

# Riverina Water County Council

## Asset Management Plan



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## Document control

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## Executive Summary

### General

Riverina Water County Council's (RWCC) asset management plan has been developed to describe how Riverina Water manages its assets to meet its responsibilities in a sustainable way.

This asset management plan is a key component of an asset management system comprised of the policy, strategy and plan. The main purpose of the asset management plan is to provide a blueprint to operate and maintain physical assets over their entire life cycle. Thereby achieving the current and in the future levels of service (LOS) at the lowest sustainable cost, while satisfying regulatory requirements.

RWCC is responsible for the water supply functions within the local government areas of Wagga Wagga City Council, Lockhart Shire Council, Federation Council and parts of the Greater Hume Shire Council areas. Riverina Water's system is divided into the three major systems of Wagga Wagga, Southern Trunk and Western Trunk. There are also eight independent systems operated by RWCC, those being Tarcutta, Humula, Woomargama, Morundah, Walbundrie/Rand, Collingullie, Oura and Holbrook.

Riverina Water's main water supply assets include:

- Water source works including water supply bores
- Treatment plants
- Reservoirs
- Pumping stations
- Water mains (including distribution, rural and reticulation)
- Land & Buildings
- Plant and Equipment

### Levels of Service (LOS)

Riverina water has defined LOS that explicitly define the standards required for the water supply system from the perspective of the individual customer. RWCC's goals for the LOS are:

- To provide water supply to customers in accordance with acceptable LOS
- To build on reputation as a leading water utility
- To offer a comprehensive service in the location, treatment, storage, movement and delivery of water and associated services.

RWCC's levels of service are included in Section 2.2.

### Life Cycle Management and Asset Condition

RWCC has an up to date asset register in the database software AssetFinda. This database is integrated with RWCC's Geographic Information System (GIS) and provide live update of spatial data integration. Asset condition ratings and asset maintenance data assist RWCC with decisions relating to asset condition and expected renewal or replacement programs.

### Operations and Maintenance Plans

The General Manager and Director of Engineering are responsible for Riverina Water's asset development, operation, and maintenance.

The aim of the operation and maintenance plan is to ensure that the service objectives are achieved at the least cost and that the impact of breakdowns or outages is minimised. Council has developed draft O&M Manuals for most of their Water Treatment Plants.

RWCC has developed maintenance management systems and has systems in place for organising and recording scheduled maintenance. Unscheduled maintenance is carried out in response to customer complaints, alarms, or requests from operators.

### **Capital Works Plan**

RWCC has developed a 30-year capital works program and maintains a significant annual investment in capital works. The estimated investment over the next 30 years is \$554 M; 59% of this amount is for renewal, 16% is to serve growth and 25% for improving levels of service.

### **Risk and Criticality**

This Asset management plan applies risk assessment as a tool to assess the importance of major assets to meet the LOS. A high-level asset criticality assessment process has identified the critical asset systems prioritised on likelihood and consequence of system failures causing LOS impacts.

### **Financial considerations**

To maintain a sustainable long-term approach to assets planning requires preparation of long-term financial plans.

The asset status is the ratio of the depreciated value of the asset to their replacement cost. In 2020/21 asset status of the Council assets is 58%. RWCC is planning to invest \$329 Million in renewals during the next 30 years.

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## 1. Introduction

This asset management plan (AMP) is prepared to communicate the actions required for the responsible management of Riverina Water County Council's core water supply system assets (and the services provided by these assets), compliance with regulatory requirements, and the funding required to provide the adopted levels of service over a 20 to 30-year planning period. The ongoing periodic update of the plan in synchronisation with Integrated Water Cycle Management Strategy will enable RWCC to review the performance of its infrastructure in relation to desired objectives for infrastructure management and funding.

The asset management plan is to be read in conjunction with the following associated planning and policy documents:

- Asset Management Policy (Policy 3.1)
- TAMP as incorporated in the IWCM Strategy
- RWCC - Integrated Water Cycle Management Issues Paper 2019
- RWCC - Integrated Water Cycle Management Strategy 2021
- Workforce Plan 2020
- Development Servicing Plan 2013
- RWCC Operational Plan (Fees and Charges and Levels Of Service)

Key stakeholders in the preparation and implementation of this AMP are:

- Government – State government having responsibility for Local Government.
- Councillors – As stewards of Council's infrastructure assets
- Customers – As users of services that rely on sound asset management
- Visitors - As temporary users of services that rely on sound asset management
- Developers – As infrastructure providers
- Employees/Volunteers – Having responsibilities for construction, operation and management of infrastructure and implementation of asset management plans
- Contractors/Suppliers – As providers of services required in the implementation of asset management plans
- Other Partners sharing asset management responsibility (including the Crown), and
- Insurers – Integral to risk management strategies that require sound asset management practice.

### 1.1 Background

Riverina Water County Council (Riverina Water) is a Local Water Utility (LWU) operating under the Local Government Act 1993 to provide potable water supply services to the County Districts covering 15,400 Km<sup>2</sup> from the Tarcutta and Humula in the east, Oaklands and Urana in the west, Woomargama and Walla Walla in the South and Brucedale, Bulgary and Morundah in the north.

Originally, the Southern Riverina County Council constituted in 1938 supplied reticulated water to the Shires of Lockhart, Kyeamba, Mitchell and part of Culcairn. Soon after, Urana and Holbrook were included followed by the City of Wagga Wagga in 1945. Southern Riverina County Council also held responsibility for the supply of electricity to the area between 1942 and 1995. The formation of the Great Southern Energy in 1995 led to a review and the formation of Riverina Water in 1997. Today, Riverina Water services Wagga Wagga City Council, Lockhart Shire Council and parts of the Greater Hume Shire Council and Federation Council (Figure 1-1).

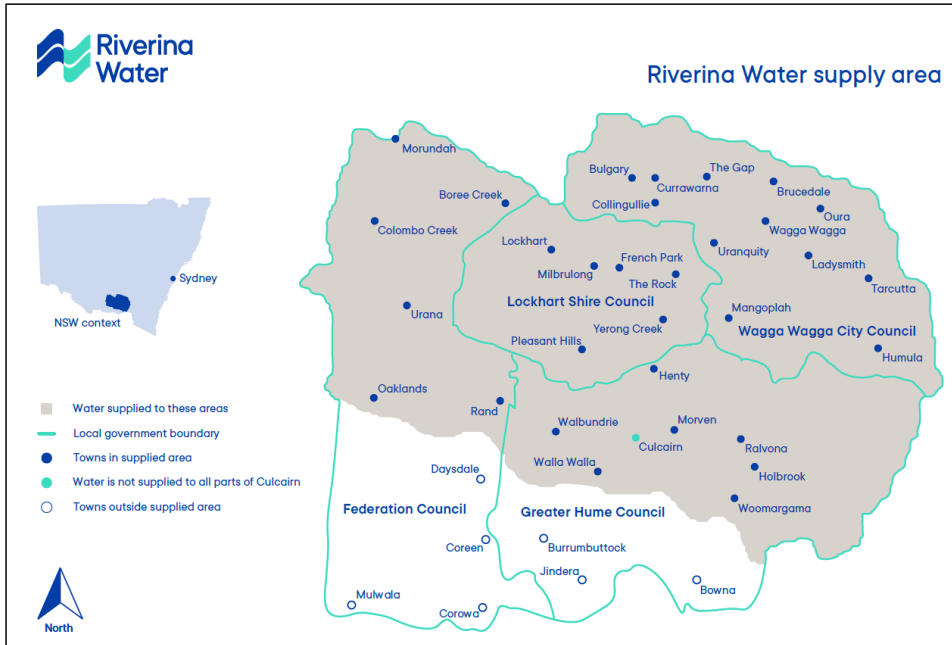


Figure 1-1: Map of Riverina Water Supply Area

Riverina Water operates four major systems and eight independent systems across these four Local Government Areas (LGAs). There are 31,897 customers (2019/20) which services approximately 77,600 people. Customers range in water requirements from basic residential use all the way to large-scale industrial purposes. A list of the serviced communities within each of the Riverina Water systems is shown in Table 1-1.

Table 1-1: Communities provided with water supply services

Water Supply System	Communities
<b>Major Systems</b>	
Wagga Wagga	Urban suburbs of Wagga Wagga on the southern side of Murrumbidgee River including Forest Hill and Ladysmith.
Southern Trunk	San Isadore, Kapooka, Uranquinty, The Rock, Mangoplah, Milbrulong, Yerong Creek, Henty, Pleasant Hills, Morven and Walla Walla (Note: Culcairn township is supplied by Greater Hume Council)
North Wagga	North Wagga, Bomen, Estella, Charles Sturt University, Cartwrights Hill, Boorooma, The Gap, Euberta, Tooyal, Currawarna and Brucedale



Water Supply System	Communities
Western Trunk	Bulgary, Lockhart, Boree Creek, Urana, Coorabin and Oaklands
<b>Independent Systems</b>	
Collingullie	Collingullie
Holbrook	Holbrook
Humula	Humula
Morundah	Morundah
Oura	Oura
Tarcutta	Tarcutta
Walbundrie-Rand	Walbundrie-Rand
Woomargama	Woomargama

Riverina Water is responsible for the operation and maintenance of the following core water supply assets:

- Water mains, including distribution, rural and reticulation
- Reservoirs
- Water Treatment Plants
- Pumping Stations
- Source works including water supply bores
- Land and buildings
- Plant and equipment

For details of RWCC's water supply schemes, refer to Section 3-Urban Water Services of RWCC IWC Strategy, 2021.

### 1.2 Goals and Objectives

Riverina Water County Council exists to provide services to its community in accordance with its Proclamation under the Local Government Act 1993. Most of these services are provided by infrastructure assets. Council has acquired infrastructure assets by 'purchase', by contract, construction by Council staff and by donation of assets constructed by developers and others to meet increased levels of service.

This plan has been developed in accordance with actions outlined in the Asset Management Policy previously adopted by Council and will provide the framework under which all infrastructure assets will be managed.

Council's goal in managing infrastructure assets is to meet the required level of service in the most cost-effective manner for present and future consumers. The key elements of infrastructure asset management are:

- Taking a lifecycle approach
- Developing cost-effective management strategies for the long term
- Providing a defined level of service and monitoring performance

- Understanding and meeting the demands of growth through demand management and infrastructure investment
- Identifying, assessing and appropriately managing risks associated with asset failures
- Sustainable use of physical resources, and
- Continuous improvement in asset management practices.

### 1.3 Plan Framework

Based on the key elements of infrastructure asset management listed in Section 1.2, the key headings within each section of the plan are:

- Levels of service – specifies the services and levels of service to be provided by council
- Future demand – how this will impact on future service delivery and how this is to be met
- Life cycle management – how Council will manage its existing and future assets to provide the required services
- Financial summary – what funds are required to provide the required services
- Plan improvement and monitoring– how the plan will be monitored to ensure it is meeting Council's objectives, and how to improve the plan

## 2. Levels of Service

Before determining optimal strategies for managing the water supply assets, it is necessary to define the service levels that these assets will deliver against. The levels of service provided by the assets should meet with statutory requirements, financial sustainability, and customer affordability.

The target levels of service determine the amount of funding that is required to operate, maintain, renew, and upgrade the water supply infrastructure, the relationship between differing levels of service and the associated cost of delivering the service. This relationship can be used with customers and decision makers to establish the desired level of service. Defined or target levels of service can then be used to:

- Develop asset management strategies to deliver sustainable levels of service
- Measure performance against defined targets
- Identify costs and benefits of the services provided
- Enable customers to assess suitability and affordability of the services offered.

Understanding the levels of service is vital for the lifecycle management of assets. They will determine what type of assets will be provided, how often they will be maintained, when assets will be rehabilitated or replaced and how the assets will be disposed of.

### 2.1 Legislative and Regulatory Requirements

Council must meet many legislative requirements including Federal and State legislation and State regulations. These are detailed in Table 2-1.

**Table 2-1: Legislative Requirements**

Key Legislative Framework and their main purposes	RWCC current performance and future targets
<b>Local Government Act (1993)</b>	
<p>This Act aims to provide the legal framework for an effective, efficient, environmentally responsible, and open system of Local Government including the provision, management and operation of water supply and sewerage works and facilities. It covers:</p> <p>Section 60 (S60) –A council must not, except in accordance with the approval of the Minister for Primary Industries, do any of the following:</p> <ul style="list-style-type: none"> <li>• as to works of water supply—construct or extend a dam for the impounding or diversion of water for public use or any associated works (not applicable),</li> <li>• as to water treatment works—construct or extend any such works,</li> <li>• as to flood retarding basins prescribed by the regulations—construct or extend any such basins.</li> </ul>	<p>RWCC has obtained Section 60 approval for the construction of the new Water Filtration Plant at Wagga Wagga Waterworks.</p> <p>All the other WTPs have been in operation prior to 1993 and do not require Section 60 approval.</p>
<p>Section 61 – The Minister for Primary Industries or a person authorised by the Minister may direct a council to take such measures as are specified in the direction to ensure the proper safety, maintenance and working of any of the following works:</p>	<p>No such direction has been made to RWCC</p>

Key Legislative Framework and their main purposes	RWCC current performance and future targets
<ul style="list-style-type: none"> <li>dams for the impounding or diversion of water for public use or any associated works,</li> <li>water treatment works,</li> <li>sewage treatment works.</li> </ul>	
<p>Section 64 – As a precondition to granting a certificate of compliance for development, a water supply authority may, by notice in writing served on the applicant, require the applicant to do either or both of the following:</p> <ul style="list-style-type: none"> <li>to pay a specified amount to the water supply authority by way of contribution towards the cost of such water management works as are specified in the notice, being existing works or projected works, or both,</li> <li>to construct water management works to serve the development.</li> </ul>	<p>RWCC implements Developer Charges (DC). The DC will be reviewed after the completion of the IWCM strategy.</p>
<p>Section 382 – Insurance against liability:</p> <ul style="list-style-type: none"> <li>A Council must make arrangements for its adequate insurance against public liability and professional liability.</li> </ul>	<p>RWCC has insurance against public liability, professional indemnity, property protection and motor vehicle insurance.</p>
<p><b>Environmental Planning and Assessment Act (1979) (incl. the EPA Regulation 2000).</b></p>	
<p>This Act aims to encourage proper management of resources, the orderly use of land, the provision of services, and the protection of the environment. It covers:</p> <ul style="list-style-type: none"> <li>Local Environmental Plans (LEP)</li> <li>Environmental Impact Statement (EIS)</li> <li>Reviews of Environmental Factors (REF)</li> </ul>	<p>RWCC is not a planning authority under the EPA Act.</p> <p>RWCC is a NSW local government authority as described in the NSW Local Government Act 1993, and is considered a public authority under the State Environmental Planning Policy (Infrastructure) 2007.</p> <p>In particular, RWCC may undertake development without consent as described in Clause 125(5)(c) of SEPP (infrastructure) 2007, but still must comply with Part 5 of the EPA Act 1979. (1)</p>
<p><b>Public Health Act (2010)</b></p>	
<p>This Act aims to promote, protect and improve public health; by providing safe drinking water to the community.</p> <p>Section 25 – a supplier of drinking water must have a quality assurance program in place and must comply with its requirements.</p> <p>A Drinking Water Management System (DWMS) satisfies this requirement.</p> <p>The requirements of the DWMS are as follows:</p>	<p>Until March 2018, RWCC used a HACCP Water Safety System, but have since developed a DWMS to replace it in accordance with the Public Health Act.</p> <p>The DWMS was prepared by NSW Health approved consultant.</p> <p>RWCC has had recurring non-conformances related to low fluoride concentration. In general, issues of low fluoride occurred due to equipment failure or operation during maintenance / equipment</p>

