desired asset renewal budget. This is largely as result of the funding model for the Water Fund not being structured such that asset renewal aligns with asset depreciation. This will therefore be a key parameter included within an update of the Water Fund model in 2024/25.

Figure 9 shows the renewal budget featured in the Capital Works Program and Long Term Financial Plan, as well as the required renewal expenditure to align with asset depreciation. The Capital Works Program and Long Term Financial Plan currently only accommodates $43M of water asset renewal.

This shortfall in asset renewal investment will result in a deterioration of asset condition and heighten future asset renewal investment requirements.

In response to this, a review of the Water Fund model will be undertaken in 2024/25 to ensure that financial sustainability can be achieved for the asset class.



	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
Required Renewal Expenditure	$7.03m	$7.43m	$7.93m	$8.37m	$8.67m	$8.99m	$9.29m	$9.60m	$9.62m	$9.94m
Renewal Budget	$3.0m	$10.2m	$7.3m	$10.1m	$3.0m	$3.5m	$1.5m	$1.5m	$1.5m	$1.5m

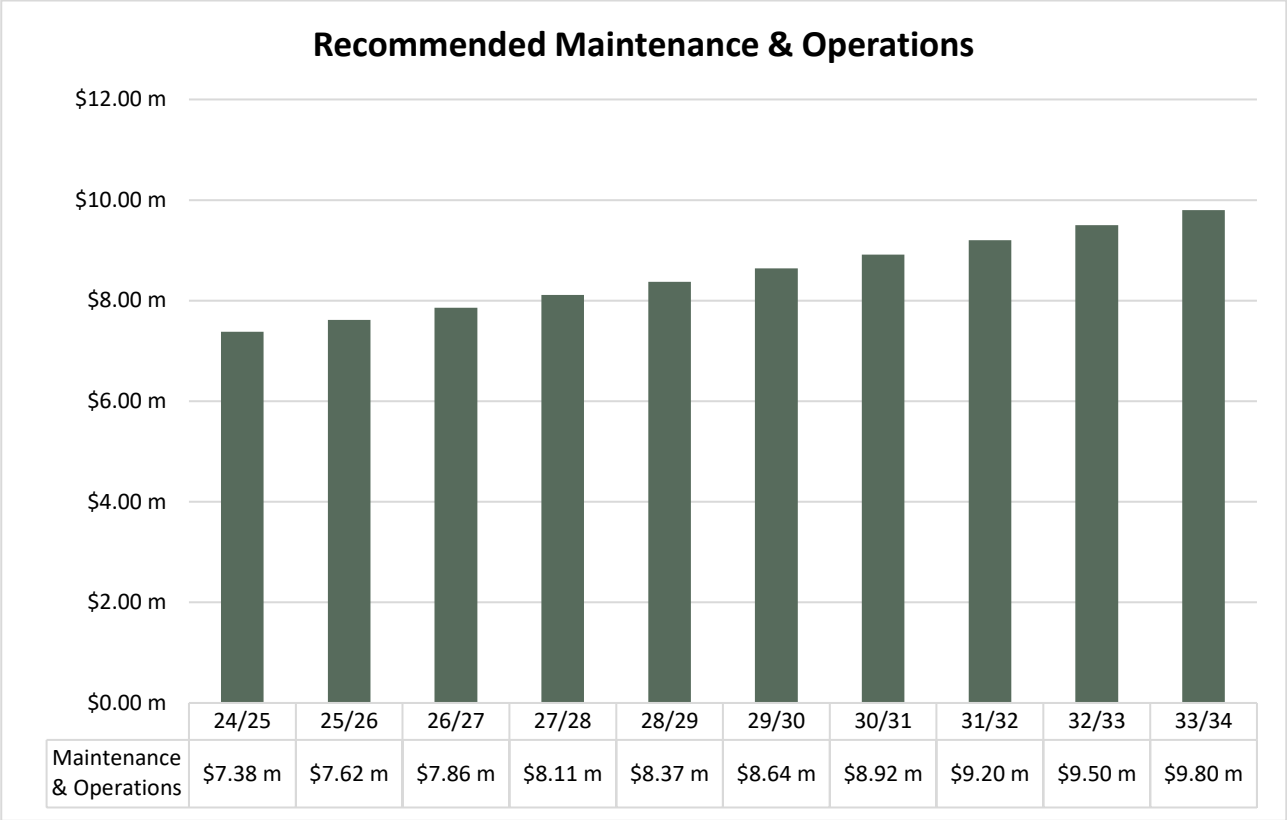
Figure 19: Recommended Renewal Expenditure, measured in millions of dollars.

