Uralla Shire Council

Demand Management Plan

Final Draft

10 April 2018

Presented by Hunter H_2O

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A	Draft	Cameron Smith	Geoffrey Long	Geoffrey Long	16 Jan 2018
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Overview & Purpose

This Demand Management Plan has been prepared for Uralla Shire Council based on a template that was prepared for the Namoi Water Alliance to provide a consistent approach to demand management across the Namoi Region.

The Demand Management Plan has been prepared in accordance with NSW Department of Primary Industries – Water (DPI Water) requirements, as documented in their *Best Practice Management of Water Supply and Sewerage Guidelines* (DWE, 2007). With recent changes to best practice requirements, Demand Management can now be considered within Council's Integrated Water Cycle Management (IWCM) Strategy, and evaluated and updated as part of Council's Strategic Business Plan (SBP). However, Uralla Shire Council considers it more practical to have a standalone Demand Management Plan, which can be reviewed and updated as required, as updates may not necessarily line up with updates to Council's IWCM (now required every eight years).

The fundamental objective of preparing and adopting a Demand Management Plan is to encourage efficient water use through the adoption of various demand management measures. This Plan outlines the various demand management measures that Uralla Shire Council will employ in order to ensure town water demand levels in Bundarra and Uralla are both efficient and sustainable. By employing effective demand management measures, Council can expect significant reductions in water supply system capital and operating costs, along with the environmental and social benefits associated with maximising urban water efficiencies.

This Demand Management Plan complements Council's existing Drought Management Plan (2015). While this Demand Management Plan focuses on a variety of demand management measures that target the sustainable and efficient use of water at all times (i.e. all year round), Council's Drought Management Plan focuses on demand and supply side measures that should be temporarily employed (only) during drought periods, when water supply sources are depleted and in danger of failing.

A key focus of the Drought Management Plan is the application of temporary water restrictions (sometimes referred to as water conservation measures), which are enforceable. Permanent Water Conservation Measures, that apply all year round, are outlined in the Drought Management Plan. These overlap with the demand management strategies of the Demand Management Plan. Both plans will share the same communications strategy.

The Demand Management Program contained within this document is only applicable to customers connected to the reticulated town water supply of Bundarra and Uralla.

DEMAND MANAGEMENT PLAN - DOCUMENT CONTROL TABLE

Revision	***Revision Date*** *(from when Revision Applies)*	***Resolved by Council*** *(date of Council Meeting)*
Final Report	Adopted by Council August 2018	June 2018 – Council Resolution 22.06/18
Revision 1		

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1 Introduction

Demand Management is an essential component of modern water resource planning and management. The implementation of a comprehensive Demand Management Program provides benefits to customers, council and the environment, including:

- Reduced customer costs due to water savings (lower water & wastewater charges) and energy savings (lower energy charges).
- Reduced long-term costs for providing water due to avoided or delayed water supply infrastructure.
- Reduced environmental impacts due to lower water extractions and lower energy usage.

This Demand Management Plan has been prepared to ensure a structured and consistent approach to the promotion of demand management initiatives across the region. The Plan includes Council's Demand Management Program, which includes a range of water conservation measures that Council will target o ensure that future town water demand levels are both efficient and sustainable.

The Plan is only applicable to customers connected to the reticulated water supply systems operated by Council, which includes systems operated in the following towns:

- Uralla
- Bundarra

Management of water supply in NSW is administered by the *Water Management Act 2000, Water Act 1912* and *Local Government Act 1993*. Demand management planning is an essential component of the NSW Government's *Best Practice Management of Water Supply and Sewerage Guidelines* (DWE, 2007) for local water utilities. This Demand Management Plan has been prepared in accordance with these guidelines and the associated Water Conservation and Demand Management Check List.

This Plan contains the following sections:

Section 2 contains a brief review of historical demands and considers the key influences on demands.

Section 3 contains a summary of current situation with water demands, including a breakdown of demands, benchmark data for residential consumption, water loss estimates and an overview of current demand management initiatives.

Section 4 contains demand forecasts for each water supply system.

Section 5 contains a summary of the Demand Management Program along with further details for each demand management measure.

Section 6 outlines the steps for implementing and monitoring the Demand Management Program.

Section 7 outlines future review and update requirements for the Plan.

Section 8 contains the references to this report.

2 Historical Water Use

Historical water consumption is influenced by a variety of factors, including:

- Prevailing climatic conditions and climate change (refer to **Appendix A**)
- Residential and non-residential development
- Planning regulations for new developments
- Demand management measures
- Restriction rules during periods of drought
- Living standards, incomes and lifestyle factors

With most of the above factors influencing demand at any given time, it is difficult to directly attribute changes in historical demand patterns to any one factor. Consequently, a general assessment has been made of the major influences of demand over the last ten years.

The total annual water production for Uralla Shire (combination of Uralla and Bundarra water treatment production) is shown below in Figure 2-1. The average combined water production over the last ten years was around 325 ML/a, with total production ranging from 265 ML in 2011/12 to 363 ML in 2007/08. Average water production for Uralla and Bundarra is around 275 ML/a and 50 ML/a respectively. The figure also includes annual rainfall for a BOM weather station (56028) in Uralla, which is indicative of rainfall in both Uralla and Bundarra. There was only minor growth in the total number of connections over this period (around 0.8% pa) and this had no obvious impact on total water production requirements.