Key Legislative Framework and their main purposes	RWCC current performance and future targets
<ul style="list-style-type: none"> <li>Produce an annual report to be made available to consumers, regulatory authorities and stakeholders</li> <li>The DWMS will be internally reviewed. The review will assess Council's performance in relation to:               <ul style="list-style-type: none"> <li>CCPs and their exceedances</li> <li>Improvement Plan</li> <li>Record keeping</li> <li>NSW Health Database performance</li> </ul> </li> </ul>	<p>replacement, or issues with solubility of product from overseas.</p> <p>PWA undertook an inspection (2016) of the North Wagga, West Wagga and Gardiner's Crossing fluoridation systems to identify the issues that result in the systems not complying with the Code of Practice. A report identifying works required to ensure compliance, was submitted. This work is ongoing in conjunction with the review of the Fluoridation Code of Practice</p>
<b>Water Management Act (2000) and Water Act (1912)</b>	
<p>This Act promotes the sharing of responsibility for the sustainable and efficient use of water between the NSW Government and water users and provides a legal basis to manage NSW water planning, allocation of water resources and water access entitlements.</p>	<p>RWCC has water licenses to extract water from various water sources in accordance with the relevant Water Sharing Plans.</p> <p>There is a potential for the Long-Term Average Annual Extraction Limit (LTAAEL) set for RWCC and Goldenfields Water in the Wagga Wagga Alluvial Groundwater Source, to be exceeded if there's a lack of inter-utility communication and coordination.</p>
<b>Protection of the Environment Operations Act (1997)</b>	
<p>Section 43 Environment protection licenses may be issued to authorise the carrying out of scheduled activities at any premises, as required under section 48,</p> <p>This clause applies to sewage treatment, meaning the operation of sewage treatment systems that involve the discharge or likely discharge of wastes or by-products to land or waters</p>	<p>RWCC has an EPA license for the WTP at 91 Hammond Avenue (EPL No. 614) which specifies monitoring requirements and discharge volume and concentration limits for discharge of treated effluent, groundwater seepage and stormwater.</p> <p>RWCC also has a Pollution Incident Response Management Plan (PIRMP).</p> <p>There have been no major or consistent breaches of the EPA License.</p>
<b>Work Health and Safety Act 2011 and WHS Regulation 2011</b>	
<p>To provide for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces. Under the Act, for Workplace Management, Council has a duty to:</p> <ul style="list-style-type: none"> <li>Identify hazards</li> <li>Manage risks to health and safety</li> <li>Implement, maintain and review risk control measures.</li> </ul>	<p>RWCC undertakes regular WHS audits at the plants to ensure their Health, Safety &amp; Rehabilitation Management System is up to date.</p> <p>An external WHS audit was undertaken in January 2018. The audit recommended that separate action plans be created for Engineering and Corporate services.</p>

Key Legislative Framework and their main purposes	RWCC current performance and future targets
<b>Fluoridation of Public Water Supplies Act (1957)</b>	
<p>This Act covers the addition of fluoride to public water supply under the NSW Fluoridation Code of Practice.</p>	<p>The small independent water supply schemes (Collingullie, Holbrook, Humula etc.) do not have fluoridation. However, the water from Ravlona bores which supplies Holbrook is naturally high in fluoride.</p> <p>The NSW Fluoridation Code of Practise (COP) is currently under review by NSW Health. The objectives of the review are to, articulate risks that are being controlled, improve alignment with DWMS, capture concerns regarding current COP and reflect findings in the new COP. It is unknown whether the changes to the COP following the review will impact on RWCC's operations.</p>
<b>Dam Safety Act 1978</b>	
<p>Under this Act, the owner of any dam listed as a prescribed dam must meet the requirements of the NSW Dams Safety Committee (DSC).</p> <p>The DSC assigns dams a consequence category relative to their dam failure consequence, and this determines the level of reporting and type of actions required by the dam owner as part of their Safety Management System (SMS).</p>	<p>RWCC owns three dams - Urana Dam, Rand Dam and Walbundrie Dam, the latter two of which are not in use. None of these dams are prescribed dams under the Dam Safety Act 1978.</p> <p>Hence, the Dam Safety Act 1978 does not apply to RWCC.</p>

### 2.1.1 Proclamation

RWCC had been established in 1993, under a proclamation by the Governor of NSW with the establishment of a number of requirements. These requirements are listed in Table 2-2.

**Table 2-2: Proclamation Requirements**

Proclamation requirements	RWCC activities
<p>Review the relative efficiencies and economies of the functions of the provision, care, control and management of headworks, distribution and reticulation of water undertaken [by Greater Hume Council] to the town of Culcairn, compared with the undertaking of those functions by RWCC. RWCC must make a report to the Minister at no more than 3 yearly intervals</p>	<p>Riverina Water conducts a performance review every 3 years in accordance with the Proclamation.</p>
<p>Develops, implement and maintain strategic business plans to facilitate the efficient provision and operation of water supply services. It shall have due regard for:</p> <ul style="list-style-type: none"> <li>Principles of commercial performance</li> <li>Integrated resource management</li> <li>Community involvement</li> </ul>	<p>RWCC's most recent Strategic Business Plan was finalised in 2012.</p> <p>Following completion of this IWCM Strategy, RWCC will develop a new Strategic Business Plan based on long-term Financial Plan and the 30-year Capital Expenditure Plan prepared as part of the IWCM Strategy</p>

Establish a customer advisory committee	Ongoing customer engagement via elected representatives and annual customer surveys. Specific Customer Advisory Committees engaged as required for specific purposes, e.g. IWCM.
Conduct annual customer surveys.	RWCC implements an annual customer survey
Establish levels of service acceptable to the community	RWCC has established customer service levels.
Make maximum endeavour to contract in, or franchise out, to constituent councils and others, management, administration and accounting functions to ensure least-cost implementation of the County Council's strategic business objectives	As seen from the rankings in the TBL reports, RWCC operates comparably to similar sized LWUs for most benchmarks and considers using services from constituent councils and others where appropriate.

## 2.2 Current and Target Levels of Service

Council has defined service levels as part of the Business Plan for Water Supply. Achievement of these service levels are regularly monitored.

### Technical LOS

RWCC's system design and operations are based on providing the following technical levels of service (Table 2-3).

Riverina Water is reviewing its Levels of Service to reflect the 'type' of water supply system, based on:

- Typical elevation of service reservoirs with respect to water supply systems' ground elevations
- Supply is directly via trunk mains or a reticulated supply system
- Urban (Wagga Wagga reticulated areas) or Rural supply systems

**Table 2-3: Council's Service Levels for Water Supply - Technical**

Technical Levels of Service
<b>Security of Water Supply</b>
5/10/10 rule based on 95th percentile dry year demand: <ul style="list-style-type: none"> <li>• Duration of water restrictions does not exceed 5% of the time</li> <li>• Frequency of water restrictions does not exceed 10% of years (i.e. on average once every 10 years)</li> <li>• Severity of water restrictions does not exceed 10%. System must be able to meet 90% of unrestricted demand (i.e. 10% average reduction in consumption due to water restrictions.)</li> </ul>
<b>Pressure</b>
Provide pressures between 12 and 120 metres head at the water meter when service has no flow.

**Flow Rate**

Provide water to each connection at an available flow rate not less than:

Diameter of service pipe (mm): 20 25 32 40 50

Minimum flow rate (litres/min): 20 35 60 90 160

Trickle feed option is on an economic basis case by case.

The minimum flow rate available for rural properties may be less where elevations or operational factors limit the supply. In some situation, the flow may be restricted to 11 kL/day. In such situations or where part of the property being serviced has elevation higher than the head available, connection approval may be granted provided a private balance tank and pressure system are installed within the property at owner's cost.

**Water for Fire Fighting**

Provide fire flows in reticulation systems in accordance with NSW Water Directorate Fire Flow guidelines.

A positive residual head should be maintained while supplying fire flow plus 75% of the design peak instantaneous demand.

**Water Quality**

Potable Water Supply:

- 100% compliance with the ADWG for health-based parameter
- Compliance with the DWMS
- Compliance with the ADWG for aesthetic parameters

Where it can be achieved, water quality should meet the 2011 Australian Drinking Water Guidelines, published jointly by the National Health and Medical Research Council (NHMRC) and the Natural Resource Management Ministerial Council.

**Customer LOS**

The customer levels of service adopted for RWCC's water supply schemes are the standard targets that RWCC aims to achieve and are presented in Table 2-4. However, they are not intended as a formal customer contract.

**Table 2-4: Council's Service Levels for Water Supply - Customers**

Customer Levels of Service
<b>Consumption Restrictions in Droughts</b>
<ul style="list-style-type: none"> <li>• Water restrictions may be applied to encourage wise water use, to reduce excessive demand, or to conserve limited resource in time of drought.</li> <li>• Restrictions may also be applied at the request of DPIE Water or to comply with an adopted Water Sharing Plan.</li> <li>• To reduce evaporation losses, the use of fixed sprinklers and sprays for open air watering of vegetation may be banned during the summer months (daylight saving time) between 10.00 am – 5.00 pm.</li> </ul>



**Interruptions to Supply**

Planned:

- Residential and commercial customers will receive 24 hours written notice and industrial customers will receive 7 days written notice.

Unplanned:

- Not to occur more than 2 times per year if lasting up to 12 hours.
- Not to occur more than 5 times per year if lasting up to 5 hours.

**Response Time**

Response time is defined as time to have staff on site to commence rectification of problem after notification by the public or RWCC staff. Council aims to meet the following response times depending on priority.

Priority 1:

Defined as failure to maintain continuity or quality of supply to a large number of customers or to a critical use at a critical time.

- 1 hour (during working hours)
- 2 hours (after working hours)

Priority 2:

Defined as failure to maintain continuity or quality of supply to a large number of customers or to a critical use at a non-critical time.

- 3 hours (during working hours)
- 4 hours (after working hours)

Priority 3:

Defined as failure to maintain continuity or quality of supply to a single customer.

- One working day

Priority 4:

Defined as a minor problem or complaint which can be dealt with at a time convenient to the customer and the water authority.

- Within 2 weeks

Catastrophe:

Any situation of this nature would prompt immediate action involving senior personnel and emergency services with the aim of containing and resolving the situation as quickly as possible.

**Customer Complaints and Enquiries of General Nature**

Respond to 95% of written complaints or inquiries within 10 working days. Respond to 95% of personal complaints or inquiries within 1 working day.

**Special Customers**

- Certain customers may have special needs by virtue of specific health, commercial or industrial circumstances. Specific levels of service and associated charges should be negotiated with these customers.

### 3. Future Demand

#### 3.1 Demand Drivers and Forecasts

The key drivers that influence the variability and growth in demand are:

- Population and population growth
- Changes in demographics and urban growth
- Changes in and uses of industrial and commercial usage
- Regional and global economic factors
- Tourism, particularly holiday accommodations
- Climate and seasonal factors
- Availability of recycled water
- Water losses
- Geology and soils
- Legislative changes

The recently completed Integrated Water Cycle Management (IWCM) Strategy included a number of analyses to determine 30-year population growth, area-specific water demand strategies and recommended actions to be taken to reduce potable water demand.

Demand management strategies provide alternatives to the creation of new assets to meet growing demands and look at ways of improving the efficiency of assets and modifying customer consumption behaviour in order that the utilisation of existing assets is maximised, or at least, the need for new assets is either deferred or reduced.

##### 3.1.1 Residential users and growth

Riverina Water does not expect the areas outside Wagga Wagga to grow significantly over the next 30 years. This expectation is reflected in the Department of Planning projections that show relatively little or no growth in the other LGAs compared to Wagga Wagga LGA.

##### **Wagga Wagga LGA**

Wagga Wagga City Council engaged .id to develop population and household forecasts for Wagga Wagga LGA and present what is driving population change in the community and how the population, age structure and household types will change each year between 2016 and 2036.

The .id study found that the bulk of recent growth in Wagga Wagga has been in the small areas of Bourkelands – Tatton, Glenfield Park and Springvale - Lloyd. Recently, Wagga Wagga City has played host to two distinct housing market roles; drawing young adults, attracted to education, transport, employment opportunities and providing homes to both young and mature family households. Recent migration into the area largely arrived from the surrounding Local Government areas, metropolitan Sydney or overseas. Conversely, the flows away from the City were largest toward South East Queensland and greater Melbourne.

The importance of the Wagga Wagga City as a destination for both families and young adults is expected to continue over the forecast period. New residential development opportunities in Estella - University, Springvale - Lloyd, North Wagga Wagga - Bomen, and Forest Hill - East Wagga Wagga will cater for an increase in families to the area while continued 'infill' development in Wagga Wagga (Central) will provide household growth for young adults.

The .id analysis split the Wagga Wagga LGA into 15 forecast areas, shown in Figure 3-1.

