



WATER DEMAND MANAGEMENT STRATEGY

2016 - 2025

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1. Executive summary

Cairns Regional Council (Council) has had an active demand management strategy (DMS) with an associated suite of actions and initiatives since 2006. At the commencement of demand management in 2006, Council adopted a target of 10% reduction in total use per capita for a 3-year period until 2009. In 2008, consumption had reduced by approximately 15% to 447 L/c/d. The ongoing aim endorsed by Council in 2009 was to ensure that the total consumption for all sectors in Cairns stays at or below 450 L/c/d. Over the last few years, the total use per capita has varied between 404 and 434 L/c/d.

With forecasts anticipating a continuing growth in the population and economy of the Cairns region, Council has adopted the recommendations in the final report of the community-based Water Security Advisory Group (WSAG) as the Cairns Water Security Strategy (CWSS). A key recommendation of the WSAG, and initial component of the CWSS in achieving the balance between demand and supply, is to develop and implement a revised DMS.

The revised DMS builds on previous and current demand management activities, and considers benefit-cost outcomes of the assessment by the WSAG of other potential actions and initiatives. The revised DMS has been developed to accord with the key water supply planning principles adopted by the WSAG in a manner that addresses the behaviours of both residential and non-residential users through focussed actions.

The DMS initiatives are grouped into the following categories based on similarity of action:

- Regulatory and Council initiatives
- Intelligent water networks
- Water education programs
- Water efficiency upgrades and retrofits

The implementation of the initiatives and actions are planned over a 10-year period with the majority of activity in the initial one to two years to complete discrete projects and establish ongoing programs of works. The cumulative water saving benefit resulting from implementation of the DMS over the timeframe is estimated to generate a diminishing total use per capita:

Year	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26
Total per capita (L/c/d)	418	412	405	398	392	386	383	381	380	378	377

2. Introduction

The population and economy of the Cairns region continues to grow and place increasing demands on water supply. In response, Council formed a community-based WSAG to guide the development of a water security strategy that identifies a program of demand management initiatives and supply augmentations to ensure that the Cairns region has sufficient water to meet demand under normal and adverse environmental conditions into the future.

In September 2015, Council adopted the recommendations in the final report of the WSAG as the CWSS. The DMS is a key component of the CWSS in that the reduction in the total demand for potable water is a key initial step in achieving the balance between demand and supply. The various DMS activities of the CWSS are referenced in Recommendations 14 and 15:

- CWSS Recommendation 14: Develop and implement a DMS with defined targets and actions based on considering the applicability to Cairns of initiatives identified during the WSAG process.
- CWSS Recommendation 15: Develop an intelligent water supply and distribution network involving implementation of smart grid technologies and 'smart meters' to provide real time water consumption data with consequential operational benefits and water savings.

Following the adoption of the CWSS, Council has further considered the demand management initiatives identified during the WSAG process and an approach for developing an intelligent water network (IWN) in formulating this DMS.

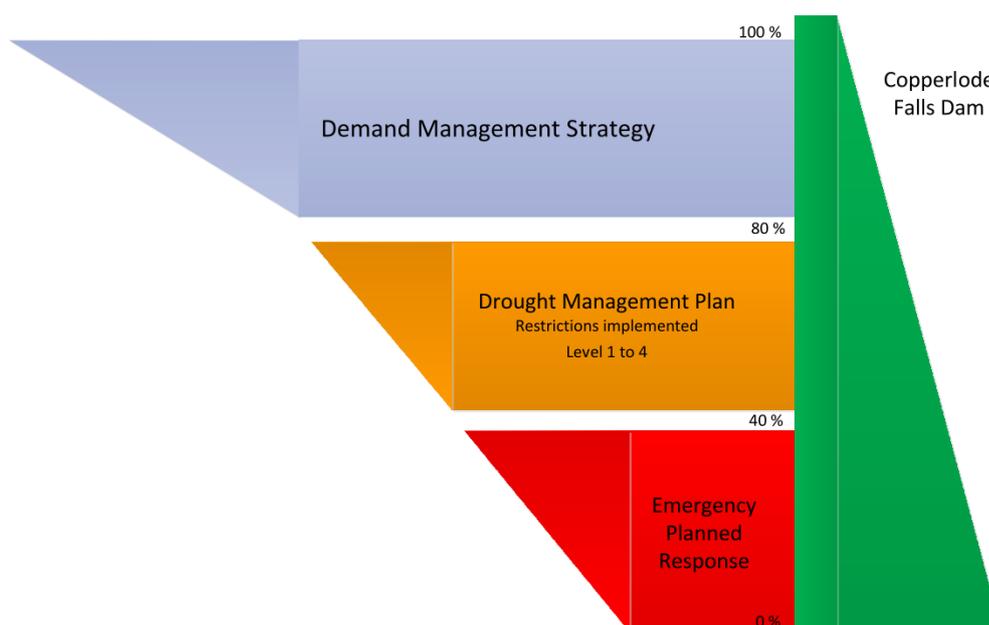
The primary objectives of the DMS are:

- To build on previous and current demand management activities
- To achieve significant and sustained water savings by customers
- To continue to build a water conservation culture in the community
- To minimise losses and non-revenue water in our distribution network
- To improve water accounting via metering, data management and reporting
- To ensure Council is leading by example in water conservation
- To prolong the timing for implementation of supply augmentations while mitigating short-term risks to supply

3. Purpose

In order to achieve the primary objectives, the DMS details what will be done, the expected water savings from the action, how the action will be implemented and estimates the cost to implement the action. Finally, it proposes indicators that could be used to monitor and measure the outcomes.