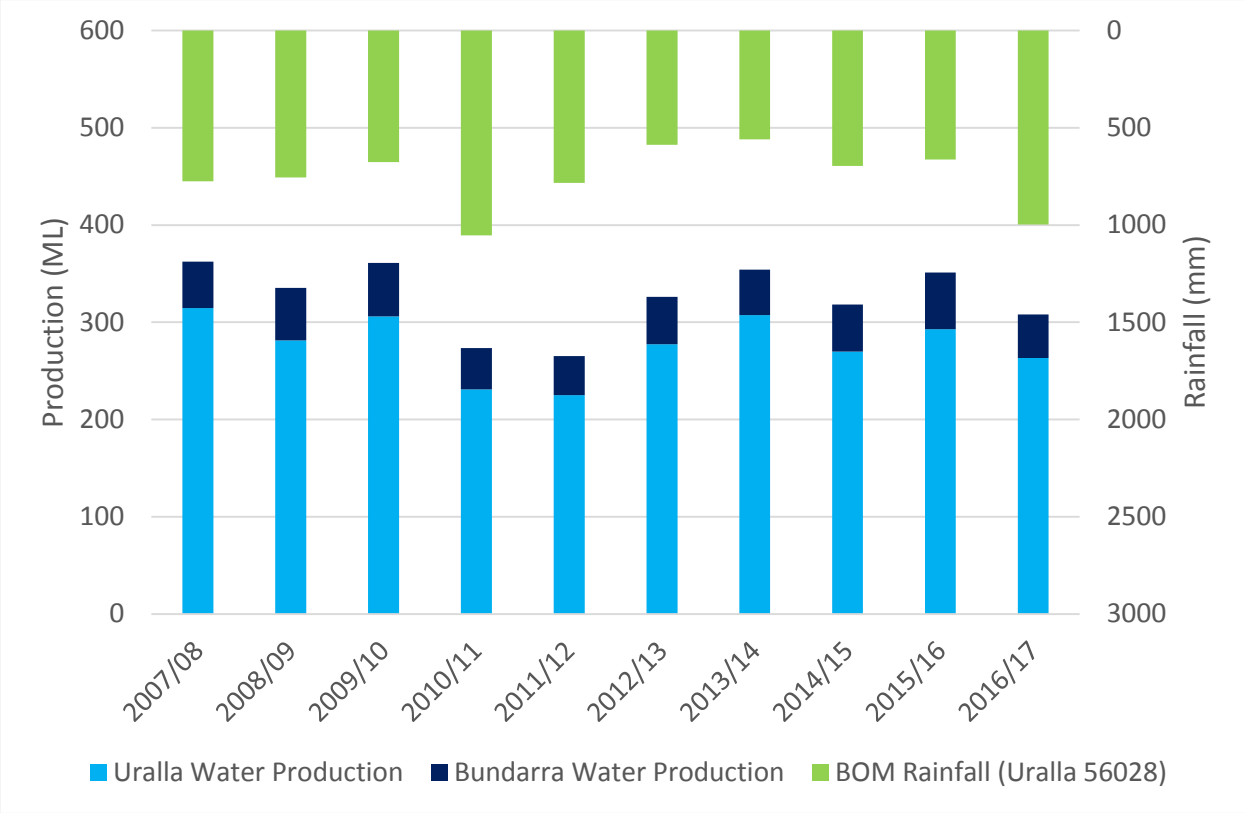

Figure 2-1 Annual Treated Water Production Versus Rainfall (10 years)

The average annual residential usage per property over the past eight years (based on customer metering data) is shown below in Figure 2-2. The figure shows that residential consumption is typically higher in

Uralla than Bundarra, with residential consumption per property averaging around 162 kL/a in Uralla and 145 kL/a in Bundarra (and around 160 kL/a combined). It is not uncommon in smaller communities like Bundarra for residential water usage to be less than nearby larger towns due to a combination of greater awareness of water availability/scarcity and lower household incomes.

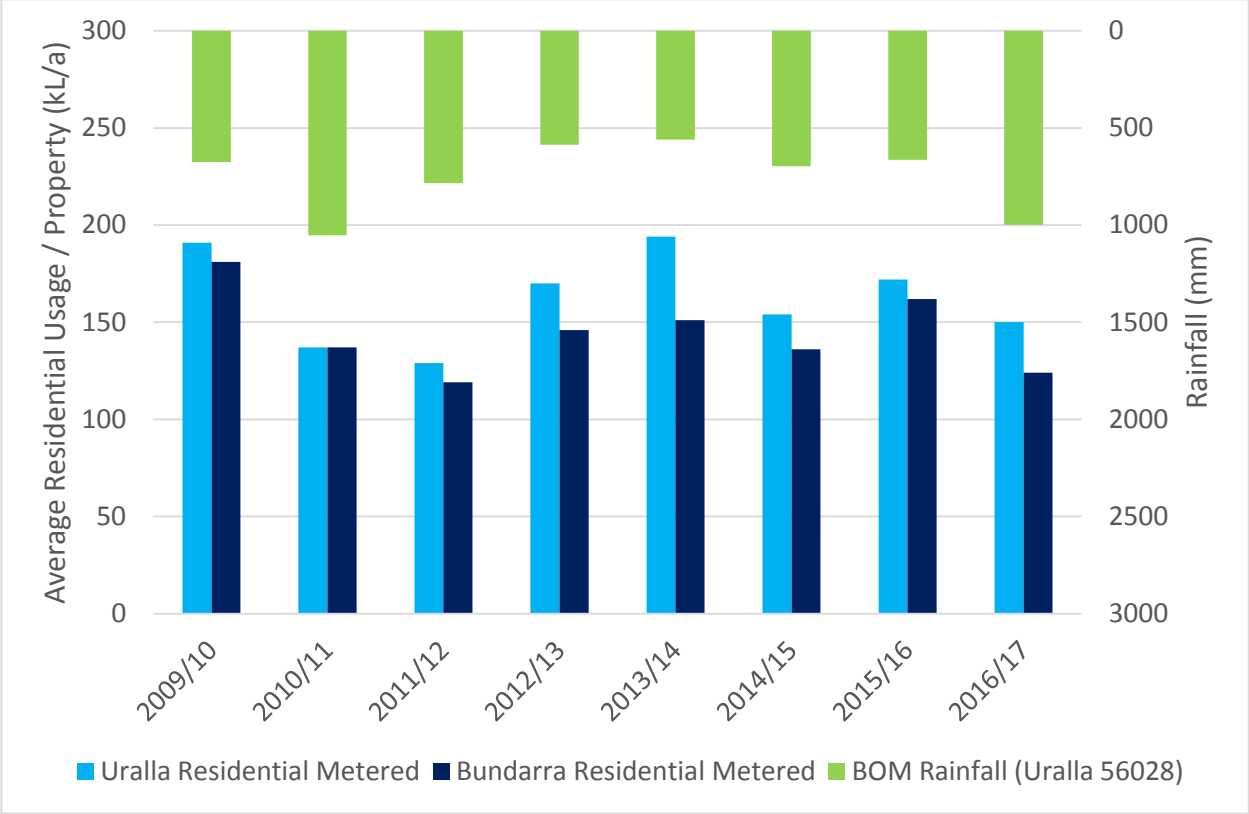

Figure 2-2 Average Annual Residential Usage per Property from Customer Metered Data (8 years)

Prevailing climatic conditions, particularly maximum temperatures and rainfall during summer months, have a significant impact on water consumption – particularly residential outdoor water usage. Council's annual water production data (Figure 2-1) and average residential usage per property data (Figure 2-2) indicate that demands are generally influenced by rainfall, with demands typically increasing in drier years and typically decreasing in wetter years. More specifically:

- In wetter years (e.g. Financial Years 2010/11 and 2016/17), total water production typically reduces to 300 ML/a or less and average residential usage per property typically reduces to 150 kL/a or less.
- In drier years (e.g. Financial Years 2009/10, 2013/14 and 2015/16), total water production typically increases up to around 350 ML and average residential usage per property typically increases to 170–190 kL/a (combined).

The Uralla water supply was subject to Level 1 water restrictions during 2016, the Bundarra water supply has been subject to several short periods of water restrictions (ranging from one to three months) in 2013/14, 2015/16 and 2016/17. There is no obvious impact on annual water consumption during the years restrictions applied in Bundarra, most likely due to their relatively short period.

3 How Water is Currently Used

A general assessment of how water is currently used in Uralla Shire is summarised below, including a breakdown of consumption by major demand category, a further breakdown in residential consumption, benchmarking of residential consumption, water loss estimates and an overview of current demand management measures.

Note that water consumption data from 2015/16 has been used throughout Section 3 to assist with benchmarking to the latest available performance reporting information (DPI Water, 2017).

3.1 Demand Categories

The breakdown of water consumption by major demand type for the combined water supply systems is shown in Figure 3-1 below. Residential consumption is the largest water consumption category and represents 80% of total authorised consumption. Around 12% of consumption is non-residential (commercial and municipal), while 8% is unbilled. Unbilled water consumption includes some parks and gardens watering which is presently unmetered and unmetered standpipe usage (mainly used for dust suppression and construction purposes).