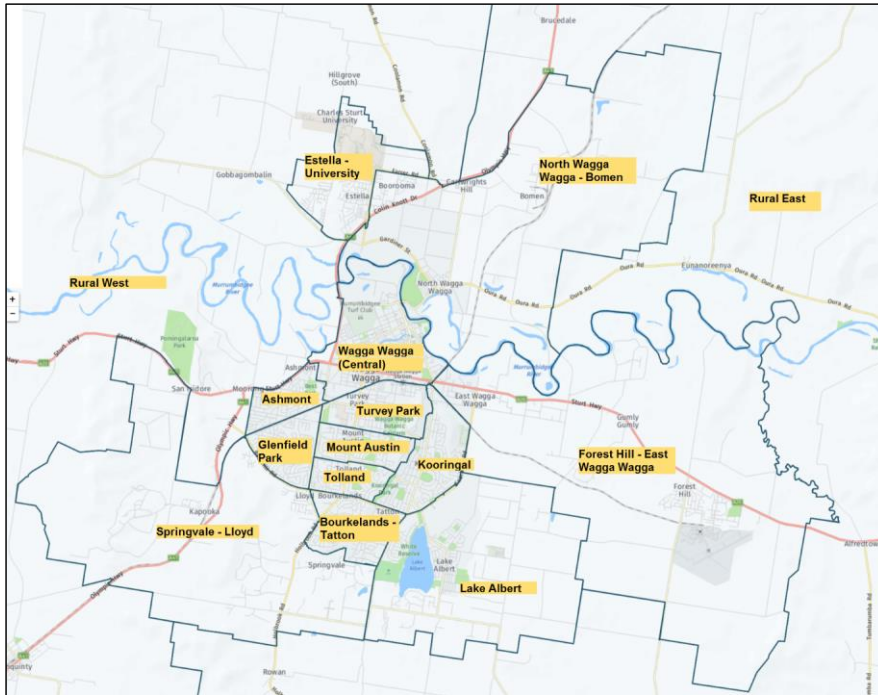


Figure 3-1: Wagga Wagga City Council - .id forecast areas

The population and dwelling forecasts to 2036 are provided in Table 3-1 and Table 3-2 respectively.

Table 3-1: .id forecast five yearly population growth for Wagga Wagga LGA

.id Forecast Area	2016-2021	2021-2026	2026-2031	2031-2036
Ashmont	-51	43	46	32
Bourkelands - Tatton	358	-50	-78	-39
Estella - University	1,423	1,327	1,094	1,195
Forest Hill - East Wagga Wagga	466	372	326	279
Glenfield Park	41	-16	-30	-30
Kooringal	101	154	72	167
Lake Albert	196	93	71	74
Mount Austin	155	33	57	54
North Wagga Wagga - Bomen	552	444	206	-63

.id Forecast Area	2016-2021	2021-2026	2026-2031	2031-2036
Rural East	96	90	87	162
Rural West	264	188	180	193
Springvale - Lloyd	1,028	1,010	1,008	984
Tolland	70	79	48	49
Turvey Park	14	14	8	44
Wagga Wagga (Central)	724	504	536	444
<b>Total Wagga Wagga LGA</b>	<b>5,437</b>	<b>4,286</b>	<b>3,630</b>	<b>3,545</b>

Note: the population is projected to decrease in the areas of Bourkelands -Tatton and Glenfield Park

Table 3-2: id forecast five yearly dwelling growth for Wagga Wagga LGA

.id Forecast Area	2016-2021	2021-2026	2026-2031	2031-2036
Ashmont	15	15	16	20
Bourkelands - Tatton	124	3	0	0
Estella - University	442	428	442	480
Forest Hill - East Wagga Wagga	157	130	130	125
Glenfield Park	4	0	0	0
Koorringal	37	45	62	84
Lake Albert	66	56	34	21
Mount Austin	5	8	15	15
North Wagga Wagga - Bomen	210	170	98	9
Rural East	50	50	51	70
Rural West	76	74	75	74
Springvale - Lloyd	351	350	350	350
Tolland	3	1	2	2
Turvey Park	48	25	15	15
Wagga Wagga (Central)	227	225	225	225
<b>Total Wagga Wagga LGA</b>	<b>1,815</b>	<b>1,580</b>	<b>1,515</b>	<b>1,490</b>

**Outside Wagga Wagga LGA**

The following dwelling growth rates have been nominated for towns in the other three LGAs serviced by Riverina Water:

- one dwelling per year for Urana
- two dwellings per year for The Rock and Walla Walla
- four dwellings per year for Holbrook and Henty
- five dwellings per year for Lockhart.

**Riverina Water Service Area growth forecast**

Based on the nominated growth in the respective LGAs, the total estimated serviced population over the next 30-years is given in Table 3-3.

**Table 3-3: Serviced population estimate**

	2017	2022	2027	2032	2036	2042	2047
Riverina Water Serviced Population	72,500	77,800	82,000	85,700	88,600	93,600	97,700

**3.1.2 Non-residential users and growth**

**Non-residential retail customers**

Riverina Water services more than 6,000 non-residential retail customers. Some of the largest include the Teys Abattoir (average use of 650 ML/year), the Heinz-Watties Factory (average use of 140 ML/year) and Charles Sturt University (average use of 280 ML/year), all located in North Wagga.

Demands from non-residential users were projected to grow at different rates relative to residential growth in their respective water supply system and depending on the user category (e.g. commercial user demand is expected to increase at same rate as residential demand, however pool user demand is not expected to grow).

**Bulk supply customers**

Riverina Water also services two bulk supply customers – the RAAF Airbase (average use of 125 ML/year), and the Kapooka Army Base (average use of 310 ML/year).

The bulk supply to the RAAF Airbase is expected to increase by about 12 ML/year over the next ten years as a result of a 10% increase in recruits over this period. The bulk supply to the Kapooka Airbase is expected to increase by about 80 ML/year over the next ten years, as a result of a 33% increase in recruits over this period. There is also expected to be a small number of new dwellings in the Kapooka Marriage Quarters.

**Bomen Special Activation precinct (SAP)**

Special Activation Precincts (SAPs) are unique to regional NSW and bring together planning and investment to focus on growing jobs and economic activity in an area. Precincts will support industries in line with the competitive advantages and economic strengths of each area.

In January 2019 the NSW Government announced the creation of a SAP in the north-east area of Wagga Wagga (called Bomen) to create a world-class business precinct, capitalise on the inland rail project currently under construction, and promote advanced manufacturing, agribusiness, and freight and logistics. DPIE Water together with the Wagga Wagga City Council are developing a master plan for the SAP. The master plan proposal will identify the scale, type and extent of the development in the SAP along with the infrastructure needed to support its development and mitigate its impact.

The Wagga Wagga precinct will cover an area of approximately 4,500 hectares, including 300 hectares already developed as part of the Bomen Business Park. The precinct will incorporate the Riverina Intermodal Freight and Logistics (RIFL) hub to create faster and easier access to national and international markets for regional producers. Building on already-planned private and government investments, the precinct will create up to 6,000 new jobs across a range of industries.

### 3.2 Future Water Demands

The recent Riverina Water IWCM analysed past water demands and forecasted future water demand considering the projected population growth and estimated water savings. Table 3-4 and Table 3-5 present the Peak Day and Annual water demands at five-year intervals until the Year 2047. The demands are total water production including water losses.

**Table 3-4: Peak Day Demand Projections (ML/d)**

System	2017	2022	2027	2032	2037	2042	2047
Wagga Wagga	86.1	90.1	93.6	96.7	99.9	103.3	106.8
Southern Trunk	12.7	13.6	14.6	15.2	15.8	16.4	17.1
North Wagga	20.6	25.4	29.8	33.6	37.1	40.8	44.5
Western Trunk	4.8	4.9	5.0	5.0	5.1	5.2	5.3
Independent - Collingullie	0.7	0.8	0.8	0.9	0.9	0.9	1.0
Independent - Holbrook	2.7	2.8	2.9	3.0	3.1	3.2	3.2
Independent - Humula	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Independent - Oura	0.5	0.5	0.5	0.6	0.6	0.6	0.6
Independent - Tarcutta	0.5	0.5	0.5	0.6	0.6	0.6	0.7
<b>Total</b>	<b>128.7</b>	<b>138.7</b>	<b>147.8</b>	<b>155.6</b>	<b>163.1</b>	<b>171.2</b>	<b>179.3</b>

**Table 3-5: Average Year Demand Projections (ML/year)**

System	2017	2022	2027	2032	2037	2042	2047
Wagga Wagga	9,582	10,030	10,407	10,752	11,105	11,490	11,875
Southern Trunk	1,474	1,547	1,615	1,683	1,751	1,821	1,891
North Wagga	2,751	3,355	3,912	4,389	4,831	5,301	5,772
Western Wagga	614	626	636	647	658	669	680
Independent - Collingullie	64	69	73	77	80	85	89
Independent - Holbrook	265	274	282	289	297	305	314
Independent - Humula	8	9	10	10	12	13	13

Independent - Oura	40	42	44	46	48	50	53
Independent - Tarcutta	42	45	47	49	52	55	57
<b>Total</b>	<b>14,839</b>	<b>15,997</b>	<b>17,025</b>	<b>17,943</b>	<b>18,835</b>	<b>19,789</b>	<b>20,743</b>

### 3.3 Demand Management

Demand management solutions involve both 'asset-based' and 'non-asset based' solutions. 'Asset-based' solutions for managing demand for new services include a combination of managing and upgrading of existing assets, and providing new assets, and 'non-asset based' solutions involve policy and planning initiatives and pricing signals. The IWCM Strategy has identified major asset-based solutions (capital works) to address future demand trends as listed in Table 3-6.

**Table 3-6: List of infrastructure works and their timing**

Action	Timeframe
Augment the supply from the Urana Filtration Plant to both Urana and Oaklands to reduce the requirement from Bulgary Bores.	2020-2030
Upgrade the Woomargama Treatment Plant, together with online turbidity/ chlorine meters and develop SOPs.	2020-2030
Replace Oura reservoirs: <ul style="list-style-type: none"> <li>New 1.2ML of storage or</li> <li>Two 600 KL reservoirs</li> </ul>	2020-2030 2020-2030 and 2040-2050
<ul style="list-style-type: none"> <li>Replace Morundah WTP, or</li> <li>Construct pipeline from Boree Creek to Morundah</li> </ul>	2020-2030
Cover Bulgary aeration basin, and the four aeration towers and basin at West Wagga WTP	2020-2030
Replace Tarcutta bore 5	2022/2023
Bellvue-Glenoak <ul style="list-style-type: none"> <li>New 6.2 ML Glenoak Reservoir</li> <li>Upgrade Bellvue PS to 10.2 ML/day</li> <li>Upgrade Glenoak PS to 10.5 ML/day</li> </ul>	2037/2038 2035/2036 2029/2030
North Wagga system <ul style="list-style-type: none"> <li>Augment capacity of the Wagga Wagga WTP from 75ML/day to 105ML/day, with around 30 ML/day transferred to the North Wagga System.</li> </ul>	2020-2030
Estella <ul style="list-style-type: none"> <li>New 11 ML Estella Reservoir</li> <li>Upgrade Estella PS to 20.7 ML/day</li> </ul>	2028/2029 By 2030

Action	Timeframe
<b>Brucedale</b> <ul style="list-style-type: none"> <li>New 1.5 ML Brucedale Reservoir</li> <li>Upgrade Brucedale PS to 1.5 ML/day</li> </ul>	2025/2026 by 2040
<b>East Bomen</b> <ul style="list-style-type: none"> <li>New 6.0 ML East Bomen Reservoir</li> <li>Upgrade East Bomen PS to 12.0 ML/day</li> </ul>	2032/2033 by 2040
<b>Western trunk</b> <ul style="list-style-type: none"> <li>Upgrade Urana WTP to 3.2 ML/day and upgrade Clear Water Storage pumps to 2.7 ML/day.</li> </ul>	2021/2022
<b>Oaklands and Urana</b> <ul style="list-style-type: none"> <li>New 0.5 ML Oaklands Reservoir.</li> <li>New 1.0 ML Urana Reservoir</li> <li>Upgrade Oaklands PS to 0.7 ML/day</li> <li>New Urana Reservoir PS 1.7 ML/day</li> </ul>	after 2050 by 2030 2028/2029 by 2030
<b>Lockhart</b> <ul style="list-style-type: none"> <li>New 2.5 ML Lockhart Reservoir</li> </ul>	by 2030
<b>The Rock</b> <ul style="list-style-type: none"> <li>Supply from a new 2.0 ML reservoir to be constructed at The Rock, with new 1.6 ML/day PS</li> </ul>	2021/2022
<b>Collingullie</b> <ul style="list-style-type: none"> <li>New 1.5 ML Collingullie Reservoir</li> </ul>	2035
<b>Woomargama</b> <ul style="list-style-type: none"> <li>Replace WTP and pump station.</li> <li>Construct a second bore.</li> </ul>	2024/2025 2021/2022

Demand management through 'non-asset based' solutions focus on encouraging customers to reduce consumption by using water more efficiently and includes insuring against risks and managing failures.

As part of Riverina Water's demand management strategy, a 30-year Peak Day 'game plan' was developed to optimise the production and transfer of supplies between the integrated water supply systems: Wagga Wagga, North Wagga, Southern Trunk and Western Trunk systems.



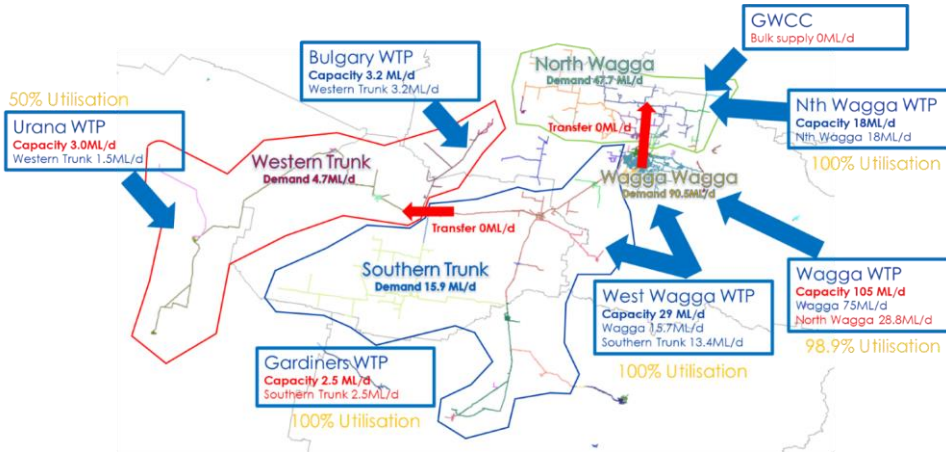


Figure 3-2: Demand Management ‘Game Plan’

Other opportunities identified to date for demand management are shown in Table 3-7.

Table 3-7: Non-Asset Based Demand Management

Service Activity	Demand Management Plan
Water Consumption	<p>The following water demand management measures have been adopted and are applied in all three water supply systems:</p> <ul style="list-style-type: none"> <li>• A two tier ‘best practice’ water charging policy approved by IPART, with higher users paying more for water.</li> <li>• BASIX for new buildings and a default requirement for large rainwater tanks to be installed at all new residences.</li> <li>• Operation of the ‘Waterwise’ program whereby customers are offered a number of retro-fit rebate incentive schemes to install to save water involving cash payments to install rainwater tanks, replace single flush with dual flush toilets, and replace inefficient water appliances.</li> <li>• Installation of effluent recycling system to replace potable water as source for water playing fields</li> <li>• Operation of a Council’s Water Restrictions Policy to ensure sustainability of supply during extended dry period when water sources are drawn down and are not being replenished.</li> </ul>

## 4. Lifecycle Management Plan

The lifecycle management plan details how the Riverina Water Council plans to manage and operate the assets to provide the agreed levels of service (defined in Section 2) while optimising life cycle costs. Life cycle management has a direct impact on the provision of water services to the customer. This section identifies the measures that require to be implemented to achieve these levels of service.