7.2 Maintenance & Operations Forecast

To sustain the current Maintenance and Operations Level of Service whilst accommodating a growing asset base, annual maintenance & operations budget increases are required. The required maintenance and operations expenditure across the 10-year period is therefore forecast to be $100M.

The Long Term Financial Plan is unfortunately not able to accommodate the entirety of this desired maintenance and operations budget. This is largely as result of the funding model for the Water Fund not being structured such that maintenance and operations funding increases in line with asset base growth.

This will therefore be a key parameter included within an update of the Water Fund model in 2024/25.



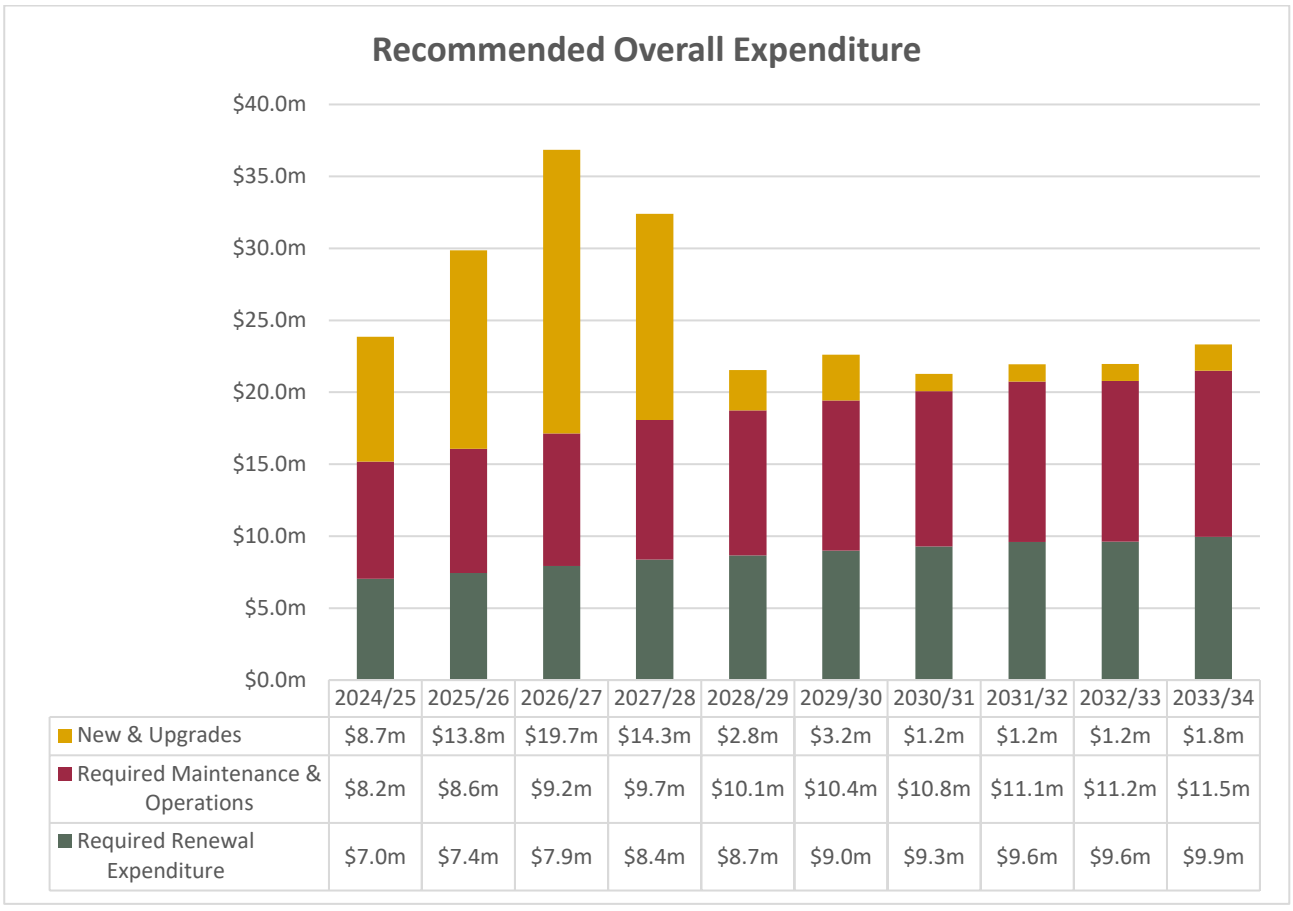
	24/25	25/26	26/27	27/28	28/29	29/30	30/31	31/32	32/33	33/34
Maintenance & Operations	$7.38 m	$7.62 m	$7.86 m	$8.11 m	$8.37 m	$8.64 m	$8.92 m	$9.20 m	$9.50 m	$9.80 m