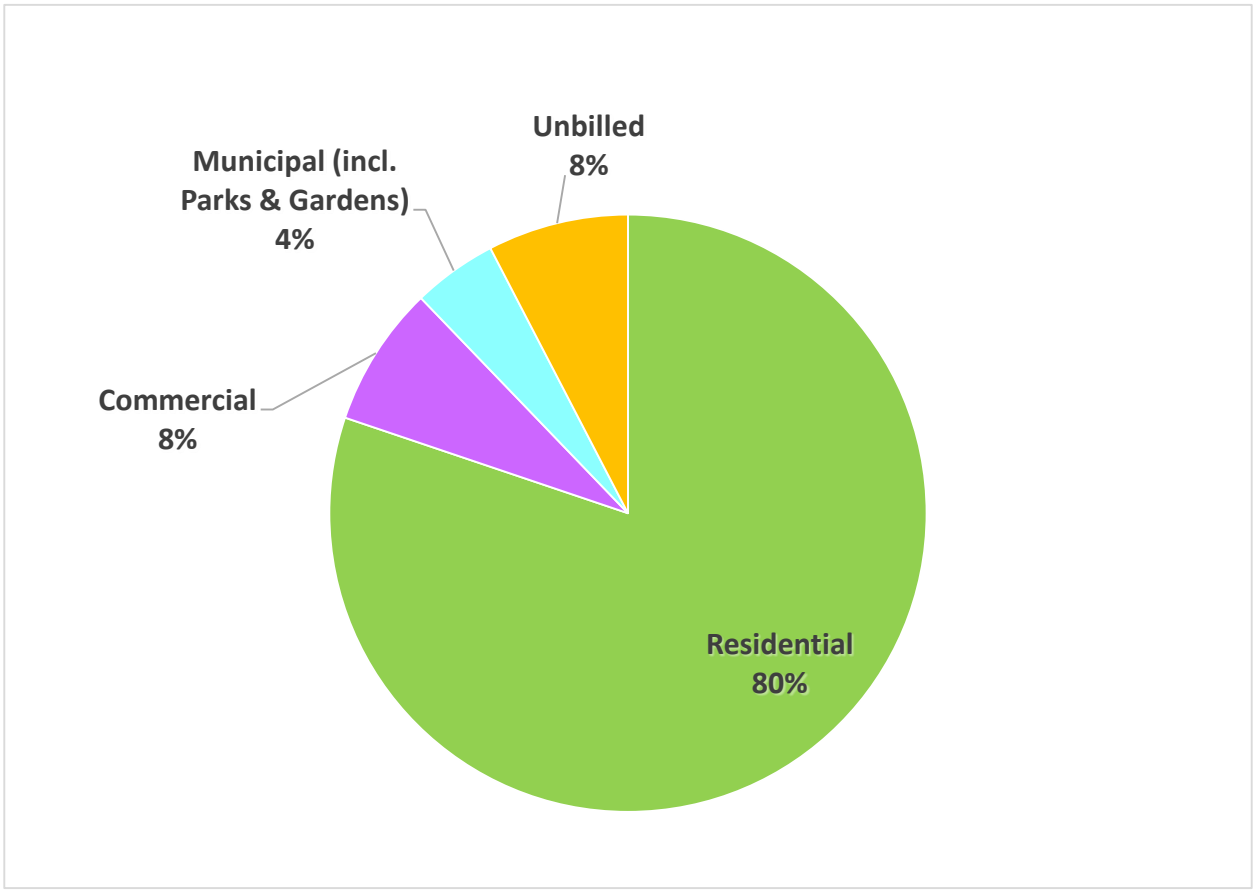

Figure 3-1 Uralla Shire Water Supply – Consumption by Major Demand Type (2015/16)

An analysis of metered water consumption by major demand category was undertaken for the Uralla water supply system and Bundarra water supply and is included below on Table 3-1.

Table 3-1 Metered Consumption by Category (2015/16)

Demand Category	2015/16 Consumption (ML/a)	% of Total Consumption	Connections	Consumption per Connection (kL/a/conn.)
URALLA WATER SUPPLY				
Uralla Residential	183.9	80%	1,070	172
Uralla Non-Residential	45.2	20%	114	397
URALLA TOTAL	**229.1**		**1,184**	**193**
BUNDARRA WATER SUPPLY				
Bundarra Residential	29.8	83%	184	162
Bundarra Non-Residential	6.3	17%	28	226
BUNDARRA TOTAL	**36.1**		**212**	**170**
URALLA SHIRE COUNCIL				
Council Residential	213.7	81%	1,254	170
Council Non-Residential	51.5	19%	142	363
COUNCIL TOTAL	**265.2**		**1,396**	**190**

The metered consumption figures for 2015/16 show that residential consumption was up slightly on average, with average residential consumption per property being 172 kL/a in Uralla and 162 kL/a in Bundarra, compared to average figures (over past eight years) of 162 kL/a and 145 kL/a respectively. This was most likely due to below average rainfall in 2015/16. Average residential consumption per property was 170 kL/a for the combined towns (i.e. Uralla Shire).

Average non-residential consumption per property varied between 226 kL/a in Bundarra and 397 kL/a in Uralla, which is most likely due to larger commercial and industrial users being located in Uralla.

3.2 Benchmarking of Residential Consumption

Benchmarking of residential consumption was undertaken using performance data from 2015/16 from across the state (DPI Water, 2017) as shown on Figure 3-2 below. Uralla Shire's originally reported residential consumption per property was 189 kL/a (as included in the 2015/16 performance / benchmark reports for NSW). However, as discussed in Section 3.1, average residential consumption per property for 2015/16 is now estimated to be around 170 kL/a, based on metered consumption data. This figure is significantly less than the inland benchmark of 248 kL/a (per property), and only slightly higher than the statewide benchmark of 162 kL/a. While Uralla Shire is an inland council, its climate is generally milder and its rainfall is generally higher than those experienced by inland councils that are further west of the Great Dividing Range and at lower elevations. Therefore, Uralla Shire's residential consumption would be expected to be considerably lower than the inland benchmark. The adjacent Armidale Regional Council's residential consumption of 205 kL/a/property provides a more useful benchmark.