Council, as the asset owner, is committed to maintaining its water supply assets to ensure customers' desired levels of service are maintained at levels commensurate with affordability expectations. To meet this requirement, Council seeks to match funding levels, condition and community expectations.

### 4.1 Existing Assets

#### 4.1.1 Assets Register

Riverina Water has an up to date assets register for the existing assets, which contains data such as assets description, location, size, construction year, estimated residual life and current replacement costs.

A summary of the Gross Replacement Values (GRV) and Current Written Down Values (CWDV) as of June 2021 for the asset types in each of the major systems of Riverina Water are presented in the tables below. Assets that are not identified with any system in the assets register have been marked as "Unassigned". The values exclude any Works-In-Progress (WIP). A more detailed list of the above-ground assets and their capacities are presented in Appendix A.

**Table 4-1: Riverina Water Treatment Plants**

System	Gross Replacement Value	Written Down Value
Wagga Urban Scheme	\$89,037,940*	\$58,790,529
Western Trunk System	\$4,216,122	\$1,064,377
Independent Schemes	\$3,194,054	\$1,776,338
Southern Trunk System	\$677,745	\$305,555
North Wagga System	\$3,427,847	\$ 800,171
<b>Total</b>	<b>\$ 100,553,708</b>	<b>\$ 62,736,970</b>

**Table 4-2: Riverina Water Ground Water Bores**

System	Gross Replacement Value	Written Down Value
Wagga Urban Scheme	\$2,457,850	\$1,153,082
Western Trunk System	\$464,964	\$234,116
Independent Schemes	\$1,893,361	\$1,284,405
Southern Trunk System	\$385,400	\$221,933
North Wagga System	\$1,141,926	\$492,692
<b>Total</b>	<b>\$6,343,500</b>	<b>\$3,386,228</b>

**Table 4-3: Riverina Water Pumping Stations**

System	Gross Replacement Value	Written Down Value
Wagga Urban Scheme	\$6,779,585	\$2,516,447
Western Trunk System	\$1,288,700	\$405,918
Independent Schemes	\$1,916,000	\$858,367
Southern Trunk System	\$2,960,115	\$1,794,632
North Wagga System	\$2,880,038	\$952,442
Unassigned	\$145,973	\$139,048
<b>Total</b>	<b>\$15,970,411</b>	<b>\$6,666,854</b>

**Table 4-4: Riverina Water Reservoirs**

System	Gross Replacement Value	Written Down Value
Wagga Urban Scheme	\$29,462,923	\$19,179,265
Western Trunk System	\$3,287,038	\$1,318,792
Independent Schemes	\$4,330,181	\$2,271,609
Southern Trunk System	\$9,445,602	\$5,076,494
North Wagga System	\$8,731,871	\$5,000,882
Unassigned		
<b>Total</b>	<b>\$55,257,615</b>	<b>\$32,847,041</b>

**Table 4-5: Riverina Water Other Assets**

System	Gross Replacement Value	Written Down Value
Wagga Urban Scheme	\$778,170	\$434,774
Western Trunk System	\$882,034	\$539,091
Independent Schemes	\$180,339	\$134,250
Southern Trunk System	\$116,170	\$115,621
North Wagga System	\$287,849	\$279,051
Unassigned		
<b>Total</b>	<b>\$2,244,561</b>	<b>\$1,502,786</b>

**Table 4-6: Riverina Water Pipeline**

System	Gross Replacement Value	Written Down Value
Wagga Urban Scheme	\$159,989,361	\$91,083,258
Western Trunk System	\$42,716,412	\$26,785,656
Independent Schemes	\$17,300,357	\$9,477,330
Southern Trunk System	\$60,509,029	\$27,640,370
North Wagga System	\$45,140,720	\$29,098,159
Unassigned	\$235,312	\$232,015
<b>Total</b>	<b>\$325,891,191</b>	<b>\$184,316,788</b>

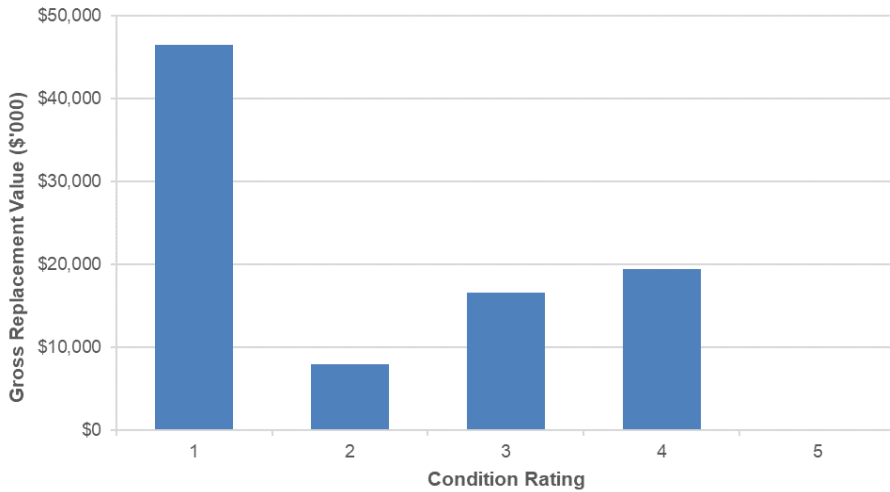
#### 4.1.2 Asset Condition

The asset attributes recorded in the assets register has been used for an initial overall assessment of condition of asset components. Condition is monitored and managed at an operational level using visual assessment techniques of common distress modes, and the information used to prepare the condition profile is based on regular assessments every year dependant on the recorded asset and service deficiencies of the Water asset stock. Condition is measured using a 1 – 5 grading system as detailed in Table 4-7.

**Table 4-7: Simple Condition Rating Model**

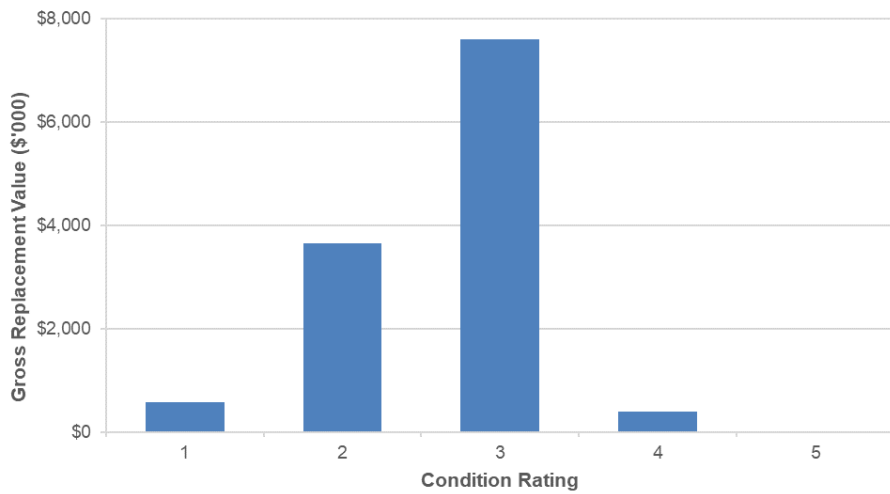
Condition Rating	Description of Condition
1	Very Good: only planned maintenance required
2	Good: minor maintenance required plus planned maintenance
3	Fair: significant maintenance required
4	Poor: significant renewal/rehabilitation required
5	Very Poor: physically unsound and/or beyond rehabilitation

A consolidated summary of the condition profiles for various asset types are shown in the following figures..



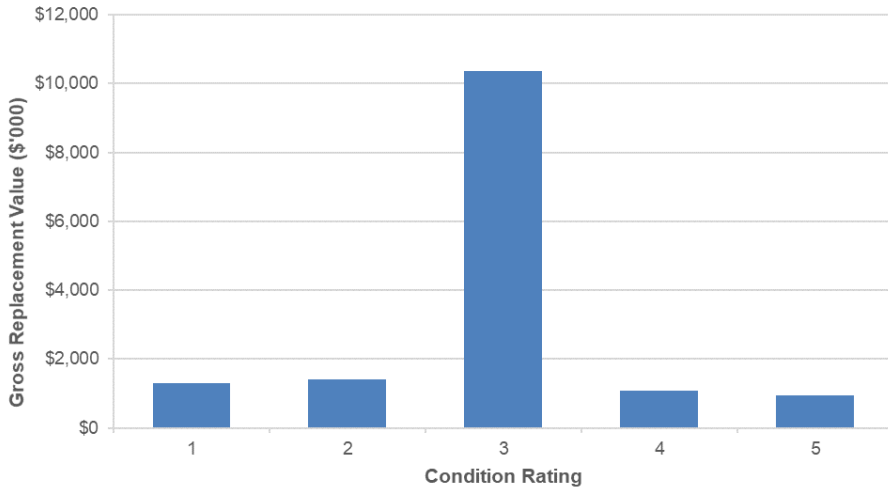
**Figure 4-1: Water Treatment Plants Condition Profile**

Note: The new Wagga Water Treatment Plant (valued at \$40M) is included in the asset register in 2020/21 with condition rating of 1.

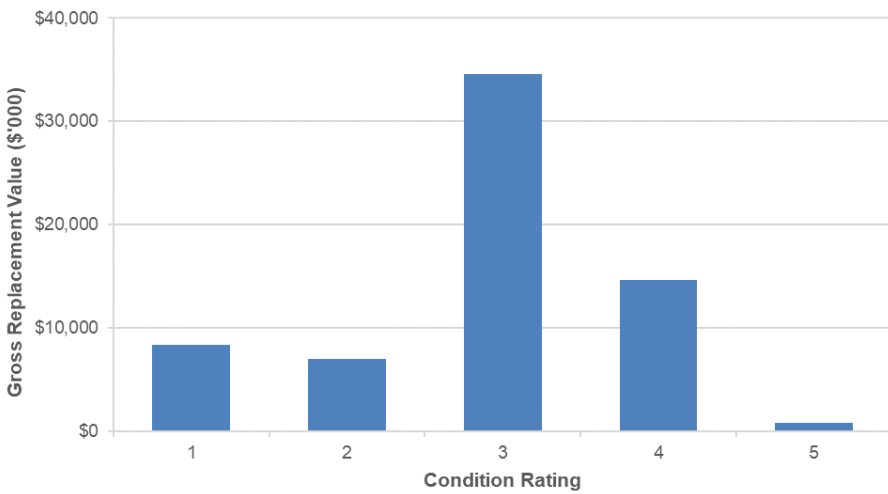


**Figure 4-2: Ground Water Bores Condition Profile**

Note: Riverina Water has nearly completed its bore rehabilitation programme retro fitting stainless steel sleeving into previous mild-steel casings.



**Figure 4-3: Water Pumping Stations Condition Profile**



**Figure 4-4: Water Reservoirs Condition Profile**

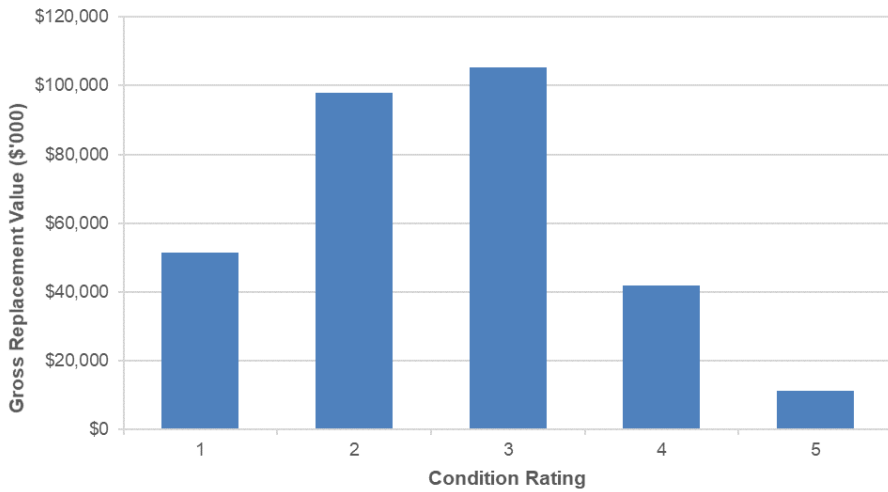


Figure 4-5: Water Pipelines Condition Profile

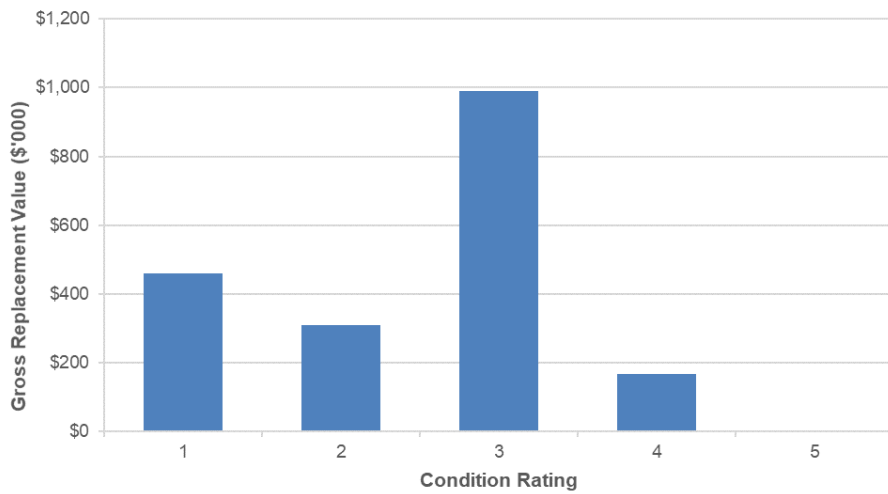


Figure 4-6: Miscellaneous Assets Condition Profile

## 4.2 Risk Management Plan

The purpose of infrastructure risk management is to document the results and recommendations of the periodic identification, assessment and treatment of risks associated with providing services from infrastructure (Ref.: ISO 31000:2009 Risk Management – Principles and Guidelines). Council has developed and adopted a corporate risk framework based on the AS/NZS Risk Management 4360:2004.

It is important for Council to quantify and make informed decisions on how to deal with risks. The assessments will need to cover WH&S, operational and environmental aspects. By identifying critical assets and failure modes, investigative activities, condition inspection programs, maintenance plans and capital expenditure programs can be planned and prioritised for the critical areas. The result will be the preparation of contingency plans for each risk. The contingency plans will allow Council to respond to events that last for extended periods and facilitate a return to normal operation as soon as possible after interruption.