The DMS is relevant to operational states when the stored volume in Copperlode Falls Dam is above the first restriction level as defined in Council's drought management plan. The role of the DMS and its relationship to other instruments to manage demand under normal and adverse environmental conditions is illustrated in the figure below.



The report is a high level document that covers the varied aspects of the DMS. The DMS is a revision-controlled document which will be reviewed and updated, typically on an annual basis. The document will be reviewed and updated to reflect:

- Activities and progress since the last review
- Performance against the planned implementation schedule
- Significant changes in the regional context since the last review
- Identified upcoming issues and actions
- Risk assessment and management
- Proposed timing of the next review

The DMS is based on previous investigations undertaken as part of the WSAG process and further develops the implementation timeframes. Information regarding the population and water demand forecasting, the assessment of the potential actions, their impact and cost, and the selection of which actions to incorporate into the DMS are detailed in separate and previous documents and only briefly summarised in this document.

4. Demand management strategy development

4.1 Principles

Development of the DMS was based on the following principles, which are consistent with those adopted by the WSAG:

- Costs must be acceptable to Council and the wider community, in that it accords with balancing the economic, social and environmental needs for water
- Initiatives are feasible and can be delivered with available technology or achievable innovations
- Actions are compliant and congruent with relevant legislation. In order to secure new water supplies, it will be incumbent on Council to demonstrate effective demand management and the efficient use of existing supplies
- Strategy is acceptable to the wider Cairns community, in that everyone has a role to play in responsible water resource management
- The DMS is key to providing water security for the Cairns Local Government Area and that reducing per capita demand for potable water is a high priority

The above points represent a holistic approach to managing water resources and build on the previous actions undertaken by Council since 2006.

4.2 Previous demand management activities

Council has had an active DMS with an associated suite of actions and initiatives since 2006. At the commencement of demand management in 2006, Council adopted a target of 10% reduction in total use per capita for a 3-year period until 2009. In 2008, consumption had reduced by approximately 15% to 447 L/c/d. The ongoing aim endorsed by Council in 2009 was to ensure that the total consumption for all sectors in Cairns stays at or below 450 L/c/d.

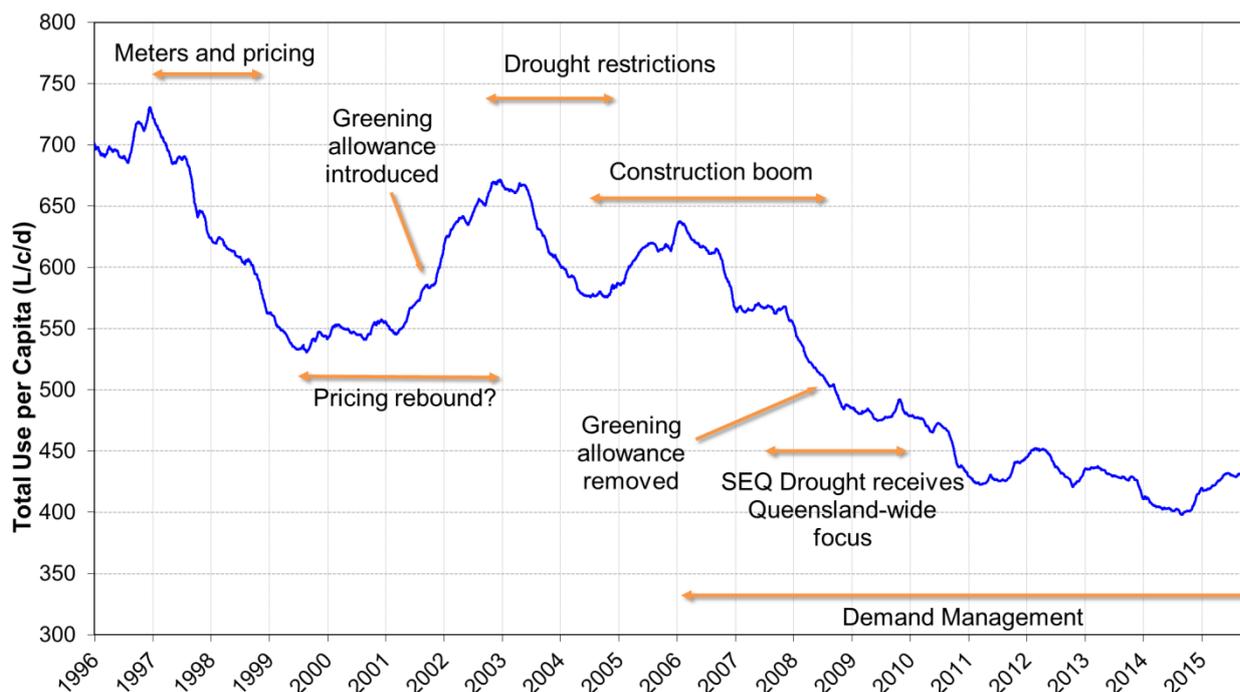
The actions and initiatives implemented since 2006 are broadly generalised as either customer side or system actions, as summarised in the table below.