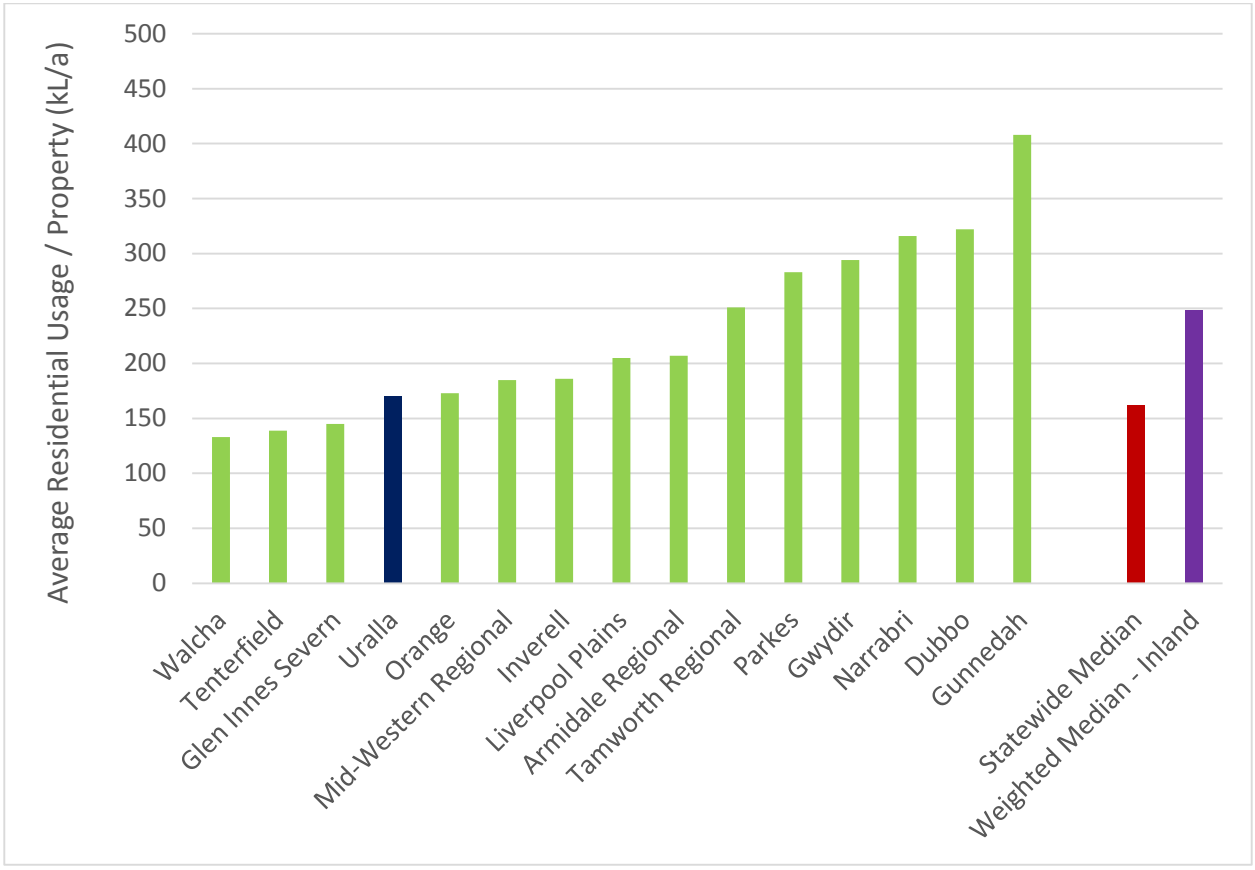

Figure 3-2 2015/16 Benchmarking Data for Residential Consumption (DPI Water, 2017)

3.3 Residential End-Use

In the absence of local residential end-use metering data to provide an accurate estimate of end-use consumptions, typical values have been adopted based on recent end-use studies conducted across Australia. These studies have typically been undertaken by large coastal metropolitan water utilities and there is a lack of useful end-use metering data for regional areas in NSW and across Australia. However, while external water usage and evaporative coolers usage can differ substantially across Australia, with external water usage commonly exceeding 50% of total usage in many western NSW towns, the total volume and breakdown of internal usage is generally relatively consistent across water utilities.

The key assumptions used in developing the residential end-use breakdown were:

- Total household usage was assumed to be 170 kL/a (based on 2015/16 residential usage)
- Internal household usage was assumed to be 136 kL/a (i.e. 80% of total consumption) or around 155 L/p/d
- Internal consumption breakdown was based on typical values from recent end-use studies across Australia
- Outdoor water usage (primarily irrigation in summer months) was assumed to be the remainder of water usage after accounting for internal usage – i.e. 34 kL/a or 20% of total consumption. *(By comparison, Tamworth Regional Council's outdoor water usage is estimated to be around 40% of residential consumption, while Gunnedah Shire Council's outdoor water usage is estimated to be around 55% of residential consumption)*

Figure 3-3 below shows the assumed breakdown of residential end-use that has been adopted for the purposes of assessing demand management options.

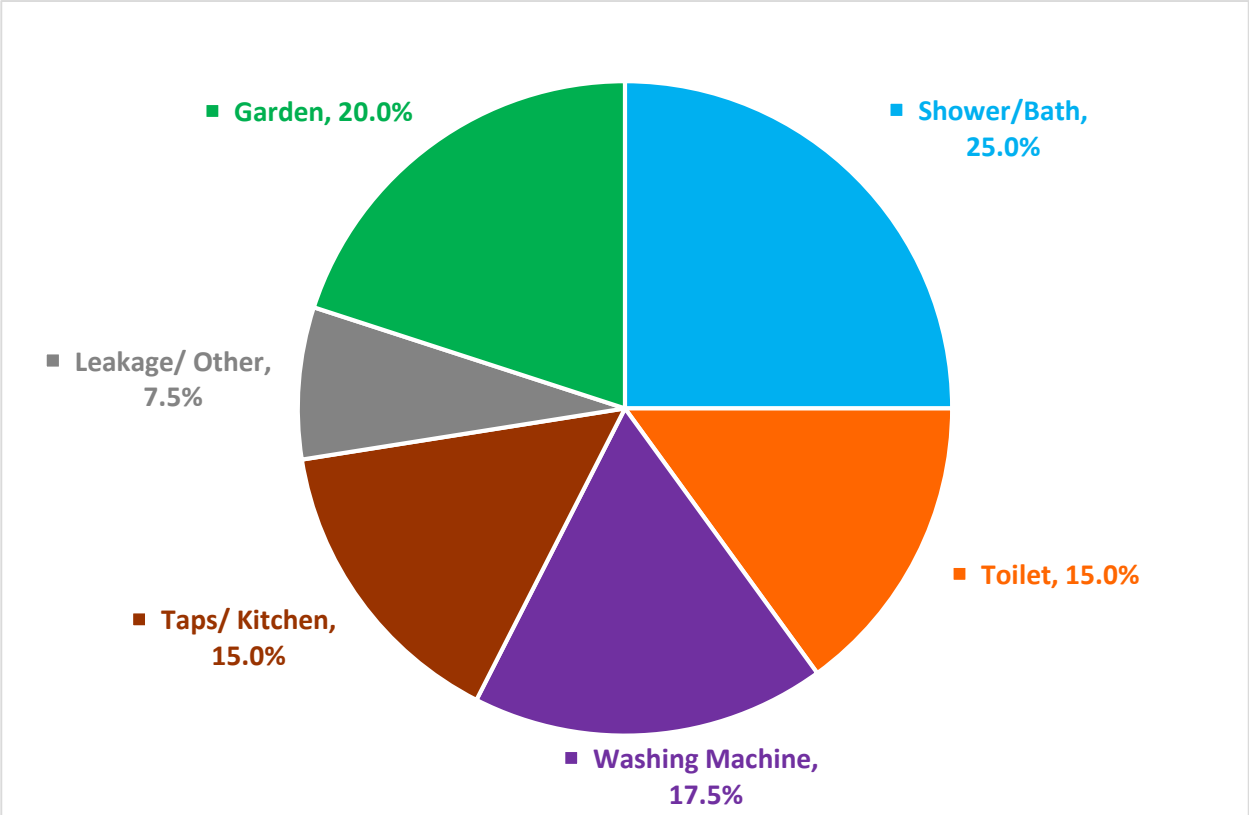

Figure 3-3 End-Use for Residential Properties in Uralla Shire based on 170 kL/a per household (Estimate Only)

It should be noted that the majority of garden usage would be expected to occur during the warmer months of the year (October to March) and therefore the equivalent annual residential usage per household would be closer to 140 kL/a during the colder months (April to September) and 200 kL/a during the warmer months.