Prioritisation is generally guided by the weighing up of the following considerations:

- What RWCC would ideally like to do based on the risks and criticality of its asset base (aspirational)?
- What would RWCC like to do with the existing budgets (practical)?
- What can be done by RWCC in a financially sustainable manner based on an acceptable service and risk trade-off with the AM Plan matching long-term financial plan (optimal prioritised targets)?

The decisions are then made based on the objective to achieve optimum benefit from the available resources.

The RWCC corporate risk framework (referred to as the Risk Management Plan) consists of a policy statement, roles and responsibilities for risk management across Council, a process for carrying out risk assessments and likelihood / consequence tables for rating risks. The risk assessment process offers a tool to identify credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and development of a risk treatment plan for non-acceptable risks.

A preliminary assessment of risks associated with Riverina Water's infrastructure assets has identified critical assets based on the consequences of their failure on the service levels and the outcomes are presented in Appendix B.

## 4.3 Operations Plan

The purpose of the Operations Plan is to ensure that the service objectives are achieved at the least cost and that the impact of any breakdowns or outages is minimised. Operations are more applicable to provision of utility services including the operation of water supply, sewerage and waste assets. Typically, operations involve additional cost items unrelated to maintenance such as power use, chemical purchases, routine sampling and testing, staffing of facilities, meter reading and general monitoring of services.

When the existing system is inadequate or where assets are found to be approaching capacity or the end of their economic life, the operation plan outputs should include a schedule of required capital works and maintenance cost and that the impact of any breakdowns or outages is minimised.

The operations plan sets out system operating rules and operating procedures for operating the water supply system and its individual sub systems. This may be achieved through the process illustrated in Figure 4-7.



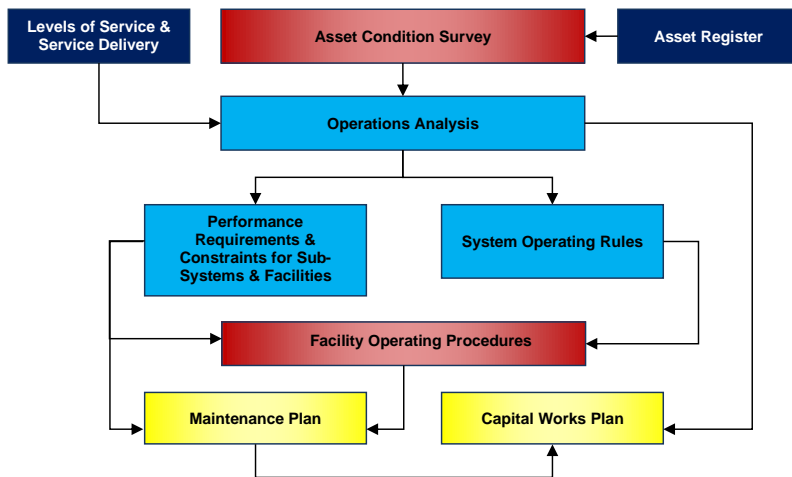


Figure 4-7: Operations Planning Flowchart

#### 4.3.1 Operations Analysis

Key to managing asset systems is the identification of system, subsystem, and asset section performance requirements. These requirements take the form of:

- outputs
- reliability
- availability

Operations staff need to be able to move to operate equipment and systems and find whether the existing system is capable of economically meeting its levels of service.

Riverina Water has been successfully operating its systems for many years, that has been done mostly on an informal basis of operational and maintenance knowledge. Council has commenced the process of documenting operational performance requirements for its systems and sub-systems. As part of the development of Riverina Water's asset management system key duty statements will be established for asset systems beginning with the most critical systems.

#### 4.3.2 Operating Rules and Procedures

The extensive systems operated by Riverina Water are managed under a set of rules identified and implemented by Riverina Water staff over many years of operations. The system operating rules provide details on how the total system is operated during normal operation and during breakdown conditions. Riverina Water has a number of existing system operating rules as follows:

- Riverina Water Quality Management System, HACCP Manual 2011
- Riverina Water Description of Water Supply System 2010
- Riverina Water Operational Plan 2011/2012

Operating procedures can take a number of forms. Incident plans need to be developed for handling emergencies. Procedures for system operations tend to be focussed on start-up, operation and troubleshooting, shutdown and quality analysis. Operating procedures usually specify the condition the assets need to be in to allow appropriate operation to take place. This can be to meet the levels

of service or to ensure that the operator is safe. An example of this is operation of a gaseous chlorine water treatment system. The pre-operation condition check should ensure that the asset is “fit for purpose” i.e. safe and fully operable to achieve water quality levels of service. This operational definition of “fit for purpose” provides the maintenance staff with a clear target for their work. If the maintenance staff cannot achieve the “fit for purpose” condition, then renewal or upgrade may be required.

Riverina Water has a number of existing procedures of various dates some of which may require updating. These procedures assist the operators of individual sub-systems to meet the operation requirements at minimum cost and to train new staff. For example, identified processes for commissioning Urana WTP in spring to ensure its availability to process water from Colombo Creek and to meet Western Trunk summer peak day needs. A list of Riverina Water’s existing operating rules and procedures are available in documents listed in Table 4-8 below.

**Table 4-8: Overview of Status of RWCCs existing operating procedures**

Area	System Operation Protocols	Water Quality Procedures	Start-up Procedures	Trouble Shooting Guide	Shutdown Procedures	Comments
Wagga Wagga System	N	Y	N	N	N	-
Southern Trunk System	N	Y	Y	N	N	O&M Manuals draft completed for Gardner
Western Trunk Main System	N	Y	Y	N	N	O&M Manuals draft completed for Bulgary WTP
Tarcutta	N	Y	Y	Y	Y	O&M Manual draft completed
Humula	N	Y	Y	Y	Y	O&M Manual draft completed
Woomargama	N	Y	Y	Y	Y	O&M Manual draft completed
Morundah	N	Y	Y	Y	Y	O&M Manual draft completed
Walbundrie /Rand	N	Y	Y	Y	Y	O&M Manual draft completed
Collingullie	N	Y	Y	Y	Y	O&M Manual draft completed
Oura	N	Y	N	Y	N	-
Holbrook	N	Y	Y	Y	Y	-

Draft O&M manuals have been developed for most of the WTPs operating in RWCC. These are comprehensive documents generally following the Water Directorate guidelines. Riverina Water has identified to further develop a detailed operational plan to these guidelines:

- System operating rules to cover wide ranging system level modes.
- Individual facility (i.e. WTPs, pumping stations, reservoirs) operating procedures (with documented conditions, actions and standards) for start-up, operation and problem solving, and shutdown (allowable frequency)
- Common task operating procedures (with documented conditions, actions and standards) for similar tasks performed in different locations e.g. sparging and reservoir cleaning

#### 4.4 Maintenance Plan

Maintenance is the day to day work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again. Appropriate levels of maintenance ensure that assets attain their full operational life expectancy. The most important factor is identification of the risk to system performance from failure of each asset. This leads to a minimum performance standard for each asset. Figure 4-8 below displays the maintenance planning processes.

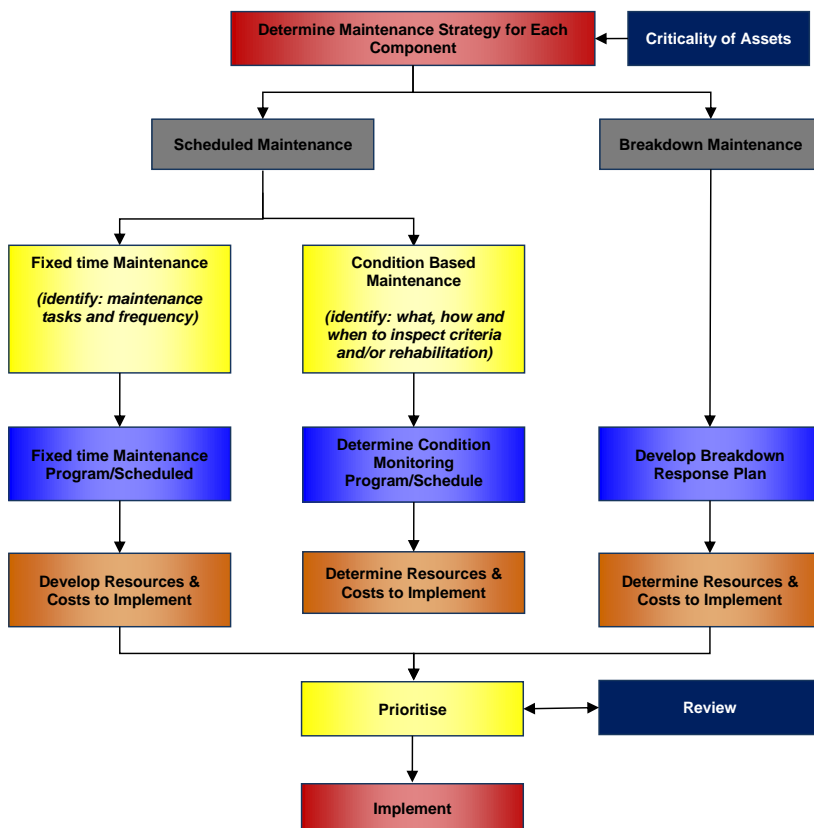


Figure 4-8: Maintenance Planning Flowchart

Maintenance comprises reactive (unscheduled/ breakdown) and planned (scheduled/ preventative) maintenance work activities and are discussed below.

#### 4.4.1 Reactive (Breakdown/ Unscheduled) Maintenance

Reactive maintenance is unplanned repair work carried out in response to breakdowns, service requests and management/supervisory directions. It includes repair work carried out in response to customer complaints, alarms, or requests from operators with little notice. Most breakdown call outs arise from three sources:

- Alarms and SCADA
- Staff observations
- Customer complaints

Critical assets such as trunk mains are covered by breakdown response when scheduled maintenance is not necessary or feasible. Riverina Water has a system in place for recording, prioritising and actioning un-scheduled maintenance. This system is detailed in the flow chart shown in Figure 4-9.

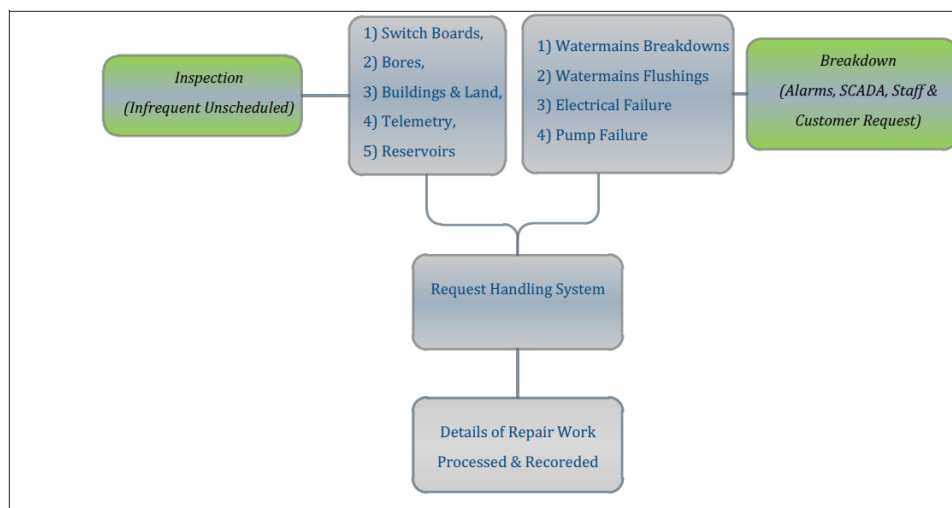


Figure 4-9: Unscheduled Maintenance Flow Diagram

Whichever source identifies the requirement for breakdown maintenance, the work is passed on to the responsible operations, works or project engineering managers to define priority and assign responsibility in the request handling system. Staff then either make the repairs or organise contractor assistance to perform the repairs.

#### 4.4.2 Planned/ Scheduled Maintenance

Scheduled or planned/preventative maintenance is work identified and managed through a management system (formal or informal maintenance management system), which is usually carried out with advance notice. Scheduled maintenance can include regular condition-based maintenance, time-based (cyclic or operating time-based) maintenance.

Regular inspections or monitoring of assets to assess its condition leads to condition-based maintenance. Activities include inspection, assessing the condition against failure/ breakdown experience, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance. Local knowledge of maintenance supervisors and staff plays an important part in the identification and programming of repair work.

Maintenance can also be scheduled on time-based cycles for example weekly, monthly or yearly maintenance or by the number operating hours. For example, cyclic maintenance is replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, building roof replacement, etc. This work generally falls below the capital/maintenance threshold.

Riverina Water has systems in place for organising and recording scheduled maintenance and has developed some maintenance management systems to plan scheduled maintenance for some subsets of its assets. These systems include:

- Schedule of pump and motor maintenance based on the number of hours of operation (Excel data base).
- Telemetry system and flow meters are on a two yearly and yearly maintenance cycle (Incomplete records kept).
- Vehicle fleet, plant and equipment are maintained as per the manufacturers' specification (Maintenance logbook kept).

Outside of Wagga Wagga, Riverina Water's assets are geographically spread across a very wide area. Much of Riverina Water's current inspections are done on an opportunistic basis. Staff will inspect systems when they are making a routine or non-routine visit to assets on a pipeline. Under DWMS, routine visual inspections of WTPs, reservoirs and pumping stations are conducted, which do not include assessment of structural integrity. This is in addition to routine or non-routine attendances by operators and other staff. Improvements could be made by scheduling comprehensive inspections (including structural integrity) of fixed assets.

Riverina Water also intends to expand this scheduled maintenance approach, where appropriate, out to many other asset types such as mains and water treatment systems. This rollout would be expected to be performed on a criticality prioritised basis with data being added into a new maintenance management system or systems.

It is expected that as the Riverina Water Maintenance system develops from core to advance approach that this system will be extended to capture the costs and link them to asset condition, reduced breakdown costs and performance against levels of service parameters.

## **4.5 Capital Works Plan**

### **4.5.1 Renewal Plan**

Renewal is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is upgrade/expansion or new works expenditure. Riverina Water identifies the estimated maintenance and capital expenditure required by matching the projected asset renewals to provide an agreed level of service to the community with the planned renewal works program. The asset register is continually reviewed and refined for the useful lives and remaining lives of asset components that improves the confidence level of the assessment of the renewal expenditure requirement.

### **4.5.2 Creation/ Upgrade/ Expansion Plan**

New works are those works that create a new asset that did not previously exist or works which upgrade or improve an existing asset beyond its existing capacity. They may result from growth, social or environmental needs. Assets may also be acquired at no cost to the Council from land development.