Customer-side actions	System-side actions
Media campaigns, schools and community education activities	Installation of district meters, pressure management
Permanent water conservation measures	Active leak detection and repair
Improved water conservation and efficiency practices by Council	Optimisation of raw water supply and treatment plant operations
Water conservation incentives for commercial customers, including the business water efficiency program (BWEF)	Reduction of unbilled and illegal connections, metering and volumetric charging for all connections
Recycled water	Metering of standpipes

4.3 Past behaviour and existing situation

Cairns has progressively reduced its demand for potable water in response to various measures implemented by Council as well as external influences, such as adverse climatic conditions and economic activity.

The figure below illustrates the progressive reduction in total demand per capita since 1996 when metering of customer connections was first introduced in Cairns. It also notes the occurrence of various initiatives, actions or measures introduced by Council, and external influences and factors.



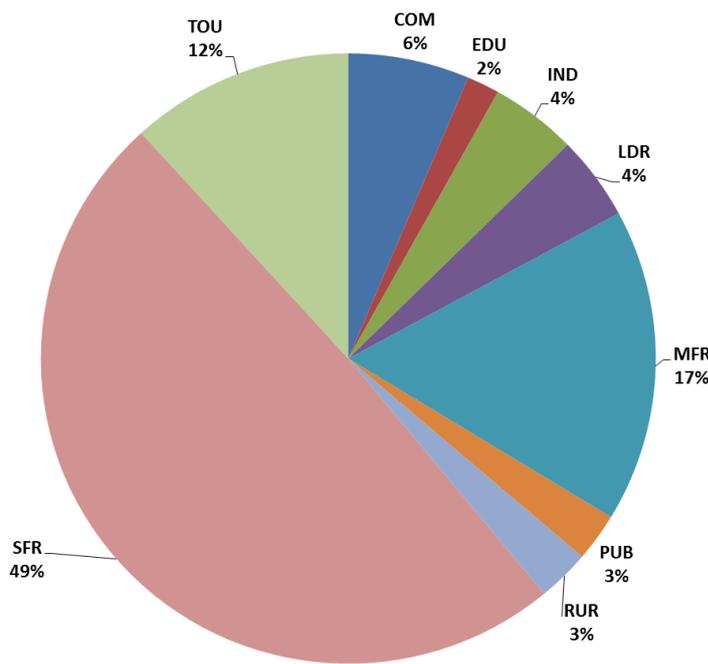
Within the past three financial years, the total use per capita has varied between 404 and 434 L/c/d. A further breakdown of this usage by residential and non-residential use is summarised in the table below.

Parameter	2012/13	2013/14	2014/15
Total use per capita (L/c/d)	434	404	433
Residential use per capita (L/c/d)	285	270	295
Non-residential use per capita (L/c/d)	149	134	137

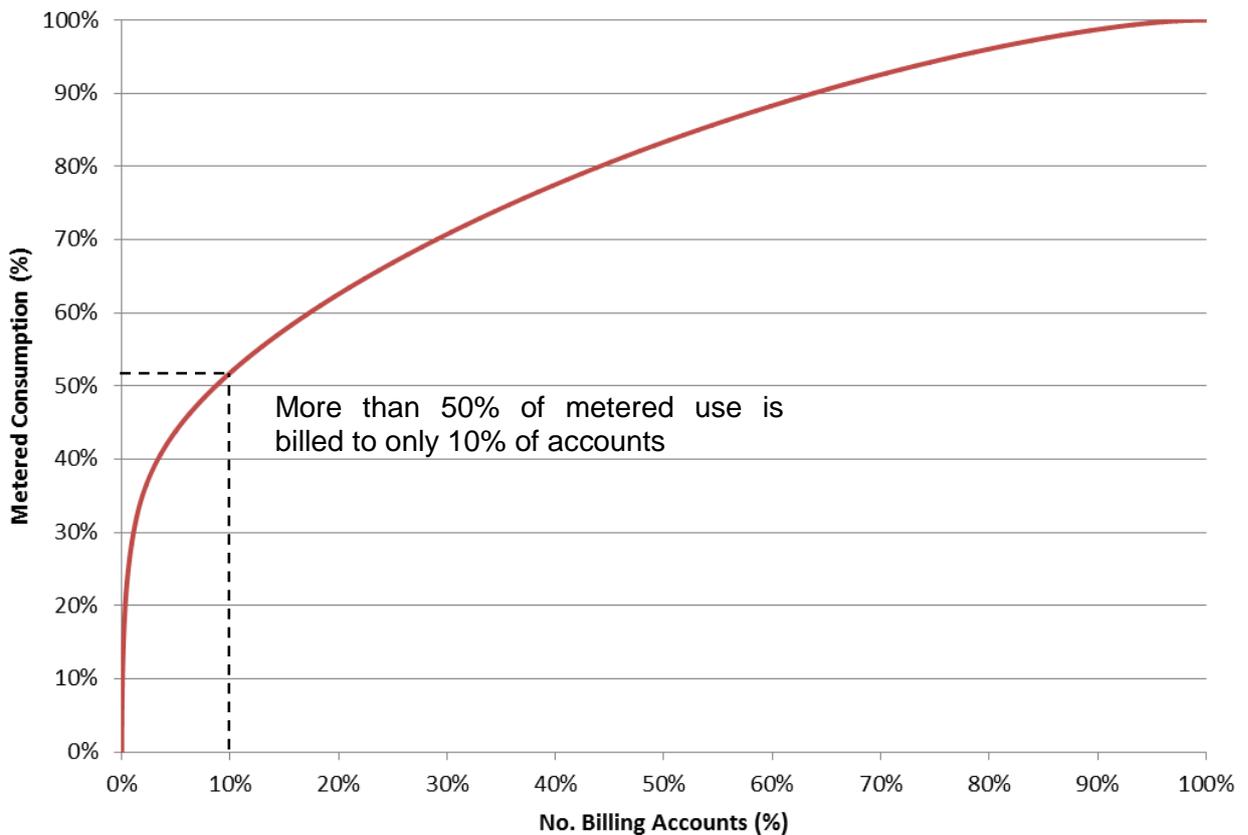
Council has undertaken an estimation methodology to remove the influence of climate on demand to enable an understanding of the underlying demand behaviour. This is referred to as the climate-corrected demand and is estimated for the recent period to be 418 L/c/d.

