ABN: 46 211 642 339
PO Box 420, Cootamundra NSW 2590
Email: mail@cgrc.nsw.gov.au
www.cgrc.nsw.gov.au

Business Paper

EXTRAORDINARY COUNCIL MEETING

COUNCIL CHAMBERS, GUNDAGAI

4:00PM, TUESDAY 6TH OCTOBER, 2020

Administration Centres: 1300 459 689

The Mayor & Councillors
Cootamundra-Gundagai Regional Council
PO Box 420
Cootamundra NSW 2590

NOTICE OF MEETING

An Extraordinary Meeting of Council will be held in the Council Chambers, Gundagai on:

Tuesday, 6th October, 2020 at 4:00PM

The agenda for the meeting is enclosed.

Phillip McMurray
General Manager

AGENDA

Order Of Business

1 ACKNOWLEDGEMENT OF COUNTRY

Council acknowledges the Wiradjuri people, the Traditional Custodians of the Land at which the meeting is held and pays its respects to Elders, both past and present, of the Wiradjuri Nation and extends that respect to other Aboriginal people who are present.

2 OPEN FORUM – THERE IS NO OPEN FORUM AT EXTRAORDINARY MEETINGS OF COUNCIL

3 APOLOGIES

4 DISCLOSURES OF INTEREST

5 GENERAL MANAGER'S REPORT

5.1 BUSINESS

5.1.1 CALL FOR NOMINATIONS OF MOTIONS FOR THE LGNSW CONFERENCE

DOCUMENT NUMBER	336642
REPORTING OFFICER	Marianne McInerney, Personal Assistant to the General Manager
AUTHORISING OFFICER	Phillip McMurray, General Manager
RELEVANCE TO COMMUNITY STRATEGIC PLAN	**4. Good governance: an actively engaged community and strong leadership team** 4.3 Cootamundra-Gundagai Regional Council is a premier local government Council
FINANCIAL IMPLICATIONS	There are no Financial implications associated with this report.
LEGISLATIVE IMPLICATIONS	There are no Legislative implications associated with this report.
POLICY IMPLICATIONS	There are no Policy implications associated with this report.
ATTACHMENTS	Nil

RECOMMENDATION

That proposed Motions tabled at the meeting be considered for endorsement for submission to the Annual NSW Local Government Conference 2020.

Introduction

The Annual Local Government Conference 2020 is being conducted as a virtual conference due to COVID-19 on the 23rd and 24th November, 2020. The conference provides the forum for consideration of Motions by all member council's present. Council has the opportunity to submit motions for presentation to the conference.

The LGNSW Board has resolved that motions will be included in the Business Paper for the Conference only where they:

1. Are consistent with the objects of the Association.
2. Relate to local government in NSW and /or across Australia;
3. Concern or are likely to concern local government as a sector;
4. Seek to advance the local government policy agenda of the Association and/or improve governance of the association;
5. Have a lawful purpose (a motion does not have a lawful purpose if its implementation would require or encourage non-compliance with prevailing laws);
6. Are clearly worded and unambiguous in nature; and
7. Do not express preference for one or several members over one or several other members.

The proposed Motion should also be accompanied with background information.

The closing date for submissions of Motions is 25th October, 2020. Should any Councillor wish to submit a proposed Motion for the consideration of Council's endorsement they are required to be tabled at this Extraordinary Council Meeting of 6th October, 2020.

5.2 ASSETS

5.2.1 INTEGRATED WATER CYCLE MANAGEMENT STRATEGY

DOCUMENT NUMBER	332909
REPORTING OFFICER	Bill Moore, Consultant Engineer
AUTHORISING OFFICER	Phillip McMurray, General Manager
RELEVANCE TO COMMUNITY STRATEGIC PLAN	**3. Sustainable natural and built environments: we connect with the places and spaces around us** 3.2 Our built environments support and enhance liveability
FINANCIAL IMPLICATIONS	There are no Financial implications associated with this report.
LEGISLATIVE IMPLICATIONS	There are no Legislative implications associated with this report.
POLICY IMPLICATIONS	There are no Policy implications associated with this report.
ATTACHMENTS	1. The Role and Purpose of the Project Reference Group ⇩ 2. Draft CGRC Integrated Water Cycle Management Issues Paper ⇩

RECOMMENDATION

1. **The Report on the Integrated Water Cycle Management Strategy and role and Purpose of the Project Reference Group and CGRC Integrated Water Cycle Management Issues Paper attached to the report, be received and noted.**
2. **Council determine the membership of the Project Reference Group including, if desired, potential community representatives.**

Introduction

NSW water utilities, usually councils, are required to prepare and implement an Integrated Water Cycle Management (IWCM) Strategy. This Strategy is designed to guide and inform the operation of Council's water supply and sewerage schemes with a view to:

- 'Right-size' any necessary infrastructure projects and identify best-value IWCM scenario on a Triple Bottom Line (TBL) basis
- Water supply security and mitigation of exposure to drought and climate variability
- Sustainable water supply and sewerage implemented
- Fair pricing of services, appropriate water and sewerage tariffs, full cost recovery and strong pricing signals to encourage efficient use of services
- Drinking water quality is fit for purpose
- Recycled water is fit for purpose

The strategy will include a thirty (30) year Total Asset Management Plan (TAMP) and 30 year Financial Plan (FP) for water and sewerage assets. Combined with a Strategic Business Plan (SBP) the TAMP and FP are reviewed and updated every 4 years. An adopted and operational IWCM is essential for Council's ability to transfer funds from the water and sewerage funds to the general fund.

Discussion

As part of the development of the IWCM, NSW Public Works Authority (PWA) has prepared a Draft Issues Paper (copy attached). This paper is the result of considerable investigation into the water and sewerage assets and operations in both Cootamundra and Gundagai along with a review of the provision of these services in the villages within the LGA.

The paper then highlights and discusses the shortfalls and failings discovered during this investigation that need to be addressed by Council; these Issues are summarised in a number of tables.

A copy of the Draft IWCM has been forwarded to the Department of Primary Industries and Environment – Water (DPIE Water) for comment.

The next stage in this process is to investigate options to address the listed issues and determine the most appropriate actions to be taken. To assist in the facilitation of this process, a Project Reference Group (PRG) is needed. The roles and responsibilities of members of this Group are set out in the attached Information Sheet 4.

Membership of the PRG will include representatives from PWA (the Consultants and Facilitators), DPIE Water (the Regulators) NSW Health and Goldenfields Water. Suggested other representatives are:

- Manager of Assets;
- 2 x Councillors;
- 2 x community representatives (1 each from Cootamundra and Gundagai);
- 2 x water and sewerage operational staff (1 each from WandS operations in Cootamundra and Gundagai).

It is recommended that Council note the draft Issues Paper (attached) and determine the membership of the Project Reference Group including, if required, potential community representatives.

NSW GOVERNMENT Office of Water

Information sheet 4

The role and purpose of the Project Reference Group

WHAT IS A PROJECT REFERENCE GROUP?

A Project Reference Group (PRG) comprises key stakeholders that assist the Integrated Water Cycle Management (IWCM) process in developing a workable long term urban water service strategy. The PRG facilitates community involvement in identifying problems and evaluating solutions.

THE ROLE OF THE PRG

Stakeholder input is required for the IWCM process to achieve its objectives. The PRG encourages discussion, debate and consideration of a wide variety of views and opinions. The key function of the PRG is to guide the IWCM process towards a solution that best meets community and customer expectations and needs.

Essentially, the PRG will:

- provide input on all existing and potential issues that affect the community relating to provision of the urban water service over the next 30 years
- help identify suitable options for managing these issues
- evaluate and compare scenarios built from mixes of options on the basis of their social, environmental and economic impacts (refer to Information Sheet 6)
- review the evaluation and comparison of scenarios in the IWCM Strategy to determine the preferred scenario to recommend for adoption and implementation by the water utility.

Involving the PRG throughout the IWCM process encourages local ownership and maximises the broader community acceptance of the IWCM outcomes. It also promotes transparency and public accountability.

WHO SHOULD BE IN A PRG?

The PRG should represent a cross section of the community and foster ownership of the process across the utility and community. In broad terms, members should represent groups that are involved with the urban water service issues and the options and scenarios used to find solutions to the issues.

Membership of the PRG also includes urban water service related representatives from the utility, local council(s), relevant State Government agencies, technical advisers and in most cases a consultant.

Apart from technical and government members in the PRG, representation can come from the following interest/ community groups:

- environmental
- Indigenous community
- water service customers
- catchment management
- property developers
- local industry and business

DUTIES OF PRG MEMBERS

PRG members:

- should be reasonably available to attend meetings and workshops
- should prepare for the meeting by reading material distributed in advance to ensure they understand what will be discussed at the workshop and are prepared to make decisions
- are encouraged to participate in discussions during the meetings by expressing their opinions and providing comments, suggestions and feedback on any matter relating to the IWCM process and documentation
- should present information representing their group, not simply their own opinion
- should support the consensus of the majority of the PRG
- should respect confidentiality, if required, of matters discussed in meetings
- should confirm the accuracy and integrity of minutes of meetings
- should disseminate information and outcomes from the meeting where possible.

THE WORKSHOPS

PRG members must not be asked to undertake the technical aspects of the study. Technical work is the role of the consultant and/or utility. PRG members are to provide stakeholder input to the process and to represent the wider community. Technical aspects of the IWCM are put to the PRG for discussion, consideration and comment. This takes place during three stages of the IWCM process.

PRG members should be provided with the agenda and report(s) before each meeting. Prior to the first workshop, the consultant and/or utility should prepare a draft IWCM Evaluation, covering background information and descriptions of the urban water service issues.

PRG WORKSHOP 1

Workshop 1 addresses issues. The objectives of workshop 1 are to:

- help the PRG understand the IWCM process
- outline the roles and responsibilities of representatives
- summarise the draft IWCM Evaluation findings, particularly the IWCM issues
- identify any other PRG related IWCM issues and discuss urban water service targets, including levels of service.

Concerns or uncertainty about targets, including levels of service, may require a separate PRG workshop.

The consultant and/or utility then complete the IWCM Evaluation. The issues are compared to work being done already or formally adopted by the utility, by developing the 'business as usual' scenario. The consultant (and/or utility) then prepares a list of all technically feasible options to address remaining issues not covered by the 'business as usual' scenario.

PRG WORKSHOP 2

Workshop 2 addresses considering options. The objectives of workshop 2 are to:

- consider the list of all feasible options to address the remaining issues
- remove any options not considered to be locally suitable (short-listing)
- identify relevant community objectives that can be included in the comparison of full scenarios ('traditional' and 'integrated') if a Detailed IWCM Strategy is developed.

Short-listing options provides for removal of those options that, after careful consideration, are clearly not locally suitable, not relevant, or are not financially justified on their own or when compared to other options to solve an issue on the basis of social, environmental and economic considerations.

As the final cost of a scenario, reflected in the Typical Residential Bill (TRB), is highly relevant to the water service customers, options with high costs should be further considered, especially where they are required only to address issues related to targets or agreed levels of service that are not essential for the local water utility. Such options may need to be reviewed to see whether the related issue and target are essential or if they could be reduced or removed. Undertaking this step prior to formally developing the preliminary scenarios can help in keeping the final cost of the TRB at a more affordable level.

The consultant/utility then bundles sufficient short-listed options into scenarios to address the remaining IWCM issues. Not all the available short-listed options will normally be required when building scenarios. No set number of scenarios is required, as long as the IWCM process is followed and at least two 'integrated' scenarios are developed if a Detailed Strategy is undertaken. The number of scenarios needed to address the remaining issues relate to the type of issues and type of short-listed options available. Consideration should be given to preparing a 'simplified' scenario if there will be no new significant capital works within the next 10 years. Use of this scenario only requires the development of a Simplifed IWCM Strategy.

PRG WORKSHOP 3

Workshop 3 addresses scenarios. The objectives of workshop 3 are to:

- review the IWCM scenarios developed using the short-listed options and confirm that all the IWCM issues are addressed (Simplified and Detailed IWCM strategies)
- consider the additional benefits of the full scenarios based on community objectives if a detailed IWCM Strategy is developed
- review the full scenarios if a detailed IWCM Strategy has been developed and rank them to show the best scenario – the one that addresses the issues and provides the best overall social, environmental and economic outcomes.

No comparison is required with the 'business as usual' or 'simplified' scenarios.

In addition to these PRG workshops, other meetings may be needed for the steering committee and/or government agencies on specific matters.

DUTIES OF THE PRG CONVENER

The PRG convener's duties are to:

- organise the PRG workshops
- ensure the agenda is prepared and sent to all members before the scheduled meeting
- ensure that all relevant material for the meeting is provided in advance to all PRG members
- ensure that minutes of completed workshops are taken appropriately and a draft is distributed to PRG members before the next meeting
- ensure that the meeting flows smoothly and focuses on the agenda items
- ensure the timeliness of the meeting
- ensure the meeting venue is convenient and accessible
- ensure opportunity is available for every member present to express their opinion.

The NSW Office of Water recommends that all PRG meetings are independently facilitated to maximise the opportunity for each member to contribute effectively.

FURTHER INFORMATION

For further information, or to discuss any aspect of the Integrated Water Cycle Management process, please contact your NSW Office of Water regional Water Utility Officer. Contact details can be found on the 'Contact Us' page of www.water.nsw.gov.au. For more general IWCM enquiries or information email information@water.nsw.gov.au.

NOW 10_261c

NSW GOVERNMENT Public Works Advisory

Cootamundra-Gundagai Regional Council

Integrated Water Cycle Management
Issues Paper

COOTAMUNDRA-GUNDAGAI REGIONAL COUNCIL

Report Number: WSR-18035
June 2020

A division of the Department of Finance, Services and Innovation

Cootamundra-Gundagai Regional Council

Gundagai Region

Integrated Water Cycle Management

Issues Paper

Report Number: WSR-18035

Document Control

Version	Author	Reviewer	Approved for issue	
			Name	Date
Draft V1	G. Clemens	G. Fernandes	Glenn Fernandes	10/08/2018
Draft V2	J Blaikie	G. Fernandes	Glenn Fernandes	13/09/2019
Draft V3	J Blaikie	G. Fernandes	Glenn Fernandes	14/02/2020
Draft V4	J Blaikie	G. Fernandes	Glenn Fernandes	22/05/2020
Draft V5	J Blaikie	W. Moore	Glenn Fernandes	1/06/2020

Glenn Fernandes

Principal Engineer – Planning (Water Utilities)

Level 4, 66 Harrington Street

Sydney NSW 2000

T | 02 9240 8751

M | 0421 487 408

E | glenn.fernandes@finance.nsw.gov.au

W | www.publicworksadvisory.nsw.gov.au

Cover image: Flooding at Gundagai in Dec 2010 (http://www.ozbc.net/tr_murrdec2010.html)

Executive Summary

In May 2016 Gundagai Shire amalgamated with Cootamundra Shire to form Cootamundra-Gundagai Regional Council (CGRC). The Local Government Area (LGA) is in the South West Slopes area of NSW, north-west of Canberra. Cootamundra-Gundagai Regional Council provides reticulated water and sewerage services to Gundagai and Cootamundra. Council commissioned the preparation of an IWCM Strategy to comply with the NSW Government's Best-Practice Management of Water Supply and Sewerage Framework. This report provides a summary of the issues and all the outcomes from items 2 to 7 of DPIE Water's IWCM checklist.

Water Supply and Sewerage Schemes

Council supplies potable water through the Gundagai and Cootamundra water supply schemes. Water supply to the villages of Stockinbingal and Wallendbeen is reticulated by Goldenfields Water County Council (GWCC). Council provides reticulated sewerage services to the town of Gundagai and Cootamundra.

The villages of Nangus, Muttama, Tumbalong, Coolac, Burra and Gundagai rural have private water supplies and on-site sewage management systems. Stockinbingal and Wallendbeen also have on-site sewage management systems.

Population and demographic projections

The projections for the Gundagai service area are limited to an initial estimated community population and a final population for a low growth scenario and a high growth scenario.

Table S1: Projected permanent population in Gundagai

2017	2047 Low growth scenario	2047 High growth scenario
1,751	2,123	2,420

The serviced area, customer locations and growth strategy were able to be defined for Cootamundra and therefore the serviced population and dwelling projections were able to be undertaken. A small amount of growth has been forecast in the serviced population for Cootamundra and the projected serviced population is summarised in Table S2.

Table S2: Projected serviced permanent population in Cootamundra

Service	2018	2019	2024	2029	2034	2039	2044	2049
Water	5,559	5,561	5,574	5,586	5,599	5,612	5,625	5,637
Sewer	5,574	5,576	5,589	5,602	5,614	5,627	5,640	5,653

Water Demand Analysis and Projection

A water demand analysis is undertaken to calculate the unit demands, estimate the non-revenue water and forecast the following demands:

- Average (rainfall) year demands – for revenue planning
- Dry year demands – to assess drought security
- Peak day demands – to assess system reliability.

Information on the water consumption patterns for the three schemes is provided in Table S3

Table S3: CGRC water consumption patterns

Scheme	Unit	Gundagai	Cootamundra
Residential to non-residential demand split	%	77%:23%	78%:22%
Non-revenue water	L/connection/day	120	81
Unit consumption per person	L/person/day	338	272
Unit residential average internal demand	L/connection/day	383	406
Unit residential peak day demand	L/connection/day	2,964	1,237

The 30-year forecasts for the Gundagai water supply based on Council's growth forecast are provided in Table S4.

Table S4: Water demand forecast – Gundagai WSS

	2017 Estimate	Low Growth Scenario	High Growth Scenario
Peak day demand (ML/day)	3.8	4.2	4.5
Average year Production (ML/year)	493	542	582
Dry year Production (ML/year)	556	613	658

The 30-year forecasts for the Cootanmundra water supply based on Council's growth forecast are provided in Table S5.

Table S5: Water demand forecast – Cootamundra WSS (ML)

	2018	2019	2024	2029	2034	2039	2049
Average year	755.0	755.8	759.8	763.9	768.0	772.1	780.5
Dry year	849.1	850.5	857.6	864.7	871.9	879.1	893.8
Peak day	6.5	6.5	6.6	6.6	6.7	6.7	6.8

Sewer load analysis and projections

A sewer load analysis is undertaken to assess the unit loadings and the average dry weather flow for the sewerage schemes. The results of the sewer load analysis are summarised in Table S6.

Table S6: Assessed sewer flows and loadings

	Gundagai STP	Cootamundra STP
ADWF (kL/day)	500	1,350
Sewer Equivalent People (EP)	2,500	6,518
Residential : Non-residential EP split	58%:42%	78%:22%
Hydraulic loading (L/EP/day)	200	207

The 30-year sewer load forecasts for the Gundagai sewerage scheme based on Council's nominated growth, are provided in Table S7

Table S7: Sewer load forecast – Gundagai sewerage scheme

	2017	2047 low growth	2047 high growth
Total EP	2,500	2,871	3,168
Projected ADWF (kL/day)	500	574	634

The 30-year sewer load forecasts for the Cootamundra sewerage scheme based on Council's projected growth are provided in Table S8

Table S8: Sewer load forecast – Cootamundra sewerage scheme

	2018	2019	2024	2029	2034	2039	2049
Total EP	6,543	6,554	6,608	6,662	6,716	6,769	6,876
Projected ADWF (kL/day)	1,352	1,355	1,366	1,377	1,388	1,399	1,421

IWCM Issues

The water and sewerage system issues that have been identified through the analyses are outlined in Table S9 to Table S11.

Table S9: General IWCM issues

Issue Type	Target for Compliance	Issue
Regulatory	Environmental Planning and Assessment Act 1979	Updates to LEP and related documents are required to document expected growth and enable the: - Documentation of the expected number of new dwellings - Identification of suitable development areas - Re-zoning of land if any is required
	Local Government Act1993	Council has not complied with annual reporting requirements (No data available for 2017/18 in the DPIE Water database on 1 October 2019)
	Work Health and Safety Act 2011	- Regular safety inspections of facilities are not undertaken by staff and management - It is not known whether Council has implemented policies and procedures needed to comply with the due diligence requirements
Contractual agreements	Agreement with Goldenfields Water	- Council does not compile annual reports for Goldenfields Water specified in the water supply agreement
Levels of Service	CRM	Information required to assess performance against LOS is not available
	Drought security	- The drought level of service for Cootamundra is different to that of Gundagai

Issue Type	Target for Compliance	Issue
Business performance	Development Contributions	There are no development contributions charged in Gundagai
	Development rates	There is no growth strategy for Gundagai
	Maintenance and renewals	There has been substantial underinvestment in maintenance and renewals

Table S10: Water supply system issues

Issue Type	Target for Compliance	Issue
Gundagai Water Supply		
Performance	Data collection	- Manually collected flow data is prone to errors and difficult to compile, visualise and analyse - Records show more water is sold than produced, therefore there is an issue with either the production meter or the customer meters
	Renewals	- The raw water pumping system has components requiring maintenance - Substantial sections of the trunk mains are in very poor condition
Cootamundra Water Supply		
Regulation	Public Health Act 2010	Low frequency manual testing of chlorine residual increases the duration of low chlorine concentration events
	Work Health and Safety Act 2011	Re-chlorination is undertaken using pool chlorine, this is a hazardous activity for staff
Contractual agreement	Goldenfields Water	Agreement requires review to ensure - consistency between values and units - consistency between sections of the document - drought security conditions are appropriate - NRW target can be reached affordably Council is unable to demonstrate compliance with peak day flow limits due to lack of consistent daily bulk supply monitoring Council has not submitted annual reports Goldenfields Water as required by the agreement

Issue Type	Target for Compliance	Issue
Performance	Data collection	- Manually collected flow data is prone to errors, has lots of missing points and is difficult to compile, visualise and analyse - Many water meters are nearing the end of their economic life
	Renewals	Reservoir 1 - Internal fixtures corroded - Pipework is at end of service life - Telemetry "would benefit from modernisation" Reservoir 2 - Valves and pipework at end of service life - Requires detailed internal inspection to assess corrosion Customer meters - 30% of the customer meters were installed in 2002/03 and are expected to reach the end of their economic life in the next few years
	Outage resilience	Reservoir capacity is less than peak day demand, there is little buffer in the event of bulk supply difficulties
Levels of Service	Main breaks	Very high frequency of main break
	Drought	- Cootamundra has spent 40% of the last 17 years on water restrictions - Drought security different to Gundagai

Table S11: Sewerage system issues

Issue Type	Target for Compliance	Issue
Regulatory	License	- Non-compliances due to failure to undertake required sampling or report results of sampling - Council unable to locate annual returns including the flow records for reuse schemes
	RWMP	Council does not have recycled water management systems for the effluent reuse schemes
	Backflow / cross connection policy	Backflow / cross connection policy required, policy must include the regular testing of devices and the logging of test results
Gundagai Sewerage Scheme		
Performance	Power reliability	Blackouts frequently occur during floods
	Flooding	- STP is located on flood prone land and was inundated during the 2010 and 2012 floods - Royal SPS is located on flood prone land
	Maintenance	- Cleaning of Maccas SPS required - Package SPS near Primary School in poor condition for age
	Renewals	- Boys Club SPS internal fixtures - Maccas SPS internal fixtures - Primary School SPS electricals

Issue Type	Target for Compliance	Issue
Performance	STP	- The trickling filter heads no longer functioning, - The tricking filter tank cracked and leaking - The inlet works were very labour intensive to maintain, and not performing their role effectively - Maturation ponds were very green indicating inefficient nutrient removal - The clarifier had ceased to function - Sedimentation flow weir is ineffective when one or both SPS pump to the STP - There is no inflow meter
Levels of Service	Telemetry	Limited SPS telemetry means that Council cannot monitor operations to ensure that LOS are maintained
Regulatory	Section 60 approval	Council does not have Section 60 approval for the Gundagai STP
	Wet weather performance	STP shutdown during major floods
Cootamundra sewerage scheme		
Performance	SPS	Pump stations require vegetation management to ensure safe access and enable inspection
		Betts ST - internal fixtures are corroded and need replacement - the dry well appeared wet - would "benefit from refit"
		Airport PS allows stormwater into the system due as the lid is flooded during wet weather and leaks
		Kings Drive PS valves require replacement
	Rising main	sewer rising main from the Betts Street SPS may have no functional gas release valves, increasing corrosion of the STP inlet works
	Wet weather	Very high infiltration in 2016/17, no evidence that cause has been identified or remediated
	STP	- alum dosing system is in poor condition
Regulatory	OSSM waste	Only septic effluent can be accepted and that discharged to be in the present "old" sludge lagoon. Council needs to have an approved agreement with the discharger, and that agreement needs this DPIE Water concurrence.
	STP	- Grease trap waste was received at STP and this is not allowed - Council does not know if the STP has Section 60 approval
	SPS	Backflow prevention devices require annual testing and the results must be logged
	Liquid trade waste policy	Policy yet to be implemented

Table S11: Un-serviced and partly serviced communities

Issue Type	Target for Compliance	Issue
Public Health	OSSM	- OSSMs are not inspected - Lot sizes in Stockinbingal and Wallendbeen are insufficient to meet the buffer areas distances for OSSMs

Contents

Figures

Tables

1 The IWCM Strategy

1.1 Purpose

The Integrated Water Cycle Management (IWCM) Strategy addresses two elements of the Best-Practice Management of Water Supply and Sewerage Framework and is a local water utility's (LWU's) 30-year strategy for the provision of appropriate, affordable, cost-effective and sustainable urban water services that meet community needs and protect public health and the environment. A local water utility's (LWU's) peak planning documents for its water supply and sewerage businesses are its current IWCM Strategy and its current SBP. The IWCM Strategy and SBP need to be prepared every 8 years on a rotation of every 4 years.

The IWCM Strategy:

- Identifies the water supply and sewerage needs of a LWU
- 'Right sizes' any infrastructure projects and determines their priority
- Identifies the lowest level of stable Typical Residential Bill (TRB) to meet the levels of service
- Includes a 30-year Total Asset Management Plan and Financial Plan.

1.2 Process

The process of preparing an IWCM Strategy follows the 2014 Department of Industry (DoI) Water IWCM Strategy Check List and broadly includes the following:

- Preparation of an IWCM Issues Paper
- Evaluation of feasible options
- Creation of IWCM Scenarios
- Triple bottom line assessment of the scenarios
- Developing the IWCM Strategy
- Preparation of a Total Asset Management Plan and Financial Plan.

1.3 IWCM Issues Paper

The IWCM Issues Paper presents the analysis that have been undertaken and summarises the IWCM Issues that have been identified through the analysis. The following are inputs to the IWCM Issues Paper:

- Water Service Objectives and Targets
- Growth strategy
- Existing systems
- Water cycle analysis
- Existing system performance assessment
- Assessment of unserviced areas.

Public Works Advisory (PWA) has been engaged to complete the IWCM Strategy for the communities in the Cootamundra Gundagai Local Government Area (LGA).

2 Introduction

2.1 Cootamundra-Gundagai Regional Council

In May 2016 Gundagai Shire amalgamated with Cootamundra Shire to form Cootamundra-Gundagai Regional Council (CGRC). The Local Government Area (LGA) is in the South West Slopes area of NSW, north-west of Canberra and the closest regional centre is Wagga Wagga.

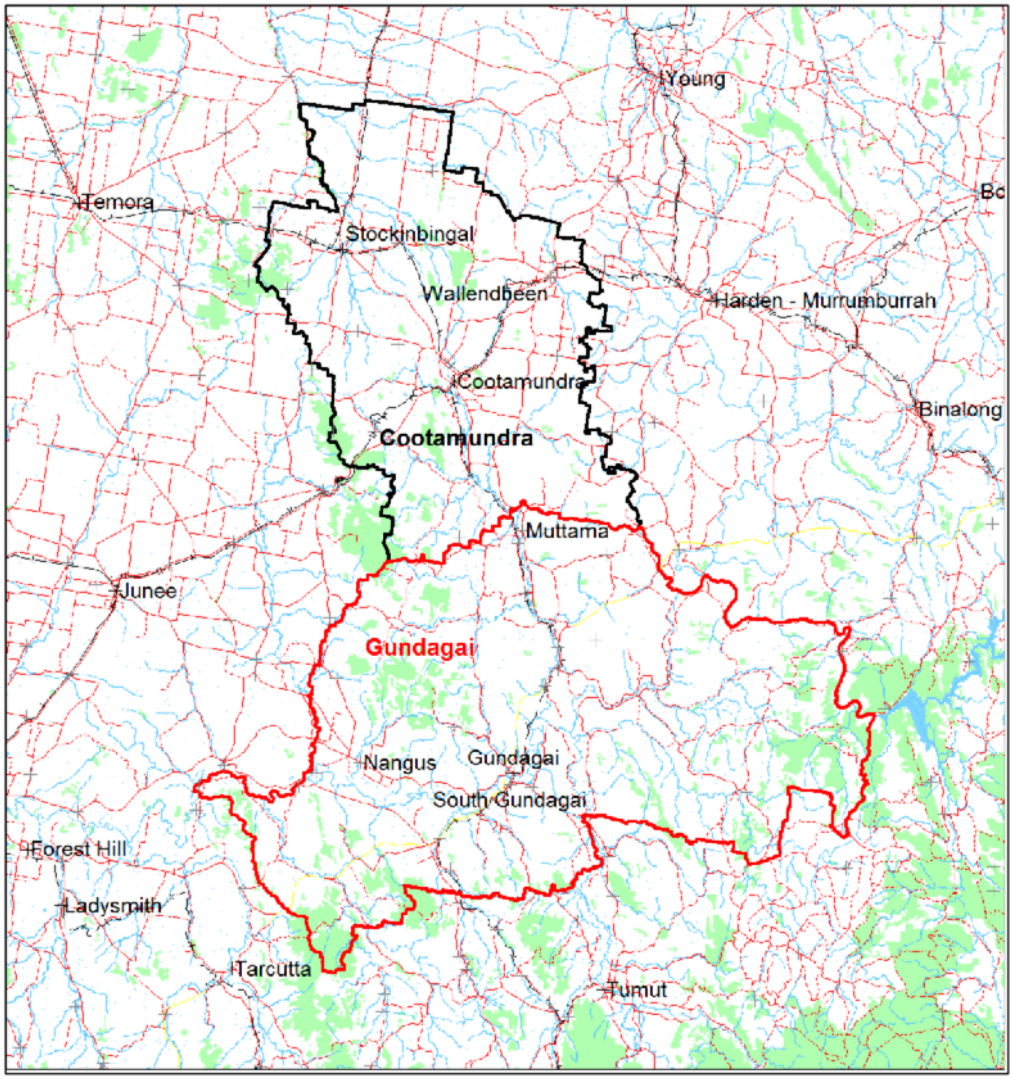


Figure 2-1: Map of Cootamundra-Gundagai Regional Council area

2.2 Communities

Cootamundra-Gundagai Regional Council provides reticulated water and sewerage services to Gundagai and Cootamundra. Several other communities and some rural areas are supplied

with potable water by Goldenfields Water County Council (Goldenfields or GWCC) or private water supplies. The serviced and unserviced communities are listed in Table 2-1.

Table 2-1: Communities by former Council and Services

Former LGA Name	Area (km2)	Community	Water supply	Sewerage
Cootamundra Shire Council	1,524	Cootamundra	Cootamundra	Cootamundra
		Stockinbingal	Goldenfields Water County Council	On-site sewage management systems
		Wallendbeen	Goldenfields Water County Council	
		Cootamundra Rural	Some Goldenfields Water County Council, some private	
Gundagai Shire Council	2,458	Gundagai	Gundagai	Gundagai
		Nangus	Private	On-site sewage management systems
		Muttama	Private	
		Tumbalong	Private	
		Coolac	Private	
		Burra	Private	
		Gundagai Rural	Private	

3 Operating environment

The delivery of urban water services including water supply, sewerage and stormwater services is subject to many legislative and regulatory requirements, guidelines, contractual obligations for delivery of services and other external and internal factors, collectively referred to as the operating environment. An IWCM issue will arise if there is a failure to meet the legal obligations or agreed levels of service in water supply and sewerage servicing including:

- Legislative and regulatory requirements (health requirements, WHS, EPA Licence)
- Levels of service targets (as agreed with customers)
- Contractual and agreed arrangements (for example conditions defined in a Memorandum of Understanding (MoU))
- Best Practice Management criteria

The operating environment compliance situation is analysed in this section to identify the IWCM issues.

3.1 Regulatory and Contractual Compliance Requirements

Council operates two sewage schemes (Gundagai and Cootamundra), one water scheme (Gundagai) and one water reticulation system (Cootamundra) under the Local Government Act, 1993. The residents outside the designated service areas are responsible for their own on-site sewerage management systems (OSSMS) and either supplied with water by Goldenfields or are required to provide their own water.

The Local Government Act and other pieces of legislation influence the way in which Council can provide the urban water and wastewater services and have specific implications for the operation of the schemes. Table 3-1 provides the details of the status of compliance with the legislative and regulatory requirements by the Council.

Table 3-1: Legislative requirements

Key Legislative Framework and their main purposes	Council current performance and future targets
Local Government Act (1993)	
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: - Section 60 - proposal approvals for water or sewage treatment works construction and for effluent and biosolids reuse - Section 61 - inspections of water and sewage treatment works - Section 64 - developer charges - Section 68 - provide an approval to applications to discharge trade waste to Council's sewerage system - Section 90 (2) - concurrence on liquid trade waste approvals - Section 428 - annual reporting	These Legislative and regulatory targets are generally met by Council. Section 60 - Council has approval for the Gundagai water treatment plant - Council does not have approval for the Gundagai sewage treatment plant as it was built prior to 1993. - Cootamundra sewage treatment plant was upgraded significantly in 1993/94, Council is unsure whether Section 60 approval was applied for or granted. **Issue** Section 61 - Council complies with the DPIE Water inspections requirements - Inspection report noted that grease trap waste was being accepted at Cootamundra STP this is not allowed **Issue** Section 64 - There are no developer charges plan for Gundagai **Issue** - Cootamundra has a developer charges plan, and fees are charged Section 68 - Council is in the process of implementing trade waste charges See Section 9.4 Section 428 - Council has not complied with annual reporting requirements (No data available for 2017/18 in the DPIE Water database on 1 October 2019) **Issue**

Key Legislative Framework and their main purposes	Council current performance and future targets
Environmental Planning and Assessment Act (1979) (incl. the EPA Regulation 2000).	
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: - Local Environmental Plans (LEP) - Environmental Impact Statement (EIS) - Reviews of Environmental Factors (REF)	Council generally complies with EPA act. Preparation of DCP under Section 72 of the EPA act and supplements provisions of Gundagai Local Environmental Plan 2011 and Cootamundra Local Environmental Plan 2013. Updates to LEP required for Gundagai to account for expected growth. **Issue** EIS for effluent reuse schemes completed
Public Health Act (2010)	
This Act aims to promote, protect and improve public health; by providing safe drinking water to the community. It requires a Local Water Utility to have a Drinking Water Management Plan (DWMP) in place. Councils performance against the DWMP was checked by: - reviewing the raw water quality received at the plant - the performance of the plant against the critical control points - review of the reticulated water quality The Act also requires that utilities ensure that all water provided is "safe", for non-potable water, this is interpreted as: - water must be fit for purpose - appropriate facilities and management systems must be in-place to ensure that public health is protected	Council has an overall DWMS with separate subplans for the Cootamundra supply scheme and the Gundagai supply scheme. The system was completed in March 2019 and so no annual reviews have been undertaken yet. Council does not have a Recycled Water Management System (RWMS) for the recycling schemes, though the end user agreement with the Gundagai Golf Course appears to cover most of the requirements See Section 6.3. Council is in the process of constructing a new STP at Gundagai and a RWMS will be prepared along with Section 60 approval, when finalising the new STP. **Issue**
Water Management Act (2000)	
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.	Cootamundra-Gundagai Regional Council has water licenses to extract water from the Murrumbidgee regulated water to supply the town of Gundagai. See Section 5.2 The supply for Cootamundra is included in the Goldenfields Water Access License y.
Protection of the Environment Operations Act (1997)	
This Act introduces an approach to protect the environment. It is a powerful tool for regulating sewerage and trade waste by local water utilities and facilitating compliance with the utility's conditions of approval for liquid trade waste discharges to the sewerage system.	Council has an EPA licenses for the STPs at Gundagai (license number 1721) and Cootamundra (license number 1603). There have been several compliance **issues** in recent years.

Key Legislative Framework and their main purposes	Council current performance and future targets
	Council has Pollution Incident Response Management Plans for the Gundagai and Cootamundra STPs.
Work Health and Safety Act 2011 and WHS Regulation 2011	
This Act has an objective to provide a consistent framework to secure the health and safety of workers and workplaces. SafeWork NSW provides guidance to employers on the recommended steps to ensure compliance with their obligations under the act and regulation.	Council does not undertake regular WHS inspections at the plants, (see section 16.1.2). **Issue** It is unknown whether Council has implemented any of the other policies and/or procedures to ensure that they are meeting their obligations under the act. **Issue**

3.2 Contractual agreements

3.2.1 Water Supply Agreement Between Goldenfields Water County Council and Cootamundra-Gundagai Regional Council

The Water Supply Agreement Between Goldenfields Water County Council and Cootamundra-Gundagai Regional Council was implemented on 1 November 2016 and is scheduled for review by 1 November 2020. The full agreement is included in Appendix A.2.

Council must compile annual reports for Goldenfields Water detailing:

- residential commercial, industrial, and agricultural demand
- analysis of residential usage
- for top 10 customers:
  - number of each connections
  - size of each connection
  - water usage

Issue: Council is does not appear to compile these reports

The levels of service to be provided by Goldenfields are:

- Drought security:
  - in the event that Goldenfields allocation is reduced due to drought, the bulk customer will incur a pro-rata reduction
- Average annual demand:
  - 200 kL/residential property
- Peak day demand:
  - 2.5 kL/property
- Water quality:
  - water of a quality that meets the Australian Drinking Water Guidelines (ADWG)
- Interruptions
  - Provide 7 days' notice of planned bulk supply interruption
  - Maximum of 24 hours interruption of supply for planned interruptions
  - Maximum of 16 hours interruption of supply for unplanned interruptions
- Goldenfields limit of responsibility
  - the downstream end of the Goldenfields meter, on the inlet pipe of the reservoir

The parties will co-operate in the preparation of the drought management plan, the levels of restrictions and water conservation measures will be consistent between the regional and the local drought management plan

The agreement has several **issues** including:

- discrepancies between units and values, for example peak day demand target is listed as 2.5% of the average day rather than 250% of average day or 2.5 kL/property per day
- discrepancies between sections, for example the average annual demand is listed as 200 kL/property in the levels of service section, and 200 kL/residential property in the performance targets section
- the drought security condition does not account for the difference between the estimated dry year demand and the unrestricted licensed extraction, this means that it is more onerous than necessary to meet the restricted licensed extraction as long as the dry year demand is lower than the unrestricted licensed extraction.

The levels of service and performance targets in Table 3-2 will be used in this IWCM.

Table 3-2: Assumed Goldenfields levels of service and performance targets

Parameter	Unit	Target
Water losses	% of bulk supply	5%
Average annual residential consumption	kL/assessment	200
Peak day residential consumption	kL/assessment	2.5
Total annual bulk water supplied	ML/year	1400-1800

3.2.2 End user agreement with Bidgee Banks Golf Course

Council supplies the Bidgee Banks Golf Course with treated effluent for irrigation. The main conditions of the end user agreement between Council and the Bidgee Banks Golf Course are:

- Irrigation may commence between 8 PM and 9 PM after all players are off the course
- Irrigation must cease before 3 AM
- There must be a minimum withholding period of 4 hours
- Effluent irrigation of other sporting facilities will cease
- Signs warning that effluent irrigation is undertaken, and the relevant hygiene principles should be followed are to be displayed
- There are specific rules for effluent irrigation during wet and/or windy weather
- Inspections by greenkeepers are to be undertaken daily
- Golf Club is to allow water quality and soil monitoring to be undertaken by those engaged by Council

4 Water Services Objectives and Targets

4.1 Objectives

A typical list of objectives relevant to the management of the urban water services has been provided in Table 4-1 and Table 4-2 for consideration by Council staff and the Project Reference Group (PRG). Each objective has one or more Service Standard (or Design Basis) drawn from legislation, best practice guidelines, and industry practice.

It should be noted that the objectives and targets would have a direct and significant influence on the future direction and management of the urban water services, hence allowing the identification of issues. Further it is noted that meeting agreed objectives and targets incurs cost, which needs to be recovered through typical residential bills and developer charges, and hence needs to be considered in the context of the community's preferences and ability to pay (i.e., affordability). Thus, it is expected that CGRG will use the draft typical list as the starting point in its consultation with the PRG/Community and establish through the consultation process an agreed set of objectives and the associated Key Performance Indicators (KPIs) and targets.

Table 4-1: Cootamundra-Gundagai Shire Council's Water Supply Service Objectives and Targets – Draft

Objective	Service Standard (Design Basis)	Performance Indicator	Cootamundra Target	Gundagai Target
Water supply security				
Adequate potable water for current and future generations with reasonable level of restrictions	Surface Water – 5/10/10 rule based on 95th percentile dry year demands: • Water restrictions are in place for no more than 5% of the time • Water restrictions occur on average once every 10 years • During water restrictions, demand is reduced by 10%	• Frequency of restrictions • Total percentage duration of drought related restrictions • Average number of drought related Level 3 restrictions.		
Water extraction licence limits not exceeded	Projected town water supply extraction is within the upper limit of the water extraction licence and meets any license conditions.	• Annual volume of water extracted.	N/A	1,250 ML/year
Drinking water quality				
Protects public health	• 100% compliance with the ADWG for health based parameters. • Compliance with the DWMS	• Number of boil water alerts • Non-compliances reported in annual DWMS audit.		
Aesthetically fit for purpose	% compliance with the ADWG for aesthetic parameters	Number of customer complaints: • Discoloured water complaints • Complaints of taste • Complaints of odour		

Objective	Service Standard (Design Basis)	Performance Indicator	Cootamundra Target	Gundagai Target
Reliability of supply infrastructure				
Limit supply interruptions	Asset condition rating (default rating 2)	Number of unplanned service interruptions due to asset failure: • Main breaks • Water service failure		
Maintain Continuous Service Availability	Workforce resourcing	Response time to incidents • Major main burst • Minor main burst • Water service failure		
Maintain adequate pressure	Treatment and distribution system capacity designed to supply 95th percentile Peak Day Demand. Minimum pressure at customer tap of 15m when delivering 0.1 L/s and meeting the Peak Day Demand.	Number of incidents causing complaints about pressure.		
Provide adequate firefighting capability	System can supply 10 L/s for 4 hours when supplying peak day demands while maintaining adequate pressure.	Percentage of urban area with firefighting facilities. Percentage of system capable of meeting fire engine requirements.		