A list of new infrastructure capital works identified by the IWCM strategy is provided in Table 3-6. The 30-year capital works programs and the Total Asset Management Plan for the adopted IWCM strategy are presented in Figure 4-10. The Operation and Maintenance costs forecasts for the 30-year period is shown in Figure 4-11.

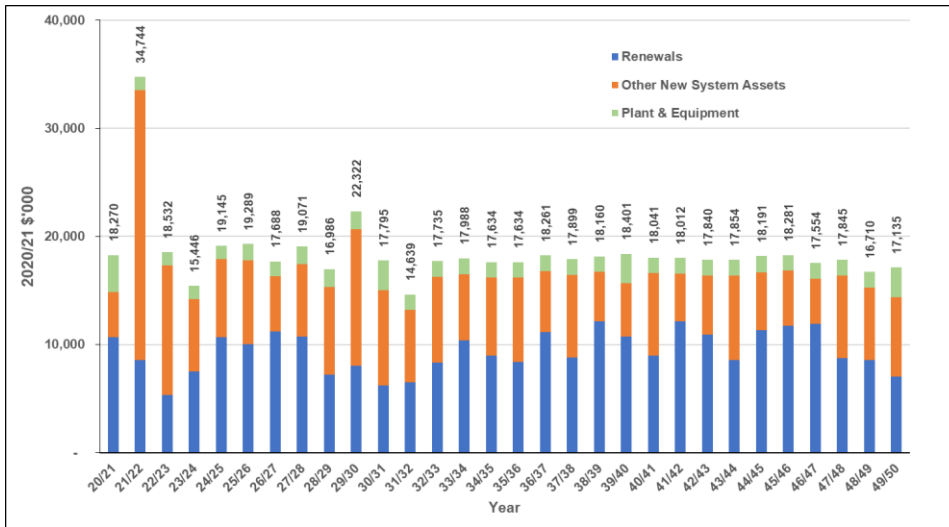


Figure 4-10: 30-Year Capital Works Schedule

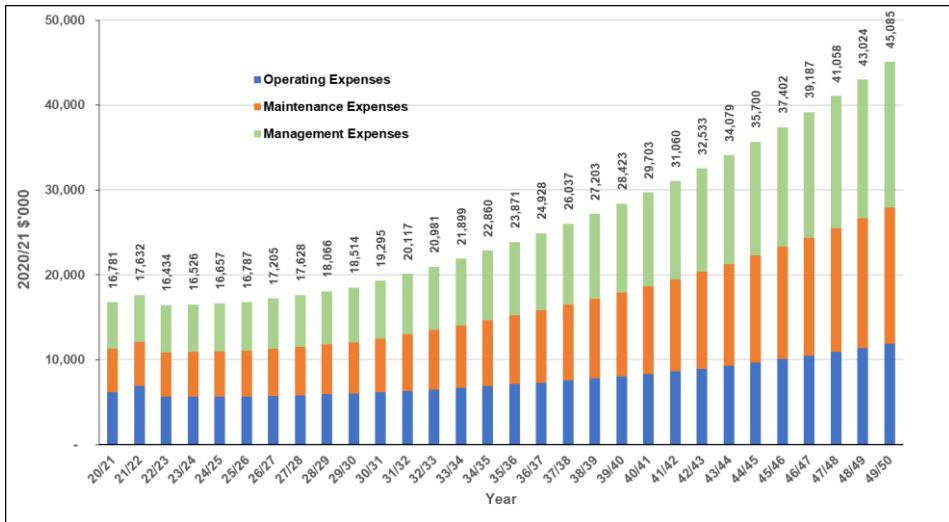


Figure 4-11: 30-year O&M Costs Schedule

#### 4.5.3 Disposal Plan

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, demolition or relocation. The following is a list of the various “failure modes” or reasons for disposal:

- Structural: where the physical condition of the asset is the measure of deterioration, service potential and remaining life
- Capacity: where the level of under or over capacity of the asset is measured against the required level of service to establish the remaining life
- Level of service failure: where reliability of the asset or performance targets are not achieved
- Obsolescence: where technical change or lack of replacement parts can render assets uneconomical to operate or maintain
- Cost or economic impact: where the cost to maintain or operate an asset is greater than the economic return.

Assets identified for possible decommissioning and disposal are shown in Table 4-9. These assets will be further reinvestigated to determine the required levels of service and see what options are available for alternate service delivery, if any.

Parts of mechanical equipment that has been replaced will be explored for possible use as spare parts or sold as scrap metal unless it is considered to have genuine re-sale value. In this case the piece of surplus equipment will be sold with income directed to the water fund account.

**Table 4-9: Assets identified for Disposal**

Asset Demolition	Year	Cost
Millswood (Abandoned) Reservoirx2	21/22	\$50,000
Bomen No.1 Steel (Abandoned) Reservoir	21/22	\$50,000
Ladysmith Low Level (Abandoned) Reservoir x 3	23/24	\$50,000
San Isadore (Future Abandoned) Reservoirx2	23/24	\$50,000
Beauty Point No2 (Future Abandoned) Reservoir	23/24	\$150,000
The Rock (Future Abandoned) Reservoir	31/32	\$150,000
Beauty Point No1 (Abandoned) Reservoir	23/24	\$150,000
Mt Austin No2 (Buckmans) Reservoir	33/34	\$150,000
Uranquinty elevated reservoir	22/23	\$200,000
Walbundrie WTP, Raw Water Dam and Billabong Creek intake	24/25	\$50,000
Rand WTP, Raw Water Dam and Billabong Creek intake	24/25	\$50,000
Rand Raw Water Storage Dam	24/25	\$50,000
Rand Sediment lagoon	24/25	\$50,000
Mangoplah LL Pump Station and LL Tanks	32/33	\$30,000
French Park Pump station	32/33	\$20,000
Boree Creek Pump Station	32/33	\$20,000
Mountain View Pump Station	33/34	\$80,000

## 5. Financial Summary

This section contains the financial requirements resulting from all the information presented in the previous sections of this asset management plan. The financial projections will be improved as further information becomes available on desired levels of service and current and projected future asset performance.

### 5.1 Historical Financial Statements

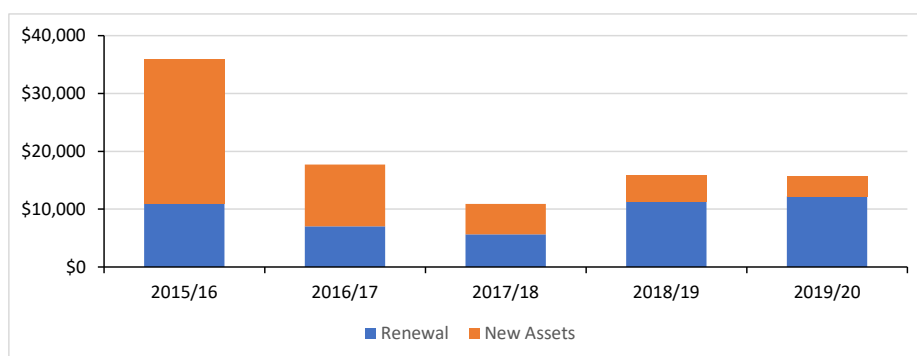
A summary of Riverina Water’s financial position as at 30 June 2020 is provided in Table 5-1.

**Table 5-1: Riverina Water’s financial position - 30 June 2020**

<b>Net Operating Result</b>	
Before grants and contributions provided for capital purposes	\$9,757m
<b>Net Assets</b>	\$405,967m
<b>Debt service cover ratio</b>	
Benchmark >2.00x	7.69x
<b>Cash expense cover ratio</b>	
Benchmark > 3 months	18.3 months
<b>Own source operating revenue ratio</b>	
Benchmark >60.00%	92.59%

A summary of Riverina Water’s capital investment over the last five years is summarized below and presented in Figure 5-1:

- \$95 Million in capital works has been delivered
- In 2019 Riverina Water delivered \$15.39 Million in capital works, which was the second highest in the State.
- This equated to approximately \$487 of capital expenditure on the provision of water supply services per connected property.
- Current replacement cost of assets per assessment is \$15,422. This is the 5th lowest of major water utilities in the State



**Figure 5-1: Riverina Water’s capital expenditure in the last five years (\$'000)**



## 5.2 Funding Strategy

Planned and forecast expenditure is to be funded from RWCC's operating and capital budgets that draws from the following funding sources (Table 5-2).

**Table 5-2: Funding Sources**

Expenditure Category	Description of Expenditure	Funding Source
Operations	Expenditure for day to day activities of business operations, e.g. energy cost, chemicals, bulk water purchase, licencing charges etc.	Water charges Fund reserves
Maintenance	Expenditure for the on-going upkeep of assets to ensure they meet their useful lives	Water charges Fund reserves
Asset rehabilitation/ renewal	The investment of maintaining the current level of service by reinstating the original life of the asset	Water charges Fund reserves
New assets for improved levels of service to existing customers	The expenditure in a new asset to improve the levels of service and/or to meet legislative requirements, e.g. water quality improvements, Telemetry/ SCADA for improved operational controls	Water charges Fund reserves Govt. grants Loans
New acquired assets	New assets constructed by developers for future new customers and their costs and handed over to the LWU for ongoing operation, maintenance and renewal	Contributed/ gifted assets
New or augmented assets for growth	Major new assets needed to service future growth	Developer charges Water charges Fund reserves Govt. grants Loans
Disposal	Costs associated with decommissioning and disposal of assets	Water charges Fund reserves

The operation and maintenance expenditure are funded from the annual water charges that contribute to cash reserves. Some, or all, capital works (for asset renewal and new assets) are funded directly from accumulated cash reserves including saved depreciation expenses and accumulated developer charges. To overcome intergenerational equity issues, renewal programs are generally fully funded out of internally generated cash (where practical). Borrowing against capital acquisitions are resorted to top up available funds from cash reserves, where planned expenditure constrains maintaining the adopted minimum cash levels for the fund.

Funds, which are surplus to requirements, can be used to further reduce or eliminate borrowing requirements and reduce interest payments.

### Subsidies/Grants for Capital Works

The financial forecasts for the water fund assume that no government grant/ subsidy will be available for any of the planned capital works.

## 5.3 Financial Forecasts

The 30-year capital works and O&M Plan shows the expenditure based on the current estimates for the long-term capital, operational and maintenance and are used in the financial model for projecting

the financial position over the next 30 years. The model forecast typical residential bills (TRBs) for the next 30-years are presented in Figure 5-2.

The financial forecasts consider the repayment of current outstanding loan (as at 30 June 2020), and a new loan of \$16 Million in 2022/23. The forecast levels of typical residential bills are sufficient to maintain liquidity with a minimum of \$5 Million of cash in hand.

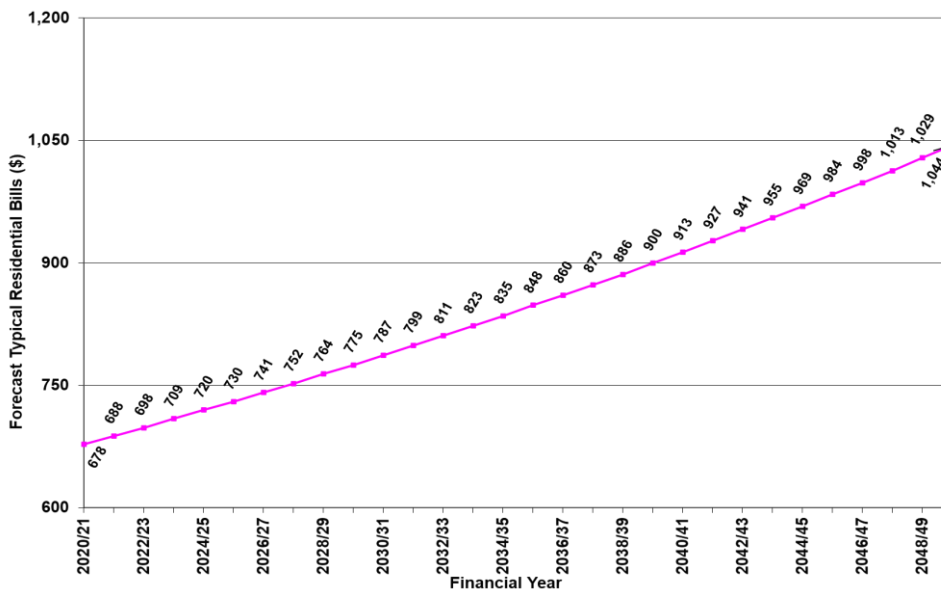


Figure 5-2: Typical Residential Bill Forecast (\$)

The levels of cash and borrowing outstanding as the planned capital work expenditure are incurred during the 30-year forecast period are presented in Figure 5-3.

A summary of projected financial results is presented in Table 5-3 . More detailed financial forecast summaries are as presented in Appendix C.

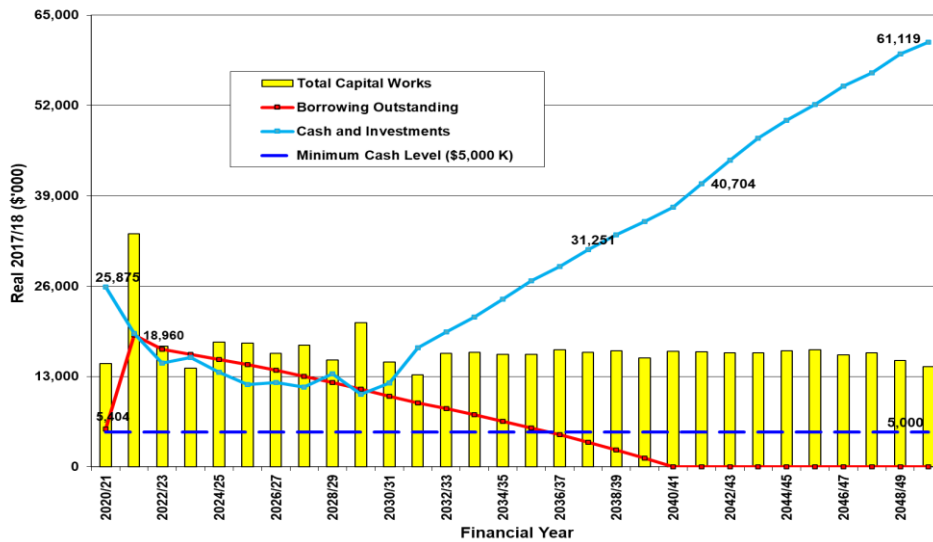


Figure 5-3: Cash & Borrowing Outstanding (\$'000)

#### 5.4 Key Assumptions of Financial Forecasts – Reliability and Confidence

This section details the key assumptions made in presenting the information contained in this asset management plan and in preparing forecasts of required operating and capital expenditure and asset values, depreciation expense and carrying amount estimates. It is presented to enable readers to gain an understanding of the levels of confidence in the data behind the financial forecasts.