Figure 20 Recommended Maintenance & Operations.

7.3 Overall Forecast

The recommended overall expenditure is a combination of the new, upgrades & developer contributions from Section 6 and the recommended renewal, maintenance & operations expenditure from Section 7. Resulting in an overall recommended expenditure of $256M over 10 years as depicted in Figure 15.

It is however acknowledged that the full extent of this recommended expenditure cannot be accommodated within the Long Term Financial Plan. Future iterations of the Asset Management Plan will further investigate and identify potential solutions.



	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34
New & Upgrades	$8.7m	$13.8m	$19.7m	$14.3m	$2.8m	$3.2m	$1.2m	$1.2m	$1.2m	$1.8m
Required Maintenance & Operations	$8.2m	$8.6m	$9.2m	$9.7m	$10.1m	$10.4m	$10.8m	$11.1m	$11.2m	$11.5m
Required Renewal Expenditure	$7.0m	$7.4m	$7.9m	$8.4m	$8.7m	$9.0m	$9.3m	$9.6m	$9.6m	$9.9m

Figure 21: Recommended Overall Expenditure, measured in millions of dollars.

8 Improvement Plan

Asset Planning is a journey of continuous improvement with there always being opportunities to further improve the accuracy of asset data, better understand community needs & expectations and more efficiently meet the service needs of the Shire. The below items are specific improvements that can be made to this document as well as the operation of Council.

No	Task	Responsibility	Timeline
1	Update GIS mapping layers with records of watermain failures and inspections	Assets	2024/25
2	Review construction year data and subsequent age based condition calculations	Assets	2024/25
3	Review and update Water Fund model	Assets	2024/25
4	Prepare Water Supply Resilience Plan	Assets	2024/25
5	Implement Technology One Strategic Assets Module	Assets	2024/25
6	Undertaking water system audit including water meter testing (bucket testing) and calibration.	Assets	2025/26
7	Develop and implement program for inspection and audit of bulk meters for detecting water loss.	Assets	2025/26
8	Linking Maintenance works to Asset Register and GIS layer.	Assets	2025/26
9	Update valuation methodology of assets from modrates to unit rates	Assets	2025/26
10	Comprehensive Valuation	Assets	2026/27
11	Formalise documentation of inspection and maintenance works.	Assets	2025/26
12	Analyse and identify risks and opportunities for water quality performance to ensure licence conditions are met.	Assets	2026/27
13	Review and update Shirewide Water Masterplan	Assets	2026/27

Table 13: Improvement Plan