A further (typical) analysis of metered consumption data depicted below indicates a predominantly residential water use (70%), whilst 50% of the water is billed to only 10% of the accounts. Consequently, demand management initiatives address both residential and non-residential users through focussed actions.

Metered Consumption by Sector



Label	Description	Example
SFR	Single Family Residential	Single Unit Dwellings
MFR	Multi Family Residential	Flats Units Group Title
LDR	Low Density Residential	Large Homesites
TOU	Tourist and Residential	Guest Houses (Private Hotels) Motels Caravan Parks
COM	Commercial	Restaurants Hotels / Taverns Shops
EDU	Educational	Nurseries Schools University
IND	Industrial	General Industry Light Industry Marinas
PUB	Public	Hospitals Cemeteries
RUR	Rural and Public Open Space	Parks, Gardens Agriculture Horticulture



4.4 Approach for assessment of actions and initiatives

Council's WSAG considered the assessment of potential demand management actions, their impact and cost. Actions were prioritised primarily by cost per unit volume of water saved, with the implementation of lower cost actions first. The cost of each action as incurred by Council, the user and the community were estimated and utilised where relevant.

5. Actions

The assessment by the WSAG of potential demand management actions resulted in the categorisation of initiatives as per its recommendation Item 14:

- Part A, to be implemented over a 5-year period with estimated savings of 465 ML/a, consisting of:
 - Water efficiency labelling and standards (WELS)
 - Community education programs
- Part B, to be implemented over a 10-year period with estimated savings of 2,152 ML/a, consisting of:
 - Water efficient appliances for new residential developments
 - Water efficient appliances for new non-residential developments
 - Water system pressure reduction
 - Future leakage management
 - Large water users audit and retrofit program
- Part C, to be implemented over a 5-year period with estimated savings of 269 ML/a, consisting of:
 - Residential retrofit program
 - Tourist accommodation water efficiency retrofit program
 - School water efficiency program
 - Commercial kitchen 'smart rinse' fixtures retrofit
- Part D, to be implemented over a 5-year period with estimated savings of 140 ML/a, consisting of:
 - Commercial cooling tower tune-up
 - Rainwater tank information
 - Waterless urinal retrofit
 - Sub-metering of new multi-family dwellings

Of equivalent relevance to demand management is recommendation Item 15 of the WSAG to develop an intelligent water supply network.

Council has subsequently given consideration to grouping component initiatives based on similarity of action to enable clearer implementation. The following table of summary groupings illustrates the relationship with the demand management parts nominated by the WSAG.

CWSS grouping	WSAG Part A	WSAG Part B	WSAG Part C	WSAG Part D	WSAG IWN
Regulatory and Council Initiatives	✓	✓			
Intelligent water networks		✓			✓
Water education programs	✓		✓	✓	
Water efficiency upgrades and retrofits		✓	✓	✓	

A brief description of each grouping and initiative is provided below, including the actions required by Council, the actions required by the customer, and the estimated water saving benefit. The cost to Council of each action and the direct cost to the customer to complete each initiative and action is summarised in subsequent sections of this report. Collectively, this provides the benefits to Council and the impacts to customers.

5.1 Regulatory and Council initiatives

This group of actions relate to initiatives that are imposed by government regulations or as an initiative of Council. The group includes the following initiatives:

- Water efficiency labelling and standards
- Water efficient appliances for new residential developments
- Water efficient appliances for new non-residential developments
- System leakage management
- Recycled water schemes

5.1.1 Water efficiency labelling and standards

Description	Estimated water saving
The labelling of various appliances with their water use and star rating regarding their water use efficiency is a federal government program, which has no cost to Council, whilst it yields reasonable benefits. This program is already in operation and has been included in the forecasts for completeness.	218 ML/a (3.8 L/c/d)
	Council actions
	None
	Customer actions
	None