3.4 Water Losses

For the NSW Water Supply and Sewerage Benchmarking Report (DPI Water, 2017), DPI Water has adopted the following terms used by the International Water Association (IWA) to define key components of losses from a water supply system:

1. **Real losses**: including leakage and overflows from all parts of the water supply system
2. **Apparent losses**: including metering inaccuracies and unauthorised consumption (theft)
3. **Unbilled authorised consumption**: including water used by the local water utility for operational reasons, water used for firefighting and water supplied free of charge

Water losses are generally defined as real losses plus apparent losses, while non-revenue water (NRW) is generally defined as water losses plus unbilled authorised consumption and can be calculated from the difference between water production (metered flow into a water supply system) and metered consumption (metered flow from the water supply system to the end user).

Key water loss indicators included in the 2015/16 NSW Water Supply and Sewerage Benchmarking Report (DPI Water, 2017) are included in Table 3-2 below.

Table 3-2 Water Loss Indicators – Uralla Shire & NSW Benchmarks (2015/16)

Water Loss Indicator	Uralla Shire	NSW State-Wide Benchmarks (2015/16)		
		20th percentile	Median (50th percentile)	80th percentile
Real Loss (L/service connection/day)	**20**	40	70	100
NRW (L/service connection/day)	**70**	56	92	133
NRW (% of total production)	**11%**		10%	

The estimated real water losses for USC are very low compared to benchmarking data. This was confirmed by leakage testing (acoustic high resolution survey) that was undertaken in 2011, which estimated leakage at the time to be very low, around 1.3% of water supplied. However, it is likely that leakage rates have increased over time and Council estimates that current real losses may be around 3-4%. A full water balance assessment would need to be undertaken to better understand the nature of water losses, including a more accurate estimate of the breakdown of water losses into real losses and apparent losses.

Non-revenue water (NRW) is slightly under the benchmark value based on L/connection/day and slightly over the benchmark value based on percentage of total production. NRW for USC is impacted by the relatively high level of unbilled consumption.

It should be noted that the above figures are approximate estimates only and are not supported by annual water balance calculations.

3.5 Current Demand Management Measures

USC currently only has limited demand management measures in place, as outlined below.

Permanent Water Conservation Measures (PWCM)

USC's Drought Management Plan (USC, 2015) includes the following PWCM:

1. Sprinklers / fixed hoses are not to be used for watering of gardens and lawns between; 8.00am to 6.00pm during Eastern Daylight Saving Time; and between 9.00am and 4.00pm Eastern Standard Time.
2. Hand held hoses fitted with a trigger nozzle may be used at any time for general watering of gardens and vehicle washing.
3. No hosing down of hard surfaces.
4. New turf may be watered at any time with an approved Water Management Plan for up to six weeks from installation of turf.

PWCM's are not currently publicised by Council and are therefore not well known. Council has indicated a desire to review the PWCM in association with this Demand Management Plan with the objective of simplifying the PWCMs and making the measures less restrictive.

Smart Water Advice Member

USC is a member of Smart Water Advice, which involves an annual fee to provide access to online resources, in association with the six other councils associated with the Namoi Water Alliance. The Smart Water Advice website (www.smartwatermark.org/Namoi/) includes information on water sustainability and water savings tips. However, similar to the PWCM, Council does not currently actively publicise the Smart Water Advice website.

Best Practice Water Pricing

Council's water rates for 2017/18 include a standard annual access charge of $316 and a uniform usage charge of $2.30/kL, which is in line with the NSW state median usage charge (DPI Water, 2017), and provides a strong water conservation signal. Water rates are reviewed annually.

Since 2011, DPI Water has removed the need for local water utilities to use inclining block tariffs and the NSW Government now encourages the use of a two-part tariff with a uniform water usage charge, similar to USC's current water tariff.

4 Future Water Use

Estimates of future population levels, dwelling numbers and water usage were prepared in 2014 and documented in *Uralla and Bundarra Water Demand Projections* (NSW Public Works, 2014) and are summarised below.

4.1 Population and Dwelling Projections

Population and dwelling projections for Uralla Shire are shown below in Figure 4-1. The rate of population growth over the next 20 years is expected to gradually reduce from around 0.3% pa to 0.1% pa, while dwelling growth rates are expected to reduce from 0.6% pa to 0.1% pa. This is in accordance with the most recent population projections prepared by the NSW Department of Planning & Environment (NSW DP&E, 2018). Population and dwelling growth rates are expected to be similar for Uralla and Bundarra.

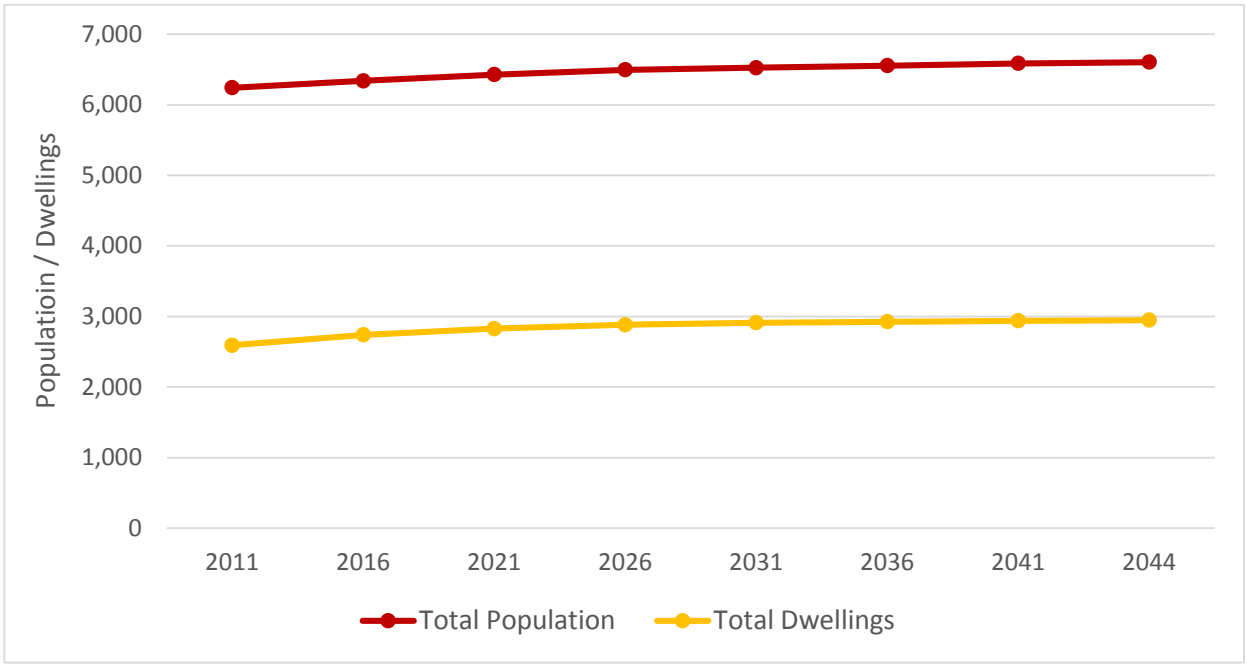

Figure 4-1 Uralla Shire Population and Dwelling Projections (NSW Public Works, 2014)

4.2 Demand Projections

Average year demand projections have been determined for both Uralla and Bundarra and are included below in Table 4-1. As shown in the table, only modest increases in demands are projected.