Table 4-2: Cootamundra-Gundagai Shire Council's Sewerage Service Objectives and Targets – Draft

Objective	Service Standard (Design Basis)	Performance Indicator	Cootamundra Target	Gundagai Target
Reliability of collection and treatment infrastructure				
Maintain Continuous Service Availability	Asset condition rating (default rating 2)	Number of unplanned service interruptions due to asset failure: • Backup of sewage into properties • Overflow due to pump failure • Main blockage/collapse		
	Workforce resourcing	Response time to incidents • Moderate/major spill • Minor spill/blockage		
Protect the Environment and Receiving waters				
System Performance	• Compliance with the EPL • Contain 8 hours sewage load @ADWF within each SPS • Rainfall event with a 20% AEP • Compliance with biosolids guidelines • Reduce effluent discharge from the STP • Minimise odours	• Non-compliances with EPL • Number of overflows @ADWF • Number of overflows for the selected rainfall event • Non-compliances • % effluent reuse • Number of odour complaints		
Effluent reuse quality	Comply with the Recycled Water Management System (RWMS)	• Non-compliance to the RWMS		

4.2 Customer relationship management (CRM) system

Council provided a summary of the customer complaints and inquires that relate to water and wastewater in Cootamundra and Gundagai for the period from September 2016 to 26 September 2019. The information provided was:

- Records enquiries:
  - Water Meters – 1
  - Effluent Water (enquiry regarding volume of treated effluent used on Gundagai Golf Course) – 1
  - General Water Supply – 76
- Service Requests:
  - Sewerage Issues – 200
  - Water Mains – 170
  - Water Meters – 482
  - Water Pressure – 23
  - Water Quality – 270.

This information is insufficient to assess performance against the levels of service.

5 Water Supply Systems

5.1 Water catchments

Cootamundra and Gundagai lie in the Murrumbidgee River Catchment. The major dam upstream of Cootamundra and Gundagai is Burrinjuck (south-west of Yass), Gundagai is further downstream and so can also access flows from Blowering (south-east of Tumut).

5.1.1 Murrumbidgee Catchment

The Murrumbidgee catchment in southern NSW has many significant wetland habitats of international ecological importance and a diverse climate, ranging from the alpine conditions of the Snowy Mountains to the semi-arid conditions of the Riverina Plains.

The catchment is 84,000 square kilometres, with land use dominated by extensive agriculture and grazing occupying 64 per cent of the catchment. Major water users include local water utilities, forestry, tourism, and agriculture, including rice, dairy, wool, wheat, beef, lamb, grapes and citrus.

The Murrumbidgee catchment is shown in Figure 5-1.

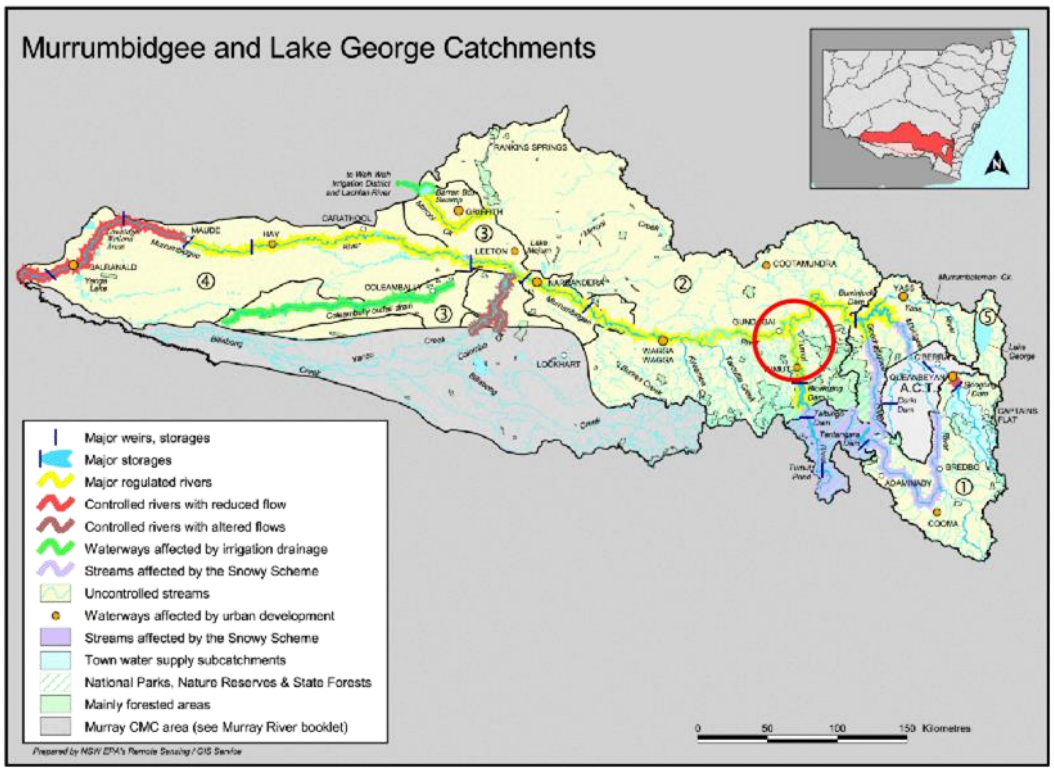


Figure 5-1: Murrumbidgee River Catchment

5.1.2 Murrumbidgee Regulated River Water Source Water Sharing Plan

Gundagai extracts water from the Murrumbidgee River section managed under the Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016, this plan is due for renewal or replacement in 2026. A map of the catchment upstream Gundagai is included in Figure 5-2.

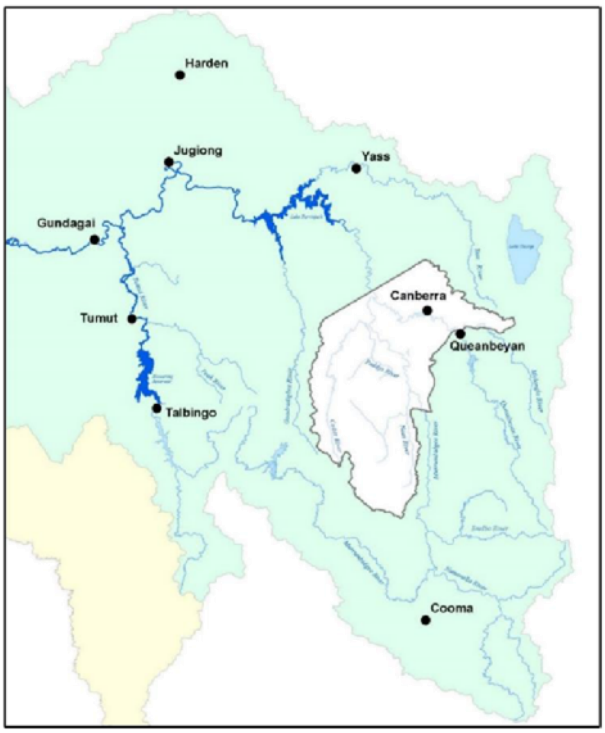


Figure 5-2: Murrumbidgee Regulated River Water Source upstream of Gundagai

Cootamundra is supplied with water extracted from the Murrumbidgee River, slightly downstream of Jugiong.

5.2 Gundagai Water Licensing

Council has an annual LWU license allocation to extract 1,250 ML/year of water from the Murrumbidgee River for water supply to Gundagai. Details of the licenses are given in Table 5-1.

Table 5-1: Council owned Water Access Licenses

License Number	Category	Nominated Works Approval	Purpose	Allocation (ML/year)	Expiry Date	Kind of Approval
WAL6455	Local Water Utility	40WA400007 1 x 250 mm centrifugal pump	Town Water Supply	1,250	01 July 2024	Water Supply Works
WAL13622	Regulated River (General Security)	40CA400792 1 x 80 mm centrifugal pump	Irrigation	51	30 June 2027	Water Supply Works and Water Use

5.3 Gundagai water restriction policy

Council implements water restrictions for customers of the Gundagai water supply in accordance with their *Water Restrictions Policy* when water in the dams drops below a certain level. The first level of water restrictions is voluntary and not particularly onerous on the residents, but Council's experience has been that as soon as the level 1 restrictions notification is posted, residents of Gundagai respond with a very significant decrease in consumption. The highest level of restriction implemented in Gundagai in past years is given in Table 5-2.

Table 5-2: Highest Level of Water Restriction in past years

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2	1	None	1	3	2	3	1	None	None	None	1

The water restriction policy for Gundagai is included in Appendix A.1

5.4 Gundagai Water Supply Scheme Description

The installation of the reticulated water system for Gundagai Shire began in the early 1900's, the initial system consisted off an untreated water supply pumped from the Murrumbidgee River via a raw water pump station.

Raw water is now sourced from a point just upstream of the original supply point, where it's treated, pumped to elevated service storages and then supplied to the Gundagai urban area along with adjacent rural-residential and highway commercial areas. (1)

5.4.1 Raw Water Source

The raw water source for the Gundagai water supply system is the Murrumbidgee River, the extraction point is downstream of Burrinjuck Dam and the junction with the Tumut River.

5.4.2 WTP Description

The treatment process at the Gundagai WTP comprises the following process steps:

- raw water is dosed with alum sulphate as it enters the WTP to aid coagulation and flocculation
- dosed water flows to the clarifier where it undergoes settling
- clarified water is filtered through two 3-layer media filters (the media filters use a layer each of coal, fine sand and gravel)
- filtered water undergoes pH correction using a lime slurry
- filtered water undergoes disinfection by chlorination
- disinfected water is fluoridated
- treated water is sent to an onsite holding tank prior to reticulation
- backwash water from the filters and sludge solids from the clarifier are disposed of in two sludge lagoons
- supernatant from the sludge lagoons is released back into the Murrumbidgee River, downstream of the intake point.

A schematic of the WTP and reticulation network is presented in Figure 5-3

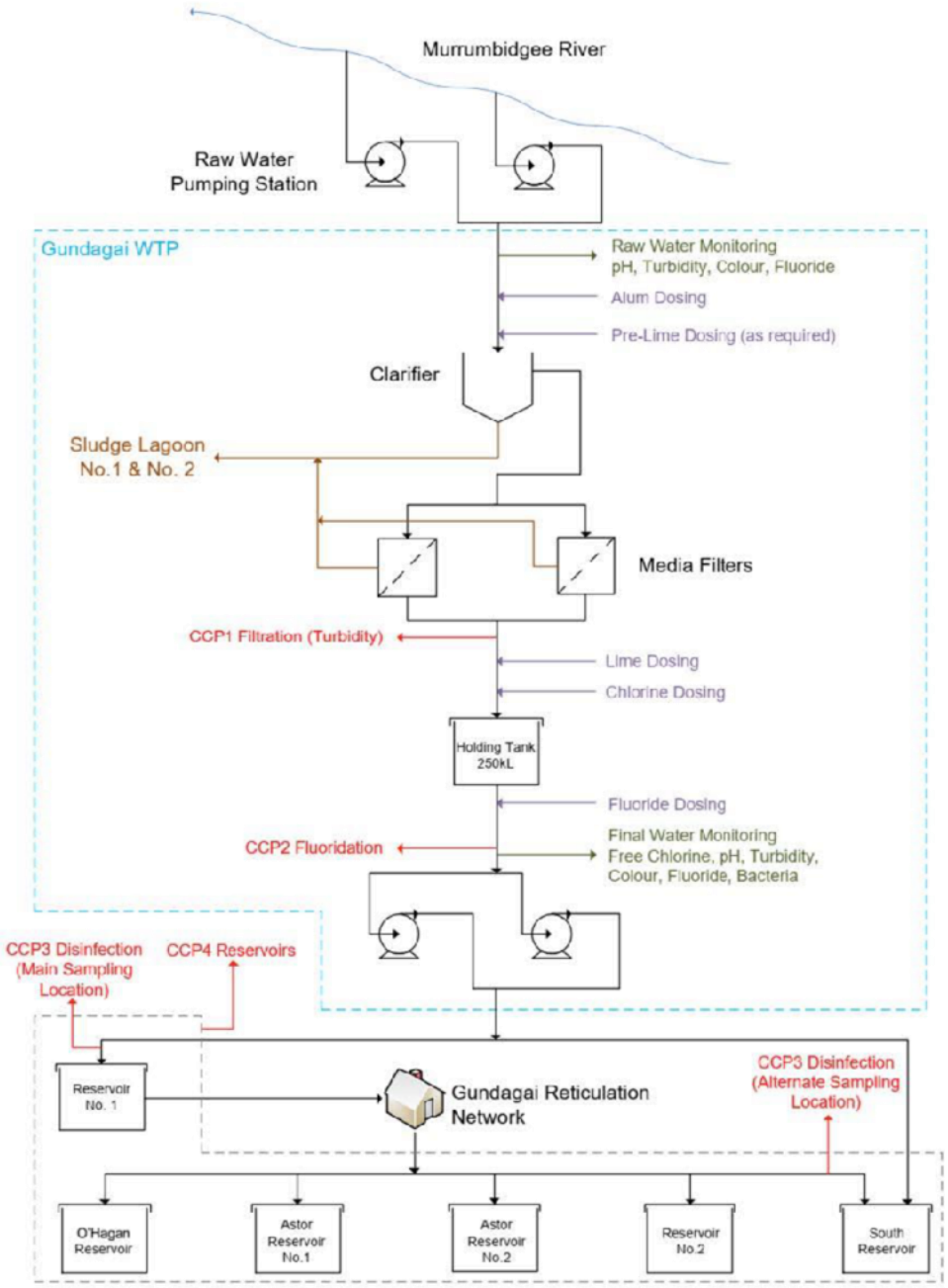
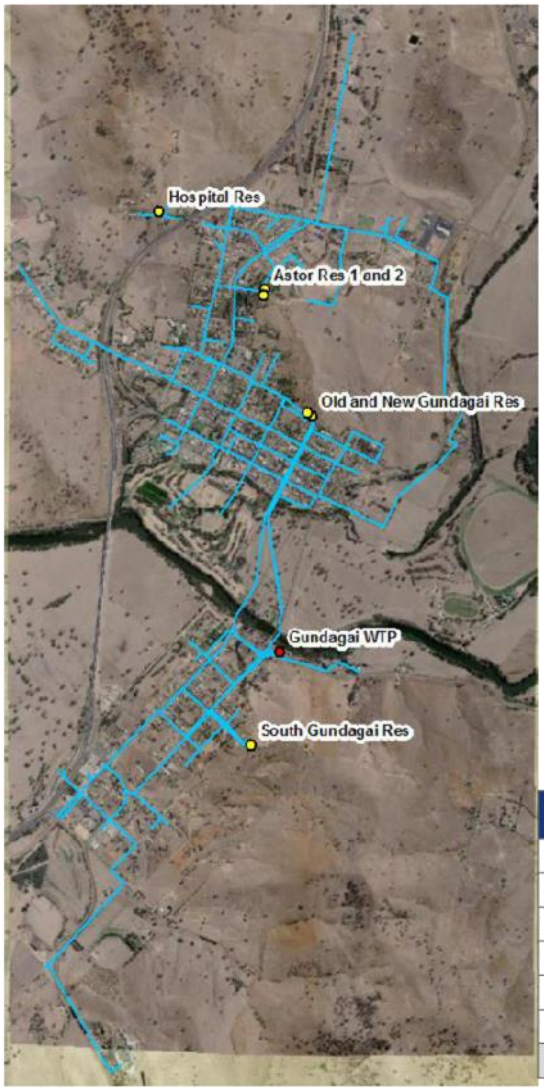


Figure 5-3: Gundagai WTP and Reticulation schematic

5.4.3 Distribution

From the WTP, water is pumped directly to the New Gundagai Reservoir atop Mt. Parnassus, and from there it is distributed by gravity to a further five reservoirs. The downstream reticulation system then distributes the water in a single pressure system over the whole network. This is shown in Figure 5-4 with the reservoir capacities.



Reservoir	Capacity (ML)
New Gundagai Reservoir	2.27
Old Gundagai Reservoir	0.91
Astor Reservoir 1	0.45
Astor Reservoir 2	1.20
South Gundagai Reservoir	0.45
Hospital Reservpir	0.14
Total	**5.42**

Figure 5-4: Gundagai Water Supply Scheme Overview

Council has advised that they are interested in using raw water directly from the Murrumbidgee to irrigate the parks and gardens in Gundagai. Currently irrigation is done using treated water.

5.5 Cootamundra Water Supply

Goldenfields Water County Council supplies bulk potable water to Cootamundra sourced from the Murrumbidgee River on the downstream side of Jugiong. A schematic diagram of the Goldenfields Jugiong supply is shown in Figure 5-5. Goldenfields holds the water extraction licenses for the bulk supply scheme.

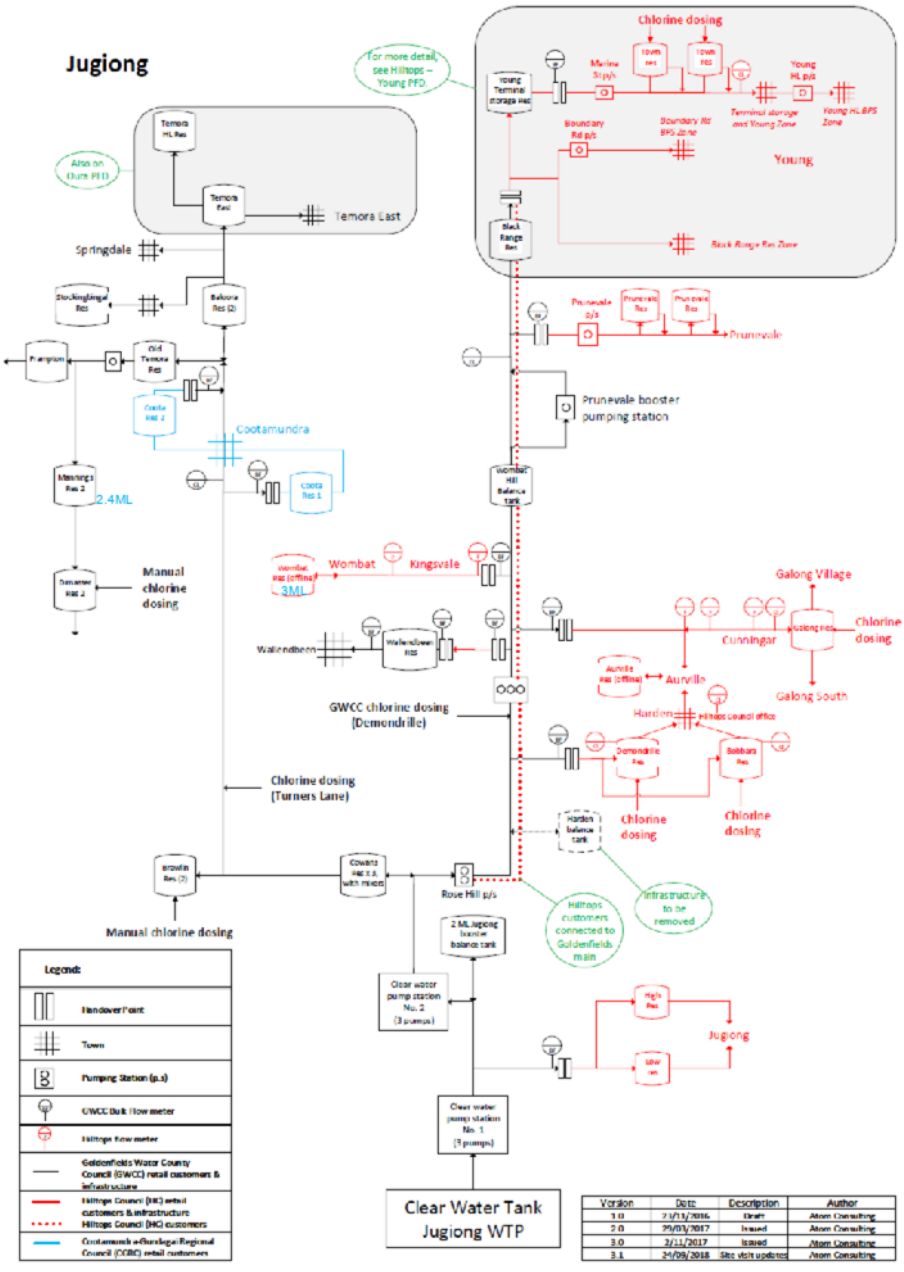


Figure 5-5: Schematic diagram of the GFCC Jugiong water supply scheme

Drought water restrictions implemented in Cootamundra are the same as those implemented for other users supplied by the Goldenfields' Jugiong supply. Council may also implement water restrictions for operational reasons, for example the need to take a reservoir offline or bulk supply interruption.

Goldenfields Water has implemented drought water restrictions based on:

- license allocations
- discussions with DPIE Water and WaterNSW on the forecast availability of water
- notifications from DPIE Water on catchment wide restrictions
- demand management policies.

Between 2002/03 and 2011/12 water restrictions were implemented for 69% of the time under several policies with different naming schemes and requirements. Given the number of systems used the following categories have been used in the graph (Figure 5-6):

- 0 – no restriction on domestic garden irrigation (31% of the time, mostly during winter)
- 1 – restrictions on the use of fixed hoses and sprinklers, no restrictions on hand held hoses (50% of the time)
- 2 – restrictions on the use of hand held hoses, fixed hoses and sprinklers (16% of the time)
- 3 – no domestic garden irrigation (3% of the time).

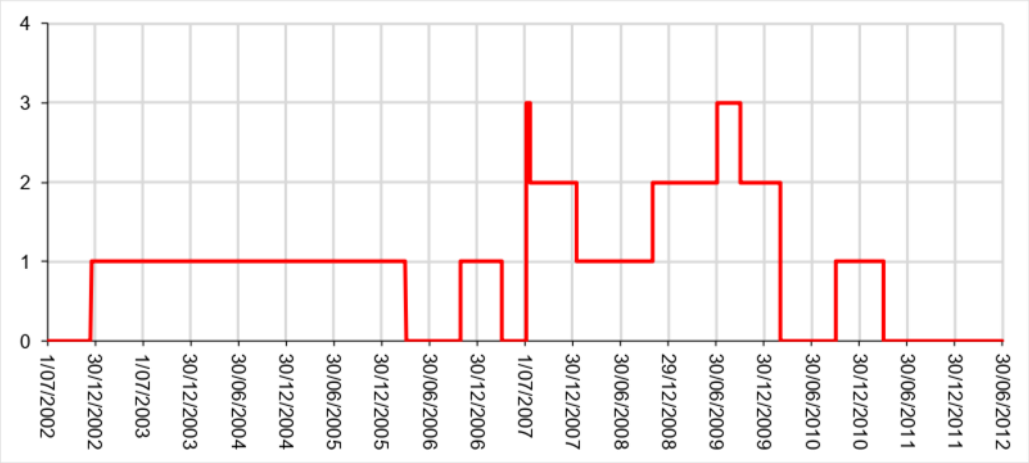


Figure 5-6: Cootamundra water restriction history

5.6 Urban Stormwater

5.6.1 Gundagai urban stormwater

Council has advised that due to the small size of the Gundagai town, they have not had a need for a formal stormwater plan.

Stormwater flow in Gundagai has been managed through street gutters which direct flows towards Morleys Creek or other water courses which then flow into the Murrumbidgee River.

Council charges a stormwater levy of $25 per assessment in town area to be used for stormwater infrastructure.

5.6.2 Gundagai flood study

The Murrumbidgee River at Gundagai is subject to significant flooding. The following flood levels by flood Annual Exceedance Probability (AEP) are defined by the SES (2):

- 20% AEP 8.53 m (215.659 mAHD)
- 10% AEP 9.4 m (216.529 mAHD)
- 5% AEP 10.05 m (217.179 mAHD)
- 1% AEP 11.3 m (218.429 mAHD)

Gundagai Shire experienced major flooding in December 2010 (peak at 10.2 m) and March 2012 (peak at 10.9 m), resulting in major impacts on infrastructure including damage to roads, bridges and recreational areas.

The facilities within the 1% AEP flood extent include the water treatment plant and the sewage treatment plant. The 1% AEP flood map is included in Figure 5-7.

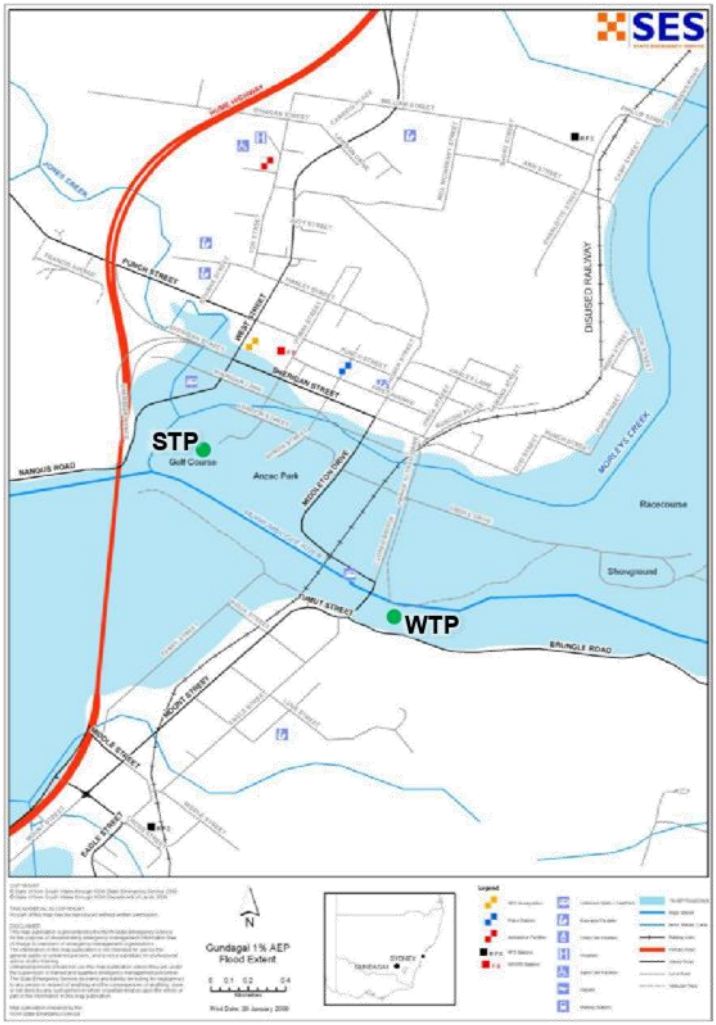


Figure 5-7: Gundagai 1% annual exceedance probability flood extent

5.6.3 Cootamundra urban stormwater

In 2018, Council commissioned a Stormwater Priority Assessment Report (3). The main projects planned for Cootamundra are:

- Floodplain Risk Management Plans for Cootamundra and Stockinbingal
- inspection and drain cleaning in Cootamundra
- Adam Street and McGowan Street, Cootamundra – Construct a small levee or grassed earth bank on the road reserve along fence line to separate mainstream flood waters from local water
- Continue the construction of concrete "v" drain and grassed channel sides at various locations throughout Cootamundra
- Southee Circle, Cootamundra. CCTV inspection of pipes. Analyse stormwater capacity and overland flow paths. Design improvements to minimise flooding risk.

Council proposes to fund these projects partly from the money granted under the NSW Government's Stronger Communities Fund, other grants and some Council funds.

5.6.4 Cootamundra Flood study

Cootamundra is on the banks of Muttama Creek and has a relatively small catchment of 160 km^2. Cootamundra is prone to flash flooding and has an extensive flood planning area in the LEP, mapped in Figure 5-8, the flood planning area is the 1% AEP + 0.5mAHD.

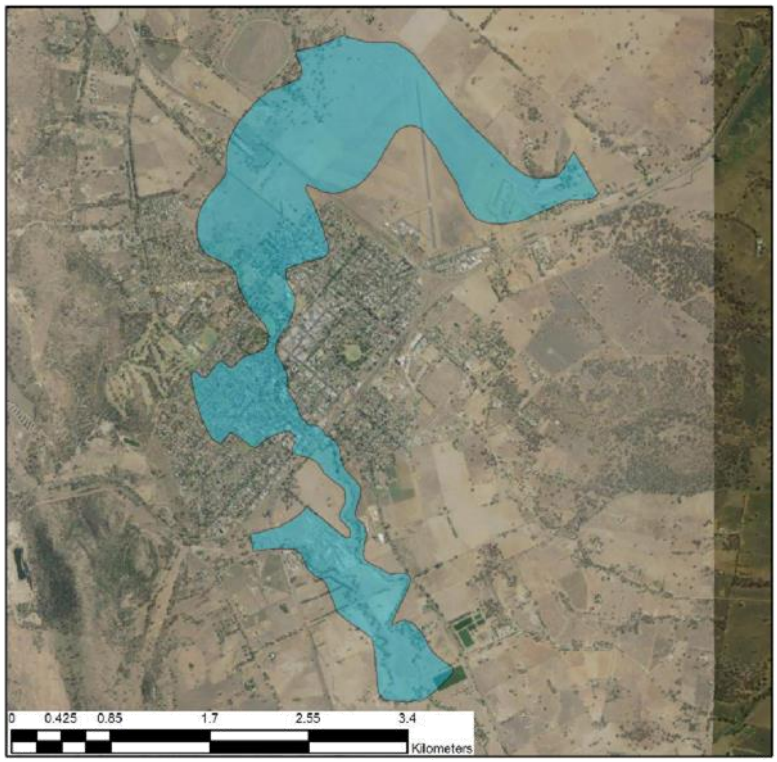


Figure 5-8: Cootamundra Flood Planning Area

CGRC has appointed WMAwater to undertake a detailed flood study for Cootamundra.

6 Gundagai Sewerage Scheme

The original Gundagai Sewerage System was commissioned in 1923 with a conventional gravity system of predominantly VC pipe and one SPS to transfer sewage to the Gundagai STP. As the town grew, the serviced area was extended to the north and south, including the town on the southern side of the Murrumbidgee river.

6.1 Sewage Collection and Transfer

Sewage is pumped to the STP from the northern side of Gundagai by the *Royal SPS*, and from the southern side by the *Boys Club SPS*.

There are two additional SPS; the *Primary School SPS* which pumps from the northern edge of town to the gravity catchment of the Royal SPS, and the *McDonalds SPS* which pumps from the southern edge of town to the gravity catchment of the Boys Club SPS. This is shown in Figure 6-1.

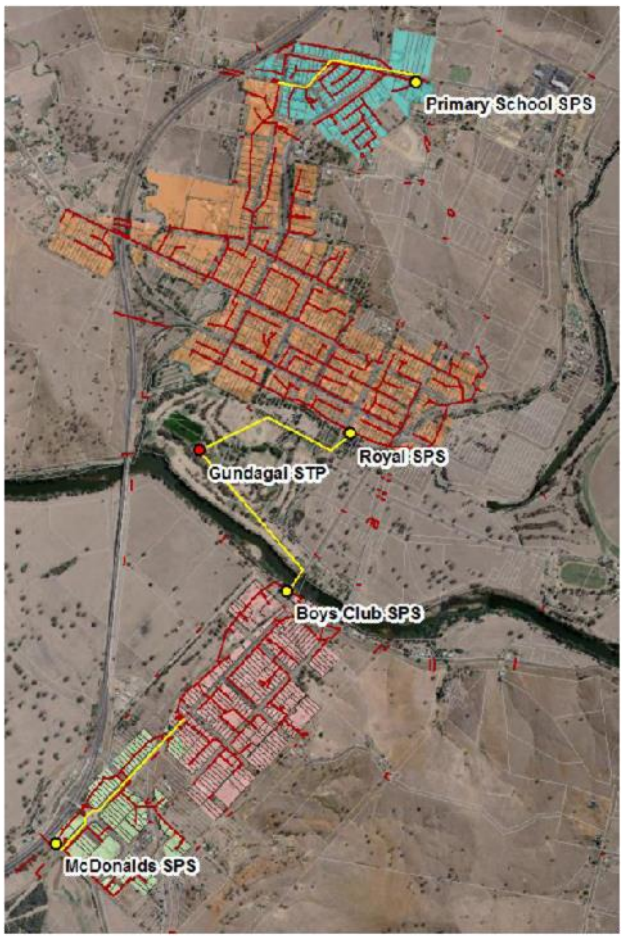


Figure 6-1: Gundagai Sewerage Scheme service area and catchments

All existing pumping stations are based upon fixed speed submersible pumps with one duty and one standby pump providing 100% standby capacity, operated in alternating fashion.

6.2 STP Description

The original Gundagai STP was commissioned in 1923 and was based on the biological filtration process (trickling filters) for secondary treatment. In 1970, to cater for the connection of South Gundagai, the STP was upgraded to include a humus tank and maturation ponds.

Gundagai STP is thought to have a capacity of 0.5 ML/day, based on the standard design criteria at the time of its construction in the 1970s.

The current plant consists of the following process units:

- an inlet structure
- one Imhoff tank and one primary sedimentation tank
- two trickling filters
- one humus tank
- two sludge digesters
- five sludge drying beds
- two maturation ponds

An overview of the process is shown in Figure 6-2.

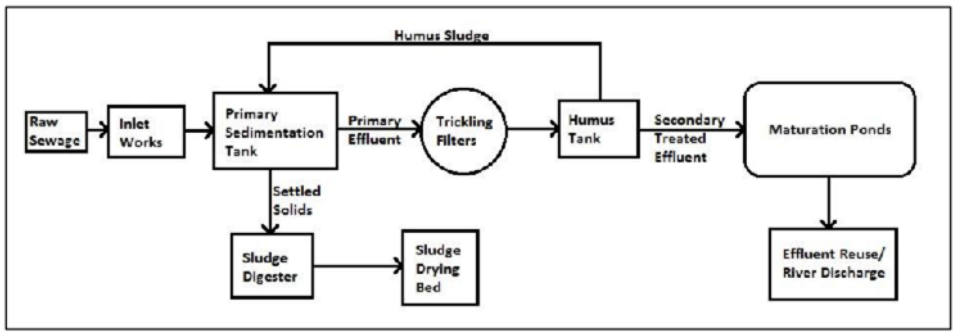


Figure 6-2: Gundagai STP – Existing process flow diagram

6.3 Effluent Management

Council currently reuses all effluent produced from the STP for irrigation of the town's golf course and adjacent sports grounds. Effluent is pumped from the maturation ponds to a storage at the golf course. In addition to this, there are significant evaporative losses from the maturation ponds and on-course water storage, which has meant that no effluent is discharged under normal operation. The only time that effluent is discharged to surface water is when there is a flood and the golf course storage overflows, which Council advises has only happened around twice during the last 20 years.

Council has drafted a new draft end user agreement which is currently being developed in consultation with the golf club. Council does not have Section 60 approval for the Gundagai STP, or a RWMP for the effluent reuse scheme. **Issue**

6.4 Biosolids Management

Council currently disposes of their biosolids at the local landfill.

6.5 STP EPA License Requirements

The EPA license for Gundagai STP (number 1721) specifies monitoring at the following points:

1. Effluent quality monitoring – Final Tertiary pond discharge pipe, monitoring of quality is conducted quarterly using grab sample methods
2. Total volume monitoring – Discharge pipe leading from the humus tank to the tertiary effluent ponds, frequency of measurement is daily using flow meter and continuous logger
3. Discharge to utilisation – Surrounding golf course and adjoining sports fields
4. Effluent volume monitoring – Flow meter downstream of effluent reuse pump station, continuous monitoring using magnetic flow meter

The volumetric must be recorded daily at Point 4 by a magnetic flow meter, and daily during any discharge at Point 2 by a flow meter. The volumetric flow at Point 4 (effluent volume monitoring) must not exceed 5,000 kL/day.

Point 1 is monitored quarterly by grab sample for BOD, conductivity, total nitrogen, oil and grease, pH, total phosphorus, thermotolerant coliforms and total suspended solids. The only licensed concentration limit is that thermotolerant coliforms must not exceed the 100-percentile limit of 1,000 CFU/100mL.

7 Cootamundra Sewerage Scheme

7.1 Sewage Collection and Transfer

The Cootamundra township sewage collection system comprises approximately 58 km of gravity main and 3.2 km of rising main. Sewage is pumped into the main catchment by 3 small SPS, servicing the airport and two non-residential developments to the south of the town. The catchment boundaries are mapped in Figure 7-1 and the system hierarchy and known capacities are summarised in Table 7-1.

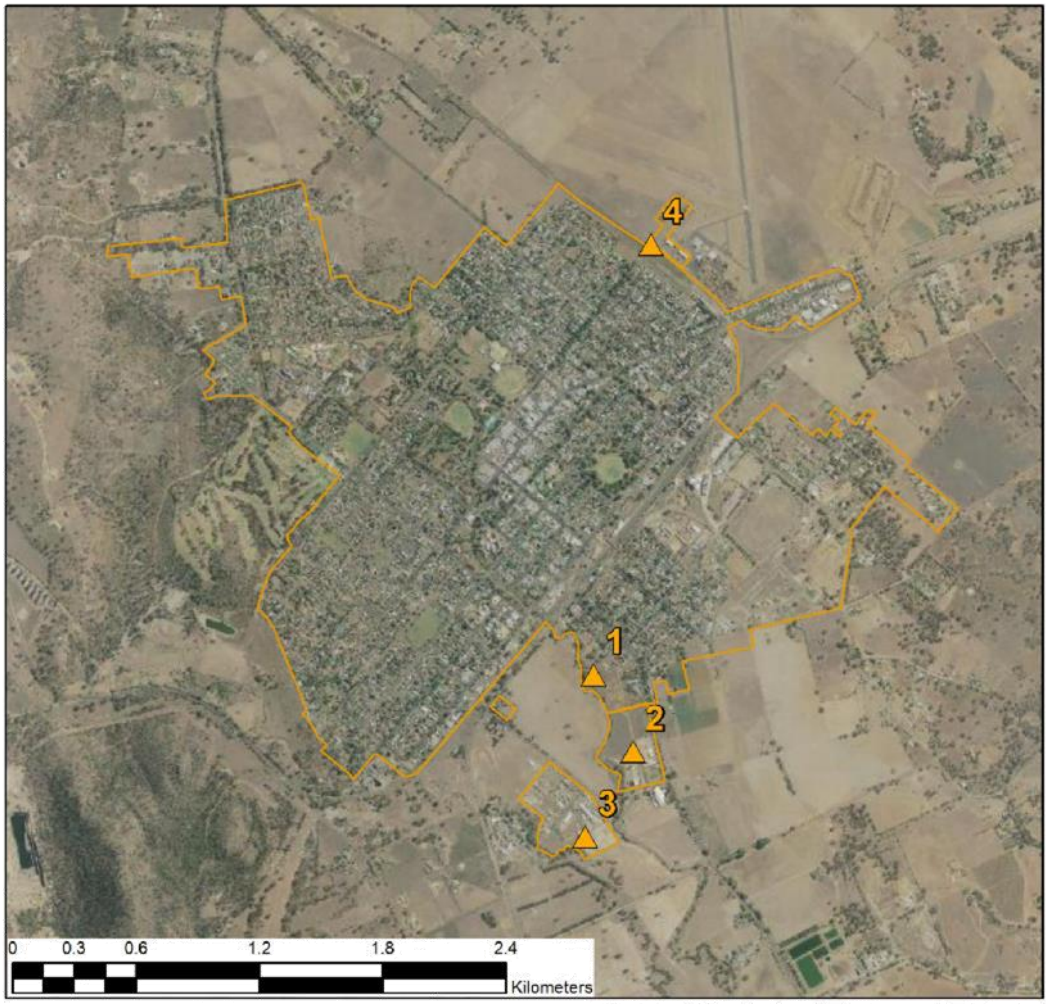


Figure 7-1: Cootamundra Sewerage Scheme Service Area and SPS Catchments

Table 7-1: Cootamundra SPS hierarchy

SPS 2 (Strikers)	SPS 1 (Betts St)	STP ADWF 2,700 kL/day (30 L/s) PWWF 230 L/s Storm bypass for flows > 100 L/s Storm flow storage 80 ML
SPS 3 (King St)		
SPS 4 (Airport) ADWF 0.6 L/s PWWF 4 L/s		

Table 7-2: Cootamundra SPS and rising main data

SPS	Rising Main Length (m)	Rising Main Diameter (mm)	Pump well diameter (m)	Pump well depth (m)	Individual pump flow rates (L/s)	Maximum wet weather flow rate (L/s)
1	2500	375	2.74	12.2	59.2	133
2	450	80	1.80	4.75	Council has no records	
3	525	80	1.80	6.20	Council has no records	
4	350	80	1.80	3.40	Council has no records	

7.2 STP Description

The Treatment Works was constructed in 1980 with an anaerobic lagoon to accept the waste from the tannery and the overflow plus the towns domestic sewage to be treated in an aerated lagoon and maturation pond. The augmentation commissioned in 1992/3 converts the aerated lagoon to an extended aeration tank which is operated as a continuous system with a clarifier providing separation and solids recirculation, the augmentation also included a new inlet works, a new tertiary effluent pond, and facilities for the chemical removal of phosphorous from the influent.

A schematic diagram of the plant is provided in Figure 7-2 and the design capacity and load is summarised in Table 7-3. The design data was sourced from the 1993 Cootamundra Sewerage – Sewage Treatment Works Guidelines for Operation.

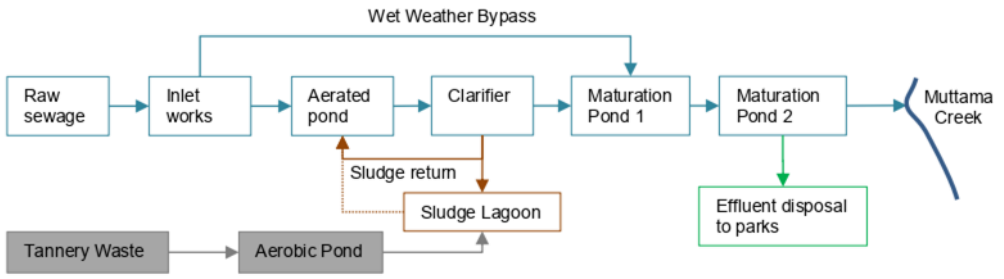


Figure 7-2: Cootamundra STP schematic diagram

Table 7-3: Cootamundra STP Design Data

Design data		Units	Design criteria	Capacity
	Ultimate capacity	EP		12,000
Unit loading	Flow	L/EP/day	240	
	BOD_5	g/EP/day	70	
	Suspended solids	g/EP/day	70	
	Total Nitrogen	g/EP/day	10	
	Total Phosphorus	g/EP/day	2	
Flows at ultimate capacity	ADWF	L/s		34
	PDWF	L/s	2xADWF	68
	PWWF	L/s	7 x ADWF	230
Received Inflow Distribution	Flow to aeration tank at dry weather flow	L/s		100
	Flow to aeration tank at wet weather flow	L/s		120
	Flow bypassed at wet weather discharge	L/s		110
Design effluent characteristics	BOD_5	mg/L		20
	Suspended solids	mg/L		30
	Total Nitrogen	mg/L		15
	Ammonia Nitrogen	mg/L		10
	Total Phosphorus	mg/L		1
	Oil and Grease	mg/L		10
	pH			6.5-5.8
Inlet works	Design flow	L/s		230
Flume	Design maximum flow	L/s		120
Aeration Tank	Volume	m^3		6200
Sludge lagoon	Design capacity	EP		22,000
Anaerobic pond	Volume	m^3		6,400
Effluent ponds	Volume – older pond	m^3		30,000
	Volume – newer pond	m^3		14,000

7.3 Effluent Management

Council reuses effluent at many of the parks and schools in and around Cootamundra.