5.1.2 Water efficient appliances for new residential developments

Description	Estimated water saving
<p>Since 1 March 2009, the Queensland Development Code's water conservation requirements (QDC Mandatory 4.1 Section 9) apply statewide to new houses, townhouses and units in areas serviced by a water service provider.</p> <p>The QDC requires the following star rating for fixtures:</p> <ul style="list-style-type: none"> • Toilets - minimum 4-star WELS rated • Tapware - minimum 3-star WELS rated • Showerheads - minimum 3-star WELS rated. <p>All of the above fixtures can be purchased with higher star ratings. Council can require the use of higher star rating fixtures in areas under its jurisdiction.</p>	1024 ML/a (17.7 L/c/d)
	Council actions
	<ul style="list-style-type: none"> • Create new local law requiring installation of water efficient fixtures and appliances for new residential development, with a minimum 4-star WELS rated. • Liaise with plumbing suppliers to ensure that only fittings, fixtures and appliances with the minimum star efficiency are stocked. • Liaise with licenced plumbers and certifiers to ensure that only fittings, fixtures and appliances with the minimum star efficiency are installed.
	Customer actions
	<ul style="list-style-type: none"> • Procure fittings, fixtures and appliances with the minimum star efficiency.

5.1.3 Water efficient appliances for new non-residential developments

Description	Estimated water saving
Similar to the residential program (Item 5.1.2), Council can require new non-residential development to install water efficient showerheads, urinals, toilets, tapware and appliances with a minimum of 4-star efficiency required.	17 ML/a (0.3 L/c/d)
	Council actions
	<ul style="list-style-type: none"> As for Item 5.1.2
	Customer actions
	<ul style="list-style-type: none"> As for Item 5.1.2

5.1.4 System leakage management plan

Description	Estimated water saving
Council is continuing to implement the current system leakage management plan (SLMP). The plan includes leak identification through active leak detection sweeps using acoustic equipment, and the subsequent rectification of the identified leaks. These sweeps are typically undertaken by an external contractor, with repair and rectification of any leaks carried out by Council. Water pressure reduction in DMAs is discussed separately in Section 5.2.4.	485 ML/a (8.4 L/c/d)
	Council actions
	<ul style="list-style-type: none"> Review actions and results from existing plan, including optimising and rationalising existing district metered areas (DMAs), and reviewing the accuracy of the bulk water meters and DMA meters. Consider any new leak detection technologies. Identify areas most likely to produce the best outcomes. Update and implement the SLMP outcomes, including any additional DMAs.
	Customer actions
	<ul style="list-style-type: none"> None

5.1.5 Recycled water schemes

Description	Estimated water saving
Council has existing recycled water schemes supplying various areas of Cairns for outdoor irrigation use. These schemes have potential for expansion to supply additional customers where recycled water is fit for use as a substitute for potable water.	The savings will be determined on an individual basis when the feasibility of each opportunity is considered as part of a business case assessment.
	Council actions
	Manage feasibility studies that: <ul style="list-style-type: none"> assess the recycled water use options and schemes available the feasibility of systems analyse the costs and benefits develop a preliminary business case
	Customer actions
	<ul style="list-style-type: none"> None

5.2 Intelligent water network

This group of actions relates to developing an intelligent water supply and distribution network involving implementation of smart grid technologies and smart meters to provide real-time water consumption data with consequential operational benefits and water savings. This group of actions includes the following initiatives:

- IWN monitoring
- Smart water meters and advanced water metering infrastructure
- Sub-metering of new multi-family dwellings
- Water system pressure reduction
- Streamlined data & billing management

Whilst separately documented, several of the above initiatives are contingent on and benefit from the implementation of other initiatives. For example, IWN monitoring produces greater outcomes when there are more DMAs, which are part of water system pressure management. Similarly, system leakage management is much better if IWN monitoring is implemented. The costs and savings have been developed for each initiative assuming that the other initiatives will be implemented. In summary, whilst many initiatives are separately documented in Sections 5.1, 5.2 and 5.3, to achieve the outcomes they need to be implemented in a coordinated manner. If they are not implemented in a coordinated manner, the benefits will be less and the costs may be higher.

5.2.1 Intelligent water network monitoring

Description	Estimated water saving
IWN monitoring gathers various forms of data from the network, analyses and interprets this data and identifies areas that are not operating as expected.	Dependant on existing system status, and will be estimated as part of the investigation as part of Council actions below.
	Council actions
	Manage a feasibility study that: <ul style="list-style-type: none"> • assesses the IWN systems available • the current state of Council information sources, systems and procedures, including the quality of the data gathered • the capability and maturity of the existing network monitoring • the feasibility of systems • proposes implementation and improvement options • analyses the costs and benefits • develops a preliminary business case
	Customer actions
	<ul style="list-style-type: none"> • None

5.2.2 Smart water meters and advanced water metering infrastructure

Description	Estimated water saving
Smart water meters automatically provide water-use information more frequently than manually-read meters and transfer this information remotely.	Not specifically quantified, as it provides information to facilitate water use behaviour modification.
	Council actions
	Manage an investigation that: <ul style="list-style-type: none"> assesses the smart meters available the current state of Council information sources, systems and procedures the feasibility of these systems proposes implementation and improvement options analyses the costs and benefits develops a preliminary business case
	Customer actions
	<ul style="list-style-type: none"> None

5.2.3 Sub-metering of new multi-family dwellings

Description	Estimated water saving
<p>From 1 January 2008, the Queensland Plumbing and Wastewater Code requires mandatory installation of sub-meters in all new multi-unit developments and some non-residential premises. This does not apply to the retrofit of existing buildings, only new buildings.</p> <p>This program is already in operation and has been included in the forecasts for completeness.</p> <p>This metering and individual billing within new multi-family dwelling complexes will provide a price signal to the user to improve water conservation.</p>	52 ML/a (0.9 L/c/d)
	Council actions
	<ul style="list-style-type: none"> Adopt Council policy to support enforcement
	Customer actions
	<ul style="list-style-type: none"> None yet are better-informed by directly receiving bills with meter read data.