Table 4-1 Projected Bulk Water Demands – Uralla Shire Water Supply Systems (2016 – 2036)

Water Supply System	Annual Demand for Bulk Water (ML/a)				
	2016	2021	2026	2031	2036
Uralla	321	331	337	341	342
Bundarra	54	55	56	57	57

Note: Based on Average Year Demand Projections (NSW Public Works, 2014)

Demand projections for Uralla and Bundarra are also shown graphically below in Figure 4-2. It should be noted that the demand projections assume that non-residential development (and demands) will grow in line with residential dwelling (and demands) growth and no allowance has been made for impacts associated with future climate change. Future demand estimates should include a more detailed assessment of non-residential demand projections and should consider potential impacts on demands due to future climate change.

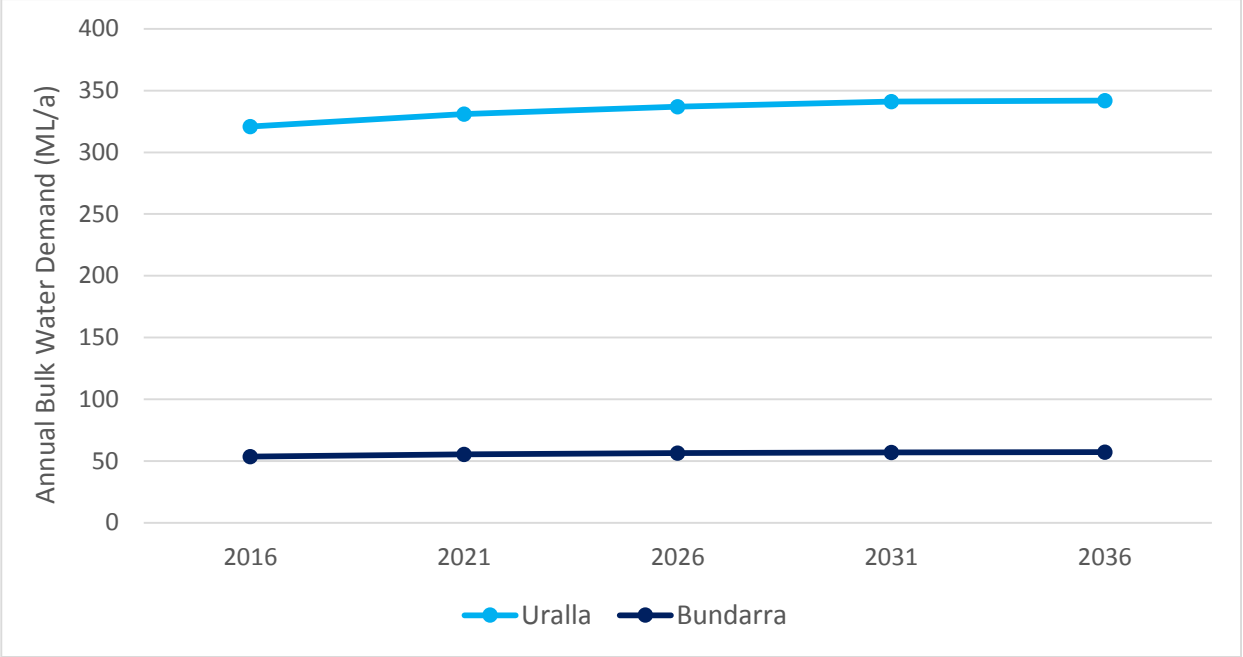

Figure 4-2 Projected Bulk Water Demands – Uralla Shire Water Supply Systems (2016 – 2036)

5 Demand Management Program

The proposed Demand Management Program (DMP) is outlined below in Table 5-1.

Table 5-1 Uralla Demand Management Program

Demand Management Measure	Details	Timing	Customers Targeted	Estimated Council Program Cost ($ pa)
Community Awareness Program	Development of a Community Awareness Program, including: 1. Incorporating a water information component into the monthly council newsletter/Facebook page/rates notice/website, with information on the current status of Uralla and Bundarra water supplies, PWCMs and general water savings tips. 2. Incorporating a water supply information section into the new council website, with information on the current status of Uralla and Bundarra water supplies, PWCMs, general water savings tips and a link to Smart Water Advice website for more water savings tips. 3. Participation in National Water Week, including providing links on Council's website to relevant information and working with other Councils on a regional approach to promoting National Water Week. 4. Uralla Shire Mayor to reiterate water supply information that is contained within council newsletter (particularly during dry periods) through bi-weekly radio interviews. 5. All customers, including Council owned properties, are metered and billed 4 times per year and bulk water production is metered daily. 6. Customer water accounts to include comparisons to benchmark usage, year to date consumption and water efficiency tips.	Monthly Ongoing Annually As required From FY 2019 2020 With billing cycle	All	**$3K**
Water Pricing	Maintaining strong water conservation signals through the continued use of best practice water pricing, with at least 50% of income generated from usage charges.	Ongoing (reviewed annually)	All	*(Costs already included in Water Operations Budget)*

Demand Management Measure	Details	Timing	Customers Targeted	Estimated Council Program Cost ($ pa)
Permanent Water Conservation Measures (PWCM)	PWCM are not enforceable with currently available resources. As per the Drought Management Plan, PWCM are adopted as ongoing education and engagement tools for voluntary uptake. PWCM strategies are incorporated into enforced water restrictions once these are triggered: 1. Minimise watering during the heat of the day. 2. Use a trigger nozzle on hoses to conserve water and avoid waste. 3. Wash down hard / paved surfaces with a high-pressure hose only.	Ongoing	All	*(Costs included in Community Awareness Program)*
Non-Residential Large User Audits	• Large User Audits for Council owned parks (one per year) • Large User Audits of other large water users (during drought periods)	Annually with application of Level 3 restrictions	Council owned properties Other large users	**$6K(future budget allocation)**
Regulation & Planning Controls	The following regulation and planning controls will contribute to water savings over the life of the Program: • BASIX • WELS Rating Scheme • Smart Approved WaterMark Program	Ongoing	New Residential + New Fittings / Appliances	*(Costs included in Community Awareness Program)*
Water Loss Management	Water Loss Management Program, which includes: • Metering of all properties / connections • Meter replacement program • Annual water loss assessment (including calculation of water balance to estimate NRW and components of water losses) • Periodic inspection of key assets for water leaks	Monitored with each water meter read. Water loss assessment to be conducted least bi-annually	All water supply systems	**Costs included in operational program**

More details on the estimated program costs and water savings are included in Appendix B.