In April 2002, the Cootamundra Effluent Re-use Scheme was commissioned. This scheme recycles treated effluent using automated underground irrigation systems in Cootamundra's parks, gardens and road reserves. Council has EPA approval for the use of treated effluent to irrigate open space in several schools, though Council is unable to locate the effluent application records that must be submitted to the EPA this is an **issue**.

The re-use dam, on Gundagai Rd has 80 ML of storage and the Golf Course has an additional 40 ML storage. These storages enable the watering of the parks and gardens to continue in most dry periods.

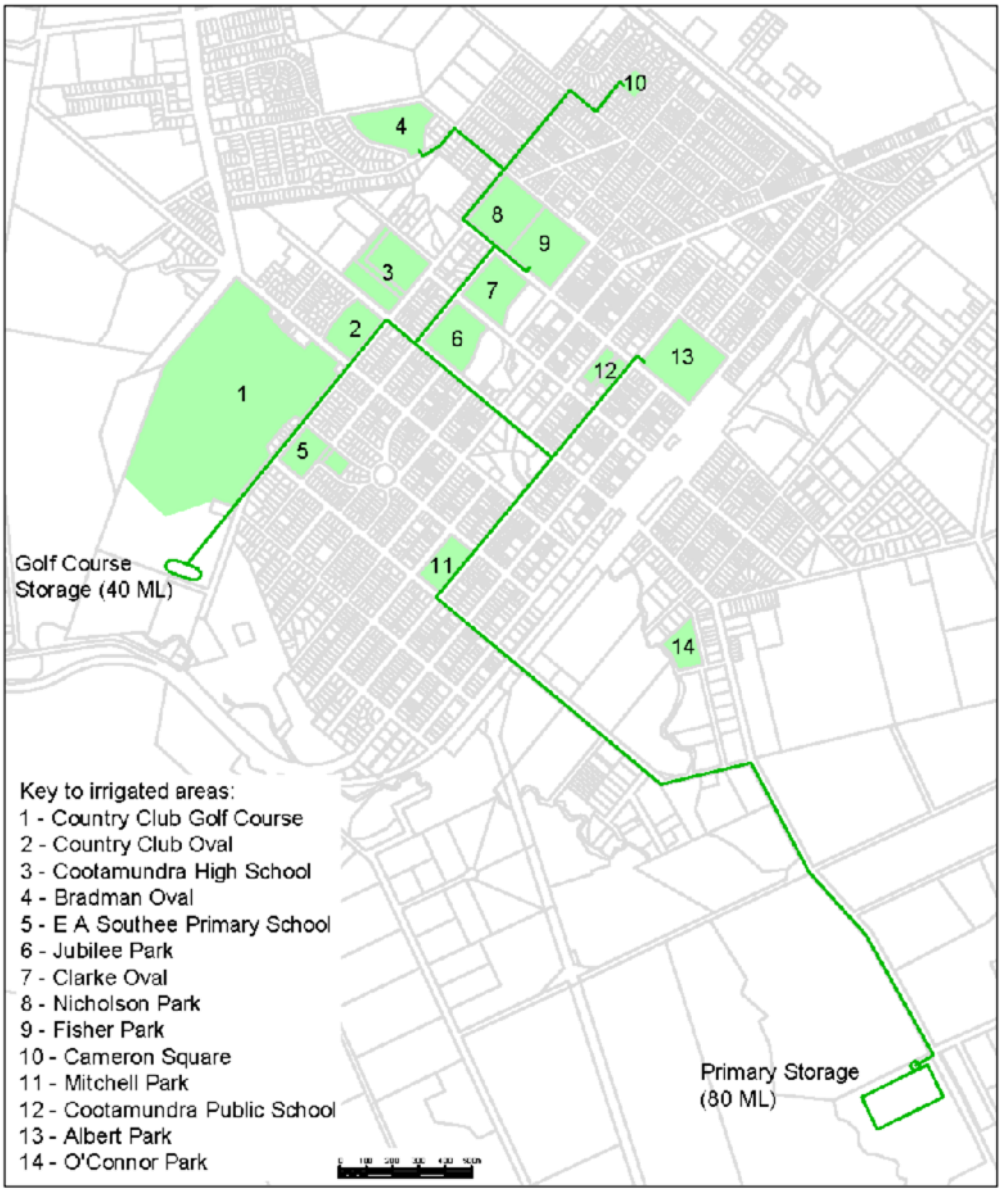


Figure 7-3: Cootamundra effluent reuse system

7.4 Biosolids Management

The biosolids from the Cootamundra STP are stored on site. Testing of the biosolids shows that there is still a high chromium content even though the tannery has closed. This may indicate that there is infiltration from the old tannery site into the biosolids storage site.

The sludge stabilisation grade can be determined from the process used to treat the sludge. For an extended aeration plant like Cootamundra, the biosolids may meet the Grade B requirements if "at least 20 days continuous or intermittent extended aeration including aerobic digestion time followed by six (6) months storage of biosolids in a lagoon or equivalent process." Council does not know if this requirement is met, this is a **data gap**.

The contaminant concentration of the dried biosolids is used to determine the contaminant grade. Council is unable to locate the test results; this is a **data gap**.

7.5 STP EPA License Requirements

The EPA license for Cootamundra STP (number 1603) specifies monitoring at the following points:

1. Wet-weather overflow – measured at the spillway of the of the wet weather storage pond
2. Treated effluent flow – measured at the outlet weir of maturation pond 2
3. Mitchell Park reuse effluent flow and soil quality monitoring
4. Albert Park reuse effluent flow and soil quality monitoring
5. Jubilee Park reuse effluent flow and soil quality monitoring
6. Clarke Oval Reserve reuse effluent flow and soil quality monitoring
7. Fischer Park reuse effluent flow and soil quality monitoring
8. Bradman Oval reuse effluent flow and soil quality monitoring
9. Cameron Square Park reuse effluent flow and soil quality monitoring
10. Nicholson Park reuse effluent flow and soil quality monitoring
11. Country Club Oval reuse effluent flow and soil quality monitoring
12. Effluent quality and volume monitoring at the outlet from the 80 ML wet weather storage pond to the pump station for effluent utilisation
13. EA Southlee Public School reuse effluent flow and soil quality monitoring
14. Cootamundra High School reuse effluent flow and soil quality monitoring
15. Cootamundra Public School reuse effluent flow and soil quality monitoring
16. Mitchell Park groundwater monitoring using piezometer
17. Albert Park groundwater monitoring using piezometer
18. Jubilee Park groundwater monitoring using piezometer
19. Clarke Oval Reserve groundwater monitoring using piezometer
20. Bradman Oval groundwater monitoring using piezometer
21. Nicholson Park groundwater monitoring using piezometer
22. Country Club Oval groundwater monitoring using piezometer

23. EA Southlee Public School groundwater monitoring using piezometer
24. Cootamundra High School groundwater monitoring using piezometer
25. Cootamundra Public School groundwater monitoring using piezometer

There is no groundwater monitoring point listed in the license for Fischer Park or Cameron Square Park.

The assessable pollutant load limits are summarised in Table 7-4. Total pollutant fees have varied dramatically and are generally either <$5/year or between $1000 and $5000/year.

- Low pollutant fees (<$5) were charged in 2017/18, 2015/16, 2014/15, 2013/14
- Medium pollutant fees ($5-$1000) were charged in 2008/09
- High pollutant fees ($1000-$5000) were charged in 2016/17, 2012/13, 2011/12, 2010/11, 2009/10, 2007/08, 2006/07, 2005/06, 2004/05.

Table 7-4: Assessable pollutant load limits

Assessable Pollutant	Load limit (kg/year)
BOD (Enclosed Water)	3,950
Nitrogen (total) (Enclosed Water)	10,650
Oil and Grease (Enclosed Water)	5,700
Phosphorus (Enclosed Water)	400
Total suspended solids (Enclosed Water)	5,100

The reuse water quality for all sites must meet the criteria in Table 7-5 at all times.

Table 7-5: Reuse water quality standard

Pollutant	Unit	100 percentile concentration limit
Biochemical Oxygen Demand	mg/L	30
Faecal Coliforms	colony forming units per 100 mL	10
pH	pH	5.5-9.5

The maximum annual effluent overflow volume measured at Point 1 is 600 ML/year.

8 Asset Performance and Issues

8.1 Asset Valuation

Council's most recent water and sewerage asset revaluation was undertaken in 2017 (4), the current replacement cost for each system and asset class is summarised in Table 8-1 and Table 8-2.

Table 8-1: Cootamundra asset valuation summary

System	Asset Class	Current Replacement Cost (CRC) ($K)	Accumulated Depreciation ($K)	Written Down Current Value (WDCV) ($K)	WDCV / CRC
Water	Reservoir 1	1,628	863	765	47.0%
	Reservoir 2	1,125	567	558	49.6%
	Reticulation	11,735	7,901	3,834	32.7%
	Total	**14,488**	**9,331**	**5,157**	**35.6%**
Sewerage	Gravity Reticulation	21,217	15,234	5,982	28.2%
	Rising Mains	519	129	391	75.3%
	SPS 1 Betts St	2,019	789	1,230	60.9%
	SPS 2 Strikers	166	35	130	78.7%
	SPS 3 King Dr	181	40	141	77.8%
	SPS 4 Airport	151	31	120	79.6%
	WWTP – Biological Treatment	2,399	927	1,471	61.3%
	WWTP – Chemical Dosing	124	58	66	53.1%
	WWTP – Effluent Storage	2,062	458	1,604	77.8%
	WWTP – Preliminary Treatment	205	102	102	50.0%
	WWTP – Primary Sedimentation	740	241	499	67.5%
	WWTP – Process	638	228	410	64.2%
	WWTP – Siteworks	82	33	49	60.0%
	WWTP – Sludge Dewatering	240	75	165	68.7%
	WWTP – Trade Waste	199	78	121	61.0%
	Total	**30,942**	**18,458**	**12,483**	**40.3%**

Table 8-2: Gundagai asset valuation summary

System	Asset	Current Replacement Cost (CRC) ($K)	Accumulated Depreciation ($K)	Written Down Current Value (WDCV) ($K)	WDCV / CRC
Water	Raw water PS	715	243	472	66.0%
	WTP – Chemical Dosing	450	204	246	54.6%
	WTP – Clearwater	247	64	183	73.9%
	WTP – Disinfection	120	33	88	72.9%
	WTP – Filtration	2,049	476	1,573	76.8%
	WTP – Primary Clarification	773	201	572	74.0%
	WTP – Process	1,673	557	1,116	66.7%
	WTP – Siteworks	679	140	539	79.3%
	WTP – Pump Station	144	38	106	73.3%
	Reservoirs	3,086	1,368	1,718	55.7%
	Reticulation	351	31	321	91.3%
	Trunk	2,407	1,514	894	37.1%
	Total	**12,695**	**4,869**	**7,826**	**61.6%**
Sewerage	Gravity Reticulation	7,461	4,923	2,538	34.0%
	Rising Mains	601	391	210	35.0%
	SPS Boys Club	144	38	106	73.3%
	SPS Feeder Primary School	44	9	35	78.5%
	SPS McDonalds	153	40	113	73.8%
	SPS Primary School	196	57	139	70.9%
	SPS Royal	769	283	487	63.3%
	WWTP – Biological Treatment	566	444	122	21.6%
	WWTP – Effluent Storage	488	148	339	69.6%
	WWTP – Preliminary Treatment	33	22	12	34.7%
	WWTP – Primary Sedimentation	402	298	104	25.8%
	WWTP – Secondary Sedimentation	261	156	106	40.4%
	WWTP – Siteworks	46	14	32	70.0%
	WWTP – Sludge Dewatering	150	83	67	44.5%
	WWTP – Sludge Storage	318	254	64	20.0%
	Treated Effluent PS	42	13	30	70.0%
	Total	**11,675**	**7,173**	**4,502**	**38.6%**

8.2 Asset management system

The asset condition description as stated in the Integrated Planning and Reporting Manual for local government in NSW, is outlined in Table 8-3.

Table 8-3: Asset condition rating as stated in the IP&R Manual

Level	Condition	Description
1	Excellent	No work required (normal maintenance)
2	Good	Only minor maintenance work required
3	Satisfactory	Maintenance work required
4	Poor	Renewal required
5	Very Poor	Urgent renewal/upgrading required

The assets of concern (**issues**) are highlighted in red.

Table 8-4: Cootamundra asset condition rating

System	Asset Class	Current Replacement Cost (CRC) ($K)	Condition Rating				
			1	2	3	4	5
Water	Reservoir 1	1,628	0.0%	24.3%	73.7%	2.0%	0.0%
	Reservoir 2	1,125	0.0%	0.0%	98.1%	1.9%	0.0%
	Reticulation*	11,735	6.1%	11.0%	16.3%	31.9%	34.8%
	Total	**14,488**	**4.9%**	**11.6%**	**29.1%**	**26.2%**	**28.2%**
Sewerage	SPS 1 Betts St	2,019	11.7%	78.6%	0.0%	9.7%	0.0%
	SPS 2 Strikers	166	86.7%	13.3%	0.0%	0.0%	0.0%
	SPS 3 King Dr	181	84.5%	15.5%	0.0%	0.0%	0.0%
	SPS 4 Airport	151	95.7%	4.3%	0.0%	0.0%	0.0%
	Gravity Reticulation	21,217	3.5%	7.9%	14.1%	14.0%	60.5%
	Rising Mains	519	14.2%	85.8%	0.0%	0.0%	0.0%
	WWTP – Biological Treatment	2,399	0.0%	98.0%	0.0%	2.0%	0.0%
	WWTP – Chemical Dosing	124	0.0%	31.0%	69.0%	0.0%	0.0%
	WWTP – Effluent Storage	2,062	77.9%	22.1%	0.0%	0.0%	0.0%
	WWTP – Preliminary Treatment	205	0.0%	0.0%	100%	0.0%	0.0%
	WWTP – Primary Sedimentation	740	0.0%	100.0%	0.0%	0.0%	0.0%
	WWTP – Process	638	13.4%	86.6%	0.0%	0.0%	0.0%
	WWTP – Siteworks	82	0.0%	100.0%	0.0%	0.0%	0.0%
	WWTP – Sludge Dewatering	240	0.0%	93.5%	6.5%	0.0%	0.0%
	WWTP – Trade Waste	199	0.0%	100.0%	0.0%	0.0%	0.0%
	Total	**30,942**	**10.3%**	**27.2%**	**10.6%**	**10.4%**	**41.5%**

*Council is currently undertaking an extensive water main replacement program.

Table 8-5: Gundagai asset condition rating

System	Asset	Current Replacement Cost (CRC) ($K)	Condition Rating				
			1	2	3	4	5
Water	Raw water PS	715	46.8%	32.6%	20.5%	0.0%	0.0%
	WTP – Chemical Dosing	450	3.8%	90.4%	5.8%	0.0%	0.0%
	WTP – Clearwater	247	39.5%	60.5%	0.0%	0.0%	0.0%
	WTP – Disinfection	120	29.2%	70.8%	0.0%	0.0%	0.0%
	WTP – Filtration	2,049	79.1%	19.0%	1.9%	0.0%	0.0%
	WTP – Primary Clarification	773	69.9%	30.1%	0.0%	0.0%	0.0%
	WTP – Process	1,673	0.0%	100.0%	0.0%	0.0%	0.0%
	WTP – Siteworks	679	93.3%	6.7%	0.0%	0.0%	0.0%
	WTP – Pump Station	144	49.5%	45.1%	5.4%	0.0%	0.0%
	Reservoirs	3,086	3.9%	58.6%	37.4%	0.0%	0.0%
	Reticulation	351	15.0%	82.7%	2.3%	0.0%	0.0%
	Trunk	2,407	14.7%	10.6%	35.1%	3.0%	33.4%
	Total	**12,695**	**30.6%**	**44.4%**	**17.5%**	**0.6%**	**6.3%**
Sewerage	Gravity Reticulation	7,461	2.8%	10.3%	35.0%	0.2%	51.7%
	Rising Mains	601	2.2%	0.0%	70.0%	0.0%	27.8%
	SPS Boys Club	144	49.5%	45.1%	5.4%	0.0%	0.0%
	SPS Feeder Primary School	44	85.3%	14.7%	0.0%	0.0%	0.0%
	SPS McDonalds	153	53.3%	41.6%	5.1%	0.0%	0.0%
	SPS Primary School	196	21.2%	78.8%	0.0%	0.0%	0.0%
	SPS Royal	769	7.0%	93.0%	0.0%	0.0%	0.0%
	WWTP – Biological Treatment	566	0.0%	0.0%	0.0%	100.0%	0.0%
	WWTP – Effluent Storage	488	0.0%	100.0%	0.0%	0.0%	0.0%
	WWTP – Preliminary Treatment	33	0.0%	29.4%	0.0%	70.6%	0.0%
	WWTP – Primary Sedimentation	402	0.0%	22.3%	0.0%	36.3%	41.4%
	WWTP – Secondary Sedimentation	261	0.0%	31.1%	0.0%	68.9%	0.0%
	WWTP – Siteworks	46	0.0%	100.0%	0.0%	0.0%	0.0%
	WWTP – Sludge Dewatering	150	0.0%	15.2%	84.8%	0.0%	0.0%
	WWTP – Sludge Storage	318	0.0%	0.0%	0.0%	100.0%	0.0%
	Treated Effluent PS	42	0.0%	100.0%	0.0%	0.0%	0.0%
	Total	**11,675**	**4.4%**	**21.8%**	**27.2%**	**10.7%**	**35.9%**

The NSW Code of Accounting Practice and Financial Reporting (5) states that the *Estimated cost to bring to satisfactory standard (BTS)* should be measured against the condition rating of 2 'Good', unless Council has undertaken consultation with their community and has agreed to a

different condition level for council's assets. Council does not have a target asset condition rating, this is a **data gap**.

The main assets of concern in Cootamundra are the reservoirs, the sewer reticulation, and the WWTP chemical dosing system.

The Gundagai STP is currently in poor condition, Council expects to call tenders for the construction of a new STP by mid-2020 and may include a new SPS and rising mains subject to the availability of funds. The other assets of concern in Gundagai are the reservoirs, trunk mains and gravity sewers.

8.3 Replacement cost and cost to bring to satisfactory standard

The amalgamation of the Councils and the changing reporting requirements have greatly influenced the availability of asset condition and valuation data. Table 8-6 provides the water supply and sewerage gross replacement costs as well as the "Estimated cost to bring assets to a satisfactory standard". These values are obtained from Special Schedule 7 of the financial statements from the 2015/16, 2016/17 and 2017/18 annual reports.

Table 8-6: Gross replacement cost and cost to bring assets to a satisfactory standard

Service	Indicator	Financial Year			
		2015/16		2016/17	2017/18
		CSC	GSC	CGRC	CGRC
Water	Gross replacement cost ($'000)	15,576	18,050	30,569	31,580
	Estimated cost to bring assets to a satisfactory standard ($'000)	725		5,926	6,452
Sewerage	Gross replacement cost ($'000)	38,267	15,141	47,789	50,127
	Estimated cost to bring assets to a satisfactory standard ($'000)	585	-	9,561	8,853

8.4 Asset performance indicators

The asset performance indicators with the Code of Accounting Practise and Financial Reporting benchmark for the water supply and sewerage assets are presented in Table 8-7 and Table 8-8. These values are obtained from Special Schedule 7 of 2014/15, 2015/16, 2016/17 and 2017/18 Financial Statements. All indicators not meeting the benchmarks are highlighted in red.

Table 8-7: Cootamundra Gundagai water asset performance indicators

Indicator	Financial Year						Benchmark
	2014/15		2015/16		2016/17	2017/18	
	CSC	GSC	CSC	GSC	CGRC	CGRC	
Infrastructure Renewals Ratio $= \frac{Asset\ renewals}{Depreciation, amortisationa\ and\ impairment}$	32.8%	9.9%	0.0%	10.4%	45.2%	80.6%	> 1
Infrastructure Backlog Ratio $= \frac{Estimated\ cost\ to\ bring\ assets\ to\ a\ satisfactory\ standard}{Net\ carrying\ amount\ of\ infrastructure\ assets}$	18.1%	0.0%	18.5%	0.0%	40.6%	43.6%	< 0.02
Asset Maintenance Ratio $= \frac{Actual\ asset\ maintenance}{Required\ asset\ maintenance}$	1.03	0.73	1.13				> 1
Cost to bring assets to agreed service level $= \frac{Estimated\ cost\ to\ bring\ assets\ to\ an\ agreed\ service\ level\ set\ by\ Council}{Gross\ replacement\ cost}$					0.0%	20.4%	
Capital expenditure ratio $= \frac{Annual\ Capital\ Expenditure}{Annual\ Depreciation}$	0.33	0.10					

Table 8-8: Cootamundra Gundagai sewer asset performance indicators

Indicator	Financial Year						Benchmark
	2014/15		2015/16		2016/17	2017/18	
	CSC	GSC	CSC	GSC	CGRC	CGRC	
Infrastructure Renewals Ratio $= \frac{Asset\ renewals}{Depreciation, amortisationa\ and\ impairment}$	0%	258%	256%	51.6%	88.5%	256%	> 1
Infrastructure Backlog Ratio $= \frac{Estimated\ cost\ to\ bring\ assets\ to\ a\ satisfactory\ standard}{Net\ carrying\ amount\ of\ infrastructure\ assets}$	2.99%	0%	2.86%	0.00%	43.7%	38.2%	< 0.02
Asset Maintenance Ratio $= \frac{Actual\ asset\ maintenance}{Required\ asset\ maintenance}$	1.03	1.19	0.92	0.00	0%	0%	> 1

Indicator	Financial Year						Benchmark
	2014/15		2015/16		2016/17	2017/18	
	CSC	GSC	CSC	GSC	CGRC	CGRC	
Cost to bring assets to agreed service level $= \frac{Estimated\ cost\ to\ bring\ assets\ to\ an\ agreed\ service\ level\ set\ by\ Council}{Gross\ replacement\ cost}$					0%	17.7%	
Capital expenditure ratio $= \frac{Annual\ Capital\ Expenditure}{Annual\ Depreciation}$	0.33	2.58					

The following water asset **issues** are of note:

- the infrastructure renewals ratio has been consistently under the benchmark, indicating that insufficient renewals have been undertaken
- the infrastructure backlog ratio has been generally over the benchmark indicating that a portion of the assets have a condition rating that is worse than Council's agreed condition rating. These are mostly the trunk mains at Gundagai and the reticulation mains at Cootamundra.

The following sewerage asset **issues** are of note:

- the infrastructure renewals ratio has been frequently under the benchmark, indicating that insufficient renewals have been undertaken
- the infrastructure backlog ratio has been generally over the benchmark indicating that that a portion of the assets have a condition rating that is worse than Council's agreed condition rating. These are the gravity reticulation at Cootamundra and Gundagai, and the STP at Gundagai.
- the asset maintenance ratio has generally been below the benchmark indicating that insufficient maintenance has been undertaken.

8.5 Department of Primary Industry inspection

The Senior Water & Wastewater Treatment Officer of DPI-Water (now DPIE Water) – Cootamundra Office, inspected the Cootamundra and Gundagai sewage treatment plants on the 5th-6th February 2018. The key results of the inspection were:

Policy

- Under no circumstances is grease trap waste allowed to be received at a STP. Issue
- A trade waste policy must be prepared and implemented to protect the sewerage system infrastructure, offer WH&S protection for staff and to ensure that the plant does not exceed the licence conditions. Issue

  A backflow / cross connection policy must be prepared and implemented to reduce the potential contamination risks for the drinking water. **Issue**

Gundagai STP

- This works continues to be operated and maintained as best as can be expected given its deteriorated condition and it is a credit to Council's Operators that this works continues to produce a satisfactory effluent.
- The bio-filter plant at Gundagai has good ammonia to nitrate conversion. The BOD (33 mg/L) however, is slightly elevated above the desired level of 20 mg/L. This BOD level; would have reduced further in the tertiary ponds.

Cootamundra STP

- The operation, maintenance and presentation of this plant were found to be satisfactory. The activated sludge plant at Cootamundra is producing a high quality effluent.
- Only septic effluent can be accepted and that discharged to be in the present "old" sludge lagoon. Council needs to have an approved agreement with the discharger, and that agreement needs this Department's concurrence. Issue

Cootamundra SPS

- The sewer pump stations, particularly, the Betts St PS, needs attention. The grounds were severely overgrown. Issue
- Presently the stormwater drainage at the airport PS allows excess stormwater to enter this pump station adding unnecessary infiltration into the system. The pump station needs to be raised and lids secured to reduce this infiltration. Issue
- backflow protection devices must be tested annually and that test results recorded. This is a required as per AS3500. Any backflow event must be investigated and fixed. Issue

9 Financial Performance and Issues

9.1 Water Supply Fees and Charges

Prior to 2008 Council allowed each user to use up to 350 kL/year after which they would be charge for usage, in line with Historical local government practices at the time. Following asset valuations and the strategic business planning undertaken by Council, a three-tier usage charge was implemented to ensure that Council had the funds to replace worn assets and so they were less dependent on funding assistance.

CGRC's most recent water supply fees and charges, obtained from Council's website, are given in Table 9-1.

The CGRC Typical Residential Bill for water supply was $632 in 2016/17, which is lower than the state median of $814 for similar size LWUs (1,501 to 4,000 connections). (6)

Table 9-1: Gundagai water supply fees and charges

		Residential		Non-Residential	
2017/18	Water Access Charge – per year[1]	Residential	$209.00	Meter Size 20 mm [1]	$209.00
		Vacant Residential	$209.00	Meter Size 50 mm	$1,307.00
				Meter Size 100 mm	$5,225.00
	Usage Charge – per kL	0 to 300 kL/year	$1.54	All usage	$2.09
		301 to 500 kL/year	$2.09		
		Over 500 kL	$3.58		
2019/20	Water Access Charge – per year[1]	Residential	$230.00	Meter Size 20 mm [1]	$230.00
		Vacant Residential	$230.00	Meter Size 50 mm	$1,441.00
				Meter Size 100 mm	$5,760.00
	Usage Charge – per kL	0 to 300 kL/year	$1.70	All usage	$2.30
		301 to 500 kL/year	$2.30		
		Over 500 kL	$3.95		

1 – Water access charges not shown for other meter sizes – 25, 32, 40 and 80 mm

Table 9-2: Cootamundra 2019/20 water supply fees and charges

		Residential	Non-Residential	Community
Water Access Charge – per year [1]	Meter Size 20 mm	$371.00	$439.00	$219.00
	Meter Size 50 mm	$2,316.00	$2,740.00	$1,369.00
	Meter Size 100 mm	$9,266.00	$10,961.00	$5,481.00
	Strata	$371.00	$439.00	
	Vacant	$371.00	$439.00	$219.00
	Fire service	-	$0.00	
Usage Charge – per kL		$2.25	$2.47	$1.86

1 – Water access charges not shown for other meter sizes – 25, 32, 40 and 80 mm

9.2 Sewerage Fees and Charges

CGRC's most recent sewerage fees and charges, obtained from Council's website, are given in Table 9-3.

The CGRC Typical Residential Bill for sewerage was $412 in 2016/17, which is lower than the state median of $560 for similar size LWUs (1,501 to 4,000 connections). (6)

Table 9-3: Gundagai 2017/18 sewerage fees and charges

		Residential		Non-Residential	
2017/18	Sewer Access Charge – per year[1]	Occupied Vacant Residential	$751.00 $118.00	Meter Size 20 mm [1] Meter Size 50 mm Meter Size 100 mm	$197.00 $1,230.00 $4,916.00
	Usage Charge – per kL	No usage charge		All non-res Minimum non-residential charge	$2.98 $751.00
2019/20	Sewer Access Charge – per year [1]	Occupied	$800.00	Meter Size 20 mm [1]	$210
		Vacant Residential	$126.00	Meter Size 50 mm	$1,311
				Meter Size 100 mm	$5,241
	Usage Charge – per kL	No usage charge	$3.17	All non-res	$3.17
				Minimum non-residential charge	$800

1 – Sewer access charges not shown for other meter sizes – 25, 32, 40 and 80 mm

Table 9-4: Cootamundra 2019/20 water supply fees and charges

		Residential	Non-Residential	Community
Sewer Access Charge – per year[1]	Meter Size 20 mm	$454.00	$267.00	$133.00
	Meter Size 50 mm	$454.00	$1,669.00	$833.00
	Meter Size 100 mm	$454.00	$6,675.00	$3,338.00
	Vacant	$227.00	$227.00	$113.50
Usage Charge – per kL		$2.58	$2.58	$2.58
Minimum annual charge			$454.00	$454.00

1 – Water access charges not shown for other meter sizes – 25, 32, 40 and 80 mm

9.3 Developer contributions

The development contributions for Cootamundra water supply headworks are payable by Council to Goldenfields. The Cootamundra reticulated water supply and sewage developer contributions are summarised in Table 9-5 and the Equivalent Tenement (ET) definitions used by Goldenfields to estimate the charges for multi-unit and non-residential developments are summarised in Table 9-6.

There are no development contributions charged in Gundagai, this was not an issue before the merger as Gundagai had less than 4,000 connections, the merged Council area has over 4,000 and therefore development contributions plans are required under the best practice guidelines.
Issue

Table 9-5: Development Contributions per ET

Service		2016/17	2017/18	2018/19	2019/20
Water	Goldenfields charge	$7,135	$7,491	$7,643.01	$7,948.73
Sewer		$4,471	$4,605.13	$4,789.34	$4,980.91

Table 9-6: Goldenfields ET Definitions

Multi-unit development	1 Bedroom unit	0.50 ET/unit
	2 Bedroom unit	0.75 ET/unit
	3 Bedroom unit	1.00 ET/unit
Non-residential development*		The maximum of 1 ET or 1 ET/250 kL/year 1 ET/4 kL/peak day

* Proposed industrial developments where the future use is unknown are to use the NSW Water Directorate guidelines Ets per gross hectare for Unknown Future Use – Medium to calculate the Charge.

9.4 Liquid Trade Waste Policy

The Liquid Trade Waste (LTW) Policy from the former Cootamundra Shire Council has been adopted for the area of Gundagai. Council is the initial stages of developing a new LTW Policy for the amalgamated LGA, however it is expected to only have minimal changes from the Cootamundra Policy.

Table 9-7: 2019/20 liquid trade waste

	Cootamundra	Gundagai
Grease trap disposal fee	$60.00	
Reinspection fee	$133.00	
Septic tank disposal fee	$42.00	
Trade waste annual fee	$231.00	$231.00
Trade waste usage charge for Category 2 businesses	$4.00	$4.00

Charges have been implemented for Gundagai. The category 2 LTW customers are generally:

- retailers
  - food
  - concrete
  - fuel
  -
- service providers
  - accommodation
  - medical (excluding pharmacies)
  - mechanical
  - parts of schools
  - town swimming pool.

Council is currently (as of September 2019) in the process of implementing the LTW scheme in Cootamundra.

9.5 Financial Performance Comparison

The financial performance of Council's water and sewer business are compared with other utilities of a similar size. At the time of the 2015/16 performance report, Council provided:

- water to 4,040 properties, fitting in the 4,000 to 10,000 property utility range
- sewerage to 3,700 properties, fitting in to the 1,500 to 4,000 property utility range.

The water utility performance is summarised in Table 9-8 and the sewerage utility performance is summarised in Table 9-9.

Table 9-8: Financial Performance Comparison – Water

Indicator	Year	LWU Performance	Median for LWU with 4,000 to 10,000 properties
Residential fixed charge	2016/17	$328	$180
Residential usage charge	2016/17	$1.99 per kL	$1.85 per kL
OMA Cost (OMA)	2015/16	$0.89 per kL	$1.09 per kL
Typical Developer Charge	2016/17	$6,180 per ET	$6,300 per ET
Typical Residential Bill (TRB)	2016/17	$632	$666
Return on Assets	2015/16	1.4%	1.9%
Economic Rate of Return (ERR)	2015/16	1.0%	2.0%
Residential Revenue from Usage Charges	2015/16	59% of residential bills	74% of residential bills

Table 9-9: Financial Performance Comparison – Sewerage

Indicator	Year	LWU Performance	median for LWU 1,500 to 4,000 sewered properties
Residential fixed charge	2016/17	$412	$560
OMA Cost (OMA)	2015/16	$121	$181
LTW Usage Charge	2016/17	$3.00 per kL	$1.72 per kL
Typical Developer Charge	2016/17	$3,580 per ET	$4,200 per ET
Typical Residential Bill (TRB)	2016/17	$412	$560
Return on Assets	2015/16	1.7%	1.6%
Economic Rate of Return (ERR)	2015/16	1.6%	1.3%

10 Gundagai Growth Strategy

The detailed population analysis is given in Appendix B.

10.1 Historical Population

The ABS undertake the Census of Population and Housing every 5 years and calculates the Estimated Resident Population (ERP) as of 30 June each year. The historical pattern for the Gundagai LGA ERP is shown in Figure 10-1.

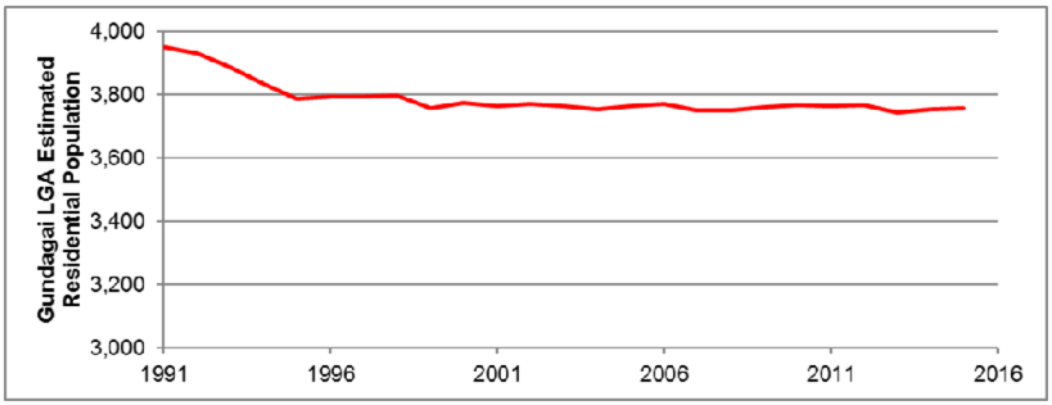


Figure 10-1: Gundagai LGA Estimated Residential Population

The LGA population dropped by about 5% from 3,951 in 1991 to 3,762 in 2001, but since then remained almost unchanged for the next fifteen years, reaching 3,756 in 2015.

10.2 Visitor Population

Gundagai's location halfway between Sydney and Melbourne makes it a popular stopping point for travellers. The ABS data set "Tourism Accommodation, Australia" (catalogue number 8635.0) indicates that on average 36% of beds are occupied and 55% of rooms are occupied

With an estimated capacity of 456 people in the motel and pub rooms, at 36% of beds occupied this equates to an average visitor population of around 140 people. If all beds, cabins and caravan sites are occupied, the peak population is approximately 600 people.

10.3 Population Projections

The NSW Department of Planning and Environment 2014 projection estimated that the population of Gundagai LGA was expected to decrease by an average of 0.4% per year between 2011 and 2031.

Council expects an increase in population over the next 30 years because of the following factors:

- Additional residents associated with the expansion of the abattoir
- Growth in tourism services with new initiatives already seeing greater numbers of day visitors
- Possible gold mine opening in the region
- Increased retirement and aged care industry as people move to Gundagai as a "tree change" destination

Council plans to cater for this growth with a short-term development, however this growth is not yet documented in any plan. Issue

Council has provided two growth scenarios which they believe may be achieved in the next 30 years. These are given in Table 10-1 with growth scenarios provided in terms of equivalent tenements (ET) by each SPS catchment.

Table 10-1: Council nominated growth projections for Gundagai – ET

	2017 ET	Low Growth ET	High Growth ET
Royal SPS	697	755	845
Primary School SPS	101	140	175
Boys Club SPS	261	325	330
McDonalds SPS	77	85	90
Sum	**1,136**	**1,305**	**1,440**

The growth projections are converted to equivalent people (EP) by multiplying ET by the household size of 2.2. The EP projections by each SPS catchment are given in Table 10-2.

Table 10-2: Council nominated growth projections for Gundagai – EP

	2017 EP	Low Growth EP	High Growth EP
Royal SPS	1,533	1,661	1,859
Primary School SPS	222	308	385
Boys Club SPS	574	715	726
McDonalds SPS	169	187	198
Sum	**2,499**	**2,871**	**3,168**

The population of other communities in the former Gundagai Shire is expected to not change of the next 30 years.

11 Cootamundra Growth Strategy

The detailed population analysis is provided in Appendix C.

11.1 Historical Population

The historical population trends for the former Cootamundra Shire and the Cootamundra SA2 (the current ABS area very similar to the old Shire) are shown in Figure 11-1.

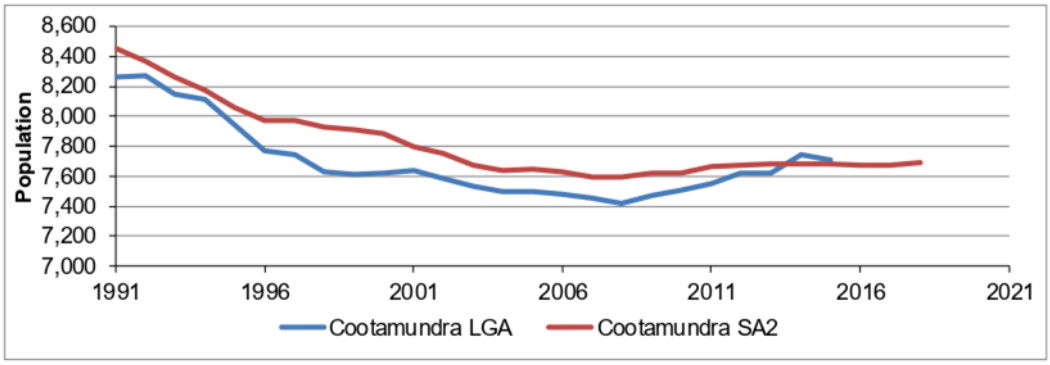


Figure 11-1: Cootamundra Estimated Residential Population

11.2 Visitor Population

Cootamundra has an estimated commercial visitor accommodation capacity of 450 people with an average of about 106 occupants. The number of visitors tends to peak around public holidays, especially Christmas and Easter. A high proportion of the visitors (estimated to be 40% by Council) stay with friends and relatives.

There are many major events each year, most held at the showground or the airport. The events at the airports are of particular interest as the airport is served by one of the small pumped sewerage catchments.

11.3 Population Projections

The NSW Department of Planning and Environment provides LGA based population projections. The most recent projection (2016) is for the merged Shire, the previous projection (2014) was prior to the merger.

The NSW Department of Planning and Environment 2014 projection estimated that the population of Cootamundra Shire was expected to decrease by 0.67% per year for the period 2011 to 2031.

The 2016 NSW Department of Planning and Environment projection provided three estimates for the period 2016 to 2036, named the “Low” (- 0.87% per year), “Main” (- 0.54% per year) and “High” (- 0.25% per year).

For the IWCM, the population and dwelling growth was developed using the following principles to project the population and dwellings in Cootamundra:

- a growth rate of 0.2% dwellings per year based on the recent growth in residential meters
- household size decreasing at 0.145% per year based on the NSW Planning Projection

- percentage of dwellings occupied remains flat
- all serviced dwelling growth is connected to both the water supply and sewerage scheme
- growth in non-private dwelling population and visitor populations in line with private dwelling population growth.

This resulted in a serviced population growth rate of 0.045% per year and an SA2 growth rate of 0.032% per year. The population projection for Cootamundra SA2 and the population served by Cootamundra water supply is graphed in Figure 11-2.

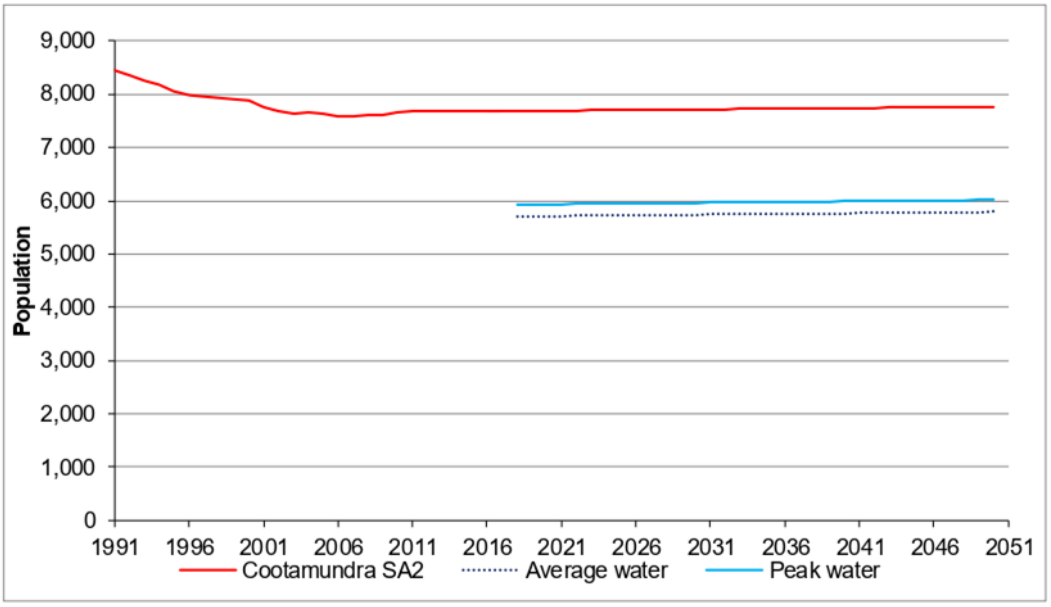


Figure 11-2: Population projection for Cootamundra SA2 and the population served by Cootamundra water supply

There are currently 11 dwellings served by the Cootamundra water supply that are not sewered. It is estimated that these dwellings house about 26 people.