5.2.4 Water system pressure reduction and monitoring

Description	Estimated water saving
<p>This initiative is aimed primarily at reducing system water leakage and bursts, whilst it has a minor impact on customer consumption, through time operated water fixtures (taps and showers).</p> <p>Cairns' network has various DMAs, several of which have pressure-reducing valves at the supply point. Additional DMAs could be developed.</p> <p>New and existing DMAs would benefit from the installation of valves to reduce the high operating pressure in these zones.</p>	78 ML/a (1.3 L/c/d)
	Council actions
	<ul style="list-style-type: none"> • Review outcomes of previous water system pressure reduction works. • Implement an updated pressure management plan.
	Customer actions
<ul style="list-style-type: none"> • None. 	

5.2.5 Streamlined data and billing management

Description	Estimated water saving
<p>Revising and streamlining the management of data including water consumptions data and providing more extensive billing information to the user, thereby demonstrating a more direct link between consumption and cost.</p>	Not yet assessed.
	Council actions
	<ul style="list-style-type: none"> • Review existing data and billing systems. • Confirm new outcomes, modify procedures and bills to achieve new vision.
	Customer actions
<ul style="list-style-type: none"> • Utilise the provided information to encourage modification of water use behaviour. 	

5.3 Water education programs

This group of actions includes the following initiatives:

- Community education programs
- School water efficiency program
- Rainwater tank information

5.3.1 Community education programs

Description	Estimated water saving
<p>Council has a community education program which encourages wise water use. This includes the provision of information to customers through printed bill flyers, web sites and community events.</p> <p>The education program sets the key water use message and underpins all other programs and is a fundamental component of any DMS.</p> <p>The program is required to be updated to be consistent with the new CWSS and re-energise the water conservation efforts of the community.</p>	248 ML/a (4.3 L/c/d)
	Council actions
	<ul style="list-style-type: none"> • Revise the existing community education program.
	Customer actions
	<ul style="list-style-type: none"> • Receive information and modify water use behaviours.

5.3.2 School water efficiency program

Description	Estimated water saving
<p>Educating the future users of water is a powerful tool in reducing future water demand. Council could facilitate a program where a trained water auditor visits schools and provides a report on options for reducing water use. Council pays for the initial auditor visit and the school pays for any retrofit actions.</p> <p>The program can involve students as part of the auditing activities. It produces water use behaviour impacts, which are carried home to further support community education.</p> <p>In addition high frequency use fixtures and appliances at school will use less water when replaced with higher star rated devices.</p> <p>The program could be initially run as a pilot for one or two large schools, with the response used to modify future implementation.</p>	56 ML/a (1.0 L/c/d)
	Council actions
	<ul style="list-style-type: none"> • Develop publication material to identify the water saving opportunities associated with schools, which would demonstrate prudent water use. • Collaborate with school authorities to identify an appropriate activity and arrange the presentation. • The activity could include students calculating of the economic benefit to the school from changes to fixtures, fittings and water use behaviour, which should encourage the Department of Education to fund the retrofits
	Customer actions
	<ul style="list-style-type: none"> • School (Department of Education) to implement activity and manage retrofit.

5.3.3 Rainwater tank information

Description	Estimated water saving
<p>Provide information to potential implementers of rainwater tanks to allow them to decide if installing a rainwater tank meets their individual values.</p> <p>This information would be available from Council and would include the likely water yield, and how to install and maintain rainwater harvesting systems in the Cairns area. It may also include information on local suppliers.</p>	17 ML/a (0.3 L/c/d)
	Council actions
	<ul style="list-style-type: none"> Develop publication material to assist customers regarding the appropriate use of rainwater, and the required equipment and maintenance to facilitate their informed decision-making regarding their purchase and implementation of a rainwater tank.
	Customer actions
	<ul style="list-style-type: none"> Receive information when sought, and decide whether they wish to install and operate a rainwater harvesting system.

5.4 Water efficiency upgrades and retrofits

This group of actions includes the following initiatives:

- Large water users audit and retrofit program
- Tourist accommodation water efficiency retrofit program
- Commercial kitchen 'smart rinse' fixtures retrofit
- Commercial cooling tower tune-up
- Waterless urinal retrofit
- Residential retrofit program

5.4.1 Large water users audit and retrofit program

Description	Estimated water saving
<p>Improving the water use efficiency of large users even a small amount can result in large savings.</p> <p>Large water users throughout the service area are provided with a Council-facilitated water audit and assessment. This provides information for the user to document a business case to improve their water use efficiency.</p> <p>The customer pays for the cost of their own retrofits. This similar to and an extension of the BWEF program.</p>	548 ML/a (9.5 L/c/d)
	Council actions
	<ul style="list-style-type: none"> Interact with identified large water users to complete an audit confirming inefficient water uses. Identify more efficient appliances or procedures. Demonstrate the economic value to the client and strongly encourage them to implement the recommended retrofit.
	Customer actions
	<ul style="list-style-type: none"> Receive information, prepare business case and manage water use improvements and retrofit where relevant.