5.1 Current and Proposed Initiatives

Community Awareness Program

A Community Awareness Program with Communications Strategy will be developed and implemented by Council. The program will relate to Councils Drought and Demand Management Plans. The awareness program will include community education and internet resources. The awareness program will also need to be consistent with similar programs that have been developed and implemented by other Namoi Water Alliance member councils.

The Community Awareness Program will include:

- Setting up of avenues for the community to access information on the status of existing water supplies, as well as resources on PWCMs, water efficiency and water savings tips. The two primary avenues for the community to access this information will be the monthly council newsletter and the council website, which is due to be updated in 2018. Council's website should include a link to the Smart Water Advice website for detailed water savings tips and further educational resources.
- Providing links on Council's website during National Water Week and exploring ways to capitalise on community education during National Water Week. Opportunities to work with other Namoi Water Alliance member councils during National Water week should also be explored.
- Customer water accounts that include water efficiency tips and provide information on customer's water usage relative to water efficient benchmarks, and year to date consumption.

The initial implementation of a comprehensive Community Awareness Program may see water savings of up to 5% reduction in residential usage. Once the program has been implemented, the continuation and ongoing development of the program is needed to maintain the savings associated with the reduction in residential usage. A relaxation of the Community Awareness Program is likely to result in a gradual increase in residential usage over time, as inefficient water habits are once again adopted.

Best Practice Water Pricing

A strong water conservation signal should be maintained through the continued use of Best Practice Water Pricing, which includes:

- Greater than 50% of residential revenue coming from water usage charges (currently around 60%)
- Continued use of a two-part tariff (i.e. separate access and usage charges) with a uniform water usage charge
- Full cost recovery, with minimal cross subsidies
- Appropriate non-residential water supply charges, including access charge relative to customer's capacity requirements (to be developed)

Permanent Water Conservation Measures (PWCM)

Permanent Water Conservation Measures (PWCM) have been adopted as a key component of Council's Demand and Drought Management Plans in order to ensure that common sense water use practices are always adopted and to reinforce other demand management measures by developing a culture of water efficiency.

Council's 2015 Drought Management Plan included proposed PWCM; however these rules are now considered to be too specific and have been simplified.

The revised PWCM are:

1. Minimise watering during the heat of the day
2. Use a trigger nozzle on hand held hoses
3. Wash down hard / paved surfaces with a high-pressure hose only

Once the revised PWCMs have been adopted, they should be incorporated into the various components of Council's Community Awareness Program to ensure that all water supply customers are aware of these water savings rules.

Non-Residential Large User Audits

Council has indicated that non-residential large user audits would be initially restricted to Council owned properties. A non-residential audit program will be implemented with the aim of auditing one Council property per year. The audit program will be based on the guidelines for Water Savings Action Plans, prepared by DPI Water. The purpose of Water Savings Action Plans is to identify and help deliver cost effective water savings in a practical, effective and flexible way. The initial audit and subsequent preparation of the Water Savings Actions Plan would be undertaken by Council.

As one of the LGA's largest users, the Water Saving Actions Plan would set an example to the other large users and the community in general. It is important that Council set the example for water efficiency for the whole community, particularly in high visibility areas such as watering of parks and gardens.

If, during the life of the Demand Management Plan, Level 3 water restrictions are applied in Uralla Shire, Council will also consider undertaking Large User Audits on other large water users in order to identify potential water savings (and associated economic savings) that could be achieved.

Regulation & Planning Controls

Council should actively support and implement various state and national based regulation and planning controls that promote water efficient products, practices and developments. Key regulation and planning controls that should be supported and promoted by the Community Awareness Program include:

- **BASIX**: The NSW Government has implemented residential building planning controls that require all new homes to be water and energy efficient. New homes are generally required to install water efficient fittings, have indigenous garden species and install a rainwater tank.

- **WELS Rating Scheme**: The State and Federal Government have implemented the Water Efficient Labelling & Standards (WELS) rating scheme which applies national mandatory water efficiency labelling (up to 6 Stars) and minimum performance standards to household water-using products.

- **Smart Approved WaterMark Program**: This program was established by four associations (Australia Water Association, Irrigation Australia, Nursery and Garden Industry and Water Services Association of Australia) as a nationally endorsed, non-compulsory water efficiency labelling scheme for products and services which primarily help reduce outdoor water use.

Water Loss Management

Real (physical) losses are generally the largest component of water losses. They are primarily an operation and maintenance issue and are therefore generally the losses that are targeted in a demand management program. Water losses are best managed by way of a Water Loss Management Program (which often is a component of a more comprehensive Asset Management Program).

The Water Loss Management Program will focus on the following areas:

- Metering of all properties and connections, including all public facilities, parks and gardens, standpipes and Council's water and sewer facilities (e.g. pumping stations).
- Introduction of a residential Water Meter Replacement Program – water meters are replaced periodically (based on age and/or total volume registered) or if they are shown to be faulty.
- Annual water loss audit (in accordance with IWA Water Audit Methods), which includes an assessment and breakdown of annual water losses for each water supply system based on the preceding 12 months of metering data.
- Where the annual water loss audit has shown an increase in real losses (generally leakage from reservoirs, watermains and service connections), inspections of key assets for the detection and repair of system leaks should occur, including inspection of water reservoirs, water pumping stations, major water system control valves and Council swimming pools.

5.2 Future Initiatives

A list of potential demand management initiatives that could be considered in the future (potentially in five years' time when the Demand Management Program is reviewed and updated), is included below:

- Rollout of smart water meters, which allows for automatic and instantaneous water consumption readings and would allow customers to view consumption data online and better track water usage.
- Implement Water Savings Actions Plans at Council owned properties such as parks.
- Development of a Water Supply Information and Water Savings smartphone application.
- Research to better characterise water end-use and household behaviour and attitudes in Bundarra and Uralla. Development of a pilot program with targeted behavioural change strategies to implement water conservation measures.

6 Implementation & Monitoring

This Demand Management Plan outlines the various demand management measures that have been adopted by Council and will be employed to encourage water efficiency across the water supply systems that are operated by Council. The development of implementation plans and ongoing monitoring of the individual programs are critical to the success of the Demand Management Plan.

Any new demand management measures will require an implementation plan to be developed and documented by Council to ensure the successful setup and delivery of the specific program. The implementation plan would cover the following key areas:

1. Program objectives and duration
2. Identify key people responsible for implementing the program
3. Identify any specific training needs
4. Develop more detailed budgets, including identifying other resourcing requirements (need to develop annual budgets for the life of the program)
5. Develop a communication strategy (in associated with Community Awareness Program)
6. Scheduling and specific requirements for monitoring and evaluation

For demand management measures that have been previously implemented by Council, these measure are unlikely to need a specific implementation plan unless the nature of the program has changed significantly or other issues such as additional training or monitoring have been identified.

Regular monitoring, evaluation and review will be required for each individual program, as well as the overall Demand Management Program. Monitoring and evaluation of individual programs should include consideration of key outcomes (eg water savings, participation rates, customer satisfaction) and key processes (eg ease of implementation, Council costs / resources to run program). Monitoring and evaluation of the full Demand Management Program should also be undertaken to assess effectiveness of the combined programs and how they relate to each other.

Annual progress reports on the Demand Management Program should be prepared in association with a progress report on Water Loss Management. The progress report should include the outcomes of regular monitoring and an evaluation of the ongoing effectiveness of the programs. Where necessary, adjustments and/or enhancements should be made to the program based on the annual progress reports.