Table 11-1: 2016 serviced population and dwelling estimate from Census data

	Water and sewer			Water Only			Total connected to water supply		
	People	Occupied Dwellings	Total Dwellings	People	Occupied Dwellings	Total Dwellings	People	Occupied Dwellings	Total Dwellings
Houses, townhouses and flats	**5,318**	**2,474**	**2,778**	**26**	**10**	**11**	**5,344**	**2,484**	**2,789**
Aged care	116	0	0	0	0	0	116	0	0
Hospital	30	0	0	0	0	0	30	0	0
Average visitor	106	0	0	0	0	0	106	0	0
Peak visitor	325	0	0	0	0	0	325	0	0
Average	**5,570**	**2,474**	**2,778**	**26**	**10**	**11**	**5,596**	**2,484**	**2,789**
Peak	**5,789**			**26**			**5,815**		

12 Gundagai Water Demand Analysis and Issues

A water demand analysis is undertaken to calculate the unit demands, estimate the non-revenue water and forecast the following demands:

- Average (rainfall) year demands – for revenue planning
- Dry year demands – to assess drought security
- Peak day demands – to assess system reliability.

The 30-year forecasts based on Council's nominated growth, are then used to determine the issues in meeting the nominated water supply security, and reliability objectives of the urban water supply system. The water demand analysis uses the water production data (that is the water delivered into the system), and the customer billing data.

The outcomes of the analysis and the issues are summarised below. Details of the analysis are provided in Appendix D.

12.1 Production Data

Council provided daily production data from the Gundagai WTP for the period 1st January 2014 to 31st December 2016. The data was given as a daily flow rate of treated water produced from the water treatment plant. The historical water production of Gundagai is shown in Figure 12-1.

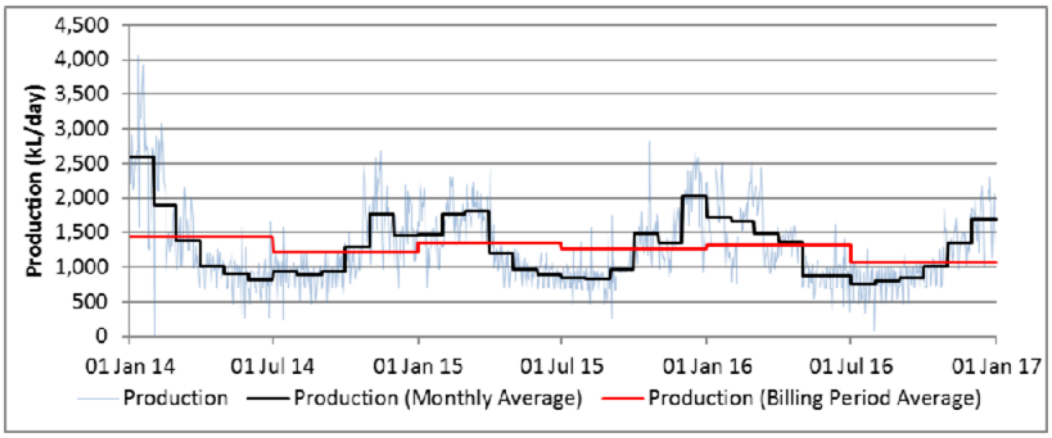


Figure 12-1: Gundagai Water Supply Historical daily production

Council's records are based upon a lot of manually collected records that:

- are prone to errors
- makes the compilation of data difficult and therefore visualisation and analysis are undertaken infrequently.

Council has engaged PWA to look at and make recommendations about upgrading its SCADA system which will include electronic data gathering and storage. **Issue**

An analysis of the production data showed that the consumption patterns are typical for the region with the consumption being highly dependent on the weather relating to lawn watering and the use of evaporative coolers.

12.2 Metered Consumption

Water meters are read twice per year for the following billing periods:

- billing period 1 – 1st July to 31st December
- billing period 2 – 1st January to 30th June

Council is currently in the process of switching over to a quarterly reading and billing periods.

Water meter billing data was provided by Council for the 2013/14 financial year to the 2016/17 financial year. The analysis of the meter data is provided in the Appendix. The key findings are:

- The total annual demand over the last four years has been fairly constant, at around 450 ML/year
- The residential to non-residential demand split is about equal – 52 % to 48%.
- The number of residential assessments has increased only from 882 to 888 over this period. The total number of connections has decreased from around 1,250 to 1,220, likely due to removal of unused meters.
- The average day consumption for an active residential assessment is 400 L with an estimated peak day consumption of 2,960 L.
- Three major users were identified – the Meat processor (16% of town demand), Gundagai swimming pool (3% of town demand), and The Five Mile highway service centre with food court billed to "Lionis Holding Pty Ltd" (5% of town demand).

The historical average daily demand including these user classes is shown in Figure 12-2. The "Misc." category shown includes demand from Schools, Caravan Parks and the Pool.

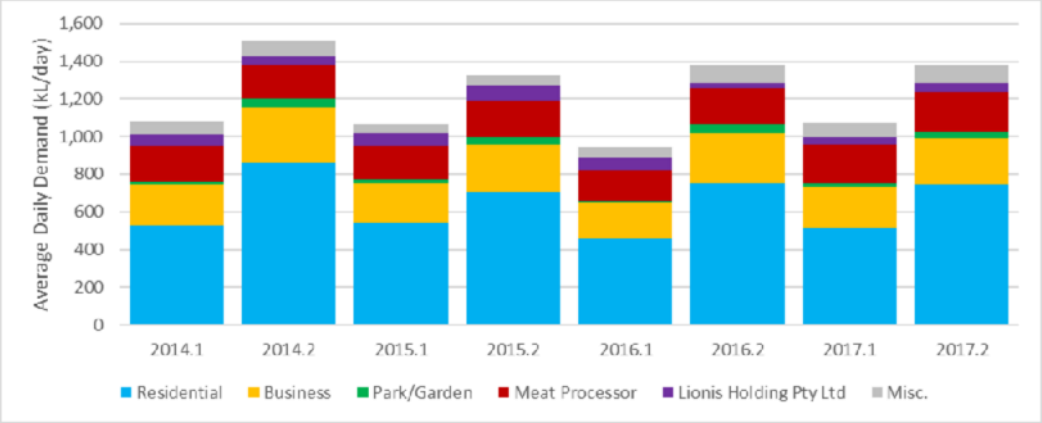


Figure 12-2: Historical average daily water demand (kL/day)

12.3 Non-revenue Water

Non-revenue water (NRW) is made up of a number of components including:

- unbilled authorised consumption which includes water used for fire-fighting and operational uses for example mains flushing
- apparent losses including illegal connections and metering inaccuracies
- real losses, mostly leakage from the network.

It has been identified that there are metering issues for the Gundagai water supply scheme which has led to the metered demand being greater than the metered production. The issue could exist with the production metering, demand metering or both. **Issue** and **data gap**.

For the water demand projections, an NRW allowance of 120 L/connection/day has been used. This is around the value of NRW reported to DI Water in the Benchmarking reports and is higher than the 2015/16 state-wide median NRW of 92 L/connection/day. A revised production for these schemes was calculated, given in the Appendix.

12.4 System Demands

12.4.1 Peak day system demand

Peak period analysis was undertaken on daily production data from the Gundagai WTP. The peak day persistence patterns for the years of available data is shown Figure 12-3.

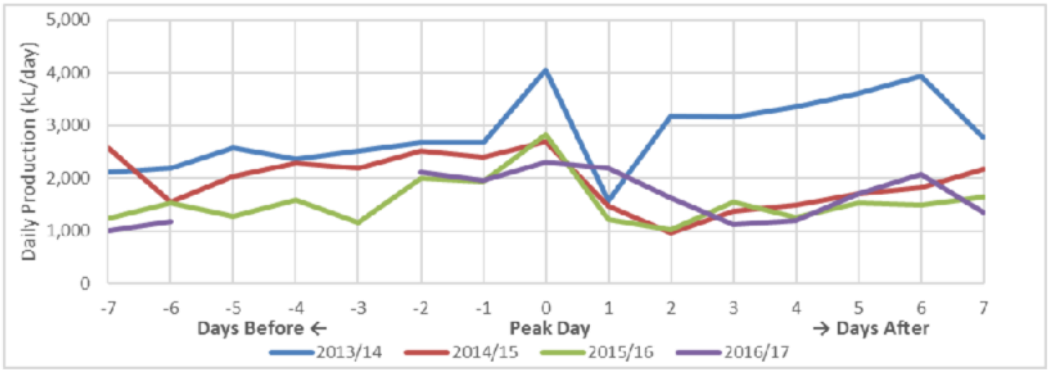


Figure 12-3: Gundagai WTP – Peak Day Production Pattern

The highest Gundagai WTP production on record was 4.1 ML/day, which occurred on 12 January 2014. The event is approximately 3.2 times the average day production of 1.3 ML/day.

12.4.2 Annual system demand

A water production model was developed, which closely relates to the recorded production within the data set provided. The details of the method used are discussed in Appendix D.3. This modelled demand is then hindcast over 45 years of available historical climate data to provide a larger data set from which the average and dry year could be estimated. The hindcast is presented in Figure 12-4.

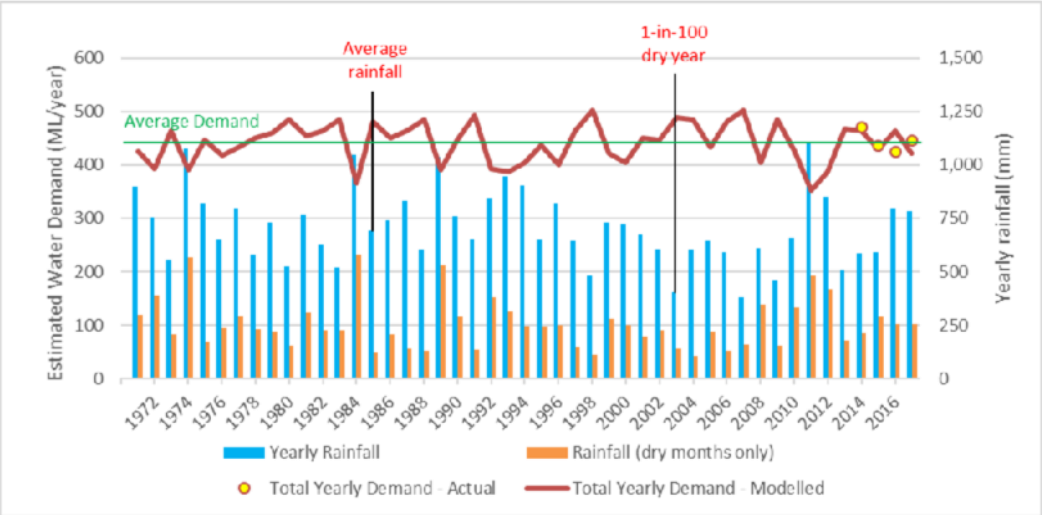


Figure 12-4: Modelled and actual total user demand showing average and dry years

The hindcast allows Council to pick the service standard (design basis) for the 'Water Supply Security' and 'Reliability' objectives that have been selected for the system. For this assessment, the 95th percentile has been considered. Based on the model the selected demands are:

Based on the hindcasting model, the corrected demands are:

- Average year demand – 438 ML/year
- Dry year demand (highest from hindcast) – 502 ML/year

12.5 Water Supply Projections

The main components of the projections for use in capacity assessment and secure yield assessment are given in Table 12-1. Further details for the demand forecast are provided in Appendix D.

Table 12-1: Water Projections Summary

	2017 Estimate	Low Growth Scenario	High Growth Scenario
Peak day demand (ML/day)	3.8	4.2	4.5
Average year Production (ML/year)	493	542	582
Dry year Production (ML/year)	556	613	658
Dry year Extraction (ML/year)	584	644	691

12.6 Water Supply Infrastructure Capacity Assessment

12.6.1 Drought security

DPIE Water has assessed the frequency and duration of droughts in the Murrumbidgee regulated river system to better understand the drought resilience of the river and investigate

the security of urban water needs (7). Modelling of the river and storages was undertaken over the period 1892 to 2014 using conservative assumptions, and a threshold 1 July combined storage volume of 600 GL was adopted as a drought trigger.

Six droughts where LWU allocations were likely to be reduced were identified over this period. The highest reduction in allocation was 50%.

If LWU allocations were to be reduced to 50%, Council's current LWU allocation of 1,250 ML would be reduced to 625 ML.

Figure 12-5 shows the estimated 2017 and future dry year extraction under the low and high growth scenarios.

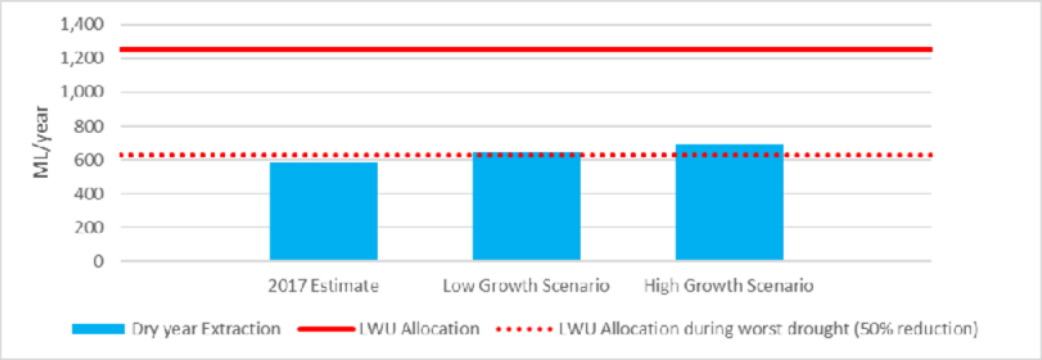


Figure 12-5: Gundagai projected unrestricted dry year extraction and license limit

The projected dry year extraction is well below the full LWU entitlement, however if the allocation is reduced by 50% because of an extreme drought, the extractions under both the low and high growth scenarios will exceed it by about 10%. A 10% reduction in demand is generally regarded as an achievable and reasonable level of water restriction during drought, it is the target level of service for NSW local water utilities that source their supply from un-regulated water sources.

12.6.2 Headworks Capacity

The Gundagai WTP has a capacity of 5.0 ML/day and the total capacity of Council's reservoirs is 5.4 ML – see Figure 5-4.

Figure 12-6 shows the estimated 2017 and future peak day production under the low and high growth scenarios.

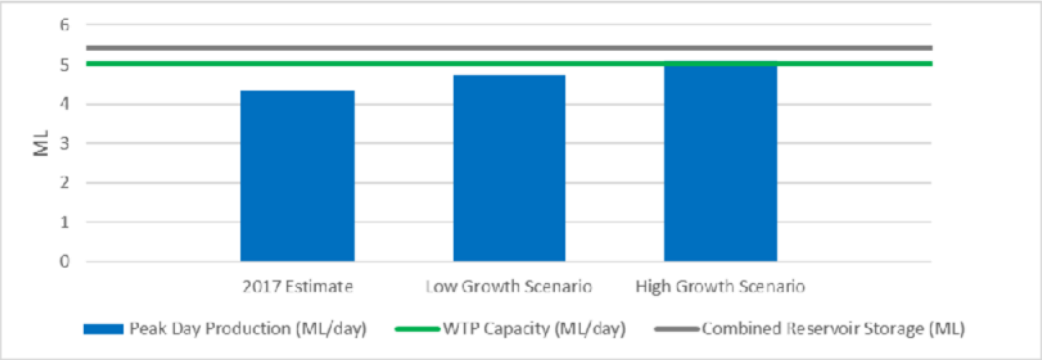


Figure 12-6: Gundagai projected peak day production and headworks capacity

The projected dry year extraction is below the combined reservoir capacity in both growth scenarios, however the WTP Capacity is slightly exceeded in the high growth scenario.

13 Cootamundra Water Demand Analysis and Issues

A water demand analysis is undertaken to calculate the unit demands, estimate the non-revenue water and forecast the following demands:

- Average (rainfall) year demands – for revenue planning
- Dry year demands – to assess drought security
- Peak day demands – to assess system reliability.

The 30-year forecasts based on Council's nominated growth, are then used to determine the issues in meeting the nominated water supply security, and reliability objectives of the urban water supply system. The water demand analysis uses the water production data (that is the water delivered into the system), and the customer billing data.

The outcomes of the analysis and the issues are summarised below. Details of the analysis are provided in Appendix E.

13.1 Production Data

Council provided two sets of bulk supply data:

- Monthly water sales data from Goldenfields Water County Council (Goldenfields) from July 2010 to February 2019
- Metered bulk supply for each of the connections to the Goldenfields network for August 2015 to March 2019 (this data is collected on most working days).

The recorded system inflows are graphed in Figure 13-1.

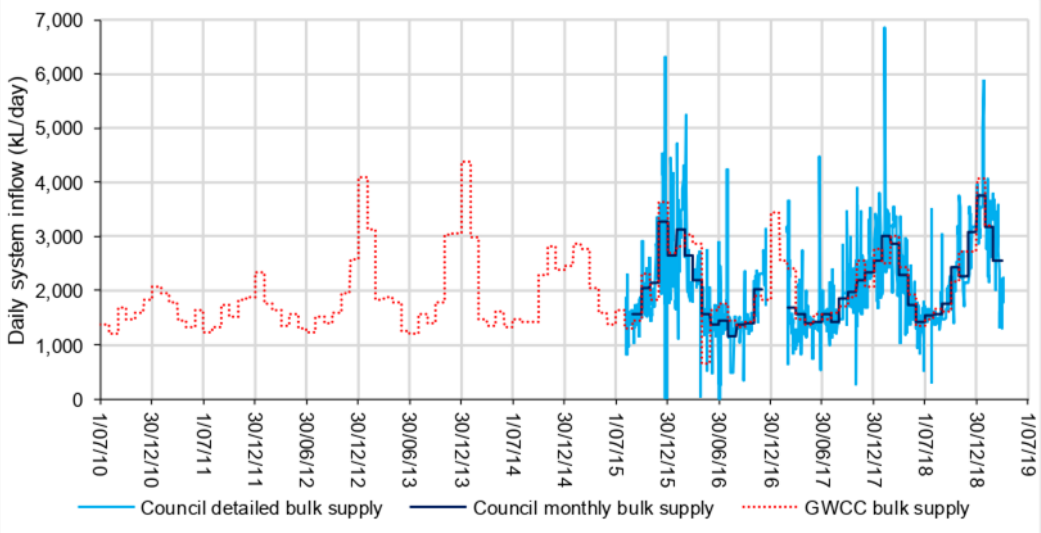


Figure 13-1: Cootamundra bulk supply records

The It appears that there is an error in the Goldenfields sales data for May 2016.

Council's records are based upon manually collected data. This data is:

- more prone to errors than automatically collected data

- has lots of gaps between 2 and 26 days where the total flow is known but the daily variation is not
- is missing the entire of summer 2016/2017.

This is an **issue** and **data gap** as the daily variability in inflow is not continuously able to be assessed.

13.2 Metered Consumption

Customer water meters are generally read four times per year, in August, November, February and May. Data was provided for the period between in November 2013 and November 2018. The daily metered demand by user category is graphed in Figure 13-2.

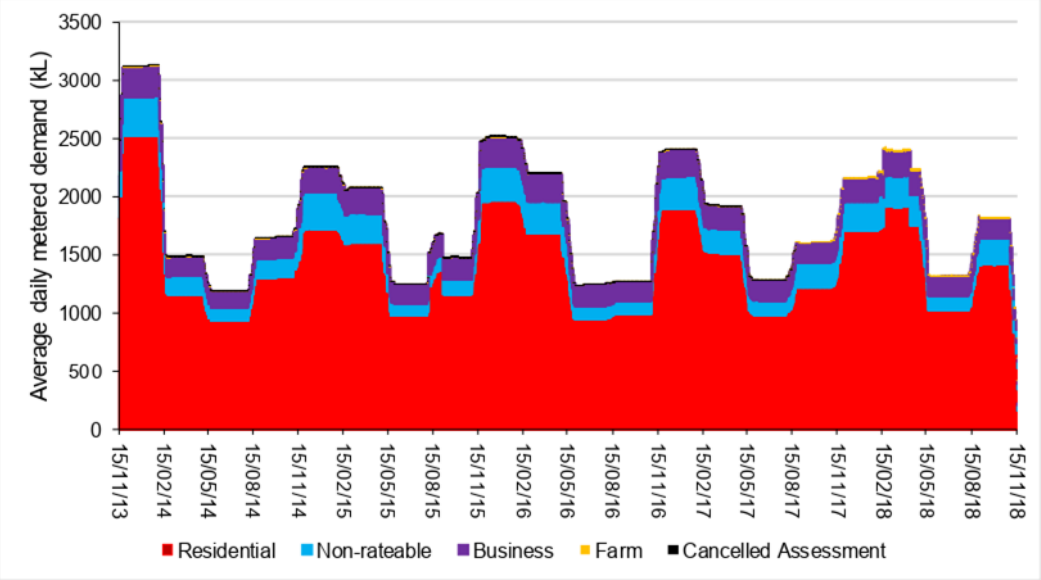


Figure 13-2: Cootamundra historical metered water demand

The key findings are:

- the major water users in Cootamundra use a relatively small percentage of the total metered use (10.4%) and a comparatively small total volume (1.76 ML/day) compared to other towns of similar size
- the residential to non-residential demand split is about 78% to 22%
- the number of residential assessments has only increased by 53 over the period of data supplied
- there are about 1% more residential meters than there are residential assessments, therefore the data analysis for residential use was done on a per water meter basis but will be reported using the term active residential property
- The average day consumption for a sewered active residential property is 585 L with an estimated peak day consumption of 1,237 L (un-sewered properties use slightly more, 595 L on an average day and 1,426 L on a peak day).

13.3 Non-revenue Water

Non-revenue water (NRW) represents the difference between the volume of water delivered into a network and the billed consumption. NRW is made up of many components, as shown in Table 13-1.

Table 13-1: Components of system water demand

System Input Volume (WTP Production)	Authorised consumption	Metered billed Authorised Consumption		Accounted for water	**Revenue Water**
		Un-metered billed authorised consumption (common in NSW non-potable supplies)			
		Unbilled Authorised Consumption e.g. flushing, firefighting, public open spaces			
	Water Losses	Apparent Losses	▪ Unauthorised Consumption ▪ Metering inaccuracies	Un-accounted for Water	**Non-Revenue Water**
		Real Losses	▪ Leakage on trunk and/or distribution mains ▪ Overflows at storage tanks ▪ Leakage on service connections		

Non-revenue water in Cootamundra averaged 81 L/meter/day. This is surprising low given the high rate of mains breaks in the town.

The age profile of the meters installed in Cootamundra is graphed in Figure 13-3.

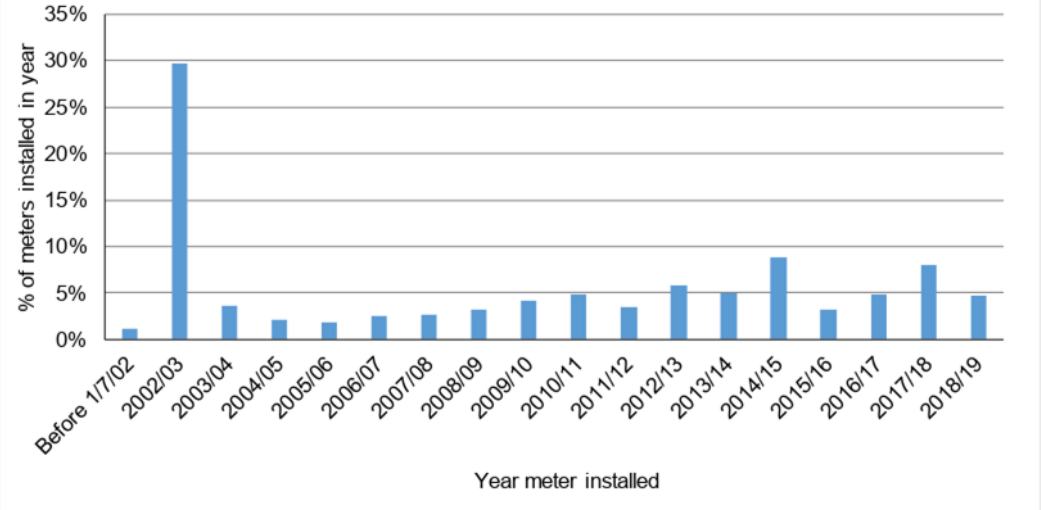


Figure 13-3: Age profile of Cootamundra meters

Between January 2014 and December 2018, Council has replaced between 3% and 9% of the meters per year, an average of 6% per year. A 2012 study (8) paper on Understanding non-registration in domestic water meters concluded that the optimum cumulative flow for meter replacement was 3,500 to 7,000 kL, at the average residential metered demand of 214 kL/year this converts to an optimal replacement age of between 16 and 33 years. Council's current program will eventually result in an average meter age at replacement of about 17 years, though the very high proportion of meters installed in 2002/03 is likely to lead to a high number of meters failing and reaching the end of their economic life in the next few years. **Issue**

13.4 System Demands

13.4.1 Annual system demand

A water production model was developed, which closely relates to the recorded production within the data set provided. The details of the method used are discussed in Appendix E.3. The modelled demand was hindcast over the 48 years of available historical climate data to provide a larger data set from which the average and dry year could be estimated. The hindcast results are graphed in Figure 13-4.

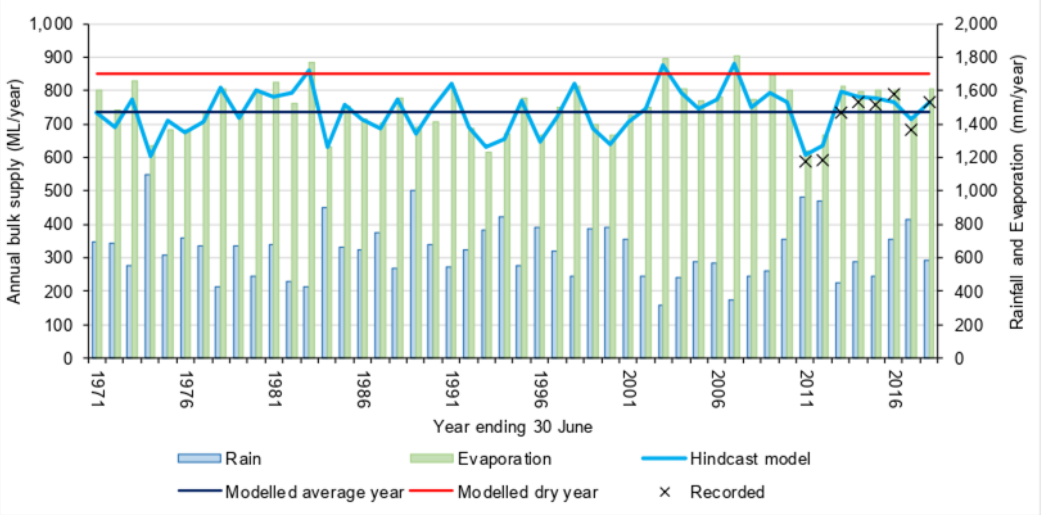


Figure 13-4: Hindcast bulk supply

Based on the hindcasting model, the corrected demands are:

- Average year demand of 737 ML/year
- Dry year demand (highest from hindcast) of 879 ML/year
- Dry year demand (95th %ile from hindcast) of 849 ML/year
- Average day peak week demand of 5.1 ML/day
- Peak day demand of 6.3 ML/day.

The hindcast results allow Council to pick the service standard (design basis) for the 'Water Supply Security' and 'Reliability' objectives that have been selected for the system. For this assessment, the 95th percentile has been considered.

13.4.2 Peak day system demand

Peak period bulk supply was difficult to assess due to the lack of daily data, especially over the late December through January period, therefore the results are less reliable than usual. Recorded peak day demands were between 5.8 and 6.9 ML/day.

13.5 Water supply projections

The main components of the projections for use in capacity assessment and secure yield assessment are given in Table 13-2.

Table 13-2: Water Projections Summary (ML)

		2018	2019	2024	2029	2034	2039	2049
Metered demand	Average year	658.7	659.3	662.4	665.6	668.8	672.0	678.5
	Average day	1.80	1.81	1.81	1.82	1.83	1.84	1.86
NRW	Average year	96.4	96.5	97.4	98.3	99.2	100.1	101.9
	Average day	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Bulk Supply	Average year	755.0	755.8	759.8	763.9	768.0	772.1	780.5
	Average day	2.07	2.07	2.08	2.09	2.10	2.11	2.14
	Dry year	849.1	850.5	857.6	864.7	871.9	879.1	893.8
	Average day peak week	5.06	5.07	5.11	5.15	5.19	5.23	5.32
	Peak day	6.50	6.51	6.56	6.61	6.67	6.72	6.83

13.6 Water Supply Infrastructure Capacity Assessment

13.6.1 Reservoirs

The peak day demands for Cootamundra is greater than the town's reservoir capacity of 5.4 ML (Figure 13-5). This is an **issue** as Council may not be able to meet the levels of service when supplying peak demands and may also affect the reliability of supply in the event of interruption to bulk supply (for example mains break).

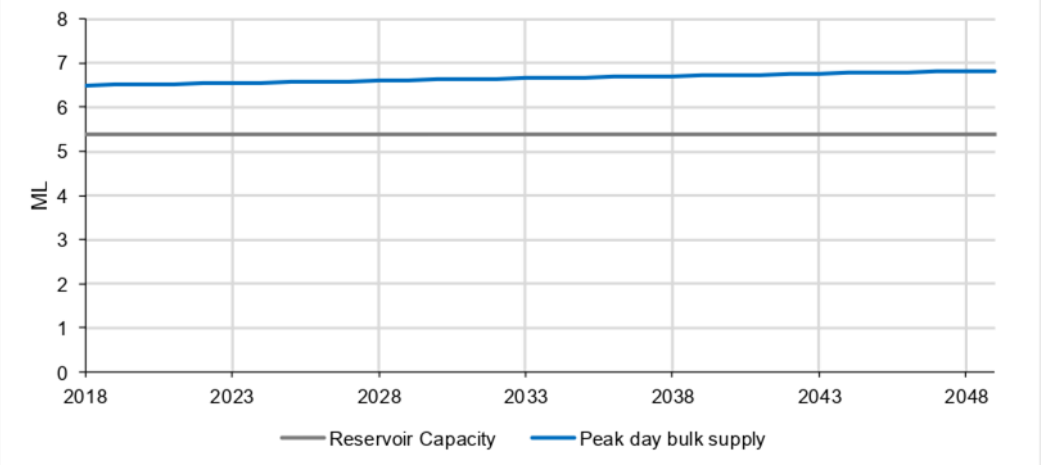


Figure 13-5: Cootamundra bulk supply peak demand

13.6.2 Drought performance

The 1990 NSW Water Supply Investigation Manual (9) defines drought security in terms of:

- percentage of time spent on restrictions (the target is generally 5%)
- percentage of years with water restrictions applied (the target is generally 10% of years)
- percentage reduction in demand due to restrictions during drought (the target is generally 10%).

Together this makes up the 5/10/10 rule used to assess drought security for country town water supplies sourcing water from un-regulated rivers. There is no equivalent rule for country town water supplies sourcing water from regulated rivers.

Between July 2002 and June 2012 Cootamundra spent 69% of the time on water restrictions though restrictions have not been applied again (full allocations were available in July 2019, the beginning of the 2019/20 water year). For some of this period, Goldenfields Water was implementing summer water restrictions as a routine measure, though it is not clear whether Goldenfields Water implemented routine restrictions to address system capacity limitations or with another aim. **Issue**

13.7 Compliance with Goldenfields Water agreement

The Goldenfields Water levels of service and performance targets are assessed in Table 13-3, the targets are discussed in Section 3.2.1. The agreement is included in Appendix A.2.

Table 13-3: Assessment of Compliance with Goldenfields Water Bulk Supply Agreement

Parameter	Unit	Target	Actual
Water losses	% of bulk supply	5%	12%
Average annual residential consumption	kL/assessment	200	188 for all dwellings 214 for occupied dwellings
Peak day residential consumption	kL/assessment	2.5	Unable to assessed – best estimate is 1.237 for occupied sewered dwellings 1.426 for occupied un-sewered dwellings
Total annual bulk water supplied	ML/year	1400-1800	588 to 788 ML/year (2011 to 2018)

Based on the assessment in section 13.3, the current water loss of 12% of bulk supply does not meet the Goldenfields Water bulk supply agreement. However, the non-revenue water per connection is better than the state-wide medium. **Issue**

The lack of consistent daily bulk supply data does mean that Council is currently unable to provide reliable evidence of compliance with the peak day extraction limit. **Issue**

The Cootamundra performance targets require revision as they are either out of date or cannot be monitored with current equipment. **Issue**

The water allocation for Cootamundra is combined with the other customers of the Goldenfields Jugiong supply, a total of 5,590 ML/year (2,795 ML/year at 50% allocation). The annual production for the Jugiong supply is graphed in Figure 13-6. Given that the un-restricted dry year demand is significantly greater than the 50% of the allocation, far more severe restrictions are likely to be required for the customers on the Jugiong Supply including Cootamundra to meet the drought allocation than the Gundagai customers. Therefore, the drought security for Cootamundra is different to that of Gundagai. **Issue**

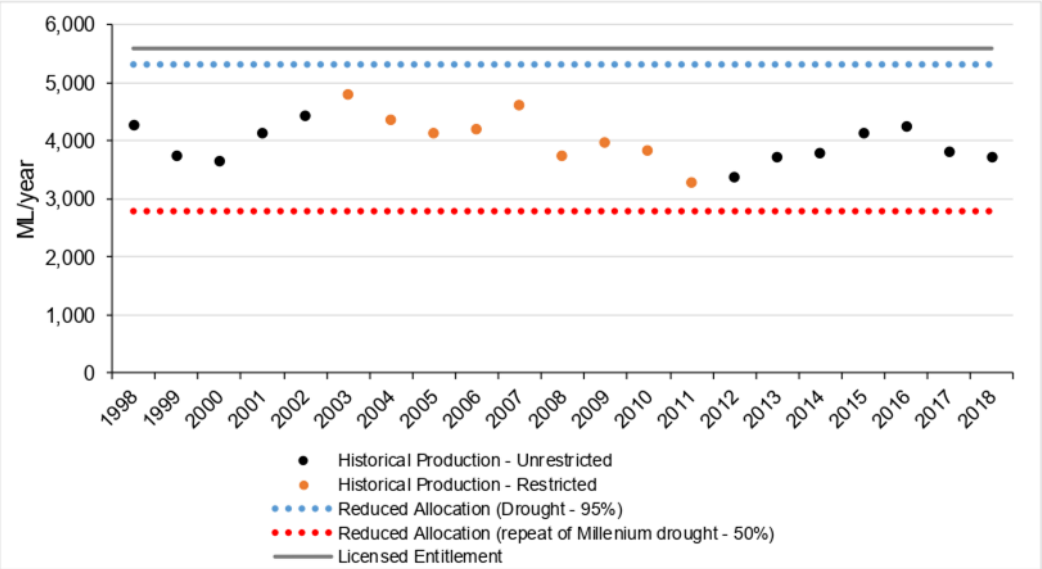


Figure 13-6: Historical production for the Goldenfields Jugiong Supply

14 Gundagai Sewer Load Analysis and Issues

14.1 Historical Sewage Flows

There is no inflow meter at Gundagai STP, and therefore historical sewage inflow could not be assessed using the conventional method of comparing historical inflow and rainfall data. **Issue** Several other data sources were used to achieve an estimate of sewer flow.

The full analysis is given in Appendix G, which shows sewer flows estimated from:

- Metered humus tank outflow
- 72-hour flow monitoring
- Sewage pump station pump run time
- Billing data

14.2 Sewer System Flow Analysis

14.2.1 Average Dry Weather Flow

The estimated ADWF calculated from water billing data is presented in Table 14-1.

Table 14-1: ADWF (kL/day) estimated from water billing data

Billing Year	2014	2015	2016	2017
Residential	270	261	262	263
Non-res	185	164	177	191
Total	**454**	**426**	**439**	**453**

Based on the above information, and the ADWF estimated from the other methods in Appendix G, the estimated current ADWF is **500 kL/day**.

Based on a 2017 EP of 2,500 an estimated current sewage loading of **200 L/EP/day** is calculated. This is within the normal range of sewage loadings.

14.2.2 Peak Dry Weather Flow

The results of the 72-hour monitoring give a peaking factor "r value" of 2.0 for Gundagai STP, as can be seen in Figure 14-1. Since the flow was measured at the outlet of the humus tank instead of the inlet works, it may not exactly represent the peak in the inflow. The peaking factor is multiplied by the instantaneous ADWF to obtain the instantaneous Peak Dry Weather Flow (PDWF).

Calculated values based on the methodology in the PWA sewer design manual, give an estimated peaking factor of 2.3 for Gundagai STP. This peaking factor has been adopted as a conservative estimate.

At the nominated ADWF of 500 kL/day, or 5.8 L/s, the estimated PDWF is **13.3 L/s**.

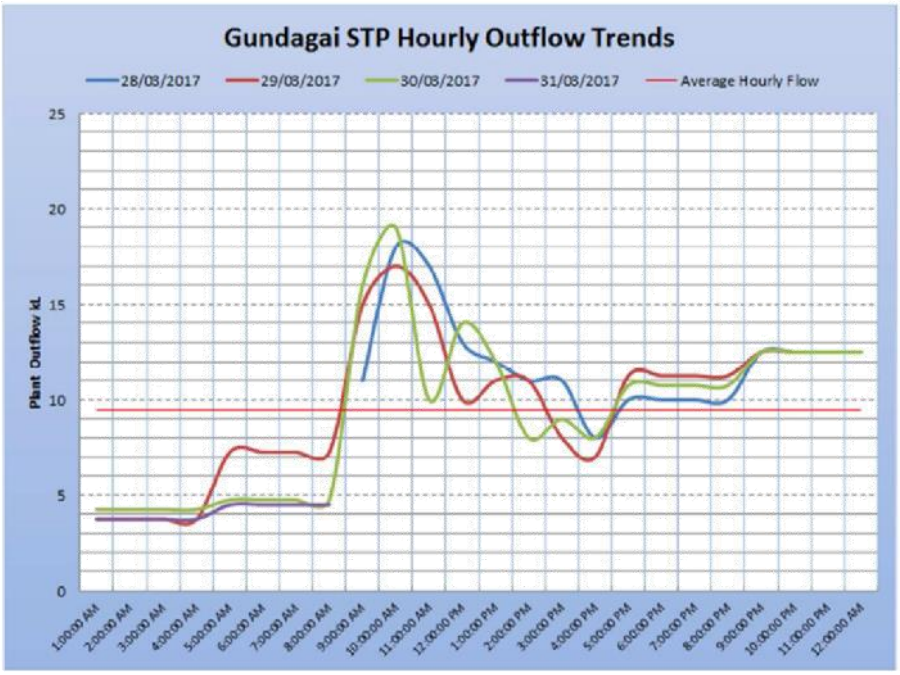


Figure 14-1: Monitored Gundagai STP diurnal flow

14.2.3 Peak Wet Weather Flow

No STP inflow data is available for wet days, however the maximum flow rate to the STP would be the combined pump rates of the pumps in the two SPS which pump to the STP. Council plans to upgrade these two SPS, however there is limited data available for estimating peak flows to the SPS which would be used to size new pumps.

Formulas in the PWA sewer design manual provide a method to calculate PDWF and PWWF from ET. The ET and EP for each pump station is taken from Section B.3.2. ADWF for each SPS was estimated based on **200 L/EP/day**. The results are given in Table 14-2.

Table 14-2: Estimated peak flows to sewer pump stations

	2017 Total ET	2017 Total EP	ADWF (kL/day)	Peaking factor 'f'	PDWF (L/s)	PWWF (L/s)	PWWF / ADWF
Royal SPS	798	1,756	351	2.4	9.6	55.9	13.8
Boys Club SPS	338	744	149	2.7	4.6	24.2	14.0
Total	**1,136**	**2,499**	**500**	**2.3**	**13.1**	**78.9**	**13.6**

Note: The Royal SPS and Boys Club SPS have an estimated pump duty of 10 L/s and 5 L/s respectively.

For the sizing of the new pumps, a PWWF to ADWF ratio of 10 has been nominated.

14.3 Tourist population effects

Visitor contribution to STP inflow could not be assessed due to insufficient data. However, since it was estimated that visitors do not have a significant impact on water demand, it is also assumed that they have minimal impact on sewage load.

14.4 Biological and Nutrient Loading

Biological and nutrient loading was assessed by PWA as part of the 2017 sewer inflow assessment. An ISCO automatic sampler was used for collection of time-based composite samples during the 72-hour monitoring period, samples from the inlet chamber to the Imhoff tank. The results are given in Appendix G.5.

Based on these results, the following was observed of the sewage from the Gundagai sewerage scheme:

- Ratio of COD to BOD was approximately 2, which is typical for domestic sewage.
- Concentrations of BOD_5 and SS present medium to high strength domestic sewage
- Concentrations of nutrients are considered typical for domestic sewage.
- Raw sewage alkalinity presents high strength domestic sewage, which can provide sufficient buffering for biological nitrification.

14.5 Sewer System Flow Projections

Future ADWF to the SPS and STP under the low and high growth scenarios was estimated by multiplying the projected sewer EP (Table 10-2) by the estimated current sewage loading of **200 L/EP/day**.

The projected sewage load is given in Table 14-3. The ADWF to the Royal and Boys Club SPS includes the contribution from their respective upstream SPS.

Table 14-3: Projected ADWF to SPS and STP (kL/day)

	2017 ADWF	Low Growth ADWF	High Growth ADWF
Royal SPS	351	394	449
Primary School SPS	44	62	77
Boys Club SPS	149	180	185
McDonalds SPS	34	37	40
Total to STP	**500**	**574**	**634**

14.6 Sewerage Infrastructure Capacity Assessment

14.6.1 STP Performance

Council in is the design stages for a new STP for Gundagai to be constructed at the site of the existing Gundagai STP. Council is interested in the new STP having a capacity of 0.6 ML/day, with the ability to expand it to 0.8 ML/day. Council is also interested in treating part of the sewage from the abattoir at the STP.

Figure 14-2 shows the estimated 2017 and future ADWF under the low and high growth scenarios. The figure also shows the design capacity of the proposed 0.8 ML/day ADWF STP that Council is currently in the process of planning.