The projections of the financial models are mainly based on the previous two years (historical) financial records. Allowance is made for new initiatives, future rate forecasts, and maintenance of sustainable Levels of Service (LOS) as identified and adopted by Riverina Water through the IWCM process.

The net operating results and other financial performance indicators such as the economic real rate of return (ERRR) etc., in the financial projections should be seen in light of the fact that the depreciation of existing assets shown in the operating statement is not a cash item. FINMOD specifically models Riverina Water's asset renewal program as the fully internally funded component of the capital works program. A modest negative operating result is often sustainable as conventional depreciation of assets is conservative in comparison with an asset renewal program that has been rigorously evaluated and adopted for the financial projections.

The financial model manages the cash flow and keeps a running tally of the cumulative depreciation so that the Council can appreciate the potential future liability for maintaining the value in the system and the LOS. By planning ahead and making optimum use of existing assets, a more cost effective and efficient service should result.

Typical Residential Bills are used as the performance indicators representing overall revenue requirements from residential customers. This should not be confused with pricing structure. Pricing, i.e. distribution of the charges according to consumption or special customer groups, is the subject of a separate revenue planning exercise. Tariff structure for the services will need to take into account corporate policies, approach to risks such as lower than adopted growth rates, increase in interest rates and the acceptability of charges to the community.

The financial model is not a substitute for normal budgeting, (i.e. short-term financial planning). The model assumes that all expenses and income occur at the beginning of the year and is therefore not appropriate to track cash flow throughout the year. It is important, however, that the budgeting process is carried out within the framework of the long-term financial plan.

Models will require updating as more accurate expenditure schedules become available. Annual update and 3 to 4 yearly review of the model projections with the up to date level of expenditure is recommended.

Table 5-3: Summary of Projected Financial Forecasts

Financial Year	Revenue and Expenses			Capital Transactions		Financial Position					System Assets			Typical Residential Bills
	Total Revenue	Total Expenses	Operating Result (Before Grants)	Acquisition of Assets	Principal Loan Payments	Cash and Investments	Borrowings	Total Assets	Total Liabilities	Net Assets Committed	Current Replacement Cost	Less: Accumulated Depreciation	Written Down Current Cost	
2020/21	31,673	24,028	7,645	18,270	1,860	25,875	5,404	425,717	12,102	413,615	371,867	-4,445	376,312	678
2021/22	32,256	25,357	6,899	34,744	2,444	19,205	18,960	446,239	25,725	420,514	396,849	-6,424	403,273	688
2022/23	32,855	24,449	8,406	18,532	2,092	14,895	16,868	452,621	23,701	428,920	408,831	-5,035	413,866	698
2023/24	33,624	24,761	8,863	15,446	697	15,742	16,171	460,856	23,073	437,783	415,532	-5,705	421,237	709
2024/25	34,459	25,119	9,340	19,145	732	13,558	15,439	469,533	22,410	447,123	422,766	-9,428	432,194	720
2025/26	35,243	25,180	10,063	19,289	770	11,845	14,669	478,896	21,710	457,186	430,522	-12,417	442,939	730
2026/27	36,109	25,446	10,663	17,688	811	12,138	13,858	488,818	20,969	467,849	435,646	-16,509	452,155	741
2027/28	37,013	26,126	10,887	19,071	854	11,484	13,004	498,922	20,186	478,736	442,363	-20,030	462,393	752
2028/29	37,986	26,844	11,142	16,986	899	13,404	12,105	509,236	19,358	489,878	450,497	-19,898	470,395	764
2029/30	38,900	27,636	11,264	22,322	946	10,406	11,159	519,626	18,484	501,142	463,135	-20,432	483,567	775
2030/31	39,853	28,476	11,377	17,795	996	12,058	10,163	530,081	17,562	512,519	471,979	-18,996	490,975	787
2031/32	40,902	29,417	11,485	14,639	973	17,113	9,190	540,667	16,663	524,004	478,630	-17,793	496,423	799
2032/33	41,967	30,420	11,547	17,735	853	19,393	8,337	551,436	15,885	535,551	486,607	-18,246	504,853	811
2033/34	43,032	31,452	11,580	17,988	869	21,549	7,468	562,222	15,091	547,131	492,703	-20,696	513,399	823
2034/35	44,104	32,536	11,568	17,634	913	24,125	6,555	572,953	14,254	558,699	499,922	-21,616	521,538	835
2035/36	45,250	33,654	11,596	17,634	960	26,787	5,595	583,666	13,371	570,295	507,715	-21,851	529,566	848
2036/37	46,364	34,803	11,561	18,261	1,008	28,831	4,587	594,297	12,441	581,856	513,400	-24,740	538,140	860
2037/38	47,539	36,005	11,534	17,899	1,059	31,251	3,528	604,851	11,461	593,390	521,050	-25,193	546,243	873
2038/39	48,731	37,216	11,515	18,160	1,113	33,380	2,415	615,332	10,427	604,905	525,601	-28,941	554,542	886
2039/40	49,994	38,617	11,377	18,401	1,169	35,253	1,246	625,620	9,338	616,282	530,499	-31,222	561,721	900
2040/41	51,224	39,877	11,347	18,041	1,229	37,376	17	635,819	8,190	627,629	538,122	-31,600	569,722	913
2041/42	52,531	41,297	11,234	18,012	0	40,704	17	647,134	8,271	638,863	542,526	-35,105	577,631	927
2042/43	53,885	42,848	11,037	17,840	0	44,085	17	658,253	8,353	649,900	547,987	-37,303	585,290	941
2043/44	55,252	44,501	10,751	17,854	0	47,272	17	669,088	8,437	660,651	555,812	-37,039	592,851	955
2044/45	56,632	46,203	10,429	18,191	0	49,880	17	679,601	8,521	671,080	561,146	-39,477	600,623	969
2045/46	58,085	47,978	10,107	18,281	0	52,147	17	689,793	8,606	681,187	566,231	-42,231	608,462	984
2046/47	59,494	49,823	9,671	17,554	0	54,763	17	699,550	8,692	690,858	570,439	-45,075	615,514	998
2047/48	60,982	51,803	9,179	17,845	0	56,704	17	708,815	8,778	700,037	578,103	-44,645	622,748	1,013
2048/49	62,556	53,865	8,691	16,710	0	59,387	17	717,594	8,866	708,728	584,812	-43,939	628,751	1,029
2049/50	64,092	56,031	8,061	17,135	0	61,119	17	725,744	8,955	716,789	592,158	-41,625	633,783	1,044

## 6. Plan Improvement and Monitoring

### 6.1 Current Asset management Practices

Asset management practices are combination of processes, data, software and hardware applied to provide the essential outputs for effective asset management thereby reducing risks and optimising investment on assets. In general computer-based asset management information systems are used to store and analyse the significant quantities of asset data collected for asset management purposes.

The benefits of having good asset management practices will provide:

- A thorough assessment of current performance and future assets requirement
- An understanding of how the asset management system will interface with other
- Council practices such as financial practices
- The resources requirement (budgets and system specialists) to maintain suitable asset management system

#### 6.1.1 Asset Management Systems

RWCC generally uses databases and excel spreadsheets to record maintenance accomplishments for pipes and most above-ground assets. RWCC's existing asset management systems and databases are summarised in Table 6-1. Some of these databases are integrated with RWCC's Geographic Information System (GIS) and provide live updates of spatial data integration.

**Table 6-1: List of Asset Groupings and Databases**

Asset Class	Database	GIS linked	Is Database up to date?
Pipes	AssetFinda	Y	Y
Pumping Stations	Excel Spreadsheet	N	Y
Dams and Wells	Excel Spreadsheet	Y	Y
Reservoirs	Excel Spreadsheet	Y	Y
Water Treatment Plants	Excel Spreadsheet	Y	Y
Bores	Excel Spreadsheet	Y	Y
Service Connections	AssetFinda	Y	Y
Mag-flow meters	Excel Spreadsheet	N	Y
SCADA	Excel Spreadsheet	N/A	Y
Land & Buildings	Excel Spreadsheet	N	Y
Above-ground structures	Excel Spreadsheet	No – Schematics only	Y
Transport	Fleet manager	N/A	Y
Plant & vehicles	Authority	N/A	Y
Computers	Excel Spreadsheet	N/A	N
Furniture	No	N/A	No breakup

\*Note: GIS & AssetFinda data do not always match up; Y = Yes, N= No, N/A= Not Applicable  
(Source: Riverina Water AMP, 2012)

Council's financial section is responsible for keeping RWCC financial asset register up to date. Entries and updates are applied based on capital expenditure. Council has an up to date asset register. The details of the existing asset register have been discussed in Section 4.1.1.

## 6.2 Performance Measures

The effectiveness of the asset management plan can be measured in the following ways:

- The degree to which the required projected expenditure identified in this asset management plan are incorporated into the long-term financial plan
- The degree to which 1-5-year detailed works programs, budgets, business plans and corporate structure take into account the 'global' works program trends provided by the asset management plan
- The degree to which the existing and projected service levels and service consequences, risks and residual risks are incorporated into the Strategic Plan and associated plans

## 6.3 Improvement Plan

The Improvement Plan is to outline how asset management processes, information systems, data and knowledge can be improved.

A basic principle of good asset management practice is that existing assets will be maintained and renewed where necessary, before the acquisition of new assets are considered. A major assumption, therefore, is that any improvement plan will be assessed according to that principle, and that the allocation of resources for the proposed improvement plan will be prioritised separately from new capital works.

### 6.3.1 From Core to Advanced Asset Management Planning

Riverina Water intends to develop a core asset management plan and over the next four years develop an advanced asset management plan. This will involve a number of steps:

- Establish prioritised system asset criticality actions
- Establish detailed operational plan components for critical systems to identify fit for purpose requirements
- Further develop detailed maintenance procedures for planned and unplanned maintenance

## 6.4 Monitoring and Review Procedures

This asset management plan will be reviewed during annual budget preparation and amended to recognise any changes in service levels and/or resources available to provide those services as a result of the budget decision process.

The Plan has a life of 4-6 years and is due for revision and updating within 2 years of each Council election.

## 7. References

1. **Public Works Advisory.** *Integrated Water Cycle Management Strategy.* 2021.
2. **Riverina Water County Council.** *Revised Delivery Program 2017/2018 to 2019/2020 and Operational Plan 2017/2018.* 2017.
3. **Riverina Water County Council.** *Description of Water Supply System.* 2014.
4. **NSW Department of Primary Industries.** *2015-16 NSW Water Supply and Sewerage Benchmarking Report.* 2017.
5. **HydroScience.** *Riverina Water County Council - Demand Management Plan.* 2012.
6. —. *Riverina Water County Council - Asset Management Plan.* 2012.
7. **NSW Division of Local Government, Department of Premier and Cabinet.** *Integrated Planning and Reporting Manual for local government in NSW.* 2012.
8. **Riverina Water County Council.** *Riverina Water Drinking Water Management System.* 2019.
9. **NSW Department of Planning, Industry and Environment.** *Yanco Creek System - Sustainable diversion limit adjustment mechanism projects.* 2019.
10. **HydroScience.** *RWCC Development Servicing Plan.* 2013.

## Appendices

### Appendix A Asset Details

#### A.1 RWCC Asset Capacities

These asset capacities were taken from RWCC's file *Design Capacities.xlsx*

**Table A-1: Asset Capacities - RWCC Service Reservoirs (Permanent)**

NAME	MATERIAL	AGE	CAPACITY (ML)
LOW LEVEL 1	Concrete	2019	11.000
LOW LEVEL 2	Concrete	2019	11.000
BEAUTY POINT 1	Prestressed Concrete	1959	4.540
BEAUTY POINT 2	Concrete	1940	0.900
BELLVUE 1	Steel	1992	2.500
BELLVUE 2	Steel	1960	0.540
BOMEN 1	Prestressed Concrete	1977	9.000
BOMEN 2	Concrete	1946	1.000
BOREE CK	Concrete	1951	0.230
BRUCEDALE	Steel	1978	0.750
COLLINGULLIE	Concrete	2015	0.700
COTTEE	Concrete	1990	0.530
CURRAWARNA	Concrete	1990	0.100
EAST BOMEN 1	Prestressed Concrete	1980	2.000
EAST BOMEN 2	Prestressed Concrete	1996	4.000
ESTELLA	Steel	1985	11.000
GLENFIELD	Prestressed Concrete	1994	11.000
GLENOAK	Steel	2000	1.300
GLENOAK 2	Concrete	2019	4.500
GREGADOO	Steel	1988	1.500
HENTY BT	Concrete	1949	4.540
HOLBROOK	Concrete	1946	1.140
HOLBROOK H.L.	Steel	1970	1.140
HUMULA 1	Concrete	1996	0.105
HUMULA 2	Concrete	1997	0.105
LADYSMITH BT	Concrete	1992	0.450
LOCKHART	Concrete	1949	0.450
LUDWIG 1	Concrete	1983	0.105
LUDWIG 2	Concrete	1983	0.105
LUDWIG 3	Concrete	1983	0.105
LUDWIG 4	Concrete	1983	0.105
MANGOPLAH HL Res	Steel	2015	0.136
MILBRULONG BT	Concrete	1949	4.540
MILBRULONG RES	Concrete	1949	0.230
MORUNDAH	Segmented Cast Iron	1962	0.136
MORVEN	Concrete	1949	1.140
MOUNT AUSTIN 1	Prestressed Concrete	1973	9.000
MOUNT AUSTIN 2	Concrete	1959	2.500
OAKLANDS	Concrete	1954	0.450
OURA 1	Concrete	2001	0.095
OURA 2	Concrete	2001	0.090
PLEASANT HILLS	Concrete	1989	0.540
RAND 1	Steel	1965	0.140
RAND 2	Steel	2002	0.140
REDHILL 1	Prestressed Concrete	1977	9.000
REDHILL 2	Steel	1966	2.500
REDHILL 3	Concrete Post Stressed	2011	10.000
ROUND	Concrete, in ground	1926	4.500

Commented [AC1]: Please add the Red Hill Road Reservoir and Glenoak number 2 res and the two, 11 meg reservoirs at Willans Hill