7 Plan Review

The Demand Management Plan should be comprehensively reviewed and updated, with community consultation, at least every five years.

Minor revisions, such as an update to information, will be made as required between comprehensive reviews without seeking community comment.

8 References

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Appendix A
Location & Climate

Location & Climate

Uralla Shire Council serves a population of over 6,000 people, over an area of around 3,215 km^2 in the New England Region, within the Gwydir River catchment. In addition to the towns and villages that have reticulated water supply systems (Uralla and Bundarra) there are several other villages located within the local government area that do not have formal water supply systems, including Invergowrie, Kentucky, Kingstown, Rocky River and Saumarez Ponds.

The New England Region experiences a dry sub-humid temperate climate. Summers are relatively short and mild and winters are long and cold. Rainfall is generally lower over the autumn and winter months and highest in summer months due to a predominance of summer storms.

Median rainfall in the region is around 780mm per annum, average evaporation is around 1,170mm per annum, and the mean maximum daily temperature is just under 20^{o}C. Monthly climate statistics for Armidale Airport AWS are included below in Table A1.

Table A1 Climate Statistics – Armidale Airport AWS 56238 (1994 – 2017)

Climate Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Median Rainfall (mm)	75	85	50	28	32	41	32	34	40	73	101	100	782
10%ile Rainfall (mm)	50	49	6	3	10	6	8	17	11	27	43	41	603
Mean Evap. (mm)	158	120	109	75	53	36	43	65	93	127	132	155	1,166
Mean Max. Temp (^{o}C)	26.0	25.1	23.1	19.7	15.8	12.7	12.1	13.9	17.7	20.5	22.7	24.7	19.5

Note: Evaporation data was taken from Armidale - Tree Group Nursery 56037 (1997 – 2017)

It is widely accepted that future climate changes could impact water supply systems through changing frequency and duration of rainfall, as well as an increase in evaporation. While estimating the impacts associated with future climate change is very difficult and is an evolving science, recent studies have started to provide some indication of the potential climate impacts. However, modelling to-date has focused more on changes in average monthly or annual statistics and less on the duration and frequency of extreme events, which is more critical for town water supply security.

According to the Adapt NSW website (setup by the NSW Office of Environment and Heritage), average temperatures have been rising since the 1950s, with the rate of change increasing from about 0.1^{o}C per decade during the 1950s to 1980s, to about 0.5^{o}C per decade in the 1990s and 2000s. The decade from 2001 to 2010 was the hottest on record, while 2014 was the hottest year on record in NSW (OEH, 2018).

The Adapt NSW website includes climate projections for NSW as well as more specific catchment based projections. An extract from the New England North West Climate Change Snapshot (OEH, 2018) is included below:

Appendix A – Location & Climate

Based on long-term (1910–2011) observations, temperatures have been noted to have been increasing since about 1970, with higher temperatures experienced in recent decades.

The New England and North West Region is projected to continue to warm during the near future (2020–2039) and far future (2060–2079), compared to recent years (1990–2009). The warming is projected to be on average about 0.7°C in the near future, increasing to about 2.2°C in the far future. The number of high temperature days is projected to increase, with fewer potential frost risk nights anticipated.

The warming trend projected for the region is large compared to natural variability in temperature and is of a similar order to the rate of warming projected for other regions of NSW.

The region currently experiences considerable rainfall variability across the region and from year-to-year and this variability is also reflected in the projections.

Currently, the biggest concern for local water utilities is the potential impact that climate change may have on rainfall patterns and volumes, and in turn how this will impact surface runoff and groundwater recharge rates. The latest estimates of hydrological climate change impacts are included in a recent report by the NSW Office of Environment and Heritage (OEH, 2015), which lists near future (2020 – 2039) and far future (2060 – 2079) estimates for rainfall, surface runoff and groundwater recharge for major river catchments across NSW. Hydrological climate change estimates for the Gwydir River catchment are included in Table A2.

Table A2 Hydrological Climate Change Impacts – Gwydir River (OEH, 2015)

Region	Percentage Change in Mean Annual:					
	Rainfall		Surface Runoff		Groundwater Recharge	
	Near Future	Far Future	Near Future	Far Future	Near Future	Far Future
Gwydir River	+0.8%	+7.4%	+3.8%	+22.9%	-4.0%	+4.4%

The table reflects the level of uncertainty surrounding climate change, with rainfall predicted to increase slightly in the near future and then further increase in the far future. Surface runoff is predicted to increase slightly in the near future, but increase significantly (around 23%) in the far future. However, groundwater recharge rates are predicted to fall in the near future, but then increase again in the far future.

While the table gives some indication of the potential changes in mean annual rainfall, streamflow and groundwater recharge rates, the potential impact on water resources is more difficult to predict, as the future nature of rainfall patterns is unknown. Climate change models have been used to estimate changes in seasonal rainfall patterns; however, these models are not currently capable of predicting future extreme rainfall patterns, such as flooding and drought events. Therefore, predictions on the future impact on water resources are currently very limited, as they generally do not consider future climate variability, particularly climate extremes.

Appendix B
Estimated Costs & Water Savings

Appendix B – Estimated Costs & Water Savings

Table B1 Direct Costs & Water Savings Associated with Demand Management Program (over 3 years)

Demand Management Measure	Assumptions (Costs & Benefits)	Council Direct Costs (over 3 years)	Estimated Water Savings (over 3 years)
Community Awareness Program / Pricing	• Costs include marketing costs (pamphlets, advertising, handouts, etc.) and membership to Smart Water Advice (no additional staff costs have been included) • Benefits assumed to be 5% reduction in residential usage in Uralla Shire in the years the community awareness program is operating (i.e. 10 ML/a)	$9K	30 ML
Non-Residential Large User Audits & Savings	• Costs include an allowance for 1 level 3 audit ($6K). Only triggered with Level 3 Water Restrictions. • Benefits are based on an assumed 10% reduction in the consumption of the target user group, Council parks and garden usage, by year 3 (i.e. 10% of 10 ML)	$12K	2 ML *(plus other flow on benefits that are more difficult to quantify)*
Permanent Water Conservation Measures	• Costs and benefits have been included in the Community Awareness Program	*(Costs included in Community Awareness Program)*	*(Savings assessed in Community Awareness Program)*
Regulation & Planning Controls	• No direct costs to Council • Benefits are based on around 9 new houses pa and a reduction in water consumption of 20% compared to the average house in Uralla Shire	0	2 ML
Water Loss Management	• Benefits are based on an assumed 1% reduction in water losses (ie reduce from around 11% to 10%) by year 3 (i.e. 1% of 325 ML)	*(Costs already included in Water Operations Budget)*	6ML
TOTALS (over 3 years)		**$21K**	**40 ML**

Assuming total savings of 40 ML over 3 years and direct program costs of $21k, the unit cost of the program to USC is around $0.52/kL (based on a simplified analysis). This compares favourably with the current Financial Year (i.e. 2018 2019) water usage charge of $2.30/kL.

Additional upfront and ongoing costs to the community, businesses and government have not been considered and additional benefits, including the deferral of capital works, reduced energy costs and reduced costs for wastewater treatment have also not been considered.