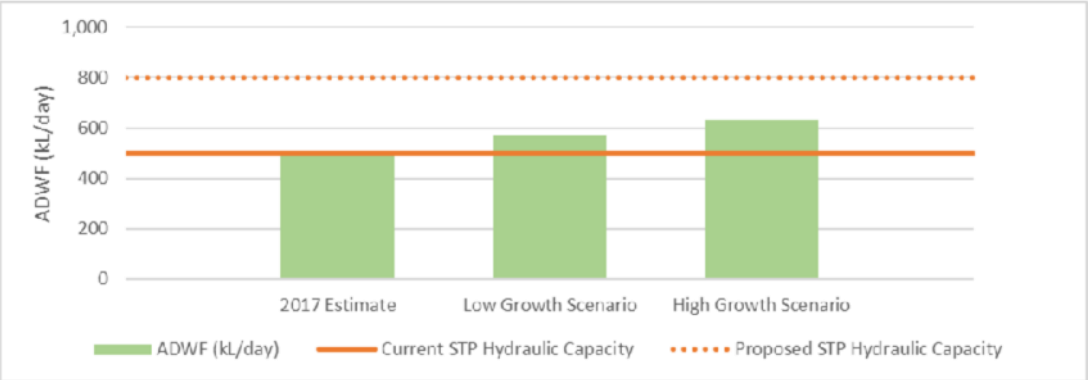


Figure 14-2: Gundagai projected ADWF and STP design capacity

Council has advised that the current power supply is quite reliable with blackouts being infrequent, and only lasting a couple of hours when they do occur. There is no history of SPS overflows during blackouts. The issue of power supply during future floods with the new plant is an **issue** that Council is currently pursuing with the local energy supplier.

Council has advised that the condition of STP has deteriorated in recent years, primarily due to age and flood damage. Recent evaluations have assessed the plant as having a high probability of physical failure during the next significant flood. Council has also noted that an upgrade to the sedimentation flow weir is required as it is currently ineffective when one or both SPS pump to the STP. **Issue**

During the major flooding events in December 2010 and March 2012 Gundagai STP was inundated leading to shutdowns of the treatment facilities for periods of three to five days, with raw sewerage entering the Murrumbidgee River during these times. (10) **Issue**.

15 Cootamundra Sewer Load Analysis and Issues

Details of the analysis undertaken are discussed in Appendix H.

15.1 Historical Sewage Flows

Manually collected daily sewage flow data was provided for the period from 1 July 2014 to 26 May 2019, the time of day for each entry was not recorded. The Cootamundra STP inflow data is graphed in Figure 15-1 along with the daily rainfall and the average metered water demand for sewered customers. The following points are notable:

- the winter water sales to sewered customers average 1,245 kL/day, the ADWF would be expected to be similar
- during Autumn 2016 there are periods where there appears to be significant exfiltration with flows received by the STP significantly lower than the winter water sales, this may indicate that there are large sections of leaky network draining sewage into the local aquifer when the water table is low.
- between July 2016 and May 2017 there appears to be an extended period of significant infiltration, this may indicate that there are large sections of leaky network draining the local aquifer when the water table is high
- Council believes that the low flows in Autumn 2018 are associated with a bulk meter error
- the STP inflow data is collected manually, therefore there may be "long days" and "short days".

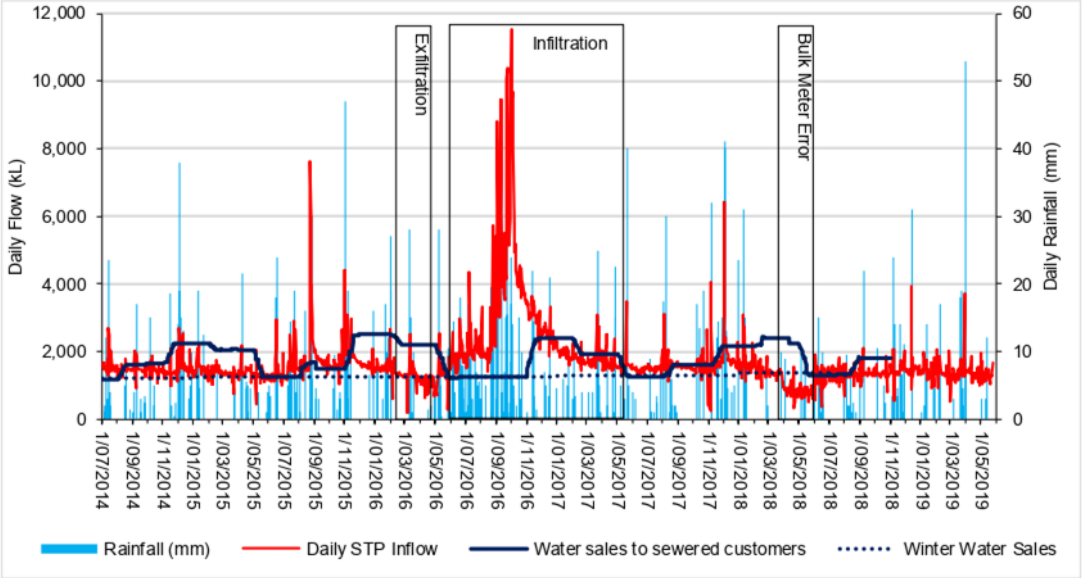


Figure 15-1: Cootamundra STP inflow

In most well sealed sewerage schemes, the flow would be expected to peak shortly after a wet weather event and then decrease to the ADWF over the next 5 to 10 days, rather than over several months.

Council has stated that "About 15km of sewer have been relined over the last 5 years. Relining was undertaken for structural purposes as well as to inhibit root intrusion but an obvious added benefit has been the reduction in ground water infiltration." This program appears to have been reasonably effective with all flows from June 2018 onwards appearing within the expected range.

15.2 Influent quality

Council has not undertaken any 72hour monitoring in recent years. As the effluent quality meets the EPA license requirements, the plant is in good condition, and the plant is currently servicing a much smaller population than it was designed for.

15.3 ADWF, EP and ET

The initial ADWF, EP and ET loads at the STP was estimated using both the metered influent volumes between July 2018 and May 2019 and the winter metered water sales to sewered properties from 2014 to 2018.

Using the winter metered water sales to sewered properties, the 2018:

- ADWF is estimated to be 1.352 ML/day
- unit EP sewage flow is estimated to be 207 kL/day
- total ET is estimated to be 3,032
- total EP is estimated to be 6,520.

Using the metered influent volumes, the ADWF was estimated to be:

- 1.34 ML/day when using the rainfall measured at the STP
- 1.35 ML/day when using the SILO rainfall data.

As the ADWF estimated using both methods are very similar and the metered demands are used to develop the unit flows and non-residential loads, the results of the metered demand based ADWF assessment will be used in the projections.

15.4 Peak Dry Weather Flow

The peak dry weather flow is the estimated peak instantaneous flow on a dry day. Calculated values based on the methodology in the PWA sewer design manual, give an estimated peaking factor of 2.00 for Cootamundra STP.

At the nominated ADWF of 1.352 ML/day (15.65 L/s), the estimated PDWF is 31.32 L/s.

15.5 Peak Wet Weather Flow

As all of the Cootamundra sewage is pumped to the STP from Betts St the design wet weather flow for the STP will be equal to the pump running at capacity for 24 hours. In 2005, Public Works Advisory completed the specification of two new pumps (to be used 1 duty and 1 standby configuration) for Betts Street, the design flow rate in the specification was 59.2 L/s. Council staff do not believe that the pump replacement occurred.

The observed peak daily wet weather flow was 11.5 ML/day (133 L/s or 9.1 ADWF), measured on the 30/09/2016. It appears that a large proportion of this flow was related to high ground water levels as this was at the end of a relatively wet fortnight and the depth of rain on the high flow day and the day before was substantially lower than the major event a week before. It then took over 7 months for the flows to recede to the ADWF. This was part of a very wet 6-month period, there were 6-month periods nearly as wet in 2012, 1974 and 2011. Given that the daily flow data was collected manually and therefore may have been collected over slightly more than

24 hours. Two conclusions can be formed from this event as the inflow exceeded the capacity of the pump specification therefore:

- Either the duty and standby pump were operating in parallel, or
- The installed pump capacity is not known and does not match the pumps specified in 2005.

This is a **data gap.**

15.6 Tourist population effects

The peak visitor population is estimated to be 4% higher than the average population.

The daily dry weather flow records for the period between 17 June 2018 and 25 May 2019 are highly variable probably due to time of day variations in data recording, this conclusion is based on very high flow days occurring just before or after very low days on several occasions. Therefore, the average daily flow was calculated for rolling dry weeks. The flow varied between a minimum of 1.123 ML/day and a maximum of 1.480 ML/day, this occurred during the week ending 7 January 2019 and is a 9% increase on the average. This week was quite warm so differentiating between additional air-conditioning bleed, swimming pool filter backwash and visitor loads is not possible.

As the STP is sized for 12,000 people and the current assessed load is about 6,500 EP, there is plenty of spare STP capacity to cope with visitor numbers.

Of greater concern is the capacity of SPS 4 (airport) to cope with visitor numbers at events held at the airport.

15.7 Forecast ADWF

Future ADWF, projection was undertaken at an SPS and STP level (Table 15-1).

Table 15-1: Projected ADWF

	SPS	2018	2019	2024	2029	2034	2039	2049
ADWF (kL/day)	1 (STP)	1,352	1,355	1,366	1,377	1,388	1,399	1,421
	2	4.68	4.68	4.69	4.70	4.71	4.73	4.75
	3	10.0	10.1	10.1	10.1	10.1	10.1	10.2
	4	0.93	0.93	0.93	0.93	0.94	0.94	0.94

16 Gundagai Infrastructure Performance Assessment

The performance of the Gundagai water supply and sewerage infrastructure was assessed to determine the current and any future issues.

16.1 Regulatory Compliance Issues

16.1.1 Performance against EPA Licence Conditions

Recent non-compliances with EPA license conditions are summarised in Table 16-1.

Most non-compliances are due to inadequate flow monitoring at the STP. **Issue**.

Table 16-1: Gundagai STP license non-compliances

Year ending	Type of non-compliance	No. of times occurred
30 April 2017	None	
30 April 2016	Sewer overflow at Royal Pumping station due to operator misjudgement regarding stop return valve. New training procedure put in place to prevent recurrence	1
30 April 2015	Total volume and effluent volume monitoring not undertaken. Effluent monitoring company not notified of new requirements. New testing requirements to be implemented.	1
30 April 2014	Effluent volume monitoring magnetic flowmeter not operational due to electrical connection not completed by Essential Energy.	1
30 April 2013	Monitoring of Effluent: Switching to monitoring of effluent volumes by magnetic flow metres not achieved by required date. Flow meters now in place.	1
30 April 2012	None	
30 April 2011	None	
30 April 2010	None	

16.1.2 Work Health and Safety Requirements

As an employer, Council is required to undertake due diligence activities to ensure that workers and visitors are safe while they are at work. The SafeWork NSW (11) states that procedures should include:

- provision of training, supervision and instruction to workers about health and safety.
- consultation with workers about health and safety.
- ensuring that health and safety representatives receive required training.
- immediately report notifiable incidents to SafeWork NSW.
- comply with SafeWork NSW inspector directions for example compliance with notices such as improvement, prohibition or other notices.
- regularly review or audit your businesses policies, procedures and practices.

Council does not currently undertake regular inspections of the treatment plants or other infrastructure. **Issue** and **data gap**

16.2 Performance against nominated Levels of Service

Council has advised that in general, there are few problems being experienced in the Gundagai reticulation systems despite the age of some of the infrastructure. There are few mains breaks and a need to replace a small amount of the water Gundagai infrastructure is anticipated during the IWCM period. Council has a prioritised list of sewerage sections that are scheduled to be replaced in the next 10 years.

Due to the sloping nature of Gundagai, the sewer mains can be a laid a lot shallower than for a number of other western towns. The reticulation system has a history of only few broken mains and tree root chokes possible due to the high rock content of the soils on which the town was built.

The Customer Relationship Management (CRM) system does not effectively capture sufficient information to assess performance against the LOS. **Issue**. The information required includes:

- date and time of initial contact
- contact method (email, phone, in person to office, in person to staff in field)
- time taken for initial response
- category of contact (complaint/request for rectification, account information request, general information request)
- category of response
- time of completion.

16.3 Best Practice Compliance

Compliance with LWU Circular 18

Council has addressed all requirements of LWU Circular 18. The Circular specifies the requirements for the following three barriers to assure the safety of each water supply and to prevent microbial contamination.

Barrier 1: Effective Disinfection

Monitoring of factors which affect disinfection

The CCPs developed in the DWMS are implemented to ensure that water leaving the Gundagai WTP consistently achieves effective disinfection. The adjustment and critical limits have also been set to achieve effective primary disinfection and to maintain a suitable chlorine residual in the reticulation to prevent re-contamination.

Achieve minimum chlorine contact time (C.t.)

ADWG recommends a turbidity of ≤ 1 NTU during disinfection and a chlorine contact (C.t.) of ≥ 15 mg.min/L with a pH of between 6.5 and 8.5.

Council has advised that chlorine contact is maintained in accordance with the set procedures for the operation of the plant and is monitored in terms of dosed levels and chlorine residual levels. Council advises that to date there have not been any significant problems that the operators can recall once the new plant was fully commissioned and Council got passed the teething stages.

Barrier 2: Distribution System Integrity

Council undertakes weekly inspection of all reservoirs and if any problems are identified the appropriate actions are taken. Council has advised that there have not been any recent problems identified.

Barrier 3: Maintain a Free Chlorine Residual in the Water in the Distribution System

Council takes water samples from different locations around Gundagai in accordance with the drinking water quality management plan.

Council has advised that chlorine residuals in the system have not proven to be a big problem due to the small size of the reticulation system. The 2016/17, 2017/18 and 2018/19 results from the monitoring program were analysed for compliance with the drinking water guidelines, the percentage compliance and number of exceptions in each year are summarised in Table 16-2.

Table 16-2: Gundagai ADWG Compliance

	2016/17		2017/18		2018/19	
	% compliance	Exception Count	% compliance	Exception Count	% compliance	Exception Count
Free Chlorine	86.27%	7	93.75%	3	93.62%	3
Total Chlorine	100.00%	0	100.00%	0	100.00%	0
Total Coliforms	98.04%	1	100.00%	0	97.87%	1
Fluoride	98.68%	4	100.00%	0	100.00%	0

16.4 Water Quality Performance

Raw Water Quality

The raw water quality varies depending upon river flow and the nature of releases from the upstream dam, as high-volume releases can stir up sediment and increase turbidity. Council has advised that typically the turbidity of the river can be down as low as 10 NTU when there are only small releases from the dam, but this can rise to around 100 – 500 NTU during significant river releases and >1,000 NTU during significant floods.

Council has advised that it is common practice for the operators to turn off the WTP during even minor flood events to allow the worst of the water quality to pass, then resume WTP operation when water quality has improved. This does not have a significant impact on the town, as consumption is reduced during the wet period associated with flooding, and Council's reservoirs can provide up 3 to 4 days' supply.

Water Treatment Plant – CCP Analysis

No data has been provided by Council to assess the performance against the CCPs. The plant is relatively new. **Issue**

16.5 Sewer Catchment Performance

Council is proceeding with plans to upgrade the Royal and Boys Club SPS, therefore no analysis has been done on the existing SPS as they will be assessed as part of the upgrade.

Council has only limited telemetry data on its current pumping stations and has engaged Public Works Advisory to address telemetry shortfalls. **Issue**

16.6 Condition inspection

As a part of the 2017 asset revaluation (4) the above ground assets were inspected, several issues were identified, these are summarised in Table 16-3. The report also concluded:

- the Gundagai sewer reticulation is showing good condition for age, with minimal pipelines in condition grade 5
- minor defects can be addressed through programmed maintenance.

Table 16-3: Issues Identified during Condition Inspection – Gundagai

Asset	Key inspection results
River water inlet works	- no issues were identified during the condition inspection
WTP	- no issues were identified during the condition inspection
Reservoirs	- no items of concern were identified
Boys Club SPS	- internal fixtures are corroded, and renewal is recommended
Maccas SPS	- the wet well was observed to be dirty, cleaning recommended - the internal fixtures are corroded, and renewal of these items is recommended
Primary School SPS	- has old electricals and an old well, which could not be opened at the time of the condition inspection
Package SPS near Primary School	- whilst it is only ten years old, it was observed during the condition inspection to be in fair condition only
Royal SPS	- is located in a flood prone location
STP	- the trickling filter heads were no longer functioning, - the tricking filter tank is cracked and leaking - the inlet works were very labour intensive to maintain, and not performing their role effectively - maturation ponds were very green indicating inefficient nutrient removal - the clarifier had ceased to function

17 Cootamundra Infrastructure Performance Assessment

The performance of the water supply and sewerage infrastructure was assessed to determine the current and any future issues.

17.1 Regulatory Compliance Issues

17.1.1 Performance against EPA Licence Conditions

Recent non-compliances with EPA license conditions are summarised in Table 16-1.

Most non-compliances are due to failure to undertake required testing or failure to report. **Issue**.

Table 17-1: Cootamundra STP license non-compliances

Year ending	Type of non-compliance	No. of times occurred
30-Apr-19	No annual report submitted	
28-Feb-15	Incorrect samples obtained resulting in soil samples not being analysed for all required pollutants.	1
28-Feb-14	Concentration limit for faecal coliforms at monitoring point 12 exceeded. Unknown cause.	1
28-Feb-13	Faecal coliforms exceeded the 100-percentile concentration limit of 200 cfu/100mL once during the reporting period.	1
28-Feb-11	Sample for point 10 was not obtained during period due to oversight.	1
28-Feb-09	Some shortfall in number of Piezometer readings	3
28-Feb-07	Faecal Coliforms at P1 – above the 100-percentile limit on two occasions at 1300 cfu/100mL and 270 cfu/100mL The pH results from 8 Jan 2007 were 9.7 at P12 and 9.6 at P1. The 100-percentile concentration limit for pH is 9.5	2 1
28-Feb-06	Suspended Solids at Monitoring Point 1 – Reading was 98 mg/L on sample date. Limit for Monitoring Point 1 is 40 mg/L.	1
28-Feb-05	Monitoring Points 1 and 12: The pH exceeded the limit of 9.5 on one occasion.	1
29-Feb-04	Exceed pH limit on 1 occasion. Exceed total suspended solids limit on 1 occasion	1 1

17.1.2 Work Health and Safety Requirements

As an employer, Council is required to undertake due diligence activities to ensure that workers and visitors are safe while they are at work. See 16.1.2 for discussion of requirements.

17.2 Performance against nominated Levels of Service

Cootamundra water supply currently experiences main breaks frequently with 6 or more breaks in a week occurring several times a year. Council is currently undertaking a $5.5-6 million program of main replacements targeting 18 km of cast iron (CI) and asbestos cement (AC) water mains, as well as the associated galvanised steel customer connections. A map of the completed replacements and the scheduled replacements is included in Figure 17-1.

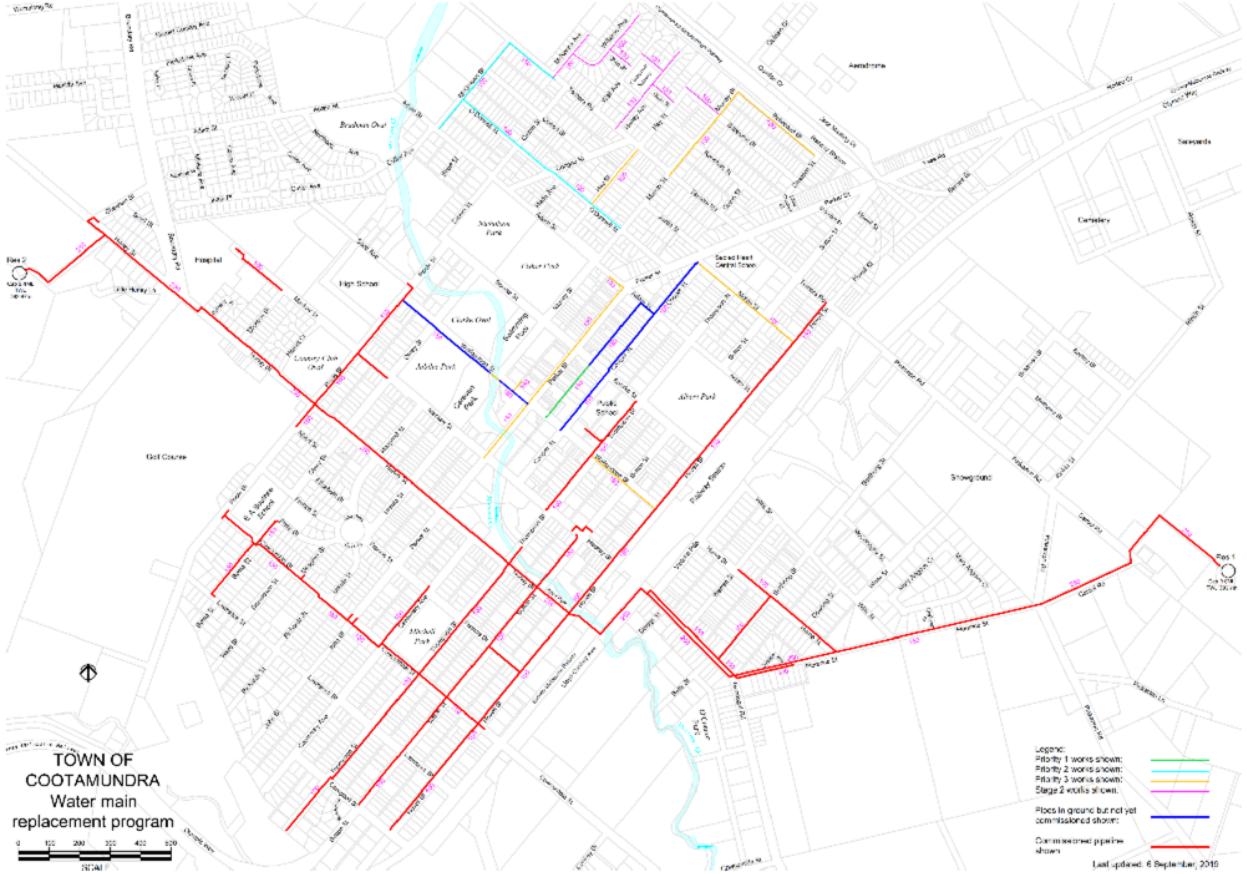


Figure 17-1: Cootamundra pipe replacement program

17.3 Best Practice Compliance

Compliance with LWU Circular 18

LWU Circular 18 specifies the requirements for the following three barriers to assure the safety of each water supply and to prevent microbial contamination.

Barrier 1: Effective Disinfection

Effective disinfection of the bulk supply is the responsibility of Goldenfields Water. Council currently undertakes free and total chlorine monitoring as part of the NSW Health Drinking Water Quality Assurance Programme, these samples are collected manually, this is an **Issue** as it increases the time to respond to potentially hazardous events when compared to automated monitoring systems.

Council is investigating options on water quality monitoring at the handover point for parameters such as pH, turbidity, free and total chlorine (e.g. data sharing from Goldenfields Water or installation of online monitoring equipment).

Barrier 2: Distribution System Integrity

Council undertakes weekly inspection of all reservoirs and if any problems are identified the appropriate actions are taken. Council has advised that there have not been any recent problems identified.

Council also monitors the reservoirs weekly for:

- Free Chlorine residual
- Total Chlorine
- pH
- Turbidity
- Temperature.

Barrier 3: Maintain a Free Chlorine Residual in the Water in the Distribution System

Manual re-chlorination is undertaken at the Cootamundra reservoirs, this is an **issue** as it is a hazardous activity for staff and the low frequency of testing increases the potential duration of low chlorine residual events. CGRC are investigating the installation of automated re-chlorination systems to improve control of chlorine residual in the network.

Council takes water samples from different locations around Cootamundra in accordance with the drinking water quality management plan. The samples are tested for:

- Free Chlorine residual
- Total Chlorine
- pH
- Fluoride.

The building surveyor is responsible for undertaking the water sampling required under the NSW Health Drinking Water Quality Monitoring Program. The 2016/17, 2017/18 and 2018/19 results from the monitoring program were analysed for compliance with the drinking water guidelines, the percentage compliance and number of exceptions in each year are summarised in Table 17-2.

Table 17-2: Cootamundra ADWG Compliance

	2016/17			2017/18			2018/19		
	% compliance	Samples collected	Exception Count	% compliance	Samples collected	Exception Count	% compliance	Samples collected	Exception Count
Free Chlorine	42.00%	50	29	82.86%	35	6	78.26%	23	5
Total Coliforms	94.12%	50	3	97.44%	39	1	100.00%	23	0
Fluoride	98.90%	365	4	97.53%	365	9	97.22%	395	11

17.4 Condition inspection

As a part of the 2017 asset revaluation (4) the above ground assets were inspected, several issues were identified, these are summarised in Table 17-3.

Table 17-3: Issues Identified during Condition Inspection – Cootamundra

Asset	Key inspection results
Reservoir No 1	- internal fixtures appeared corroded - telemetry would benefit from modernisation - renewal work is required on pipework
Reservoir No 2	- valves and pipework at this reservoir are old - internal fixtures are starting to show signs of corrosion - It is recommended that the reservoir be dived or emptied and inspected to best ascertain internal condition
SPS 1 (Betts St)	- would benefit from a refit - internal fixtures are corroded and need replacement - the dry well appeared wet, with leakage from an unknown source
Airport SPS	- no items of concern were identified at this SPS
Kings Dr SPS	- valves appeared corroded and will be due for replacement in the next 5 to 10 years
Strikers SPS	- no items of concern were identified at this SPS
SPS 1 to STP rising main	- The sewer rising main from the Betts Street SPS may have no functional gas release valves, and the resulting gas build-up is adversely affecting the life expectancy of STP preliminary works.
STP	- alum dosing system is in poor condition

Asset	Key inspection results
	- trade waste appeared to be disposed of in a separate pond onsite. This pond did not appear to be lined, and there is a potential for land contamination. This is not an ideal long-term solution.

The asset revaluation report (4) also provided the following information:

- The water pipeline assets were assessed using where breakage history and anecdotal evidence. It was noted that "Older sections of the (Cootamundra) water reticulation system are now reaching end of life and should be progressively replaced if Council is to avoid multiple burst pipelines".
- The Betts Street sewer rising main is of concern. It is a critical asset in the system because it is the sole outfall for the urban catchment. It is understood that this pipe has previously burst. Council should monitor this pressure pipeline and consider replacing it due its critical role in the sewer network when renewing the Betts Street SPS.
- The gravity sewer pipelines in Cootamundra are in reasonable condition for age. A cohort of VC sewer pipes laid in the 1930's is now reaching end of life.

18 Unserviced communities

Council is currently preparing a database of all on-site sewage management systems in the LGA. There is currently no inspection program. **Issue**

18.1 Unserviced dwellings in Gundagai Town

Gundagai is the only town in the former Gundagai Shire which has a reticulated water supply and sewerage service. Council has advised that there is a small number of properties that have a water connection in the urban area that are not economically viable to service with a conventional gravity sewerage system as is provided for the rest of the township. Council will look at options such as pressure sewerage systems over time, but the residents have not been pressuring Council in relation to these properties and they are not leading to any known problems in terms of their onsite systems.

18.2 Unsewered dwellings in Cootamundra Town

There are properties with homes and businesses around the edges of Cootamundra that are served with water but are not sewered. Almost all of these properties are well over the minimum size required for the safe operation of a septic tank OSSMS. The notable exceptions are 3 properties near the bend in Carool Rd.

18.3 Partly serviced rural communities

The following communities are provided with water by Goldenfields Water but are not sewered:

- Stockinbingal – 91 dwellings
- Wallendbeen – 47 dwellings

Stockinbingal is located on the combined floodplain of Bland and Dudauman Creeks. Dudauman Creek joins Bland Creek downstream of the village, at which point the combined catchment is some 210 km^2. Flooding occurred in September 2016, testing the towns flood mitigation works that were constructed in 1987/88. There were anecdotal reports of the surcharging of sewage from septic tanks and transpiration beds.

Table 18-1: OSSMS assessment of Stockinbingal and Wallendbeen

Parameter	OSSMS Requirement	Risk if requirement not met	Stockinbingal	Wallendbeen
Lot Size	Minimum 4,000 to 5,000 m^2	Public health risk (human contact), Environmental contamination (insufficient area for sustainable disposal)	Lot sizes in the middle of town are less than 1,000 m^2	Lot sizes in the middle of town are less than 1,000 m^2
Buffer distance to permanent surface water	Minimum 100 m	Contamination of surface water	The creeks are ephemeral, town is flood prone	The creeks are ephemeral, town experiences minor flooding,

Parameter	OSSMS Requirement	Risk if requirement not met	Stockinbingal	Wallendbeen
Site Drainage	Well drained	Resurfacing hazard – Public health risk (human contact)	Soil is clay loam.	Soil is clay loam. Suitability for absorption trench systems varies over the town

The small lot sizes are an **issue** as buffer distances between OSSMs and dwellings cannot be maintained.

The draft Wallendbeen Village Strategy (2017) states "priorities to support growth include an immediate audit of all septic systems installed in Wallendbeen by Council's Environmental Health Officer". As of September 2019, no audit has been undertaken.

The draft Stockinbingal Village Strategy (2017) states:

- Sewer is not available, with most residents utilising a septic system.
- With a number of quarter acre lots in single ownership with dwellings constructed, concern is held for the effectiveness and compliance of absorption trench septic systems.
- Stockinbingal is mapped as being flood prone throughout the residential area and groundwater is believed to be close to the surface in some areas
- Septic system audit of all dwellings, working to bring all septic systems up to code until a sewer (system) can be implemented.

As of September 2019, no audit has been undertaken, though Council reports that there are anecdotal reports that "the village of Stockinbingal has overflows from septic tanks during wet weather".

In 2018, Council commissioned the Stockinbingal Sewerage Scheme Options Study Report, this report concluded that a pressure sewerage collection system with a package IDEA type treatment plant as the preferred servicing strategy for the Stockinbingal village. A concept design for this system is currently being undertaken.

18.4 Unserviced rural communities

The following villages are unserviced:

- Nangus – 45 dwellings
- Tumblong – 30 dwellings
- Muttama – 20 dwellings
- Coolac – 12 dwellings
- Burra – 10 dwellings

The only water supply to properties in these villages is from rainwater tanks, which can be topped up in dry periods by the purchase of treated water from the Gundagai system (or possibly the Cootamundra System in the case of Muttama).

These villages rely on on-site sewage management systems (OSSMS) such as septic tanks to treat their sewage. There are also an estimated six or seven properties in the town of Gundagai that are not connected to the sewerage system as it has not yet been economical. Council will

investigate extending the sewerage scheme to these properties, which may be a pressure sewer system.

OSSMS are inspected by Council in accordance with industry practice (Local Govt /EPA manual). Council has advised that OSSMS are in general well maintained with only a small number of minor problems noticed in the inspection process. There were no signs of runoff nor any obvious percolation of this water to any water table and in addition there was no runoff sighted from any of the properties.

In addition to the above the properties where these systems are installed are large and the villages have soil that is suitable for onsite disposal including evaporation / transpiration beds and that is supported by relatively low overall rainfall and high summer temperatures leading to good overall evaporation. The properties in the villages are sufficiently large to allow generous beds to be provided.

Council believes that the village of Nangus is expected to grow significantly given its proximity to Gundagai. Council has resolved to provide a reticulated water supply to this village, following which it is expected to grow to around 120 ET by 2040. For the remainder of the villages, Council expects development will be limited to one or two ET additional by 2040, if any development is to occur at all.

Council and Goldenfields Water have commissioned a feasibility study into options for the provision of reticulated water supply to Nangus. The following options are being considered:

1. extend the existing Gundagai's potable water supply to Nangus
2. connection to Goldenfields' Tenandra scheme at Oura Road to supply Nangus
3. connection to Goldenfields' Tenandra scheme near Tenandra reservoirs and utilize the existing easement
4. connection to Goldenfields' Tenandra reservoir and use the local terrain to determine the alignment to Nangus
5. river extraction including treatment process
6. ground water extraction including treatment process
7. do nothing 'status quo'.

Report anticipated February 2020.

19 IWCM Issues

The IWCM issues are summarised in the following tables.

Table 19-1: General IWCM Issues

Issue Type	Target for Compliance	Issue
Regulatory	Environmental Planning and Assessment Act 1979	Updates to LEP and related documents are required to document expected growth and enable the: - Documentation of the expected number of new dwellings - Identification of suitable development areas - Re-zoning of land if any is required
	Local Government Act1993	Council has not complied with annual reporting requirements (No data available for 2017/18 in the DPIE Water database on 1 October 2019)
	Work Health and Safety Act 2011	- Regular safety inspections of facilities are not undertaken by staff and management - It is not known whether Council has implemented policies and procedures needed to comply with the due diligence requirements
Contractual agreements	Agreement with Goldenfields Water	- Council does not compile annual reports for Goldenfields Water specified in the water supply agreement
Levels of Service	CRM	Information required to assess performance against LOS is not available
	Drought security	- The drought level of service for Cootamundra is different to that of Gundagai
Business performance	Development Contributions	There are no development contributions charged in Gundagai
	Development rates	There is no growth strategy for Gundagai
	Maintenance and renewals	There has been substantial underinvestment in maintenance and renewals

Table 19-2: Water supply system Issues

Issue Type	Target for Compliance	Issue
Gundagai Water Supply		
Performance	Data collection	- Manually collected flow data is prone to errors and difficult to compile, visualise and analyse - Records show more water is sold than produced, therefore there is an issue with either the production meter or the customer meters
	Renewals	- The raw water pumping system has components requiring maintenance - Substantial sections of the trunk mains are in very poor condition

Issue Type	Target for Compliance	Issue
Cootamundra Water Supply		
Regulation	Public Health Act 2010	Low frequency manual testing of chlorine residual increases the duration of low chlorine concentration events
	Work Health and Safety Act 2011	Re-chlorination is undertaken using pool chlorine, this is a hazardous activity for staff
Contractual agreement	Goldenfields Water	Agreement requires review to ensure - consistency between values and units - consistency between sections of the document - drought security conditions are appropriate - NRW target can be reached affordably Council is unable to demonstrate compliance with peak day flow limits due to lack of consistent daily bulk supply monitoring Council has not submitted annual reports Goldenfields Water as required by the agreement
Performance	Data collection	- Manually collected flow data is prone to errors, has lots of missing points and is difficult to compile, visualise and analyse - Many water meters are nearing the end of their economic life
	Renewals	Reservoir 1 - Internal fixtures corroded - Pipework is at end of service life - Telemetry "would benefit from modernisation" Reservoir 2 - Valves and pipework at end of service life - Requires detailed internal inspection to assess corrosion Customer meters - 30% of the customer meters were installed in 2002/03 and are expected to reach the end of their economic life in the next few years
	Outage resilience	Reservoir capacity is less than peak day demand, there is little buffer in the event of bulk supply difficulties
Levels of Service	Main breaks	Very high frequency of main break
	Drought	- Cootamundra has spent 40% of the last 17 years on water restrictions - Drought security different to Gundagai

Table 19-3: Sewerage system Issues

Issue Type	Target for Compliance	Issue
Regulatory	License	- Non-compliances due to failure to undertake required sampling or report results of sampling - Council unable to locate annual returns including the flow records for reuse schemes
	RWMP	Council does not have recycled water management systems for the effluent reuse schemes
	Backflow / cross connection policy	Backflow / cross connection policy required, policy must include the regular testing of devices and the logging of test results
Gundagai Sewerage Scheme		
Performance	Power reliability	Blackouts frequently occur during floods
	Flooding	- STP is located on flood prone land and was inundated during the 2010 and 2012 floods - Royal SPS is located on flood prone land
	Maintenance	- Cleaning of Maccas SPS required - Package SPS near Primary School in poor condition for age
	Renewals	- Boys Club SPS internal fixtures - Maccas SPS internal fixtures - Primary School SPS electricals
	STP	- The trickling filter heads no longer functioning, - The tricking filter tank cracked and leaking - The inlet works were very labour intensive to maintain, and not performing their role effectively - Maturation ponds were very green indicating inefficient nutrient removal - The clarifier had ceased to function - Sedimentation flow weir is ineffective when one or both SPS pump to the STP - There is no inflow meter
Levels of Service	Telemetry	Limited SPS telemetry means that Council cannot monitor operations to ensure that LOS are maintained
Regulatory	Section 60 approval	Council does not have Section 60 approval for the Gundagai STP
	Wet weather performance	STP shutdown during major floods
Cootamundra sewerage scheme		
Performance	SPS	Pump stations require vegetation management to ensure safe access and enable inspection
		Betts ST - internal fixtures are corroded and need replacement - the dry well appeared wet - would "benefit from refit"
		Airport PS allows stormwater into the system due as the lid is flooded during wet weather and leaks
		Kings Drive PS valves require replacement

Issue Type	Target for Compliance	Issue
	Rising main	sewer rising main from the Betts Street SPS may have no functional gas release valves, increasing corrosion of the STP inlet works
	Wet weather	Very high infiltration in 2016/17, no evidence that cause has been identified or remediated
	STP	- alum dosing system is in poor condition
Regulatory	OSSM waste	Only septic effluent can be accepted and that discharged to be in the present "old" sludge lagoon. Council needs to have an approved agreement with the discharger, and that agreement needs this DPIE Water concurrence.
	STP	- Grease trap waste was received at STP and this is not allowed - Council does not know if the STP has Section 60 approval
	SPS	Backflow prevention devices require annual testing and the results must be logged
	Liquid trade waste policy	Policy yet to be implemented

Table 19-4: Un-serviced and partly serviced communities

Issue Type	Target for Compliance	Issue
Public Health	OSSM	- OSSMs are not inspected - Lot sizes in Stockinbingal and Wallendbeen are insufficient to meet the buffer areas distances for OSSMs

19.1 Data gaps

Some data gaps have been identified during the analysis. These have been outlined in Data gaps/inconsistencies.

Table 19-5: Data gaps/inconsistencies

Area	Data gap/inconsistency
Gundagai Water	- Negative NRW - Information to check CCP performance
Cootamundra water	Reservoir inflow data is not collected daily for both reservoirs
Cootamundra sewerage system	- SPS pump flow rates not known - Biosolids stabilisation grade unknown - Biosolids contamination test results unable to be located
All	- It is not known if Council is meeting its obligations under the WHS act and regulation - What is Council's target condition rating?

References

1. **Alf Grigg and Assosciates, Phil Hawley and Assosciates, Michael Cuthbert Engineering Consultant.** *Gundagai Shire Council Strategic Business Plan: Water Supply Services.* 2009.

2. **NSW State Emergency Service and Gundagai Shire Council.** *Gundagai Shire Flood Emergency Sub Plan.* 2013.

3. **Brearley, M.** *Priority Infrastructure Project: Stormwater Priority Assessment Report.* s.l. : Mike Brearley & Associates, 2018.

4. **Brearley & Hansen.** *Valuation of Water Supply and Sewerage Assets to 30 June 2017: Outcomes for Strategic Asset Management.* 2017.

5. **NSW Office of Local Government.** 19-04 Final Code of Accounting Practice and Financial Reporting (update 27) including Joint Organisations Supplement. [Online] 29 03 2019. [Cited: 25 09 2019.] https://www.olg.nsw.gov.au/news/19-04-final-code-accounting-practice-and-financial-reporting-update-27-including-joint.

6. **Water, NSW DPI.** *2015-16 NSW Water Supply and Sewerage Benchmarking Report.* 2017.

7. **DPI Water.** *Drought Security Assessment - Murrumbidgee regulated river.* s.l. : Department of Primary Industries, 2016.

8. *Understanding non-registration in domestic water meters - Implications for meter replacement strategies.* **Mukheibir, P, et al.** December 2012, s.l. : Australian Water Association, 2012.

9. **NSW Public Works Department.** *Water Supply Investigation Manual.* Sydney : NSW Public Works Department, 1990.

10. **Riverina Eastern Regional Organisation of Councils.** *Regional State of the Environment Report.* 2012.

11. **SafeWork NSW.** Due diligence. [Online] [Cited: 30 September 2019.] https://www.safework.nsw.gov.au/legal-obligations/employer-business-obligations/due-diligence.

12. **Gundagai Shire Counil.** *Gundagai Tourism Stragegy.* Gundagai, NSW : s.n., 2015.

13. **NSW Department of Water and Energy.** *Liquid Trade Waste Guidelines.* 2009.

14. **Gundagai Shire Council.** *Gundagai Shire Council - Water Supply Asset Management Plan.* 2012.

15. **ATOM Consulting.** *Young, Harden and Boorowa water supply systems: Water Quality Risk Assessment Output Paper.* 2017.

16. **Water Services Association of Australia.** *Pressure Sewerage Code of Australia - Part 1: Design.* 2007.

17. **SydneyWater.** Water meters policy. *SydneyWater.* [Online] 14 02 2018. [Cited: 24 09 2019.] https://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mdq3/~edisp/dd_047498.pdf. Document number 441298.

Appendices

Appendix A Policies, agreements and restrictions

A.1 Gundagai water restriction policy

The policy was adopted on the 28th of May 2019

Introduction

This Procedure details how the Gundagai Local Water Utility (Gundagai LWU) implements Water Restrictions for the purpose of water conservation, demand management and drought management. The Mayor and General Manager have been delegated authority to implement and vary water restriction levels in accordance with the Council's Policy.

Introducing a Level of Water Restriction

The following table indicates when a level of water restriction may be introduced

Trigger	Restriction level introduced
The storage in Blowering Dam or Burrinjuck Dam falls below 50%	1
The storage in Blowering Dam or Burrinjuck Dam falls below 30%	2
The storage in Blowering and Burrinjuck Dams fall below 20% or Water allocation reduced to 50%	3
The storage in Blowering and Burrinjuck Dams fall below10 % or Water allocation reduced to 30%	4
The Murrumbidgee River flow falls below 200 ML/day for a period 7 days or more or Water Allocation reduced to 25%	5
The Murrumbidgee River Flow falls below 100 ML/day for 7 days or more or Water allocation reduced to <20%	6

The Mayor and General Manager have delegated authority to impose a Restriction Level different to the above Trigger levels if it is considered necessary.

Revoking a Level of Water Restriction

Revoking the water restriction levels shall be the reverse of the above provided the dam levels or flows are likely to be sustained in the immediate future.

Variation of Water Restriction Level

The Mayor and General Manager shall determine which water restriction level will be implemented. This will be reported to the next Council meeting.

Communication Strategies

Whenever a level of water restriction is introduced or varied, the General Manager will arrange for appropriate advertising to be placed. During the period of the restrictions the advertising will be repeated monthly.

The current level of water restrictions will be displayed on Council's website and on signs displayed at the approaches to town.

For level 3 and above radio and television ads will be placed as determined by the General Manager. For level 4 and above a letter box drop of every house and business in the Gundagai

LWU area will be undertaken. The General Manager may elect to undertake a letterbox drop for lower level restrictions if he considers that it would be desirable and could enhance compliance.