5.4.2 Tourist accommodation water efficiency retrofit program

Description	Estimated water saving
<p>Notwithstanding the improvements in water efficiency use in tourist accommodation, there is still opportunity to make additional water use savings.</p> <p>To realise these, a Council facilitated program where a trained water auditor visits a tourist accommodation facility and provides advice on options for reducing water use, can be completed. Council pays for the initial auditor visit and the customer pays for the retrofit.</p> <p>Similar to the large water users audit, except that it will target medium and small tourist operations.</p>	148 ML/a (2.6 L/c/d)
	Council actions
	<ul style="list-style-type: none"> Develop publication material and content to assist tourist accommodation venues to educate their clients with regard to wise water use.
	Customer actions
	<ul style="list-style-type: none"> Receive information and audit outcomes, and arrange the improvements based on the cost positive outcome.

5.4.3 Commercial kitchen 'smart rinse' fixtures retrofit

Description	Estimated water saving
<p>Commercial kitchens can use a large amount of water, particularly during the rinsing procedures.</p> <p>The retrofitting of fine spray and water efficient nozzles can reduce water use and water heating costs.</p> <p>By developing specific information and specific targeting of this information, Council can facilitate and encourage the retrofitting of fixtures and fittings.</p>	22 ML/a (0.4 L/c/d)
	Council actions
	<ul style="list-style-type: none"> Develop publication material, which identifies inefficient kitchen or commercial water use practices. Interacts with the operators to confirm inefficient water use. Identifies more efficient fixtures and fittings or procedures. Demonstrates the economic value to the client and strongly encourage them to implement the recommended retrofit. Council utilises its databases to identify relevant businesses for receipt of this information. Council acknowledges businesses that complete the retrofit.
	Customer actions
	Receive information and arrange the improvements based on the cost positive outcome.

5.4.4 Commercial cooling tower tune-up

Description	Estimated water saving
<p>Cooling towers can use a lot of water in their operation, particularly if they continuously exchange some process water with potable water as part of a continuous dilution process.</p> <p>Council would provide a free audit service to property owners who operate a cooling tower. The audit provides outcomes and information on improving the water efficiency of the cooling towers and the potential for the operators to save money and act responsibly and more sustainably.</p> <p>The program could initially be run as a pilot program.</p>	65 ML/a (1.1 L/c/d)
	Council actions
	<ul style="list-style-type: none"> • Develop publication material and audit report format, which illustrate the water saving opportunities associated with improved operational procedures associated with cooling towers. • Undertake or arrange completion of the audits and then follow up the clients to strongly encourage the building managers to implement tune-ups.
	Customer actions
	<ul style="list-style-type: none"> • Receive audit outcomes. • Arrange the improvements based on the cost positive outcome.

5.4.5 Waterless urinal retrofit

Description	Estimated water saving
<p>Council facilitates the retrofitting of waterless urinals in businesses. Council could identify preferred suppliers to assist the retrofitting.</p>	5 ML/a (0.1 L/c/d)
	Council actions
	<ul style="list-style-type: none"> • Develop publication material, which identifies the water saving opportunities associated with waterless urinals. • Demonstrate the economic value to the client and strongly encourage them to implement the recommended retrofit. • Council utilises its databases to identify relevant businesses for receipt of this information. • Council acknowledges businesses that complete the retrofit.
	Customer actions
	<ul style="list-style-type: none"> • Receive information and arrange the retrofit.

5.4.6 Residential retrofit program

Description	Estimated water saving
<p>The Queensland Development Code Mandatory Part 4.1 – Sustainable buildings guideline only requires the inclusion of efficient WELS rated fixtures and fittings in existing residential dwellings if an extension or renovation requires building and plumbing approval.</p> <p>The penetration of water efficient fittings and fixtures in the residential sector can be increased by undertaking a residential retrofit program to dwellings that would otherwise not be using water efficient fittings and fixtures.</p> <p>This program would be a Council-facilitated program where a plumber visits residences and installs low-flow showerheads, places flow regulators in suitable taps and repairs any leaking taps. A subsidised co-payment is provided by the customer.</p> <p>Similar programs have been implemented in South East Queensland.</p>	<p>43 ML/a (0.7 L/c/d)</p> <p>Council actions</p> <ul style="list-style-type: none"> • Develop and implement the program. • Council should review outcomes from the experiences of previous programs in other jurisdictions to inform decisions about any potential co-contributions or subsidies to improve uptake, or limit the number and cost of retrofits. <p>Customer actions</p> <ul style="list-style-type: none"> • Receive audit outcomes and arrange the improvements based on the cost positive outcome.

6. Implementation

6.1 Communications & marketing

The DMS includes many actions that require the modification of water use behaviour to reduce demand. Establishing a commitment by the community to take positive action to conserve water is critical to the long term success of the program of actions. Behavioural modification will only be achieved if it is accompanied with a cohesive communications strategy.