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NAME	MATERIAL	AGE	CAPACITY (ML)
RURAL Res	Concrete	2018	5.000
SAN ISADORE 1	Concrete	1981	0.105
SAN ISADORE 2	Concrete	1982	0.105
SQUARE	Concrete, in ground	1880	4.500
TARCUTTA	Concrete	1950	0.450
THE GAP	Steel	1980	0.750
THE ROCK	Concrete	1945	1.140
TOOYAL	Concrete	1990	0.100
URANA	Concrete	1952	0.450
URANQUINTY H.L.	Concrete	1995	1.300
WALBUNDRIE 1	Concrete	1989	0.105
WALBUNDRIE 2	Concrete	1990	0.105
WALLA	Concrete	1950	0.450
WOOMARGAMA	Concrete	1991	0.040
WOOMARGAMA	Concrete	1991	0.120
YERONG CREEK	Concrete	1949	0.450

Table A-2: Asset Capacities - RWCC Service Reservoirs (Seasonal)

NAME	MATERIAL	AGE	CAPACITY
COORABIN 1	Concrete	1972	0.091
COORABIN 2	Concrete		0.091
COORABIN 3	Concrete		0.091
MOUNTAIN VIEW 1	Concrete	1978	0.105
MOUNTAIN VIEW 2	Concrete		0.105

Table A-3: Asset Capacities – Clear Water Storages (incl. Aeration Tanks)

NAME	MATERIAL	AGE	CAPACITY
Wagga WTP CWS	Concrete	2019	4.500
East Wagga Aeration Tank	Concrete	2002	4.500
West Wagga Aeration Tank 1	Concrete	1980	1.200
West Wagga Aeration Tank 2	Concrete	1980	1.200
North Wagga Aeration Tank 1	Concrete	1977	0.558
North Wagga Aeration Tank 2	Concrete	1977	0.558
Collingullie CWS	Concrete	2008	0.045
Oura CWS	Concrete	1982	0.029
Ralvona Aeration Tank 1	Concrete	1989	0.176
Ralvona Aeration Tank 2	Steel	1989	0.105
Walbundrie Aeration Tank	Concrete	2005	0.050
Tarcutta Aeration Tank 1	Poly	2008	0.045
Tarcutta Aeration Tank 2	Poly	2008	0.045
Humula CSW	Concrete	2003	0.005
Humula Aeration Tank	Concrete	2003	0.005
Bulgary Aeration Tank	Concrete	1983	0.105
Gardiners Crossing Aeration Tank	Concrete	1983	0.105

Commented [AC2]: Can we please populate the "material" and "age" Columns

Table A-4: Asset Capacities – Bores

Bore	Output (L/s)	24 hour Output (ML/day)
EAST WAGGA 1	100.0	8.64
EAST WAGGA 2	100.0	8.64
EAST WAGGA 3	120.0	10.37
NTH WAGGA 1	100.0	8.64
NTH WAGGA 2	100.0	8.64
NTH WAGGA 3	100.0	8.64
WEST WAGGA 1	75.0	6.48

Bore	Output (L/s)	24 hour Output (ML/day)
WEST WAGGA 2	100.0	8.64
WEST WAGGA 4	150.0	12.96
WEST WAGGA 5	150.0	12.96
BULGARY 1	40.0	3.46
BULGARY 3	34.0	2.94
COLLINGULLIE 1	7.0	0.60
COLLINGULLIE 2	10.0	0.86
HUMULA BORE	1.0	0.09
HUMULA WELL 1	1.4	0.12
HUMULA WELL 2	1.4	0.12
OURA 1	7.0	0.60
OURA 2	7.0	0.60
RALVONA 1B	25.0	2.16
RALVONA 2B	35.0	3.02
RALVONA 3	18.0	1.56
TARCUTTA 4	7.0	0.60
TARCUTTA 5	5.0	0.43
WALBUNDRIE 1	11.5	0.99
WALBUNDRIE 2	10.0	0.86
WALLA 1	20.0	1.73
WALLA 2	20.0	1.73
WOOMARGAMA S.P.	2.0	0.17
WOOMARGAMA BORE	2.5	0.22

**Table A-5: Asset Capacities – Pump Stations**

Location	kW	Output (L/s)	22 hour Output (ML/day)
10 M.G. PUMPHOUSE	306	200	15.8
BELLEVUE PUMPHOUSE	90	77	6.1
BOREE CK. RES BOOSTER	22	10	0.8
BRUCEDALE PUMPHOUSE	89	15	1.2
BULGARY PUMPHOUSE	180	38	3.0
COLLINGULLIE PUMPHOUSE	19	10	0.8
COLOMBO CK	11	140	11.1
COORABIN PUMPHOUSE	30	5	0.4
EAST BOMEN PUMPHOUSE	135	35	2.8
ESTELLA PUMPHOUSE	110	70	5.5
GARDINERS CROSSING PUMPHOUSE	60	20	1.6
GLENOAK PUMPHOUSE	30	22	1.7
GREGADOO PUMPHOUSE	44	45	3.6
HENTY PUMPHOUSE	69	8	0.6
HOLBROOK PUMPHOUSE	6	11	0.9
HUMULA WELL PUMPHOUSE	4	2.5	0.2
HUMULA GOLF COURSE PUMPHOUSE	2	1	0.1
LOCKHART PUMPHOUSE	35	20	1.6
MANGOPLAH PUMPHOUSE	2	5	0.4
MORUNDAH CREEK PUMP	1	2	0.2
MORUNDAH PUMPHOUSE	6	2	0.2
MOUNTAIN VIEW PUMPHOUSE	30	6	0.5
NORTH WAGGA PUMPHOUSE	373	156	12.4
OURA PUMPHOUSE	37	7	0.6
PLEASANT HILLS PUMPHOUSE	15	5	0.4
RALVONA PUMPHOUSE	187	42	3.3
TARCUTTA PUMPHOUSE	15	6	0.5
THE GAP PUMPHOUSE	37	11	0.9

Location	kW	Output (L/s)	22 hour Output (ML/day)
THE ROCK PUMPHOUSE	93	35	2.8
TOOYAL PUMPHOUSE	30	9	0.7
URANA PUMPHOUSE	11	12	1.0
URANA RESERVOIR BOOSTER	3	7	0.6
WAGGA HEADWORKS PUMPHOUSE	78	520	41.2
WALBUNDRIE BORE PUMPHOUSE	5	11.5	0.9
WATSON RD PUMPHOUSE	11	9	0.7
WEST WAGGA PUMPHOUSE	1024	350	27.7
WOOMARGAMA PUMPHOUSE	2	2	0.2

Table A-6: Asset Capacities – Treatment Plants

Name	Type	Output (ML/day)
COLLINGULIE	AERATE/FILTER	0.6
TARCUTTA	AERATE/FILTER	0.8
BULGARY	AERATION	3
GARDINERS CROSSING	AERATION	1.5
NORTH WAGGA	AERATION	25
OURA	AERATION	0.6
RALVONA	AERATION	4
WALBUNDRIE	AERATION	0.8
WEST WAGGA 1	AERATION	25
WEST WAGGA 2	AERATION	20
EAST WAGGA	AERATION	25
WAGGA WAGGA SLUDGE	CENTRIFUGE	1
MORUNDAH	FILTRATION	0.2
URANA	FILTRATION	1.1
WAGGA WAGGA Filtration Plant	FILTRATION	55
HUMULA	AERATION	0.09
WOOMARGAMA	AERATION	0.2

## Appendix B Criticality Assessment

Table B-1 below shows the theoretical outcome in terms of which form asset management actions would be expected based on the likelihood and consequence of failure of assets.

**Table B-1: Theoretical Asset Management Actions**

Consequence	7	7/1	7/2	7/3	7/4	7/5	7/6	7/7
	6	6/1	6/2	6/3	6/4	6/5	6/6	6/7
	5	5/1	5/2	5/3	5/4	5/5	5/6	5/7
	4	4/1	4/2	4/3	4/4	4/5	4/6	4/7
	3	3/1	3/2	3/3	3/4	3/5	3/6	3/7
	2	2/1	2/2	2/3	2/4	2/5	2/6	2/7
	1	1/1	1/2	1/3	1/4	1/5	1/6	1/7
		1	2	3	4	5	6	7
Likelihood								




-  Likely that Capital Works will be required (Colour Brown)
-  Likely Covered by Scheduled Maintenance (Colour Orange)
-  Likely Covered Unscheduled Maintenance (Colour Yellow)

Table B-2: Asset Criticality Assessment Outcomes

System	Asset	Level of Service & Consequence of Failure						Likelihood of Failure Worst Case Scenario			Worst Case Scenario	
		Pressure (12m-120m)	Peak Demand (Urban + 11kL/d Rural)	Supply Interrupt (LT 2/y 12h, LT 5/y 5h)	Fire Fighting (Positive Head Fire Flow + 75% Design Peak)	Water Quality – 2011 ADWG (But Aesthetic & Technology Ability)	Condition (Performs Acceptably)	Capacity (Ability to meet Current & Future LOS)	Current & Future (LOS) Consequence Likelihood	Consequence	Likelihood	
North Wagga Systems	Bores	2	3	3	1	2	7	7	7	1	7	
	Bore Rising Main	2	3	3	1	2	5	7	6	1	5	
	Treatment Plant	2	3	2	1	2	5	5	6	1	5	
	Pipeline (NW) - Industry	3	3	3	2	2	5	3	4	2	3	
	Pipeline (NW) - Estella CSU	2	3	3	1	2	4	3	4	1	3	
	Reticulation - Bomen	3	3	3	3	2	5	5	4	2	4	
	Reticulation - Estella	2	3	2	2	2	6	5	5	2	5	
	Brucedale Reticulation	4	5	4	3	2	3	2	6	2	2	
	The Gap/ Currawarna pipeline	4	5	4	3	2	3	2	6	2	2	

Main Wagga System	Wagga Surface with Treatment Plant	2	3	2	1	1	7	7	7	1	6
	River Intake Pipeline	2	3	2	1	1	7	7	7	1	7
	Riv (3x) pipelines - from WTP to CWS	2	3	2	1	1	5	5	3	1	3
	East Wagga Bores	2	2	2	1	1	7	5	7	1	5
	Wagga Low level Reservoirs	2	1	2	1	1	7	7	7	1	7
	Wagga Hi level Reservoirs	2	2	2	1	1	5	6	6	1	5
	Bellevue Reservoirs	3	4	3	2	2	5	3	4	2	3
	Wagga Trunk Mains & Pumping Stations	2	1	2	1	1	3	3	3	1	3
	East Bores Raw Rising Pipeline	2	2	2	1	1	5	5	6	1	5
	Hammond Avenue Clear Water Storage	1	2	2	1	1	7	7	7	1	7
	Lady Smith/Forest Hills Pipeline	3	3	3	1	1	4	6	5	1	4
	WI rising (multiple) mains from CWS	1	1	1	1	1	3	5	3	1	4
Southern Trunk System	West Wagga Bores	2	2	2	1	1	5	5	6	1	5
	W - West Bores Raw Pipeline	2	2	2	1	1	6	6	6	1	6
	West Wagga WTP & Pumps	2	2	2	1	1	5	3	3	1	3

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	W2 - HL Red Hill Pipeline from West WTP	2	2	2	1	1	5	4	4	1	4
	R - Trunk Main from West WTP to Henty Balance Tank	2	3	2	1	2	3	3	5	1	2
	Mains from Rock to Milbrulong Balance Tank	4	5	4	4	3	2	4	5	3	2
	RV Pipeline from Henty Balance Tank to Walla	3	4	3	2	2	5	5	5	2	5
	Rock to Mangoplah Pipeline	4	5	4	2	2	2	2	5	2	2
	Rock to Pleasant Hills Pipeline	4	4	5	2	2	5	5	6	2	5
	Walla Walla Bores	3	4	3	2	2	4	4	4	2	4
	Gardiners X-ing WTP (Walla Bores)	3	4	3	2	2	3	3	2	2	2
	Morven pipeline from Southern Trunk, incl. Henty PS	4	5	4	3	2	3	6	5	2	3
	Ralvona Bores	3	3	3	2	2	5	7	6	2	5
Holbrook Systems	Ralvona WTP & Pipeline	3	3	3	2	2	3	6	3	2	3
	Holbrook Reticulation	3	3	3	2	2	3	4	5	2	3
Western Trunk System	Bulgary Bores	3	4	3	2	2	7	4	6	2	4
	Bulgary Bores to WTP Pipeline	3	4	3	2	2	4	4	5	2	4

Asset Management Plan

Our a Syst	Bulgary WTP & pumps	3	4	3	2	2	4	4	3	2	3
	Bulgary to Milbrulong balance tank pipeline	3	4	3	2	2	3	4	4	2	3
	Pipeline from Milbrulong balance tank to Urana	3	3	3	2	2	3	5	5	2	3
	Colombo Creek Pumping station & pipeline to Urana	7	7	7	5	3	7	7	7	3	7
	Urana WTP	3	3	3	2	2	2	3	2	2	2
	Urana to Oaklands Pipeline	4	5	4	2	2	4	3	3	2	3
Morundah System	Morundah WFP, inc raw supply and pumps	5	6	5	4	3	3	6	3	3	3
	Morundah Reticulation	5	6	5	4	3	1	6	3	3	1
Collingullie System	Collingullie Bores incl. Pipeline	4	5	4	2	2	6	3	5	2	3
	Collingullie WTP (Filtration, aeration), CWS storage & pumping	4	5	4	2	2	6	6	7	2	6
	Collingullie Reticulation incl. Reservoir	4	5	4	2	2	5	3	6	2	3
Our a Syst	Oura Bores	4	5	4	2	2	6	6	7	2	6



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	Oura WTP	4	5	4	2	2	4	5	4	2	4
	Oura Reticulation incl reservoir	4	5	4	2	2	3	5	5	2	3
Tarcutta System	Tarcutta Bores	3	4	3	2	2	5	6	5	2	5
	Tarcutta WTP	3	4	3	2	2	7	7	7	2	7
	Tarcutta Reticulation	3	4	3	2	2	4	6	6	2	4
Humula System	Humula Bores	5	6	5	2	2	6	5	4	2	4
	Humula Well	5	6	5	2	2	2	4	2	2	2
	Humula Reticulation	5	6	5	2	2	4	7	6	2	4
Woomargama	Woomargama Bores	4	5	4	2	2	5	6	7	2	5
	Woomargama WTP (Cl <sup>2</sup> & aerations)	4	5	4	2	2	2	5	3	2	2
	Woomargama Reticulation & Reservoir	4	5	4	2	2	3	1	5	2	1
Walbundrie Rand	Walbundrie Bores	4	5	4	3	2	6	6	6	2	6
	Walbundrie WTP (aeration & Cl <sup>2</sup> )	4	5	4	3	2	6	6	6	2	6
	Walbundrie Rising Main	4	5	4	3	2	6	7	7	2	6
	Walbundrie Reticulation	4	5	4	3	2	5	6	7	2	5
	Walbundrie to Rand Pipeline	4	5	4	3	2	7	7	7	2	7
	Rand Reticulation	4	5	4	3	2	5	6	7	2	5





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