Whenever water restrictions are revoked or downgraded, similar advertising will be undertaken as deemed appropriate by the General Manager.

Dealing with Breaches of Water Restrictions

Consumers who are detected breaching water restrictions which are in place at that time will be dealt with as follows:

a) For the first observed breach, a warning notice from the General Manager
b) For a second observed breach, a Penalty Infringement Notice will be issued under S.637 of the Local Government Act 1993.
c) For breaches in excess of two – both the appropriate fine as in b) above and a restriction of water flow to the property, in accordance with Regulation 144(f) of the Local Government (General) Regulation 2005, will be the penalty.

Gundagai LWU will utilise the services of the Infringement Processing Bureau for the purpose of processing all fines issued.

Resourcing Activities associated with Water Restrictions

The General Manager will allocate sufficient skilled personnel and other resources to ensure that all procedures are carried out in a timely and professional manner.

Restriction Philosophy

The current restriction triggers are based on minimising our impact on the Murrumbidgee River system during times of drought and ensuring that in the event that the river drops to minimal flow, supply for essential use will be available and last as long as possible.

Restriction Levels

Details of Restriction Levels are shown in APPENDIX 1

The Mayor and General Manager may vary Restriction Level descriptions if considered necessary.

Exemptions

Exemptions may be available for the various domestic, commercial or industrial purposes. The General Manager will determine if the application has merit and if adequate supply is available prior to issuing an exemption. Consumers must have a valid exemption or they shall be liable to a penalty. An Exemption Permit form is attached in APPENDIX 2

Public Parks, Sporting Grounds, Public Swimming Pool and School Grounds

Irrigation water shall be limited as shown below. Sprinklers shall be controlled to ensure that water is not wasted on paved areas or roads.

Level	Permissible use
1	No restriction on fixed irrigation sprinklers provided that they are on a timer and controlled so that there is no pooling or runoff
2	Fixed irrigation sprinklers, night time use on a timer, controlled so that there is no pooling or runoff
3	Fixed irrigation sprinklers, night time use on a timer, controlled so that there is no pooling or runoff, no more than 3 times per week.
4	Fixed irrigation sprinklers, night time use on a timer, controlled so that there is no pooling or runoff, no more than once per week.
5	No irrigation permitted
6	No irrigation permitted. No topping up of Public Swimming Pool. (May need to close for operational or health reasons.)

Appendix 1

The following restrictions are for all domestic, commercial and industrial consumers in the Gundagai LWU.

Level 1 Voluntary

- no watering with fixed hoses or sprinklers between restriction times
- Washing of vehicles on lawns with a hose provided the use of a hose with a trigger cut off nozzle
- Water runoff onto roads or gutters banned
- Council Ranger will advise and warn anyone not co-operating.

Level 2 Mandatory

- Fixed hoses and sprinklers banned between restriction times*
- Fixed hoses and sprinklers to be on a timer
- Washing of vehicles on lawns with a hose permitted provided the use a trigger cut off nozzle
- Hosing of paths and driveways banned
- Water runoff onto roads or gutters banned

Level 3 Mandatory

- Fixed Hoses and sprinklers banned
- Odds and evens relating to street number and date. No watering on 31st.
- One hand held hose per property before or after restriction times*
- Fixed micro sprays and dripping systems maximum of 15 minutes before or after restriction times*
- Washing of vehicles on lawns with a hose permitted provided the use a trigger cut off nozzle before or after restriction times*. Washing with bucket at other times.
- Hosing of paths and driveways banned
- Water runoff onto roads or gutters banned
- Filling or topping up of Swimming Pools only permitted if cover is fitted

Level 4 Mandatory

- Fixed Hoses and sprinklers banned
- Odds and evens relating to street number and date. No watering on 31st
- One hand held hose per property before or after restriction times* for a maximum of ½ hour
- Fixed micro sprays and dripping systems maximum of 15 minutes before or after restriction times*
- Washing of vehicles on lawns with buckets.
- Hosing of paths and driveways banned
- \Water runoff onto roads or gutters banned
- Filling or topping up of Swimming Pools banned.

Level 5 Mandatory

- Outside use of hoses banned
- Bucket watering only
- Washing vehicles banned
- Limitations placed on commercial and industrial usage

Level 6 Mandatory

- No outside use of town water
- Use of recycled grey water, rainwater tank water or bore water only for outside use
- Limitations placed on internal domestic use
- Limitations placed on commercial and industrial use.

***Restriction Times 1 October to 31 March 9am to 6pm 1 April to 30 September 9am to 4pm**

Appendix 2
WATER RESTRICTION EXEMPTION PERMIT

Name of Applicant: _____

Address _____ _____

Address that the exemption applies to _____

_____

Commercial/Industrial ____ Residential ____

Signature of Applicant _____

Details of Exemption _____

_____

_____

Limitations _____

_____

_____

Approved _____ General Manager

Date exemption in force from: _____ to:_____

A.2 Goldenfields agreement

Goldenfields Water
Innovation & Efficiency

Goldenfields Water County Council
84 Parkes Street, P.O. Box 220
TEMORA NSW 2666
T: (02) 6977 3200
F: (02) 6977 3299
E: office@gwcc.nsw.gov.au
W: www.gwcc.nsw.gov.au
ABN: 54 357 453 921

Our Reference: G95300505

30 November 2016

Mr Ken Trethewey
General Manager
Cootamundra Gundagai Regional Council
PO Box 420
COOTAMUNDRA NSW 2590

Dear Ken

Re: Water Supply Agreement

Please find enclosed signed water supply agreement between Goldenfields Water County Council and Cootamundra-Gundagai Regional Council.

Please accept my apologies for the delay in forwarding the signed copy.

Yours faithfully

Phillip Rudd
General Manager

Water Supply Agreement

Between

Goldenfields Water County Council

And

Cootamundra-Gundagai Regional Council

October 2016

Acknowledgement

The preparation of this agreement was funded by NSW Health.

Contents

1 Administration

1.1 Parties

This Agreement is between:

- Goldenfields Water County Council ("Goldenfields") And
- Cootamundra-Gundagai Regional Council ("Cootamundra-Gundagai")

Cootamundra-Gundagai is referred to as "bulk customer" in the Agreement.

1.2 Purpose

Goldenfields supplies bulk water to Cootamundra Town.

The purpose of this Agreement is to define roles and responsibilities for the management of water supply within the area of operations of the parties.

1.3 Term

The Agreement commences on 1 November 2016 and will continue until terminated, or superseded by a new agreement.

Termination by either party requires a 12 month written notice.

1.4 Structure

This is a two party agreement comprising the common terms of agreement between all both parties. Specific items relevant to each party are listed in the three Annexures. The parties are responsible to keep the Annexures current.

1.5 Representatives

- Operators – responsible for the managing and coordinating day-to-day activities
- Management Committee – responsible for managing the Agreement, planning and review.
- Executive Committee – Step in to resolve issues beyond the Management Committee

Representatives from each party are listed in Clause 1 of each Annexure.

1.6 Review

The Management Committee will review the Agreement every four years. Goldenfields will initiate the review.

2 Protocol

2.1 Communication

The communication lines are listed in Clause 1 of each Annexure.

2.2 Information Collection and Sharing

2.2.1 Measurement of Bulk Supply

Goldenfields will measure the supply to each of the bulk customer using flow meters / meter at all the points of supply.

Goldenfields will verify the bulk water supply mag flow meters annually, or more frequently if required.

2.2.2 Measurement of Usage

The bulk customer will collect and maintain records of water usage by customers. Annual reports describing relevant data will be prepared by the bulk customer and made available to Goldenfields upon request. The data will include residential, commercial, industrial, and agricultural demand, analysis of residential usage, size of connection, number of connections and usage by the top 10 customers.

2.2.3 Water Quality

Goldenfields will monitor water quality as described within its Drinking Water Management System (DWMS).

2.3 Complaints

Water quality complaints and failures will be recorded in the format shown in Appendix A. The bulk customers will forward details of complaints that they consider to be caused by the bulk supply to Goldenfields as they arise.

2.4 Information Sharing

Information relevant to the management and performance of the water supply of all parties will be made available to the other parties. Specific reports are listed in Section 4.

2.5 Operations

2.5.1 Communication Lines

Operational communication lines will be, primarily, between officers listed in Clause 1 of the Annexures.

Each party will set up a group email address within its respective Council. All emails are to be directed through the group email address of each party. It will be the responsibility of each party to keep their respective group email address up to date.

2.5.2 Notification of Departure from Targets and Incidents

Water supplied by Goldenfields will be in accordance with the Goldenfields DWMS.

Goldenfields will notify the bulk customers of any departure from the target water quality or quantity as soon as practicable and within the following targets:

- Planned: minimum 7 days.
- Unplanned: maximum 1 hour after the incidence is observed by Goldenfields.

The bulk customers will notify Goldenfields:

- Activities that may affect Goldenfields, eg line flushing: minimum 7 days
- Other incidents relating to the bulk water supply: as soon as the incidence is observed by, or reported to, them.

Notification will be in person or by phone. The notifying party will ensure that the notification is received by an appropriate person. Notifications will be repeated by email or letter; with a record kept by both parties of the time and nature of the notification, and the personnel involved.

3 Quantity and Security

3.1 Levels of Service

Goldenfields will supply, and plan to supply, water to meet the requirements of the bulk customers, based on projections established in accordance with Clauses 4.4 and 4.5.

The levels of service to be provided by Goldenfields are:

- Drought security: In the event that Goldenfields allocation is reduce due to drought, the bulk customer will incur a pro-rata reduction.
- Average annual demand: 200 kL/property
- Peak day demand: 2.5 kL/property

3.2 Demand Management

Water demand will be managed in accordance with demand management plans, prepared by each party, in compliance with the latest issue of the DPI Water Best-Practice Management guidelines.

Goldenfields is responsible for preparing and implementing an Integrated Water Cycle Management Plan (IWCM). The bulk customers are responsible for preparing a local demand management plan containing strategies and actions specific to their operations. The local plans will be sub-plans to the IWCM plan.

The parties will always consider operational efficiencies when planning current and future servicing needs.

4.1 Drought Management

4.1.1 Drought Management Plans

Goldenfields is responsible for preparing and implementing a Drought Management Plan in accordance with guidelines issued by DPI Water. The plan will be prepared in consultation with, and using input from, the bulk customers.

The bulk customers are responsible for preparing local drought management plans containing strategies and actions specific to them. The local plans will be sub-plans to the regional plan.

The parties will co-operate in the preparation of the drought management plans.

The levels of restrictions and water conservation measures will be consistent between the regional and the local drought management plans.

4.3.1 Restrictions

Restrictions on the demand may be imposed if the supply of water is reduced due to a breakdown, drought or other reason.

The restrictions will be applied in accordance with the drought management plans or as directed by the governing body at the time.

4.4 Planning

The bulk customers will advise Goldenfields of relevant changes in their Environmental Planning Strategies. (Le Spatial plans, LEP's, DSP's and the approval of any proposed extension of growth in water supply)

5 Accountability

This Clause lists the obligations of all parties.

5.1 Primary Obligations

Goldenfields will:

- Supply to the bulk customers at the supply points sufficient quantities to meet demands, subject to restrictions which may apply from time to time.
- Supply water to the bulk customer of quality that meets the Australian Drinking Water Guidelines (ADWG).

The bulk customers will:

- Manage their infrastructure to best preserve disinfection residuals downstream of the supply points.
- Pay invoices presented by Goldenfields, for water and services provided by Goldenfields.
- Not exceed peak daily demands.

5.2 Testing and Metering

Sampling and testing will be carried out by Goldenfields at the locations and frequencies listed in the Goldenfields DWMS.

The testing protocol is as follows:

Water quality:

- Regulated samples will be taken and tested, at a NATA accredited laboratory, at the expense and discretion of Goldenfields.
- Test results will be made available to all parties upon request.

Water quantity:

- Goldenfields is responsible for installing, maintaining, reading meters at the supply points to the bulk customers.
- The readings will be available to the bulk customers upon request.

5.3 Responsibility for Infrastructure

The points of supply listed in the Annexures are the limits of responsibility for the infrastructure between the parties.

For reservoirs owned by the bulk customers: the limit of responsibility is the downstream end of the Goldenfields meter, on the inlet pipe of the reservoir.

For reservoirs owned by Goldenfields: the limit of responsibility is at the outlet of the reservoir, or at the downstream end of the Goldenfields meter, if the meter is installed downstream of the reservoir.

5.4 Reporting

The parties will provide the reports listed in this Clause, as well as other reports and documents that are considered relevant.

Goldenfields:

- Water quantities supplied to the bulk customer: Monthly invoice.
- Water quality testing results: GWCC DWMS

Bulk customers:

- Complaints: Forward GWCC based complaints as they arise.
- Environmental planning instruments, land use strategies and population forecasts: When updated.
- Developer Chargers: 6-Monthly (See annexure C for further information)

Monthly reports will be provided by the 15 of each month, covering the previous month. Annual reports will be provided by 31 July covering the previous financial year.

5.1 Compliance

The parties will need to comply with legislative and other NSW Best Practice requirements to demonstrate that they operate efficiently and effectively.

These requirements include:

- Water quality: Water supplied by Goldenfields should meet the latest standard of ADWG.
- Environmental protection: the parties' water supply operations need to comply with environment protection licences, and other environmental requirements.
- Water extraction: Goldenfields needs to comply with the requirements of its water access licences.
- Efficiency: the parties will work diligently to meet the targets listed in the Annexure. Over time additional requirements may be introduced which affect the operations of the parties.
- Bulk customer will take active role and every consideration in protecting water extraction areas from potential risks.

All parties will aim to comply with all statutory and legal requirements.

6 Dispute Resolution

Disputes should be handled at the lowest possible level. If unresolved, disputes will be escalated as follows:

- Operators Committee level
- Management Committee level
- Executive Committee level

7 Signatures

For Goldenfields Water County Council	Title	General Manager
	Name	Phillip Rudd
	Signature	
	Date	27/10/16

For Cootamundra-Gundagai Regional Council	Title	Interim General Manager
	Name	Ken Trethewey
	Signature	
	Date	26.10.16

Appendix A - Future Issues for Consideration

It is intended that issues that may be resolved over the next few years are listed here, with action plan and responsibilities. These issues may include:

- Online Water Quality Measurement at each major connection

Annexure A - Goldenfields Water

A1. Communication Lines - Goldenfields

Forum/Role	Goldenfields	Meeting Frequency
Operators Committee	Business Hours – GWCC Office After Hours – GWCC Duty Officer	N/A
Management Committee	Operations Manager & Production and Services Manager	Annually
Senior Executive Committee	General Manager	As required

A2. Performance Target - Goldenfields

Service	KPI	Target
Water Quality	Water quality parameters	Parameters meet Goldenfields DWMS
Dirty Water Complaints	Number per year caused by Goldenfields	0
Taste and Odour Complaints	Number per year caused by Goldenfields	0
Construction Activities	Impact on environment	No adverse impact on environment
Interruptions to Supply	Notice for planned interruption to bulk supply	7 days
	Maximum duration of interruption to supply	24 hours (planned) 16 hours (unplanned)

Annexure B – Cootamundra-Gundagai Regional Council

B1. Communication Lines – Cootamundra-Gundagai

Forum/Role	Cootamundra-Gundagai	Meeting Frequency
Operators Committee	Asset Managers Phil McMurray, Harry Sahota	N/A
Management Committee	Water Managers Mark Ellis, Harry Sahota	Annually
Senior Executive Committee	General Manager Ken Trethewey	As required

B2. Performance Targets – Cootamundra-Gundagai

Parameter	Unit	Current	Target	Time
Water losses	L/connection/day	7%	5%	
Average annual residential consumption	kL/property	207	200	
Total annual demand	ML	1400-1800		
Peak daily demand	% of average	Not known	2.5	
Daily demand	% of average	Not known	2.5	

B3. Points of Supply – Cootamundra-Gundagai

Supply will be at the following reservoirs:

Include schematics of each supply points

Annexure C – Developer Charges

GWCC reviewed it's 2011 Developer Service Plan (DSP) in 2014 which contains two areas

- Area A including Oura, Mt Arthur, Hylands Bridge, Mt Daylight and Jugiong Retail Service Areas.
- Area B Bulk customers (Councils) for the Jugiong Bulk Service Area.

The following table sets out the GWCC Developer Charges for the next four years.

DSP Name	2015/16	2016/17	2017/18	2018/19
GWCC Retail DSP Area A (per ET*)	$7,429	$7,800	$8,190**	$8,600**
GWCC Bulk DSP Area B (per ET*)	$6,470	$7,134	$7,491**	$7,866**

* The Equivalent Tenement (ET) is 250 Kilolitres per year
** shown are recommended subject to GWCC Board approval

- The standard Residential 20mm connection's Developer Infrastructure Charge is 1 ET.
- The minimum Charge is 1 ET.

For Multi-Residential Lots (Medium Density and Dual Occupancy) requirements are as follows:

- 1 Bedroom 0.50 ETs per Unit
- 2 Bedroom 0.75 ETs per Unit
- 3 Bedroom 1.00 ETs per Unit.

The Council is to raise Developer Infrastructure Charges (Charge) using the GWCC Bulk (DSP) Area B Charge for all new and any altered water service connections.

The Charge will not apply to any existing lot as at 1 January 1990 where a water rate or water charge was payable to the Council for that lot.

The Charge is to be raised (per lot) if the land is sub-divided from the original lot.

The Council shall consult with GWCC for all Non Residential developments.
The developer will be required to provide their annual volume. The Charge is calculated by dividing the annual volume by 250 kilolitres to determine the number of ETs. Exceeding the annual volume may require the payment of additional Developer Infrastructure Charges.

Proposed industrial developments where the future use is unknown are to use the NSW Water Directorate guidelines ETs per gross hectare for Unknown Future Use – Medium to calculate the Charge.

Where a proposed development includes an existing connection, the average of that connection's last six year's consumption will be base for determining the additional Charge.

The Charge for High Use Industrial Developments will be calculated on the annual volume. A deduction will be applied for constant (non-peak) demands on the GWCC system. The Council will be required to maintain any restrictor so as not to exceed the agreed flow.

New Non Residential Rural developments require on-site storage tank(s) to maintain continuity of supply. The minimum capacity shall be sufficient for 72 hours but not less than 10,000 litres. This is additional to any fire-fighting requirements of the Council or other Authorities. All tanks must remain operationally connected to Council's supply at all times.

Due to on-site storage requirements the water supply shall be considered a non-potable supply. The water supply service is to be directly connected to the storage tank (via the shortest possible route) with no other connections between the water meter and the tank.

The Council is not to allow irrigation of horticultural crops without the prior approval of GWCC.

It will be the Council's choice, whether to pass on the Charge to the developer/ land owner, or to fund the Charge themselves.

The Council within 28 days after 31 December and 30 June submit to GWCC a statement detailing the location and size of all new or altered developments made during the preceding 6 months. The Council will also make the appropriate payment, less 3% commission to GWCC.

A.3 Cootamundra water restrictions 2002/03 to 2011/12

- 5 December 2002 to 1 April 2003 – Daytime fixed hoses restricted use of fixed hoses for a total of three hours per property per day
- 5 April 2003 to 3 October 2003
  - 1 hose/tap connected to an unattended irrigation system per property between the hours of 6AM to 7AM and 6PM to 9PM
  - 1 hand held hose per property at any time
- 4 October 2003 to 22 February 2006
  - handheld hoses at any time
  - 11AM to 5PM use of any unattended fixed hose or sprinkler prohibited
  - 11PM to 5AM use of any unattended fixed hose or sprinkler only allowed with timers
  - 5PM to 11PM and 5AM to 11AM use of any unattended fixed hose or sprinkler allowed
- 23 February 2006 to 1 April 2006 – 'Level A restrictions' fixed hoses and sprinklers banned between 9AM and 5PM daily (23 February 2006 decision made to implement Level A restrictions during daylight savings every year)
- 29 October 2006 to 30 November 2006 – 'Level A restrictions' fixed hoses and sprinklers banned between 9AM and 5PM daily
- 1 December 2006 to 4 April 2007 – 'Level C restrictions' unattended fixed hose or sprinklers permitted only between 5AM to 9AM and 5PM to 9PM
- 7 July 2007 to 19 July 2007 – Level 4 restrictions applied by DI Water (DWE at the time)
  - all domestic garden watering and pool filling prohibited
  - hard surfaces may only be washed using a bucket
- 20 July 2007 to 13 January 2008
  - domestic garden watering restricted to 1 hour per day using a hand held hose
  - pool filling prohibited
  - hard surfaces may only be washed using a bucket
- 14 January 2008 to 31 October 2008 – 'Level A restrictions' fixed hoses and sprinklers banned between 9AM and 5PM daily
- 1 November 2008 to 5 July 2009 – Level 1 restrictions – all domestic garden watering using sprinklers, fixed hoses and fixed sprinkler systems is permitted only from 6.00PM to 8.00PM daily
- 6 July 2009 to 3 October 2009 – no outside watering
- 4 October 2009 to 3 April 2010 a ban on all outside watering between 8.00am and 6.00pm
- 3 October 2010 to 2 April 2011 'Level A restrictions' fixed hoses and sprinklers banned between 9AM and 5PM daily.
- In October 2011 Goldenfields announced that they had made a policy change and would no longer be enforcing summer water restrictions as a routine measure.

Appendix B Gundagai Population and Demographic Analysis

B.1 Historical population

B.1.1 LGA Population

The ABS undertakes the Census of Population and Housing every 5 years and calculates the Estimated Resident Population (ERP) as of 30 June each year (released in March of the subsequent year). The ERP is corrected for a number of factors that can cause the Census results to be inaccurate and is revised about two years after a census is undertaken to account for the results of the Census.

The historical population is graphed in Figure B-1. The LGA population dropped by about 5% from 3,951 in 1991 to 3,762 in 2001, but since then remained almost unchanged for the next fifteen years, reaching 3,756 in 2015.

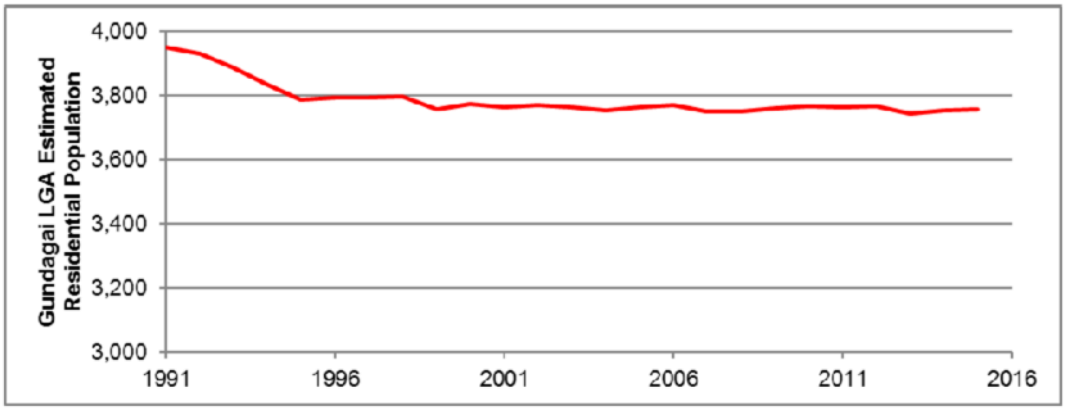


Figure B-1: Gundagai LGA Estimated Residential Population

B.1.2 Community Growth

Table B-1 outlines the historical Gundagai Urban Centre population and dwellings recorded by ABS in the past four Censuses. Due to seasonal variation in population and slight changes in statistical area boundary, this data is an estimate only.

Table B-1: Historical Population and Occupied Private Dwelling of Gundagai Urban Centre

	1991	1996	2011	2016
People	**1,989**	**1,998**	**1,926**	**1,925**
Occupied Private Dwellings	773	808	781	769
Unoccupied Private Dwellings	94	40	116	100
Total dwellings	867	848	897	869
Household Size	2.3	2.4	2.3	2.2
% Household Occupied	89.2%	95.3%	87.1%	88.5%

Source: ABS Quickstats

2016 Census Meshblock data gives an estimated 1,474 people living in Gundagai and 461 people living in South Gundagai. The 2016 meshblock data also gives a population of 101 in Nangus and 37 in Muttama.

Around 90% of occupied dwellings are separate houses, with the rest being flats, unit or apartments or semi-detached dwellings such as town houses.

B.2 Visitor Contribution

Gundagai is located a little over 4 hours' drive from Sydney and about 5 hours' drive from Melbourne. This location makes it a popular stopping point for travellers. The Gundagai Tourism Strategy (12) provides the following information:

- Gundagai enjoys 90,000 domestic visitor nights per annum
- The majority of visitors are on holiday (32,000/49%) or 'Visiting Friends and Relatives' (16,000/25%)
- The majority of visitors are adult couples (travelling without children).

The commercial visitor accommodation available in Gundagai is summarised in Table B-2.

Table B-2: Visitor accommodation

Class	Units	Unit type	Capacity
Motel	175	Room	436
Pub	16	Room	20
Cabins	14	Cabins	70
Caravan park	41	Sites	82
Total			**608**

The ABS data set "Tourism Accommodation, Australia" (catalogue number 8635.0) indicates that:

- on average 36% of beds are occupied and 55% of rooms are occupied
- peak visitor numbers occur during the Easter holiday, during the Christmas holiday period and during September/October.

With an estimated capacity of 456 people in the motel and pub rooms, at 36% of beds occupied this equates to an average visitor population of around 140 people. If all beds, cabins and caravan sites are occupied, the peak population is approximately 600 people.

B.3 Projections

B.3.1 State Government Projections

The NSW Department of Planning and Environment provides LGA based population projections. The most recent projection (2016) is for the merged Shire, the previous projection (2014) was prior to the merger.

The NSW Department of Planning and Environment 2014 projection estimated that the population of Gundagai LGA was expected to decrease by an average of 0.4% per year between 2011 and 2031.

B.3.2 Nominated Growth

Council has advised that typically 5 to 6 detached dwellings are built in Gundagai each year as new homes.

Council expects an increase in population over the next 30 years because of the following factors:

- Additional residents associated with the expansion of the abattoir
- Growth in tourism services with new initiatives already seeing greater numbers of day visitors
- Possible gold mine opening in the region
- Increased retirement and aged care industry as people move to Gundagai as a "tree change" destination

Council plans to cater for this growth with a short-term development, however this growth is not yet documented in any plan. Issue

Council has provided two growth scenarios which they believe may be achieved in the next 30 years. These are given in Table B-3 with growth scenarios provided in terms of equivalent tenements (ET) by each SPS catchment.

Table B-3: Council nominated growth projections for Gundagai - ET

	2017 ET	Low Growth ET	High Growth ET
Royal SPS	697	755	845
Primary School SPS	101	140	175
Boys Club SPS	261	325	330
McDonalds SPS	77	85	90
Sum	**1,136**	**1,305**	**1,440**

The growth projections are converted to equivalent people (EP) by multiplying ET by the household size of 2.2. The EP projections by each SPS catchment are given in Table B-4.

Table B-4: Council nominated growth projections for Gundagai - EP

	2017 EP	Low Growth EP	High Growth EP
Royal SPS	1,533	1,661	1,859
Primary School SPS	222	308	385
Boys Club SPS	574	715	726
McDonalds SPS	169	187	198
Sum	**2,499**	**2,871**	**3,168**

The population of other communities in the former Gundagai Shire is expected to not change of the next 30 years.

Appendix C Cootamundra Population and Demographic Analysis

C.1 Historical Shire Population

The ABS provides ERP data for both LGAs and Statistical Area Level 2s (SA2s). The Cootamundra SA2 is quite similar to the Cootamundra LGA boundary and data continues to be produced for the SA2.

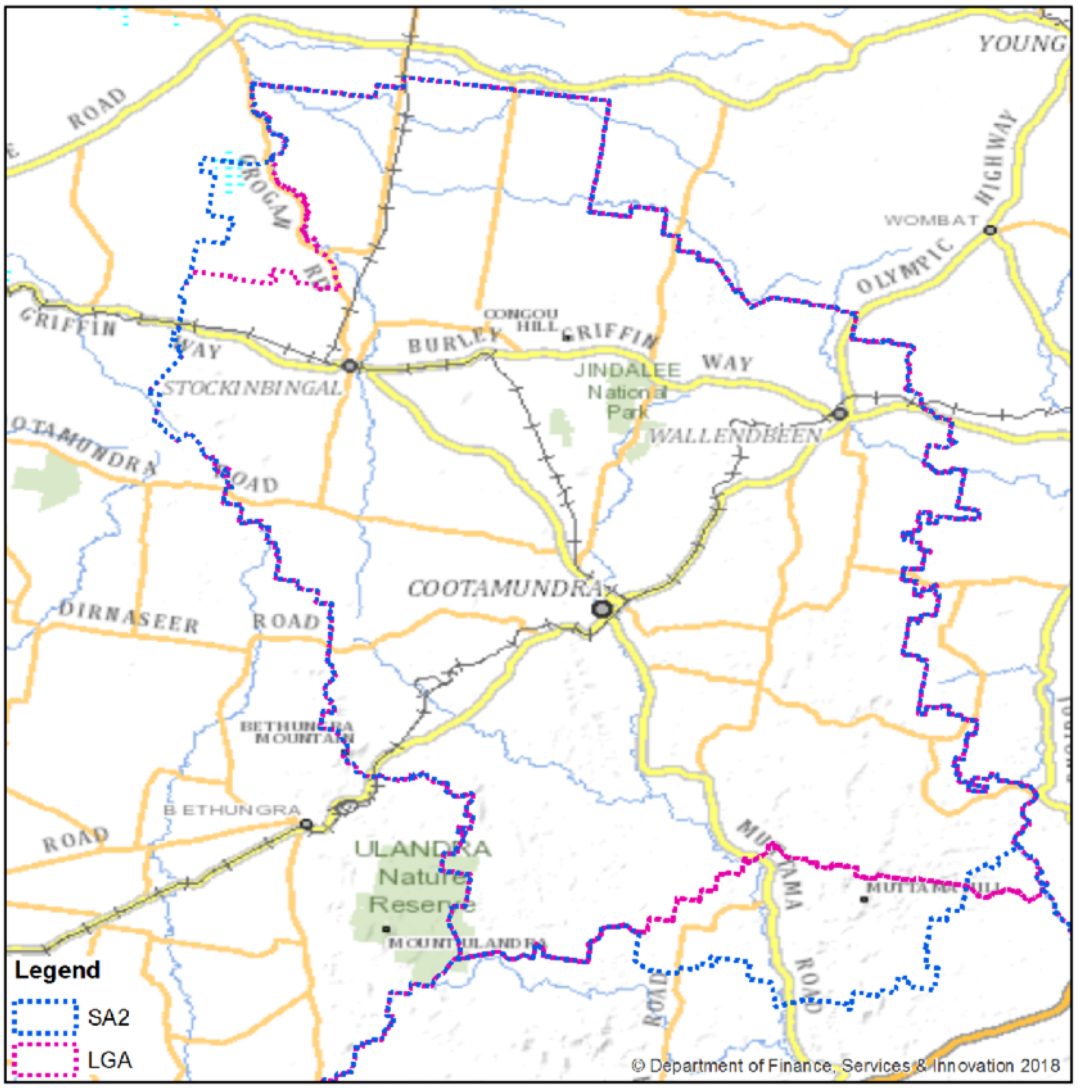


Figure C-1: Cootamundra LGA and SA2 boundaries

The population in the LGA and the SA2 are graphed in Figure C-1. This shows that the population in Cootamundra SA2 has been relatively stable since about 2003, with the population averaging 7,653 people (varying between 7,591 and 7,687).

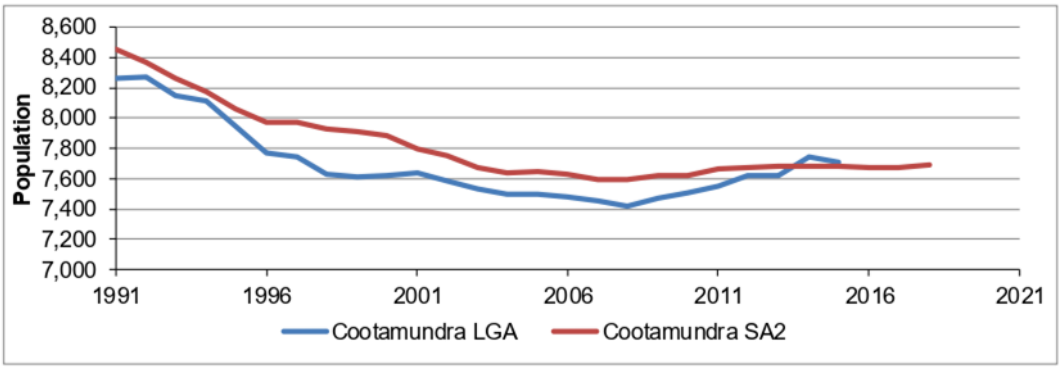


Figure C-2: Cootamundra LGA and SA2 historical population

C.2 Historical Community Growth

The historical population for each of the communities in former Cootamundra Shire has been estimated using the census data from 1991 to 2016 and is summarised in Table C-1. Due to slight changes in ABS geography, thoroughness and reporting methods, this data should be used carefully, for example the 2001 census has a large discrepancy between the ERP and the total population from the smaller units, therefore the apparent drop in the population in 2001 in Cootamundra is probably an error.

Table C-1: Historical population for communities in the former Cootamundra Shire

	1991	1996	2001	2006	2011 MB	2016 MB
Cootamundra	6,389	5,879	5,283	5,565	5,538	5,642
Stockinbingal	261	255	232	222	248	204
Wallendbeen	166	148	165	163	127	116
Cootamundra rural	1,157	1,175	1,234	1,365	1,395	1,449
Total	**7,973**	**7,457**	**6,914**	**7,315**	**7,308**	**7,411**
LGA ERP	8,264	7,769	7,635	7,483	7,546	
SA2 ERP	8,458	7,974	7,798	7,630	7,664	7,673

C.3 Visitor Accommodation

Council's 2019 Draft Tourism and Economic Development Strategy summarises the accommodation providers in Cootamundra (Table C-2) and the major events (Table C-3)

Table C-2: Cootamundra visitor accommodation providers

Accommodation type	Provider name	Bookable Spaces	Estimated capacity	Average occupants
Caravan Park	Cootamundra Caravan Park	64	160	21
Motel	Bradman Motor Inn	20	44	13
	Cootamundra Gardens Motel	23	50	15
	Cootamundra Heritage Motel	25	62	17
	Southern Comfort Motor Inn	19	44	13
	Wattle Tree Motel	15	37	10
Guesthouse	Elm and Wren	21	44	14
Self contained	Woodie's Cottage	1	9	3
Total			**450**	**106**

Table C-3: Cootamundra major events

Event	Location	Time of year
Antique Car Rally	Airport	March
Bachelor and Spinster Ball	Showground	Easter
Coota Beach Volley Ball Festival		A weekend in February
Cootamundra Annual Classic (Cycling)	Road race	Last Sunday in August
Cootamundra Show	Showground	3rd weekend of October
Drag Racing	Airport	
Father's Day Swap Meet	Showground	1st Sunday in September
Haycarters (Cycling)	Road race	2nd Saturday in May
Local Unlimited	Arts Centre	May
Make it Local		Quarterly
The Cootamundra Cup	Turf Club	October long-weekend

The events at the airport are of particular note as the airport is served by one of the small pumped sewerage catchments.

The number of visitors tends to peak around public holidays, especially Christmas and Easter. A high proportion of the visitors (estimated to be 40% by Council) stay with friends and relatives.

C.4 Non-private and Retirement Dwellings

There are two nursing homes and a hospital in Cootamundra, their names and capacity are summarised in Table C-4.

Table C-4: Cootamundra non-private dwellings

Accommodation type	Provider name	Capacity
Hospital	Cootamundra Health Service	30
Nursing home	Cootamundra Nursing Home	61
	Southern Cross Cootamundra	55

Cootamundra Nursing Home is co-located with the 25 unit Adina Court retirement village. There is a plan for the construction of two more units. At the time of the 2016 Census there were 27 people living in the retirement village.

Wattle Grove Retirement Village has 32 homes (duplexes with very small gardens) and a community hub. This development was not complete at the time of the 2016 Census.

C.5 Serviced Population and Dwellings

The 2016 serviced population and dwelling estimate was calculated using the 2016 Census data, visitor accommodation data and Council's service area maps. The results are summarised in Table C-5. In May 2016 there were 2,717 residential meters of which 89% were active, this is very similar to the percentage of dwellings occupied. The number of residential meters is slightly lower than the number of total number of dwellings, this is due to the group metering of some of the flats and townhouses.

The number of water only dwellings appears to be too high as there are only 11 un-sewered meters/assessments. Therefore, it is assumed that the difference between the water supply and sewerage service area is smaller than that mapped by Council. For the projection, it is assumed that only 11 dwellings are un-sewered and the additional people and dwellings are sewered.

Table C-5: 2016 serviced population and dwelling estimate from Census data

	Water and sewer			Water Only			Total connected to water supply		
	People	Occupied Dwellings	Total Dwellings	People	Occupied Dwellings	Total Dwellings	People	Occupied Dwellings	Total Dwellings
Houses, townhouses and flats	5,242	2,444	2,744	102	39	45	5,344	2,484	2,789
Corrected houses, townhouses and flats	**5,318**	**2,474**	**2,778**	**26**	**10**	**11**	**5,344**	**2,484**	**2,789**
Aged care	116	0	0	0	0	0	116	0	0
Hospital	30	0	0	0	0	0	30	0	0
Average visitor	106	0	0	0	0	0	106	0	0
Peak visitor	325	0	0	0	0	0	325	0	0
Average	**5,570**	**2,474**	**2,778**	**26**	**10**	**11**	**5,596**	**2,484**	**2,789**
Peak	**5,789**			**26**			**5,815**		

C.6 Population growth

C.6.1 State Government Projection

The NSW Department of Planning and Environment provides LGA based population projections. The most recent projection (2016) is for the merged Shire, the previous projection (2014) was prior to the merger.

The NSW Department of Planning and Environment 2014 projection estimated that the population of Cootamundra Shire was expected to decrease by 0.67% per year for the period 2011 to 2031.

The 2016 NSW Department of Planning and Environment projection provided three estimates for the period 2016 to 2036, named the "Low" (- 0.87% per year), "Main" (- 0.54% per year) and "High" (- 0.25% per year).

C.6.2 Population and Dwelling Forecast

The following principles were used to project the population and dwellings in Cootamundra:

- a growth rate of 0.2% dwellings per year based on the recent growth in residential meters
- household size decreasing at 0.145% per year based on the NSW Planning Projection
- percentage of dwellings occupied remains flat
- all serviced dwelling growth is connected to both the water supply and sewerage scheme
- growth in non-private dwelling population and visitor populations in line with private dwelling population growth.

This resulted in a serviced population growth rate of 0.045% per year and an SA2 growth rate of 0.032% per year.

The population forecast is summarised in Table C-6, the dwelling, residential meter and residential assessment forecasts are summarised in the Table C-7 and the forecast household size and percentage of dwelling occupied are summarised in Table C-8.

Table C-6: 2016 serviced population forecast

		2018	2019	2024	2029	2034	2039	2044	2049
Water & Sewer	Private dwelling population	5,425	5,427	5,440	5,452	5,464	5,477	5,489	5,502
	Non-private dwelling population	149	149	149	150	150	150	151	151
	Average visitor	108	108	108	108	109	109	109	109
	Peak visitor	331	332	332	333	334	335	335	336
	Average sewered	5,682	5,684	5,697	5,710	5,723	5,736	5,749	5,762
	Peak sewered	5,905	5,908	5,921	5,935	5,948	5,962	5,975	5,989
Water only	Private dwelling population	26	26	26	26	26	26	26	26

		2018	2019	2024	2029	2034	2039	2044	2049
Total	Private dwelling population	5,451	5,453	5,466	5,478	5,490	5,503	5,515	5,528
	Non-private dwelling population	149	149	149	150	150	150	151	151
	Average visitor	108	108	108	108	109	109	109	109
	Peak visitor	331	332	332	333	334	335	335	336
	Average water	5,708	5,710	5,723	5,736	5,749	5,762	5,775	5,788
	Peak water	5,931	5,934	5,947	5,961	5,974	5,988	6,001	6,015
SA2 ERP		7,687	7,689	7,702	7,714	7,726	7,739	7,751	7,764

Table C-7: Serviced private dwelling, residential meter and residential assessment projection

		2018	2019	2024	2029	2034	2039	2044	2049
Occupied dwellings	Water & Sewer	2,531	2,535	2,560	2,584	2,609	2,634	2,659	2,685
	Water only	10	10	10	10	10	10	10	10
	Total	2,541	2,545	2,570	2,594	2,619	2,644	2,669	2,695
Total dwellings	Water & Sewer	2,787	2,792	2,820	2,849	2,877	2,906	2,935	2,965
	Water only	11	11	11	11	11	11	11	11
	Total	2,798	2,803	2,831	2,860	2,888	2,917	2,946	2,976
Total residential meters	Water & Sewer	2,715	2,721	2,749	2,777	2,806	2,835	2,864	2,893
	Water only	11	11	11	11	11	11	11	11
	Total	2,726	2,732	2,760	2,788	2,817	2,846	2,875	2,904
Active residential meters	Water & Sewer	2,353	2,358	2,382	2,407	2,431	2,456	2,482	2,507
	Water only	10	10	10	10	10	10	10	10
	Total	2,363	2,368	2,392	2,417	2,441	2,466	2,492	2,517
Assessments	Water & Sewer	2,687	2,693	2,721	2,749	2,778	2,806	2,836	2,865
	Water only	11	11	11	11	11	11	11	11
	Total	2,698	2,704	2,732	2,760	2,789	2,817	2,847	2,876

Table C-8: Serviced private dwelling statistics projection

		2018	2019	2024	2029	2034	2039	2044	2049
Household size	Water & Sewer	2.144	2.141	2.125	2.110	2.094	2.079	2.064	2.049
	Water only	2.613	2.613	2.613	2.613	2.613	2.613	2.613	2.613
	Average	2.146	2.143	2.127	2.112	2.096	2.081	2.066	2.051
% occupied	Water & Sewer	86.7%	86.7%	86.7%	86.7%	86.7%	86.7%	86.7%	86.7%
	Water only	90.9%	90.9%	90.9%	90.9%	90.9%	90.9%	90.9%	90.9%
	Average	86.7%	90.8%	90.8%	90.7%	90.7%	90.6%	90.6%	90.6%

Appendix D Gundagai Water Demand Analysis

The objective of the water demand analysis is to determine the non-revenue water, the unit demands per connected active residential property, the unit non-residential demands, and to project the 30-year peak day, average year and dry year water demands. The methodology to undertake this analysis is outlined below:

- analysis the historical water supply data from flow records and consumption data from customer billing database
- correct the demands for historical factors and trends such as unaccounted for water, water restrictions, water efficiency, pricing and climate change variability
- determine the unit annual and peak day potable and non-potable demands per active connected residential property
- estimate the number of equivalent active connected residential properties for the non-residential assessments by proportioning each non-residential consumption with the unit demand per active residential property
- determine the trend corrected unrestricted annual dry year, annual average and peak day demand
- project the 30-year unrestricted annual dry year, average year and peak day potable and non-potable water demands.

D.1 Data provision and summary

D.1.1 Production Data

Council provided daily production data from the Gundagai WTP for the period 1st January 2014 to 31st December 2016. The data was given as a daily flow rate of treated water produced from the water treatment plant.

The historical water production of Gundagai is shown in Figure D-1.

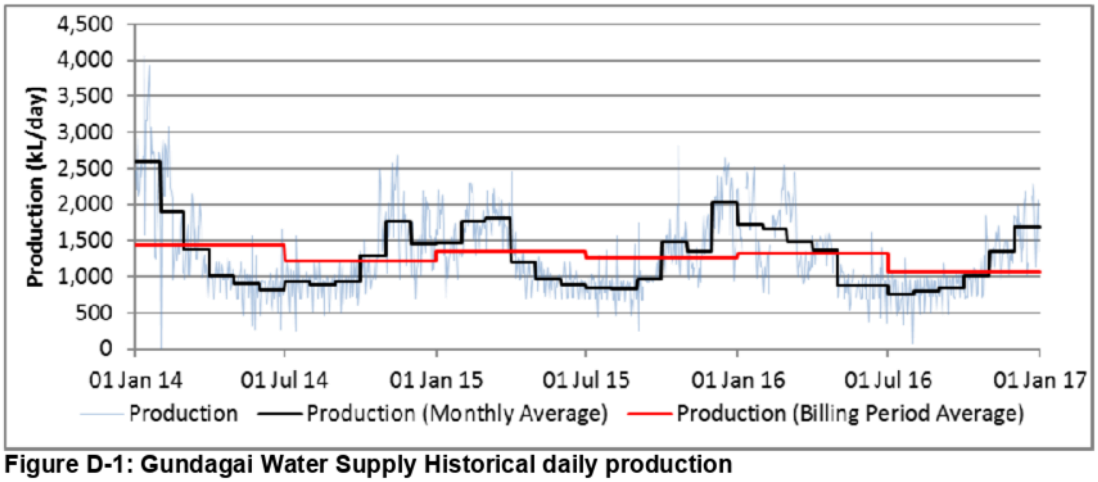


Figure D-1: Gundagai Water Supply Historical daily production

Council's records are based upon a lot of manual records that makes the compilation of data difficult. Council has engaged PWA to look at and make recommendations about upgrading its SCADA system which will include electronic data gathering and storage. **Issue**

The historical average daily production and total yearly production from the billing data is summarized in Table D-1. The average daily production over the whole period is 1,273 kL/day.

Table D-1: Average daily production and total yearly production

Billing Year	2014		2015		2016		2017	
Billing Period	1	2	1	2	1	2	1	2
Average Daily Production (kL/day)	No read	1,436	1,211	1,345	1,257	1,323	1,064	No read
Calendar Year	**2013**	**2014**		**2015**		**2016**		**2017**
Total Yearly Production (ML/year)	No read	483		475		437		No read

D.1.2 Customer Meter Data

Water meter billing data was provided by Council for the duration of 2013/14 financial year to the 2016/17 financial year. Water meters are read twice per year for the following billing periods:

- billing period 1 - 1st July to 31st December
- billing period 2 - 1st January to 30th June

Council is currently in the process of switching over to a quarterly reading and billing periods.

Each assessment is assigned to one or more meters, which are tagged as either a residential or business meter in the billing data. There are also several meters which are tagged as "Non-rateable" which do not have any recorded demand. The historical number of connections is given in Table D-2.

Table D-2: Historical number of connections

Billing Year	2014		2015		2016		2017	
Billing Period	1	2	1	2	1	2	1	2
Residential	987	1,006	945	956	948	963	951	951
Business	169	167	171	173	173	174	188	175
Non-rateable	92	92	92	91	90	93	96	96
Total	**1,248**	**1,265**	**1,208**	**1,220**	**1,211**	**1,230**	**1,235**	**1,222**

The ratio of residential to business connections is about 85:15, which is typical for a town of this size. The number of residential connections is decreasing which is expected to be due to removal of meters from assessments with several meters. However, the total number of residential assessments has actually increased slightly from 882 to 888 over this period. The number of active residential assessments has remained relatively unchanged

The historical average daily demand is given in Table D-3.

Table D-3: Historical average daily water demand (kL/day)

Billing Year	2014		2015		2016		2017	
Billing Period	1	2	1	2	1	2	1	2
Residential	529	859	542	706	458	753	516	747
Business	551	646	527	621	487	625	554	634
Non-rateable	0	0	0	0	0	0	0	0
Total	**1,080**	**1,505**	**1,069**	**1,327**	**945**	**1,378**	**1,070**	**1,380**

Using the lot and DP reference for each assessment, some business assessments were identified which could be categorised as Parks/Gardens (4 assessments), School (5 assessments), Caravan Park (2 assessments) and Pool (1 assessment). Two significant non-residential users were identified – the Meat Processor and The Five Mile highway service centre (Lionis Holding Pty Ltd).

The historical average daily demand including these user classes is shown in Figure D-2. No user demand was recorded for non-rateable connections. The "Misc." category shown includes demand from Schools, Caravan Parks and the Pool.

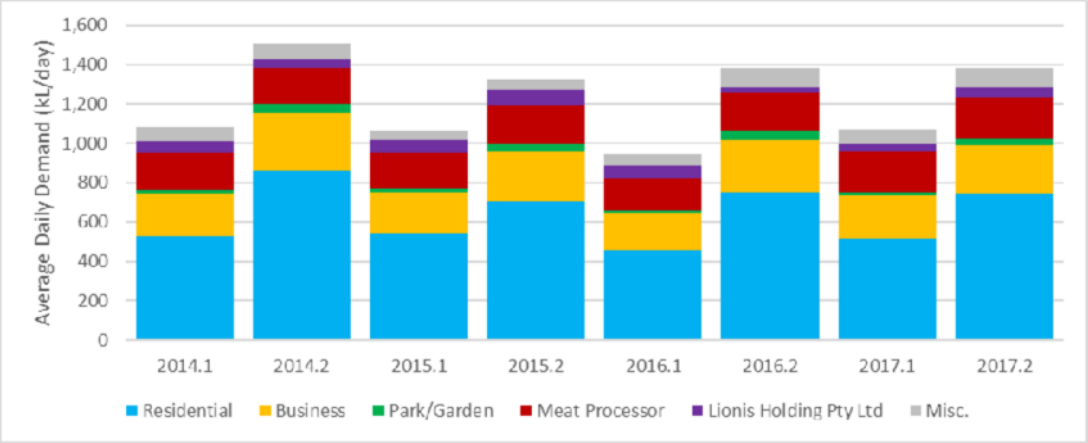


Figure D-2: Historical average daily water demand (kL/day)

D.2 Non-Revenue Water

Non-revenue water (NRW) is made up of a number of components including:

- unbilled authorised consumption which includes water used for fire-fighting and operational uses for example mains flushing
- apparent losses including illegal connections and metering inaccuracies
- real losses, mostly leakage from the network.

NRW has been estimated using the monthly production, estimated monthly metered consumption and the total number of connections. The NRW for the Gundagai water supply scheme is given in Table D-4.

Table D-4: Non-revenue Water for Gundagai water supply scheme

Billing Year	2014		2015		2016		2017	
Billing Period	1	2	1	2	1	2	1	2
Demand (kL/day)	1,080	1,505	1,069	1,327	945	1,378	1,070	1,380
Production (kL/day)	No read	1,436	1,211	1,345	1,257	1,323	1,064	No read
NRW (kL/day)	N/A	-69	142	18	312	-55	-6	N/A
NRW (L/connection/day)	N/A	-55	**118**	**15**	**257**	-45	-5	N/A

It has been identified that there are metering issues for the Gundagai water supply scheme which has led to the metered demand being greater than the metered production. The issue could exist with the production metering, customer demand metering or both, this is an Issue. A revised production for these schemes is calculated in Section D.3.2.

For the water demand projections, an NRW allowance of 120 L/connection/day has been used. This is close to the value of NRW reported to DPIE Water in the Benchmarking reports, and is higher than the 2015/16 state-wide median NRW of 92 L/connection/day. For the approximately 1,240 connections in Gundagai, this equates to an NRW of around 150 kL/day or 55 ML/year.

D.3 Water Production Assessment

D.3.1 Modelled Water Production

The water production data is analysed to determine the impact of historical factors and trends such as climate, water restrictions, water efficiency, pricing and climate change and variability. The aim of the analysis is to develop a model which, when input with historical factors/trends, will output a modelled production that approximately matches the actual historic production data. The model then hindcasts the water production for the years of climate data available.

As explained in Section D.2, a negative NRW is calculated for the system, which indicates errors in production metering at the WTP. Therefore, a water production model was not developed as the readings are dubious, instead production is estimated from correcting customer demand.

D.3.2 Production Estimated from Metered Demand Analysis

As the analysis could not be done on the water production data, the customer metered data was analysed to develop a model for the user demands.

The model developed for the total user demand pattern, which shows a good fit with actual user demand data, is shown in Figure D-3. The model assumed lawns were only irrigated in the months December to April as these are the driest months. This significantly improved the fit of the model compared with if it was assumed lawns were irrigated year round.

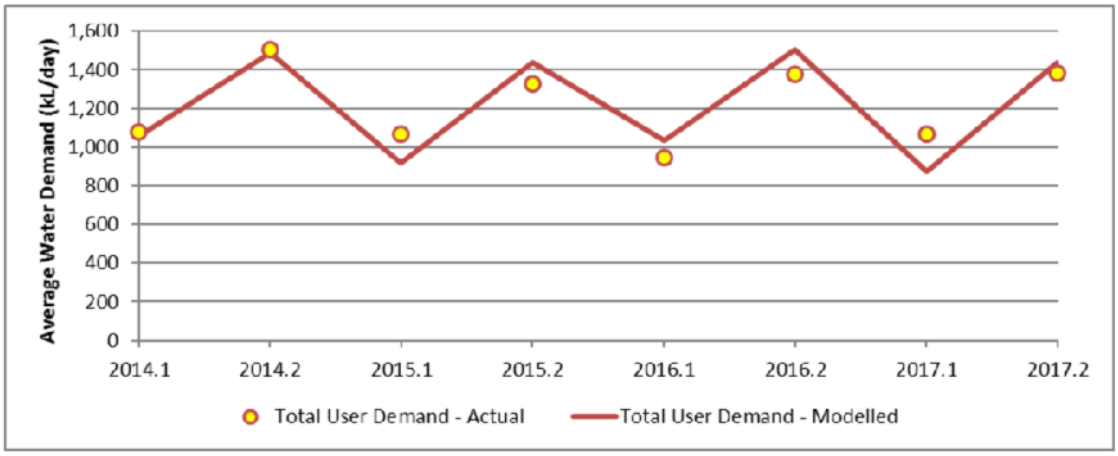


Figure D-3: Modelled and actual quarterly user demand

The model then hindcasts the demand using historical climate data obtained from SILO (rainfall, max daily temperature, and evaporation). This is shown in Figure D-4.

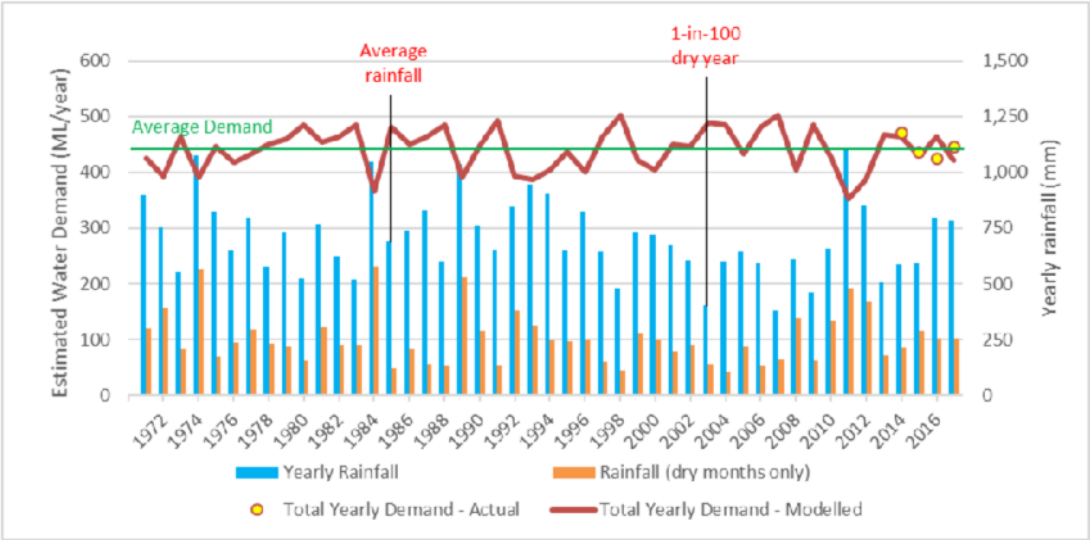


Figure D-4: Modelled and actual total user demand showing average and dry years

Analysing rainfall patterns from more than one hundred years of SILO daily rainfall data, it was determined that the 692 mm of rainfall in the year 1985 was approximately the average yearly rainfall, and the 403 mm of rainfall in 2003 was approximately a 1-in-100 (99th percentile) dry year. However, 1985 had a higher than average hindcast water demand due to the low rainfall from December to April when people are watering their lawns.

The hindcast demand of 438 ML in the year 1995 is closer to the average yearly demand. The hindcast demand of 502 ML in the years 1998 and 2007 is the highest calculated, an increase of +15% on the average demand. The climates from these years are used as the average and dry year climates for estimating climate dependent demands.

Assuming an NRW of 55 ML/year (see Section D.2) gives an estimated average and dry year production of around 495 ML and 560 ML respectively.

D.3.3 Peak Day Analysis

Peak period analysis was undertaken on daily production data from the Gundagai WTP. The peak day persistence patterns for the years of available data is shown Figure D-5.

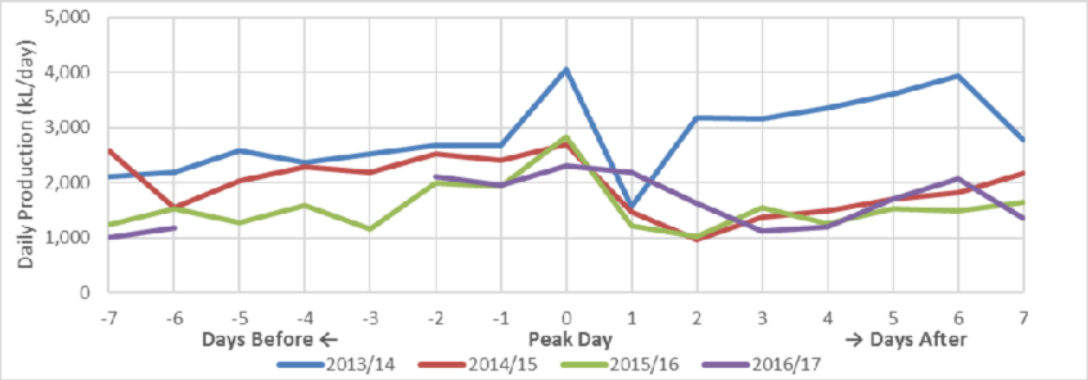


Figure D-5: Gundagai WTP – Peak Day Production Pattern

The highest Gundagai WTP production on record was 4.1 ML/day, which occurred on 12 January 2014. The event is approximately 3.2 times the average day production of 1.3 ML/day. A value of 3.2 has been adopted as the average day to peak day ratio for the Gundagai Water Supply Scheme.

The 4.1 ML/day event was preceded by several days of increasing production followed by a sharp increase 2.7 ML/day the day before to 4.1 ML. In other years, the peak event was also preceded by several days of increasing production but without the sudden sharp peak in production. These two persistence patterns are given in Table D-5.

Table D-5: Peak day persistence pattern (as % of peak day production)

Days around peak day	-7	-6	-5	-4	-3	-2	-1	Peak day	1	2	3	4	5	6	7
Sharp Increase (Jan 2014)	52	54	63	58	62	66	66	100	39	78	78	83	89	97	68
Gradual Increase (Nov 2014)	96	58	76	85	82	94	89	100	55	36	51	56	63	68	81

D.4 Metered Demand Assessment

Similar to the analysis for the water production data, customer user data was assessed for climate dependence in order to calculate an average and dry year demand.

D.4.1 Demand by User Class

The total yearly metered demand by user class is given in Table D-6.

Table D-6: Total Yearly Metered Demand by User Class (ML/year)

User Class	2013/14	2014/15	2015/16	2016/17
Residential	**253**	**228**	**221**	**230**
Non-residential				
Business	92	84	83	84
Park/Garden	13	11	11	9
School	6	5	5	6
Caravan Park	9	6	5	6
Pool	12	9	17	19
Meat Processor	68	68	64	76
Lionis Holding Pty Ltd	19	27	17	16
Total Non-residential	**218**	**209**	**203**	**217**
Total	**471**	**437**	**425**	**447**

The bi-annual demand pattern for all user classes was assessed for climate dependence using the method described above. The total metered water demand for the system, and the total residential and non-residential were determined to be climate dependent. Some of the non-residential user classes were not significantly climate dependent. The average and dry year demands are given in Table D-7.

Table D-7: Modelled demands by user class

User Class	CI demand (ML/year)	CD Demand (Ha)	Average Year (ML/year)	Dry Year (ML/year)	Average Day (kL/day)
Residential	104	29	228	277	624
Non-residential					
Business	Not Climate Dependent			86	92
Park/Garden	0	2	10	15	28
School	Not Climate Dependent			6	6
Caravan Park	Not Climate Dependent			7	9
Pool	Not Climate Dependent			14	19
Meat Processor	Not Climate Dependent			69	76
Lionis Holding Pty Ltd	Not Climate Dependent			20	27
Total Non-residential	173	9	210	225	576
Total	277	38	438	502	1,200

Note: For user classes that were assessed as not having a significantly dependent demand pattern, the average and "dry" year was just the average and maximum year from billing data.

D.4.2 Residential Unit Demands

Unit demands are assessed for an active connected residential property. An active residential property was assessed as having an average demand greater than 400 L/day. Using this cut-off value achieved a ratio of active to total residential users which was approximately the same as the occupancy ratio

The model assumed lawns were only irrigated for half the year. The model also assumed that 80% of dwellings in Gundagai had an evaporative cooler, which switched on at 25°C. Evaporative coolers used an average of 24 kL/dwelling/year or a maximum of 35 kL/dwelling/year.

The modelled average and dry year unit demands are given in Table D-8.

Table D-8: Modelled residential unit demands

	CI demand (kL/year)	CD Demand (m2)	Average Year (kL/year)	Dry Year (kL/year)	Average Day (L/day)
Res Unit Demand	140	266	272	324	744

The irrigation demand for the average day peak week from the irrigation model was estimated to be 7.9 L/m^2/day. The peak daily evaporative cooler demand from the irrigation model was estimated to be 473 L/day. Using this irrigation and evaporative cooler demand, the peak day demand for an average dwelling is estimated to be approximately **2,964 L/day**, an increase of +300% on the average day demand. Although this may be achieved by some houses, it is statistically very unlikely that all houses will use this amount all on the same day.

D.4.3 Non-residential metered water use

Three major non-residential users were identified which use a significant proportion of the towns water:

- The Meat Processor uses on average 16% of the total demand
- The Five Mile highway service centre (Lionis Holding Pty Ltd) uses on average 5% of the total demand
- The Gundagai swimming pool uses on average 3% of the total demand

These users were determined to not have significantly climate dependent demand, with not of them showing a repeating pattern between billing periods.

The estimated demands are summarized in Table D-9

Table D-9: Estimated major user demands

	Average Year (ML/year)	Peak Year (ML/year)	Average Day (kL/day)
Meat Processor	69	76	189
Lionis Holding Pty Ltd	20	27	54
Gundagai Swimming Pool	14	19	40

D.5 Impact of BASIX

The primary aim of BASIX is to reduce the annual average demand, it is less effective in reducing peak day and dry year demands as BASIX dwellings often rely on relatively small rain water tanks with potable top ups to augment their water supply.

Gundagai is in the 40% water target zone; this means that the BASIX Water target requires up to a 40% reduction in mains-supplied potable water consumption compared to the average 'pre-BASIX' home benchmark of 90.34 kL/person/year. All new dwellings are built following BASIX, and therefore the average annual water demands in the residential sector are expected to decrease for new dwellings.

The BASIX dwelling unit demands are compared to current dwelling modelled demands in Table D-10.

Table D-10: BASIX unit demand for average connected residential properties

	Average year demand (kL/property/yr)	Dry year demand (kL/property/yr)	Peak day demand (kL/property/day)
Current Dwelling	262	300	2.5
BASIX dwelling at @ 40% reduction on benchmark	120		

All new dwellings are required to be built in accordance with the BASIX regulations. At the 2016 average connected private dwelling household size of 2.2 people per dwellings, the BASIX dwelling average year demand is 120 kL/property/year. This is considerably lower than the current average year unit demand, and is unlikely to be achieved given the large property sizes in Gundagai and the use of evaporative coolers. An average year demand of 250 kL/property/day has been adopted for new dwellings.

BASIX dwelling dry year and peak day demand of 90% the current dwelling demands has been adopted for projections.

D.6 Impact of visitor population

The ABS data set "Tourism Accommodation, Australia" indicates that peak visitor numbers occur during the Easter holiday, during the Christmas holiday period and during September/October.

Analysis of historical daily production data shows no significant increase in production during the Easter holiday or September/October. Production is high during the Christmas period, however this is also expected to be due to increased lawn watering in Summer.

D.7 Impact of climate variability

Climate variability is expected to increase in the future due to changes to the composition of the atmosphere. The NSW and ACT Regional Climate Modelling (NARCliM) project is a multi-agency research partnership between the NSW and ACT governments and the Climate Change Research Centre at the University of NSW. The NARCliM project has produced regional climate projections for South-eastern Australia spanning the range of likely future changes in climate. The following data was obtained from the NARCliM project for the Murray Murrumbidgee Region.

Table D-11: Changes in average rainfall

	2020-2039	2060-2079
Summer	2.50%	7.50%
Autumn	7.50%	7.50%
Winter	-2.50%	2.50%
Spring	-15.00%	-7.50%

Table D-12: Change in average max temperature

	2020-2039	2060-2079
Yearly average	-2.5ºC	2.5ºC

The NSW Office of Environment and heritage commissioned the CSIRO to investigate the likely change in rainfall and fire danger in NSW. The CSIRO Climate Change in Australia report includes expected changes in evapotranspiration. The results are summarised in Table D-13.

Table D-13: Change in average max temperature

	2030	2050
Summer	5%	11%
Autumn	6%	15%
Winter	5%	11%
Spring	7%	15%

The model described in Section D.3.2 was run using historical climate data from 1970 to 2017, and again using a second climate change corrected series. In the climate change scenario, rainfall and evaporation were adjusted for each season by the average of the ranges in Table D-11 and Table D-13 respectively.

The overall change in production is summarised in Table D-14. The climate change scenario dry year demand is greater than the current climate average year demand by +18%.

Table D-14: Change in production under climate change scenario

	Present Climate	Climate Change Scenario	Climate change % increase demand
Average Year Demand (ML/year)	438	455	+3.9
Dry Year Demand (ML/year)	502	519	+3.4

D.8 Projected water demand, production and extraction

The following conditions were used for projecting the water demands.

PDD/ADD ratio	3.2
NRW (L/connection/day)	120
Extraction %	5%

The extraction is calculated from production assuming 5% losses at the WTP to allow for clarifier desludge and filter backwash.

	2017 ET	Low Growth ET	High Growth ET
Demand			
Average year total demand (ML/year)	438	481	514
Dry year total demand (ML/year)	502	551	591
Average day demand (ML/day)	1.2	1.3	1.4
Peak day demand (ML/day)	3.8	4.2	4.5
NRW			
Connections	1240	1,409	1,544
NRW (ML/year)	54	62	68
Production			
Average year Production (ML/year)	493	542	582
Dry year Production (ML/year)	556	613	658
Average day Production (ML/day)	1.3	1.5	1.6
Peak day Production (ML/day)	4.3	4.8	5.1
Extraction			
Average year Extraction (ML/year)	517	569	611
Dry year Extraction (ML/year)	584	644	691
Average day Extraction (ML/day)	1.4	1.6	1.7
Peak day Extraction (ML/day)	4.5	5.0	5.4

Appendix E Cootamundra Water Demand Analysis

The objective of the water demand analysis is to determine the non-revenue water, the unit demands per connected active residential property, the unit non-residential demands, and to project the 30-year peak day, average year and dry year water demands. The methodology to undertake this analysis is outlined below:

- analysis the historical water supply data from flow records and consumption data from customer billing database
- correct the demands for historical factors and trends such as water restrictions, water efficiency, pricing and climate change variability
- determine the unit annual and peak day potable and non-potable demands per active connected residential property
- estimate the number of equivalent active connected residential properties for the non-residential assessments by proportioning each non-residential consumption with the unit demand per active residential property
- determine the trend corrected unrestricted annual dry year, annual average and peak day demand
- project the 30-year unrestricted annual dry year, average year and peak day potable and non-potable water demands

E.1 Data provision and summary

E.1.1 Bulk supply

Council provided two sets of bulk supply data:

- Monthly water sales data from Goldenfields Water County Council (Goldenfields)
- Metered bulk supply for each of the connections to the Goldenfields network collected on most working days.

The recorded system inflows are graphed in Figure E-1.

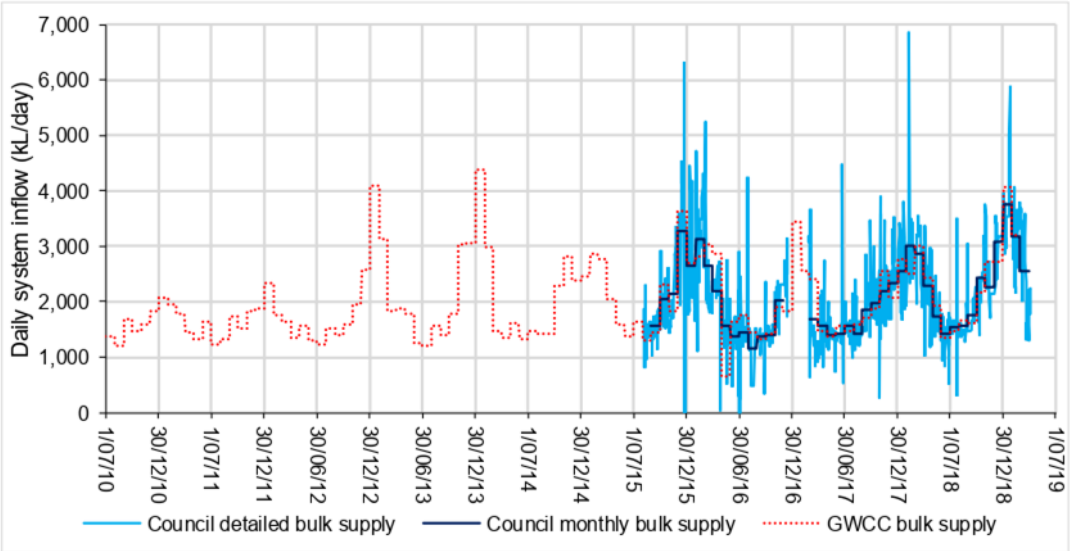


Figure E-1: Cootamundra bulk supply records

The It appears that there is an error in the Goldenfields sales data for May 2016.

Council's records are based upon manually collected data. This data is:

- more prone to errors than automatically collected data
- has lots of gaps between 2 and 26 days where the total flow is known but the daily variation is not
- is missing the entire of summer 2016/2017.

This is an **issue** as the daily variability in inflow is not continuously able to be assessed.

E.1.2 Customer Meter Data

Metered demand by customer category

Customer water meters are generally read four times per year, in August, November, February and May.

Each water meter is assigned a user class classification and an assessment. An assessment may have more than one water meter, though this is comparatively rare in Cootamundra as there are few strata properties. The historic number of water meters, assessments and average daily consumption by user category are summarised in Table E-1.

The metered demand is graphed in Figure E-2.

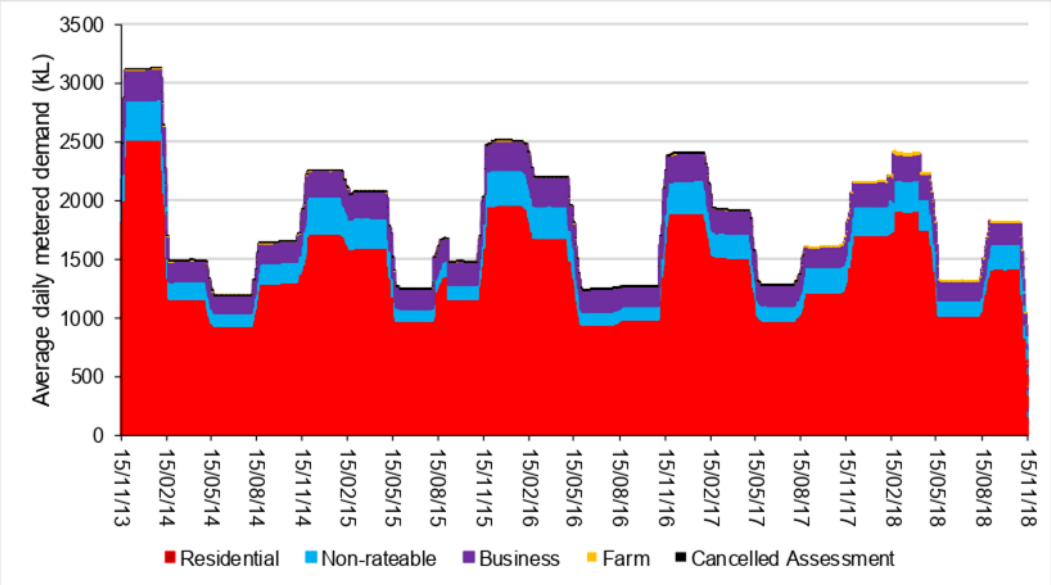


Figure E-2: Metered water demand

Table E-1: Meters, assessments and consumption by meter reading period

End of read period	Meters						Assessments						Meters per assessment				Average daily consumption (kL/day)					
	Residential	Non-rateable	Business	Farm	Cancelled Assessment	Total	Residential	Non-rateable	Business	Farm	Cancelled Assessment	Total	Residential	Non-rateable	Business	Farm	Residential	Non-rateable	Business	Farm	Cancelled Assessment	Total
11/02/14	2,675	127	308	6	2	**3,118**	2,643	86	265	5	5	**3,003**	1.01	1.48	1.16	1.20	2,453	323	259	6.6	0.5	**3,042**
9/05/14	2,693	129	311	6	2	**3,140**	2,660	86	267	5	5	**3,023**	1.01	1.50	1.16	1.20	1,172	155	170	2.3	0.1	**1,499**
12/08/14	2,696	126	312	6	2	**3,142**	2,665	85	267	5	5	**3,027**	1.01	1.48	1.17	1.20	941	119	142	1.5	0.1	**1,204**
17/11/14	2,699	126	312	6	3	**3,146**	2,669	85	267	5	5	**3,032**	1.01	1.48	1.17	1.20	1,311	174	175	1.8	0.1	**1,662**
16/02/15	2,700	126	312	5	4	**3,147**	2,672	84	267	5	5	**3,033**	1.01	1.50	1.17	1.02	1,700	309	215	2.0	2.1	**2,228**
13/05/15	2,701	127	311	5	4	**3,148**	2,673	85	267	5	5	**3,035**	1.01	1.49	1.16	1.00	1,569	255	210	2.1	2.3	**2,039**
6/08/15	2,703	127	310	5	4	**3,149**	2,675	85	267	5	5	**3,037**	1.01	1.50	1.16	1.00	989	109	169	1.0	2.7	**1,271**
11/11/15	2,706	128	309	5	4	**3,151**	2,679	85	265	5	5	**3,039**	1.01	1.51	1.16	1.00	1,220	129	193	0.6	3.2	**1,546**
16/02/16	2,709	128	309	5	4	**3,155**	2,682	85	266	5	5	**3,043**	1.01	1.51	1.16	1.00	1,928	295	240	2.3	7.0	**2,473**
16/05/16	2,717	129	309	5	4	**3,163**	2,688	85	266	5	5	**3,049**	1.01	1.51	1.16	1.00	1,645	276	235	3.1	4.0	**2,163**
16/08/16	2,720	128	308	5	4	**3,165**	2,692	85	266	5	5	**3,053**	1.01	1.51	1.16	1.00	964	120	183	0.3	3.7	**1,271**
9/11/16	2,722	128	309	5	4	**3,168**	2,695	85	266	5	5	**3,056**	1.01	1.51	1.16	1.00	1,022	116	167	0.4	3.5	**1,309**
8/02/17	2,723	128	309	5	4	**3,169**	2,696	85	267	5	5	**3,058**	1.01	1.50	1.16	1.00	1,870	270	225	1.4	4.3	**2,372**
11/05/17	2,723	127	308	5	5	**3,168**	2,694	85	267	5	5	**3,056**	1.01	1.50	1.15	1.00	1,513	202	203	1.2	3.9	**1,923**
16/08/17	2,723	128	309	5	5	**3,170**	2,695	85	267	5	5	**3,056**	1.01	1.51	1.16	1.00	999	132	171	0.7	4.6	**1,308**
20/11/17	2,724	131	311	6	0	**3,172**	2,695	86	268	6	0	**3,055**	1.01	1.52	1.16	1.00	1,228	216	174	5.6	0.2	**1,623**
15/02/18	2,727	131	312	5	0	**3,175**	2,697	86	269	5	0	**3,057**	1.01	1.52	1.16	1.00	1,701	252	199	5.2	0.0	**2,158**
10/05/18	2,729	131	311	5	0	**3,176**	2,701	86	269	5	0	**3,060**	1.01	1.52	1.16	1.00	1,840	261	207	20.8	0.0	**2,328**
21/08/18	2,727	129	310	5	0	**3,172**	2,700	86	269	5	0	**3,060**	1.01	1.50	1.15	1.00	1,055	128	170	3.4	0.0	**1,357**
31/10/18	2,723	127	308	6	0	**3,164**	2,698	85	267	6	0	**3,056**	1.01	1.49	1.15	1.00	1,407	212	177	4.2	0.0	**1,801**

Major users

Major users were selected based on high water consumption, either:

- high average (more than 5 kL/day) or
- high peak (more than 15 kL/day for a meter reading period).

The major users in Cootamundra use relatively modest volumes of water when compared to other towns of similar size. The major water users are summarised in Table E-2.

Table E-2: Major water users in Cootamundra

Assessment	User name	Average annual demand (kL/year)	Average daily demand (kL/day)	Percentage of average metered demand	Maximum metered demand (kL/day)	Time Span
10030674	Cootamundra parks and gardens (multiple sites on one assessment)	5,181	14.18	0.81%	48.17	13/08/13 to 06/11/18
10047330	Cemetery	4,515	12.36	0.70%	28.77	15/08/13 to 12/11/18
10039246	Cootamundra Nursing Home & Adina Court	10,458	28.63	1.63%	52.06	20/08/13 to 04/11/18
10039303	Cootamundra Caravan Park	2,372	6.49	0.37%	19.18	20/08/13 to 19/11/18
10045599	Cootamundra Council Works Depot 1	6,452	17.67	1.01%	31.64	20/08/13 to 19/11/18
10010320	Cootamundra Country Club	2,923	8.00	0.46%	19.92	13/08/13 to 06/11/18
10010346	Cootamundra High School	4,305	11.79	0.67%	24.48	20/08/13 to 15/11/18
10037133	Cootamundra Hospital	4,214	11.54	0.66%	39.21	20/08/13 to 18/11/18
10032670	Cootamundra Landscapers & Nursery	244	0.67	0.04%	15.62	14/08/13 to 11/11/18
10012896	Cootamundra Municipal Olympic Swimming Pool	7,601	20.81	1.18%	74.56	16/08/13 to 14/11/18
10005320	Cootamundra Saleyards	1,789	4.90	0.28%	18.76	19/08/13 to 06/11/18
10039238	Cootamundra TAFE	2,256	6.18	0.35%	17.42	15/08/13 to 12/11/18
10013167	Croker Grain Cootamundra	2,474	6.77	0.39%	15.59	20/08/13 to 14/11/18
10015550	Farm lot	346	0.95	0.05%	15.19	15/08/13 to 12/11/18
10036812	Frank Hiscock Smash Repairs	142	0.39	0.02%	15.69	17/05/13 to 04/12/18
10033272	Southee Circle park	728	1.99	0.11%	19.43	20/08/13 to 19/11/18
10011955	Southern Cross	3,778	10.34	0.59%	14.99	13/08/13 to 07/11/18
10031649	Wattle Grove Retirement Village	4,812	13.17	0.75%	26.76	15/08/13 to 14/11/18
10012789	Woolworths	2,271	6.22	0.35%	14.69	15/08/13 to 13/11/18
All	All	641,872	1,757.35		2,473.04	11/02/14 to 21/08/18

Council has plans to install a Water Park in Cootamundra Pool, the additional water needs for this expansion are not known at this stage.

E.2 Non-Revenue Water

Non-revenue water (NRW) is made up of a number of components including:

- unbilled authorised consumption which includes water used for fire-fighting and operational uses for example mains flushing
- apparent losses including illegal connections and metering inaccuracies
- real losses, mostly leakage from the network.

NRW has been estimated using the monthly production, estimated monthly metered consumption and the total number of connections. The NRW for the Cootamundra water supply scheme is given in Table E-3.

Table E-3: Non-revenue Water for Cootamundra water supply Scheme

Start	End	Days	Metered consumption (ML)	Water Meters	Council bulk supply			GWCC bulk supply		
					Flow (ML)	Unit NRW (kL/meter/day)	NRW as % of bulk supply	Flow (ML)	Unit NRW (kL/meter/day)	NRW as % of bulk supply
15/11/13	11/02/14	89	270	3,106				312	0.152	
12/02/14	9/05/14	87	130	3,127				152	0.079	
10/05/14	12/08/14	95	114	3,129				138	0.080	
13/08/14	17/11/14	97	161	3,133				188	0.091	
18/11/14	16/02/15	91	202	3,133				233	0.108	
17/02/15	13/05/15	86	175	3,135				203	0.103	
14/05/15	6/08/15	85	108	3,136				128	0.078	
7/08/15	11/11/15	97	150	3,140	166	0.055	10%	168	0.060	11%
12/11/15	16/02/16	97	239	3,144	272	0.107	12%	276	0.120	13%
17/02/16	16/05/16	90	194	3,152	221	0.095	12%	227	0.115	14%
17/05/16	16/08/16	92	116	3,155	130	0.048	11%	136	0.068	14%
17/08/16	9/11/16	85	111	3,158	117	0.022	5%	122	0.042	9%
10/11/16	8/02/17	91	215	3,160				224	0.031	
9/02/17	11/05/17	92	176	3,159				185	0.028	
12/05/17	16/08/17	97	126	3,161	141	0.051	11%	145	0.064	14%
17/08/17	20/11/17	96	155	3,168	183	0.090	15%	184	0.094	16%
21/11/17	15/02/18	87	188	3,173	219	0.114	14%	213	0.092	12%
16/02/18	10/05/18	84	196	3,174	214	0.071	9%	218	0.083	10%
11/05/18	21/08/18	103	140	3,172	158	0.057	12%	161	0.066	13%
22/08/18	31/10/18	71	128	3,164	145	0.078	12%	132	0.017	3%
2017-18 Average		**364**	**664**	**3,169**	**757**	**0.081**	**12%**	**760**	**0.083**	**13%**

The 2017-18 average calculated using the Council bulk supply data was been adopted for the projection.

E.3 Bulk Supply Trend Correction

The bulk supply trend correction was undertaken using Council's bulk flow data converted to a monthly time step. The Council data was selected over the Goldenfields as the Goldenfields data appears to be reported for the billed date, rather than the date that the meters were read.

The factors considered in the trend correction were:

- modelled irrigation demand, this had a very good fit (adjusted $r^2 = 0.883$)
- modelled evaporative cooling air-conditioning demand, this had a very good fit (adjusted $r^2 = 0.829$)
- both modelled irrigation and evaporative cooling air-conditioning demand, this had a very good fit (adjusted $r^2 = 0.885$)

- population, when added to the best fitting irrigation and evaporative cooling demand, the improved fit was not statistically significant
- pricing, when added to the best fitting irrigation and evaporative cooling demand the improved fit was not statistically significant.

Non-revenue water was not considered as the period of meter data provided was much shorter that the bulk supply.

The model was trained using the data from September 2016 to March 2019 and verified using the data from September 2015 to August 2016.

The modelled and actual water sales are graphed in Figure E-3.

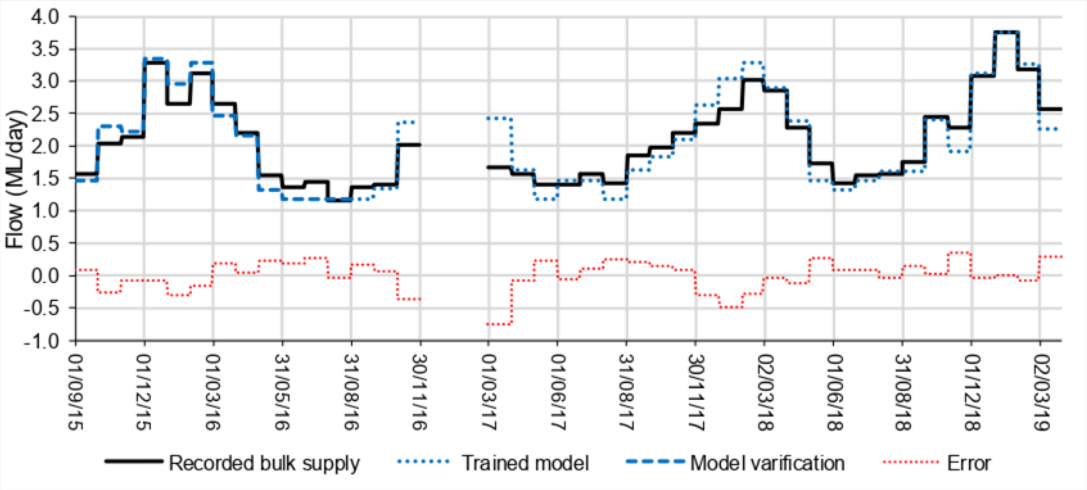


Figure E-3: Modelled bulk supply

The modelled demand was hindcast demand using historical climate data obtained from SILO (rainfall, max daily temperature, and evaporation). This is shown in Figure E-4.

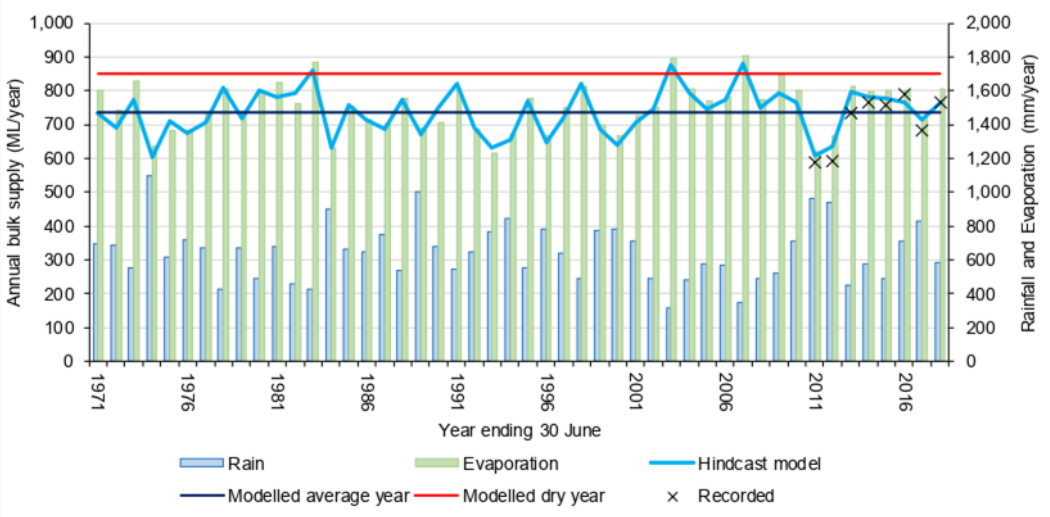


Figure E-4: Hindcast bulk supply

Based on the hindcast model:

- the water restrictions in place over summer 2010/2011 reduced the town demand for January, February and March by about 12%
- the first summer after the water restrictions were lifted (2011/2012) had similar demand reduction (12.1%)
- 2016/17 was about 2% below an average consumption year
- the average year bulk supply is 737 ML/year, this has been adopted as the starting point for the projection
- the 1 in 20 year dry year bulk supply is 849 ML/year and without restrictions it would have been exceeded in 1982/83, 2002/03 and 2006/07, this has been adopted as the starting point for the projection
- the average day peak week bulk supply is 5 ML/day, the most recent week with this modelled peak was 15/01/2019 to 21/01/2019
- the peak day bulk supply is 6.3 ML/day.

Studies undertaken for other IWCMs have shown that the peak day to average day peak week ratio is generally between 1.1 for large towns and 1.25 for smaller towns, therefore the modelled ratio of 1.255 is within the expected range and will be adopted for this projection.

E.3.1 Peak period analysis

As only 21% of the period of record has daily bulk supply data records for both supply points, and the data was missing in the middle of summer 2016/2017, the bulk supply analysis is less reliable than preferred. There were three summers of Council collected bulk supply data available. There were no peak periods when daily data was collected from both bulk supply meters.

One of the hottest, driest periods on record for Cootamundra was between the 15th January 2019 and the 18th January 2019 with maximum temperatures over 40°C. The bulk supply data for this period was collected 10 days apart on one meter and 14 days apart on the other meter, the average bulk supply flow was 3,549 ML/day.

The highest recorded demand was 6.86 ML/day on 10 February 2018, during this period, 5.18 ML was supplied to Reservoir 1 and an average of 1.68 ML/day was supplied to Reservoir 2 over a three-day period. The maximum ADPW including this date was 3.6 ML/day for the week ending 12/2/2018. The peak to average ratio for this event was 1.9 and this is substantially higher than that observed for similar communities, therefore it is likely that the very high daily demand was due to the data recording frequency for the Reservoir 2 inflow.

The peak period bulk supply from each connection is graphed for each summer for which data was available in Figure E-5.

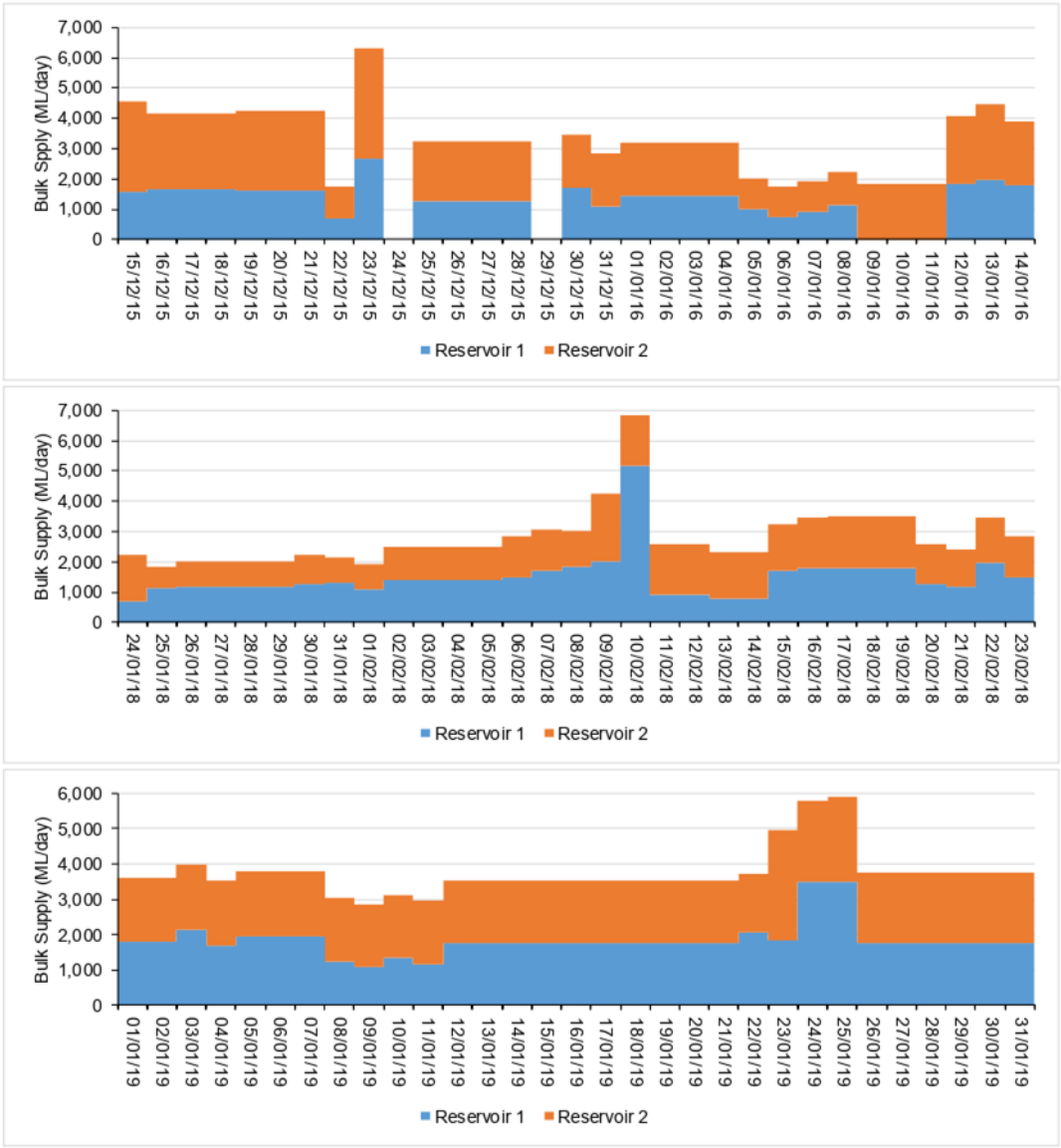


Figure E-5: Cootamundra peak period bulk supply by source

E.4 Metered demand assessment

The quarterly metered water consumption from August 2015 to August 2018 was assessed for climate dependence and other variability for:

- each major user (Table E-4
- all minor users in each user category in each intercept (combination of water supply zone and sewage pumping station)Table E-5

- average active sewered and non-sewered residential users, to develop the residential unit demands (Table E-6).

For climate independent users, the adopted peak day demand is equal to the average day metered demand for summer 2015/16.

Table E-4: Major user metered demand (kL)

Assessment	Description	Average Year	Average Day	Peak/dry year	ADPW
10030674	Parks & Gardens	6,029	16.5	8,419	76.7
10047330	Cemetery	4,291	11.7	5,992	54.6
10039246	Cootamundra Nursing Home & Adina Court	10,077	27.6	12,195	42.6
10039303	Caravan Park	2,242	6.1	2,505	6.8
10045599	Works Depot	6,630	18.2	10,077	19.2
10010320	Country Club	3,085	8.4	4,468	10.3
10010346	High School	4,499	12.3	5,710	11.4
10037133	Hospital	5,260	14.4	9,905	8.7
10032670	Landscapers	421	1.2	1,307	0.0
10005320	Saleyards	2,307	6.3	4,095	15.7
10039238	TAFE	2,094	5.7	2,924	26.7
10013167	Croker Grain Cootamundra	2,028	5.6	3,071	5.7
10015550	Farm	467	1.3	1,259	0.5
10036812	Smash Repairs	159	0.4	176	0.5
10012896	Pool	6,802	18.6	8,163	91.2
10033272	Southee Circle park	82	0.2	2,525	2.5
10011955	Southern Cross Nursing Home	3,677	10.1	4,108	12.4
10031649	Retirement Village	4,768	13.1	5,792	38.8
10012789	Woolworths	2,786	7.6	3,579	12.0

Table E-5: Minor user metered demand

Sewer Catchment	User Category	Average Year (ML)	Average Day (kL)	Peak/dry year (ML)	ADPW (kL)
1	Residential	505.02	1,383	568.96	2,994
	Non-rateable	22.12	60.6	26.83	82.09
	Business	55.39	151.6	59.10	245.23
	Farm	0.48	1.3	1.32	0.00
	Cancelled Assessment	1.51	4.1	1.67	6.96

Sewer Catchment	User Category	Average Year (ML)	Average Day (kL)	Peak/dry year (ML)	ADPW (kL)
2	Business	0.96	2.6	1.15	1.37
3	Non-rateable	0.01	0.0	0.03	0.00
	Business	2.13	5.8	2.37	5.08
4	Business	0.22	0.6	0.28	0.59
None	Residential	2.17	6.0	2.33	14.31
	Non-rateable	0.18	0.5	0.23	3.21
	Business	0.31	0.8	0.47	1.65
	Farm	0.37	1.0	0.47	3.50
	Cancelled Assessment	0.07	0.2	0.12	0.03

Table E-6: Residential unit demands (kL/active Residential Assessment)

Sewer Catchment	Average Year	Average Day	Peak/ dry Year	Peak Day
1	214	0.585	240	1.237
None	219	0.598	234	1.426

The residential unit demand for un-sewered properties is slightly higher than for sewered properties, Table E-6. The climate dependence of the sewered properties more closely correlated with the modelled irrigation demand and that of the un-sewered properties more closely correlated with the air-conditioning demand.

E.5 Impact of BASIX

As with Gundagai, Cootamundra is in the 40% water target zone; this means that the BASIX Water target requires up to a 40% reduction in mains-supplied potable water consumption compared to the average 'pre-BASIX' home benchmark of 90.34 kL/person/year. All new dwellings are built following BASIX, and therefore the average annual water demands in the residential sector are expected to decrease for new dwellings. Based on an average household size of 2.15, this converts to an average annual demand of 116.5 kL/dwelling/year, in 2016/2017 the average active residential metered demand was 211 kL/meter/year and the BASIX target demand was about the 30th percentile (30% of active residential meters used less than the BASIX target and 70% of active residential meters used more than the BASIX target).

The vast majority of dwellings in Cootamundra are detached dwellings. The current projection is based on new growth being restricted to detached dwellings.

The most difficult scenario for Council from a revenue and system sizing basis is that customers in BASIX dwellings achieve the BASIX target in average years and have a dry year and peak day demand that is same as the current average dwellings. This scenario was used in the projections.

Table E-7: BASIX dwelling residential unit demands (kL)

Sewer Catchment	Average Year	Average Day	Peak/ dry Year	Peak Day
1	116.5	0.319	240	1.237

E.6 Adopted 2018 Water Demand

Using the data from the bulk supply analysis, metered demand analysis and NRW assessment, the 2018 bulk supply demands adopted as the starting point for the projection are:

- average year demand: 755 ML/year
- average day demand: 2.067 ML/day
- dry year demand: 850 ML/year
- peak day demand: 6.5 ML/day.

E.7 Forecast Water Demand

E.7.1 Metered Water Demand

The metered water demand forecast is used in water utility financial planning. The forecast metered demand by user category is summarised in Table E-8.

Table E-8: Metered demand projection

		2018	2019	2024	2029	2034	2039	2049
Standard Residential	Average year demand (ML)	507.2	507.8	510.6	513.5	516.4	519.3	525.3
	Average day demand (ML)	1.39	1.39	1.40	1.41	1.41	1.42	1.44
	Meters	2,725	2,731	2,759	2,787	2,816	2,844	2,903
	Assessments	2,698	2,704	2,732	2,760	2,789	2,817	2,876
Non-residential & Non-private dwelling	Average year demand (ML)	151.5	151.5	151.8	152.1	152.4	152.6	153.2
	Average day demand (ML)	0.41	0.41	0.42	0.42	0.42	0.42	0.42
	Meters	449	449	450	451	452	453	455
	Assessments	362	362	363	364	365	365	367
Total	Average year demand (ML)	658.7	659.3	662.4	665.6	668.8	672.0	678.5
	Average day demand (ML)	1.80	1.81	1.81	1.82	1.83	1.84	1.86
	Meters	3,174	3,180	3,209	3,238	3,267	3,297	3,358
	Assessments	3,060	3,066	3,095	3,124	3,153	3,183	3,243

E.7.2 Bulk Supply

The projected demand on the bulk supply is summarised in Table E-9.

Table E-9: Bulk supply projection (ML)

	2018	2019	2024	2029	2034	2039	2049
Average year	755.0	755.8	759.8	763.9	768.0	772.1	780.5
Average day	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Dry year	849.1	850.5	857.6	864.7	871.9	879.1	893.8
Average day peak week	5.1	5.1	5.1	5.1	5.2	5.2	5.3
Peak day	6.5	6.5	6.6	6.6	6.7	6.7	6.8

Appendix F Water quality records

F.1 Water quality records

F.2 Gundagai C.t. Calculations

Calculation from the Gundagai DWMS

In treated water, a combined available residual chlorine level of 0.5 mg/L after a contact time of 30 minutes is considered sufficient to ensure microbial control, given a clean distribution system and no significant recontamination (ADWG 2011). Contact Time (C.*t*.) is a measure of free chlorine residual concentration (C) and contact time (t). A primary disinfection contact time greater than 15 min.mg/L is required to be consistent with ADWG requirements of 30 mins contact time at 0.5 mg/L.

Analysis of the C.*t* showed that the following reticulation pathways for treated water ensure sufficient C.*t* is achieved. Note, adequate C.*t* is not achieved if the free chlorine is measured in the final water leaving the WTP (due to the small volume of the Holding Tank and current system flow).

- Distribution via Reservoir No. 1 (detention at WTP Holding Tank and sampling at the intake of Reservoir No. 1), usual route of treated water from the WTP
- Distribution via South Reservoir (detention at WTP Holding Tank and sampling at the South Reservoir outlet), not the usual route from the WTP

The parameters used for the analysis are included in Table F-1.

Table F-1: Parameters for contact time analysis for the Gundagai scheme

Parameter	Unit	Value
Minimum concentration	mg/L	0.6
Detention Volume (Distribution via Reservoir No. 1)	m^3	269.26
Detention Volume (Distribution via South Reservoir)	m^3	917.72
Maximum System Flow	L/s	70
Baffling Factor	-	0.1 (Reservoir) 1.0 (Pipework)

If the minimum free chlorine concentration for the scheme (lower critical limit) is 0.6 mg/L, then adequate C.t is achieved as shown in Table F-2.

Table F-2: Contact time analysis for the Gundagai scheme

Distribution	Unit	Value
via Reservoir No. 1	min.mg/L	15.21
via South Reservoir	min.mg/L	15.38
Minimum Requirement	min.mg/L	15.00

F.3 Cootamundra C.t. Calculations

Not applicable

F.4 Gundagai CCPs

Location	CCP	Target	Adjustment	Critical
WTP	CCP1 - post filter turbidity	< 0.2 NTU	>0.3 NTU to 0.5 NTU	>0.5 NTU
WTP	CCP2 - Fluoridation	0.95 to 1.05 mg/L	<0.9 or >1.2 mg/L	>1.5 mg/L
Reservoir	CCP3 - Disinfection	Free chlorine 1.0 to 1.2mg/L pH 7.8 to 8.2	Free chlorine <1.0 or >1.5 mg/L pH <7.5 or >8.2	Free chlorine <0.6 mg/L pH >8.5
Reservoirs	Reservoir integrity	No breach	Site or reservoir condition poor (as per checklist)	Evidence of vermin (as per checklist)

F.5 Cootamundra CCPs

Location	CCP	Target	Adjustment	Critical
Reservoirs	Reservoir integrity	No breach	Site or reservoir condition poor (as per checklist)	Evidence of vermin (as per checklist)

F.6 Non-conformances against CCPs

Appendix G Gundagai Sewer Load Analysis

G.1 Gundagai STP inflow analysis

There is no inflow meter at Gundagai STP, and therefore sewage inflow could not be estimated using the conventional method of comparing historical inflow and rainfall data. Several other data sources were used to achieve an estimate of sewer flow.

G.1.1 ADWF estimated from metered humus tank outflow

There is a flow meter located at the outlet of humus tank, which is an indication of effluent discharge. Council's reasoning for installing the flow meter here is that it is simpler to monitor one outflow stream than two separate inflow lines, and overall losses through the WTP should be relatively minimal. However, the meter is read manually and occasionally flow is not recorded if operators are busy. Council is aware of the shortcomings attached to this and have engaged to PWA to improve the SCADA system so that there are automatic readings taken and the information captured at the same time each day. Issue

Council has assessed flow measurements from this meter back to 2016, and noted that summer flows were generally of the order of 200 to 300 kL/day whereas winter flows were of the order of 500 - 700 ML, however they noted that this was a particularly wet winter and a very dry summer. It is difficult to correlate this to actual inflow measurement due to evaporative losses and water in sludge which leave the process prior to the humus tank outlet.

G.1.2 ADWF estimated from 72-hour flow monitoring

In 2017 PWA undertook 72-hour sewage monitoring at Gundagai STP with the objective of measuring the hydraulic and biological loads on the STP. This provided a basis to determine the design loads for the detailed design of the Gundagai STP.

The monitoring was undertaken between 28 to 31 March 2017, with the flow meter installed at the outlet of the humus tank. Only 2.5 mm of rain was observed over this period, and therefore flow could be assumed to be dry weather flow.

The following was determined from the results:

- The average hourly flow during monitoring periods was 9.47 kL/hr. This works out to be around **230 kL/day ADWF**.
- There was an outflow peak in the morning from 9:00 am to 10:00 am and in the evening from 8:00 pm to 9:00 pm. Because inflow arrives earlier than outflow, it is has been assumed that there is an inflow peak in the morning from 8:00 am to 9:00 am and in the evening from 7:00 pm to 8:00 pm. This is consistent with patterns for similar inland towns.
- The morning peak and evening peak to average flow ratios have been calculated as 2.00 and 1.32, respectively. Smaller populations generally have higher peaks due to less activity in the catchment overnight.

The days over which monitoring occurred were relatively hot, with temperatures experienced in the high twenties. It is expected that evaporative losses would be significant over this period, and the average of 230 kL/day measured at the humus tank outlet may reflect a significantly higher inflow to the STP.

The monitored plant flow is presented in Figure G-1.

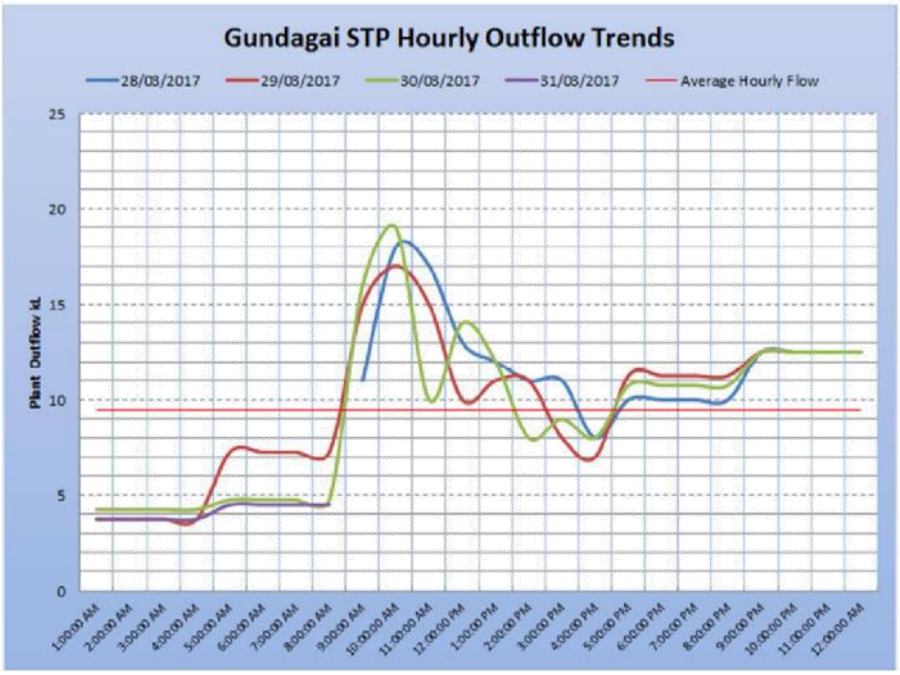


Figure G-1: Monitored Gundagai STP diurnal flow

G.1.3 ADWF estimated from pump run time

Council has attempted to estimate STP Inflow from the pump run time data of the two SPS that pump to the STP; the Royal SPS and the Boys Club SPS.

The pump rates of these two pumps was unknown, so Council first estimated it using a draw down test. Council has advised that this proved difficult and required several attempts; there were differences between the two pumps in each station, problems with cavitation, significant ragging problems, and great discrepancies based upon the head in the wet well. Issue. Based on this investigation, Council has estimated the pump rates of the Royal SPS and the Boys Club SPS is approximately **10 L/s** and **5 L/s** respectively. The pump rates were then multiplied by pump run times recorded in 2012. The results are given in Table G-1.

Table G-1: Council estimated STP Inflow – calculated from pump run times

	Royal SPS				Boys Club SPS				Total Daily Inflows(ML)
Date	Pump No 1 Hours	Pump No 2 Hours	Total Hours Run	Daily Flow (ML)	Pump No 1 Hours	Pump No 2 Hours	Total Hours Run	Daily Flow (ML)	
4/9 **(M)**	6	7	13	**0.47**	1	1	2	**0.04**	**0.51**
5/9 **(T)**	4	5	9	**0.32**	1	1	2	**0.04**	**0.36**
6/9 **(W)**	5	5	10	**0.36**	2	2	4	**0.08**	**0.44**
7/9 **(T)**	4	10	14	**0.50**	1	1	2	**0.04**	**0.54**
8/9 **(F)**	5	3	8	**0.29**	2	2	4	**0.08**	**0.37**
9/9 **(S)**	6	4	10	**0.36**	2	1	3	**0.06**	**0.42**
10/9 **(S)**	4	4	8	**0.29**	1	2	3	**0.06**	**0.35**

Based on the above assessment daily inflow ranges from **0.35 to 0.54 ML/day**. The figures also indicate that in this week approximately 15% of the flow came from South Gundagai and approximately 85% of flow came from North Gundagai.

If both pumps were to run continuously for a whole day during a wet weather event, Council estimated that the maximum STP inflow would be around 1.50 to 1.75 ML/day.

G.1.4 ADWF estimated from billing data

A dry weather sewer flow was also estimated for each user in the billing data.

The total sewer load for residential users was obtained by multiplying the number of active residential assessments (those having an average demand greater than 400 L/day – see Section D.4.2) by the modelled average daily residential internal water demand of 384 L/day. All of the residential internal water consumption is assumed to be discharged to the sewer.

The total sewer load for non-residential users was obtained by multiplying the average daily water demand for each user by a discharge factor for that user class, obtained from NSW Department of Energy's *Liquid Trade Waste Guidelines* (13). The discharge factor was 0.95 for all business users and the pool, 0.75 for caravan parks and schools, and zero for park/gardens, Lionis Holdings Pty Ltd and the Meat Processor.

The estimated ADWF calculated from water billing data is presented in Table G-2. Based on this analysis the ADWF is estimated to be around **450 kL/day**.

Table G-2: ADWF (kL/day) estimated from water billing data

Billing Year	2014	2015	2016	2017
Residential	270	261	262	263
Non-res	185	164	177	191
Total	**454**	**426**	**439**	**453**

G.2 Gundagai EP and ET

The number of ET and EP were estimated during the calculation of ADWF from billing data.

The residential ET equals the number of active residential assessments, and the non-residential ET was estimated by dividing the non-residential sewage load by the average daily residential internal water demand of 384 L/day. The ET value was then multiplied by the household size of 2.2 to obtain an estimate EP.

The estimated ET and EP is presented in Table G-3. The ET estimated from billing data is very close to the estimated ET provided by Council in Table 10-1.

Table G-3: ET and EP from billing data (kL/day)

Billing Year	2014	2015	2016	2017
Residential ET	703	681	683	686
Non-residential ET	482	429	462	497
Total ET	**1,185**	**1,110**	**1,145**	**1,183**
Residential EP	1,547	1,499	1,503	1,508
Non-residential EP	1,059	944	1,016	1,094
Total EP	**2,607**	**2,443**	**2,518**	**2,602**

G.3 Gundagai STP Loading

G.3.1 Average Dry Weather Flow

Based on the above information the estimated current ADWF is **0.5 ML/day** as a conservative estimate.

Based on an EP of 2,500, an estimated current sewage loading of **200 L/EP/day** is calculated. This is within the normal range of sewage loadings.

G.3.2 Peak Dry Weather Flow

The results of the 72 hour monitoring give a peaking factor "r value" of 2.0 for Gundagai STP. Since the flow was measured at the outlet of the humus tank instead of the inlet works, it may not exactly represent the peak in the inflow. The peaking factor is multiplied by the instantaneous ADWF to obtain the instantaneous Peak Dry Weather Flow (PDWF).

Calculated values based on the methodology in the PWA sewer design manual, give an estimated peaking factor of 2.3 for Gundagai STP. This peaking factor has been adopted as a conservative estimate.

At the nominated ADWF of 500 kL/day, or 5.8 L/s, the estimated PDWF is **13.3 L/s**.

G.3.3 Peak Wet Weather Flow

No STP inflow data is available for wet days, however the maximum flow rate to the STP would be the combined pump rates of the pumps in the two SPS which pump to the STP. Council plans to upgrade these two SPS, however there is limited data available for estimating peak flows to the SPS which would be used to size new pumps.

Formulas in the PWA sewer design manual provide a method to calculate PDWF and PWWF from ET. The ET and EP for each pump station is taken from Section B.3.2. ADWF for each SPS was estimated based on **200 L/EP/day**. The results are given in Table G-4.

Table G-4: Estimated peak flows to sewer pump stations

	2017 Total ET	2017 Total EP	ADWF (kL/day)	Peaking factor 'r'	PDWF (L/s)	PWWF (L/s)	PWWF/ ADWF
Royal SPS	798	1,756	351	2.4	9.6	55.9	13.8
Boys Club SPS	338	744	149	2.7	4.6	24.2	14.0
Total	**1,136**	**2,499**	**500**	**2.3**	**13.1**	**78.9**	**13.6**

Note: The Royal SPS and Boys Club SPS have an estimated pump duty of 10 L/s and 5 L/s respectively.

For the sizing of the new pumps, a PWWF to ADWF ratio of 10 has been nominated.

G.4 Gundagai Tourist population effects

Visitor contribution to STP inflow could not be assessed due to insufficient data. However, since it was estimated that visitors do not have a significant impact on water demand, it is also assumed that they have minimal impact on sewage load.

G.5 Gundagai Biological and Nutrient Loading

Biological and nutrient loading was assessed by PWA as part of the 2017 sewer inflow assessment. An ISCO automatic sampler was used for collection of time-based composite samples during the 72-hour monitoring period, samples from the inlet chamber to the Imhoff tank.

A summary of the raw sewage quality is given in Table G-5.

Table G-5: Gundagai STP – Average Influent Sewage Quality

Parameter	Value (kg/d)	Flow Weighted Average Concentration (mg/L)
Chemical oxygen demand, COD	128.7	566.3
Biochemical oxygen demand, BOD_5	63.7	280.4
Total Kjeldahl nitrogen, TKN	10.7	47.2
Ammonia nitrogen, NH_3 – N	9.8	43.1
Oxidised nitrogen, NOx	< 0.023	< 0.1
pH (range)	-	6.84 - 7.35
Suspended solids, SS	69.9	307.5
Oil and grease, O&G	4.1	18.2
Total phosphorus, TP	1.9	8.3
Ortho-phosphate, Ortho P	1.4	6.2
Alkalinity, Alk	68.8	302.7

Based on these results, the following was observed of the sewage from the Gundagai sewerage scheme:

- Ratio of COD to BOD was approximately 2, which is typical for domestic sewage.
- Concentrations of BOD_5 and SS present medium to high strength domestic sewage
- Concentrations of nutrients are considered typical for domestic sewage.
- Raw sewage alkalinity presents high strength domestic sewage, which can provide sufficient buffering for biological nitrification.

G.6 Gundagai sewer system flow forecast

Future ADWF to the SPS and STP under the low and high growth scenarios was estimated by multiplying the projected sewer EP (Table 10-2) by the estimated current sewage loading of **200 L/EP/day**.

The projected sewage load is given in Table G-6. The ADWF to the Royal and Boys Club SPS includes the contribution from their respective upstream SPS.

Table G-6: Projected ADWF to SPS and STP (L/s)

	2017 ADWF	Low Growth ADWF	High Growth ADWF
Royal SPS	351	394	449
Primary School SPS	44	62	77
Boys Club SPS	149	180	185
McDonalds SPS	34	37	40
Total to STP	**500**	**574**	**634**

Appendix H Cootamundra Sewer Load Analysis

H.1 Cootamundra STP inflow analysis

The Cootamundra STP inflow data is graphed in Figure H-1 along with the daily rainfall and the average metered water demand for sewered customers. The following points are notable:

- the winter water sales to sewered customers average 1,245 kL/day, the ADWF would be expected to be similar
- during Autumn 2016 there are periods where there appears to be significant exfiltration with flows received by the STP significantly lower than the winter water sales, this may indicate that there are large sections of leaky network draining sewage into the local aquifer when the water table is high.
- between July 2016 and May 2017 there appears to be an extended period of significant infiltration, this may indicate that there are large sections of leaky network draining the local aquifer when the water table is low
- Council believes that the low flows in Autumn 2018 are associated with a bulk meter error
- the STP inflow data is collected manually, therefore there may be "long days" and "short days".

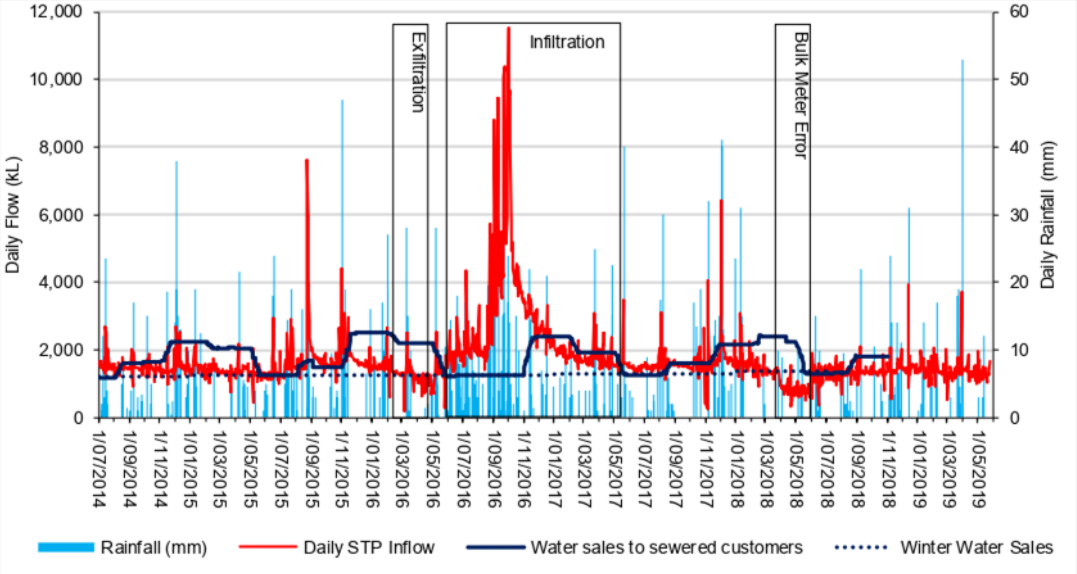


Figure H-1: Cootamundra STP inflow

In most well sealed sewerage schemes, the flow would be expected to peak shortly after a wet weather event and then decrease to the ADWF over the next 5 to 10 days, rather than over several months.

Council has stated that "About 15km of sewer have been relined over the last 5 years. Relining was undertaken for structural purposes as well as to inhibit root intrusion but an obvious added benefit has been the reduction in ground water infiltration." This program appears to have been reasonably effective with all flows from June 2018 onwards appearing within the expected range.

H.2 Cootamundra ADWF, EP and ET

Due to the extended periods of high infiltration, exfiltration and poor-quality bulk meter data, the analysis has been undertaken using both the metered influent volumes between July 2018 and May 2019 and the winter metered water sales to sewered properties from 2014 to 2018.

H.2.1 Sewage load based on water sales

For this analysis, the average winter water sales to sewered customers was be used as the ADWF and the ET and EP were estimated using the same data.

The residential ET equals the number of active residential assessments, and the non-residential ET was estimated by dividing the non-residential winter water sales by the average residential winter water dales. The ET value was then multiplied by the household size to obtain an estimate EP.

Table H-1: ET and EP from billing data (kL/day)

		2014	2015	2016	2017	2018
Average winter water consumption (kL/day)	Residential	930	978	953	988	1,046
	Non-residential	262	281	306	304	301
	Total ADWF	**1,192**	**1,259**	**1,259**	**1,292**	**1,347**
Average active residential meters		2,321	2,336	2,305	2,318	2,355
Household size		2.15	2.15	2.15	2.15	2.15
ET	Unit flow (kL/ET/day)	0.401	0.419	0.413	0.426	0.444
	Residential	2,321	2,336	2,305	2,318	2,355
	Non-residential	654.8	669.7	739.6	712.2	677.2
	Total ET	**2,976**	**3,006**	**3,044**	**3,031**	**3,032**
EP	Unit flow (kL/EP/day)	0.186	0.195	0.192	0.198	0.207
	Residential	4,990	5,022	4,955	4,985	5,062
	Non-residential	1,408	1,440	1,590	1,531	1,456
	Total EP	**6,397**	**6,462**	**6,545**	**6,516**	**6,518**

Based on the above information, the 2018 the:

- ADWF is estimated to be 1.35 ML/day
- unit EP sewage flow is estimated to be 207 L/day
- total ET is estimated to be 3,032
- total EP is estimated to be 6,520.

H.2.2 Sewage load based on 2018/19 influent flows

The metered influent volumes between July 2018 and May 2019 were analysed to find the ADWF. Dry weather days were defined as day more than 6 days after the last day with more than 3mm of rain. Using this method and the rainfall measured at the STP, the ADWF is estimated to be 1,340 kL/day, using the SILO rainfall data the ADWF is estimated to be 1,350 kL/day. This is very close to the estimate based on the metered demand, given that the metered demands are used to develop the unit flows and non-residential loads, the results of the metered demand based ADWF assessment will be used in the projections.

H.3 Peak Dry Weather Flow

The peak dry weather flow is the estimated peak instantaneous flow on an average flow day. Calculated values based on the methodology in the PWA sewer design manual, give an estimated peaking factor of 2.00 for Cootamundra STP.

At the nominated ADWF of 1.352 ML/day (15.65 L/s), the estimated PDWF is 31.32 L/s.

H.4 Peak Wet Weather Flow

The observed peak daily wet weather flow was 11.5 ML/day (133 L/s or 9.1 ADWF), this was measured on the 30/09/2016, it appears that a large proportion of this flow was related to high ground water levels as this was at the end of a relatively wet fortnight and the depth of rain on the high flow day and the day before was substantially lower than the major event a week before. It then took over 7 months for the flows to recede to the ADWF. This was part of a very wet 6 month period, there were 6 month periods nearly as wet in 2012, 1974 and 2011.

In 2005, Public Works Advisory completed the specification of two new pumps (to be used 1 duty and 1 standby configuration) for Betts Street, the design flow rate in the specification was 59.2 L/s, with both pumps running, this is equivalent to 10.23 ML/day. Council staff do not believe that the pump replacement occurred. Given that the daily flow data may have been collected over more than 24 hours, it is reasonably likely that the peak capacity is 10.23 ML/day and this has been adopted as the PWWF.

Council has stated that “About 15km of sewer have been relined over the last 5 years. Relining was undertaken for structural purposes as well as to inhibit root intrusion but an obvious added benefit has been the reduction in ground water infiltration.” The program appears to have been quite successful with substantially lower wet weather flows observed for some larger (ARI about 1 in 2 year) events since the upgrade.

H.5 Cootamundra sewage system flow and load forecast

Future ADWF, EP and ET projection was undertaken at an SPS and STP level. The 2018 starting point has been estimated using:

- the 2018 winter metered water demand as the 2018 ADWF for SPS 1
- the 2018 ADWF for SPSs 2 to 4, the average day peak quarter metered water demand for all customers served by the SPS was used (all of the metered users in these catchments are non-residential and the total metered demands for these areas are climate independent)
- the ADWF per ET of 0.444 kL/ET/day
- the ADWF per EP of 0.207 kL/EP/day

Pump stations 2, 3 and 4 pump into the catchment of SPS 1.

Table H-2: SPS and STP

	SPS	2018	2019	2024	2029	2034	2039	2049
ADWF (kL/day)	1 (STP)	1,352	1,355	1,366	1,377	1,388	1,399	1,421
	2	4.68	4.68	4.69	4.70	4.71	4.73	4.75
	3	10.0	10.1	10.1	10.1	10.1	10.1	10.2
	4	0.93	0.93	0.93	0.93	0.94	0.94	0.94

	SPS	2018	2019	2024	2029	2034	2039	2049
ADWF (L/s)	1 (STP)	15.65	15.68	15.81	15.94	16.06	16.19	16.45
	2	0.054	0.054	0.054	0.054	0.055	0.055	0.055
	3	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	4	0.011	0.011	0.011	0.011	0.011	0.011	0.011
ET	1 (STP)	3,043	3,048	3,074	3,099	3,124	3,149	3,198
	2	10.5	10.5	10.6	10.6	10.6	10.6	10.7
	3	22.6	22.6	22.7	22.7	22.8	22.8	22.9
	4	2.09	2.09	2.10	2.10	2.10	2.11	2.12
EP	1 (STP)	6,543	6,554	6,608	6,662	6,716	6,769	6,876
PDWF (L/s)	1 (STP)	31.32	31.36	31.59	31.82	32.05	32.28	32.72
	2	0.26	0.26	0.26	0.26	0.26	0.27	0.27
	3	0.49	0.49	0.49	0.49	0.49	0.49	0.50
	4	0.071	0.071	0.071	0.071	0.071	0.071	0.072
Theoretical PWWF (L/s)	1 (STP)	207.8	208.2	209.9	211.5	213.2	214.9	218.2
	2	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	3	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	4	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Theoretical PWWF (kL/day)	1 (STP)	17,957	17,986	18,132	18,278	18,422	18,566	18,853
	2	75.5	75.6	75.7	75.9	76.0	76.2	76.5
	3	155.7	155.8	156.1	156.5	156.8	157.1	157.8
	4	16.6	16.6	16.6	16.7	16.7	16.7	16.8

McKell Building
2-24 Rawson Place
Sydney NSW 2000

www.publicworksadvisory.nsw.gov.au

McKell Building
2-24 Rawson Place
Sydney NSW 2000

www.publicworksadvisory.nsw.gov.au

6 CONFIDENTIAL ITEMS

6.1 CONFIDENTIAL

DOCUMENT NUMBER	336597
REPORTING OFFICER	Marianne McInerney, Personal Assistant to the General Manager
AUTHORISING OFFICER	Phillip McMurray, General Manager
RELEVANCE TO COMMUNITY STRATEGIC PLAN	**4. Good governance: an actively engaged community and strong leadership team** 4.1 Decision-making is based on collaborative, transparent and accountable leadership
FINANCIAL IMPLICATIONS	There are no Financial implications associated with this report.
LEGISLATIVE IMPLICATIONS	To facilitate compliance with sections 10 and 11 of the Local Government Act 1993.
POLICY IMPLICATIONS	There are no Policy implications associated with this report.
ATTACHMENTS	Nil

Note

Council's Code of Meeting Practice allows members of the public present to indicate whether they wish to make representations to the meeting, before it is closed to the public, as to whether that part of the meeting dealing with any or all of the matters listed should be closed.

RECOMMENDATION

1. **Item be considered in closed Council at which the press and public are excluded in accordance with the applicable provisions of the Local Government Act, 1993 and related public interest reasons detailed.**
2. **In accordance with section 11 (2) and (3) of the Local Government Act, 1993, the reports, correspondence and other documentation relating to Item be withheld from the press and public.**

6.2 COOTAMUNDRA AQUATIC CENTRE AND SPORTS STADIUM REVIEWED EXPESSIONS OF INTEREST

Provisions for Confidentiality

Section 10A (2) (d(i)) – The Confidential Report contains commercial information of a confidential nature that would, if disclosed prejudice the commercial position of the person who supplied it.

Public Interest

It is considered that discussions of this matter in open Council would, on balance, be contrary to the public interest as it would prejudice Council's ability to secure the optimum outcome for the community..