In the Wet Tropics of Far North Queensland, this can be a challenging task. Residents and visitors to the region are not faced with images of almost dry dams and parched earth like they are, at times, in the more temperate regions of Australia. The reasons for saving water in the tropics are not necessarily obvious. As such, water conservation messages and information must be designed to relate to local conditions, and be understood and accepted by the local community and visitors alike.

The communications and marketing strategy for the CWSS includes the communications and community engagement plan for the DMS project, and is documented separately. It builds from Council's process of involving and collaborating with stakeholders of the WSAG during development of the CWSS and is aimed at the broader community. The communications and marketing strategy for the CWSS will:

- Deliver effective and integrated communications and resources that build the cultural change capacity of people to move towards more sustainable behaviour and better understand the drivers relating to the CWSS, in particular the DMS.
- Market and distribute material and carry out activities to keep the broader community appropriately informed of Council's CWSS.
- Increasing target group awareness and use of water supplies and services, including catchments, storage, treatment and delivery.

6.2 Schedule of actions

Across the DMS program of works, the projects and related actions have been arranged into the following timescales:

- Imminent commence within 1 year
- Short term commence within 2 years
- Medium term commence after 2 years

Action	Imminent		Short term	Medium term
	2015/16	2016/17	2017/18	2018/19 – 2025/26
Regulatory and Council initiatives				
Water efficiency labelling and standards	✓	✓	✓	✓
Water efficient appliances for new residential developments	✓	✓*	✓*	✓*
Water efficient appliances for new non-residential developments	✓	✓*	✓*	✓*
System leakage management plan	✓	✓	✓	✓
Recycled water schemes	✓	✓*	✓*	✓*
Intelligent water networks				
IWN monitoring	✓	✓*	✓*	✓*
Smart water meters and advanced water metering infrastructure	✓	✓*	✓*	✓*
Sub-metering of new multi-family dwellings	✓	✓*	✓*	✓*
Water system pressure reduction	✓	✓*	✓*	✓*
Streamlined data & billing management			✓*	✓*
Water education programs				
Community education programs	✓	✓	✓	✓
School water efficiency program		✓*	✓*	✓*
Rainwater tank information		✓	✓	✓
Water efficiency upgrades and retrofits				
Large water users audit and retrofit program		✓	✓	✓
Tourist accommodation water efficiency retrofit program			✓	✓
Commercial kitchen 'smart rinse' fixtures retrofit			✓	✓
Commercial cooling tower tune-up			✓	✓
Waterless urinal retrofit			✓	✓
Residential retrofit program				✓*

Note: * Indicates implementation of the initiative is subject to further Council endorsement.

6.3 Cost

The estimated cost to Council of implementation and the direct cost to customer for the activities are indicated in Table 1.

6.4 Cumulative water savings

The cumulative water savings estimated to result from the implementation of the DMS activities are indicated in Table 2.

6.5 Council decision making

Council will be engaged at key decision points throughout implementation of the DMS program. There are a number of project elements that have the potential for significant public interest and Council will be briefed on all major aspects of the works prior to them being more broadly communicated to the public.

In addition, monthly status reports will be prepared and included in the CWSS Progress Report. These regular updates will provide opportunities to assess the progress and direction of the DMS, provide feedback and intervene if deemed appropriate.

Financial approvals will follow the delegated authority levels adopted for other capital works. While there is potential for a major contract within the DMS that will require full Council approval to award, there is also a large amount of work for which approval by delegated authority will be appropriate.

Table 1: Estimated cost to Council of implementation and the direct cost to customer for the activities

Activity	Cost \$'000												Direct cost to customer
	2015/16		2016/17		2017/18		2018/19		2019/20	2020/21	2021/22	2022/23 to 2025/26	
	Set up	On going	Set up	On going	Set up	On going	Set up	On going	On going				
Water efficiency labelling and standards				0									0
Water efficient appliances for new residential developments	29	0											0
Water efficient appliances for new non-residential developments	29	0											0
System leakage management		165		165		165							0
Recycled water schemes													
Intelligent water network monitoring	60	TBD											0
Smart water meters and advanced water metering infrastructure	40	TBD											
Sub-metering of new multi-family dwellings				0									0
Water system pressure reduction	30	14		14		14		14	14				0
Streamlined data & billing management				0			40						0
Community education programs			TBD	TBD		TBD		TBD	TBD	TBD	TBD	TBD	0
School water efficiency program			44	58		58		58	58	58	58	58	0
Rainwater tank information					32	3		3	3	3	3	3	3
Large water users audit and retrofit program			44	29		29		29	29	29			50 to 430
Tourist accommodation water efficiency retrofit program					29	29		29	29	29	29		10

Activity	Cost \$'000												Direct cost to customer
	2015/16		2016/17		2017/18		2018/19		2019/20	2020/21	2021/22	2022/23 to 2025/26	
	Set up	On going	Set up	On going	Set up	On going	Set up	On going	On going				
Commercial kitchen 'smart rinse' fixtures retrofit					29	29		29	29	29	29		5
Commercial cooling tower tune-up					29	29		29	29	29	29		8
Waterless urinal retrofit					29	29		29	29	29	29		1
Residential retrofit program							313	60	60	60	60	60	0.02 to 0.100
Sub total	188	179	88	266	148	385	353	280					
Total	367		354		533		633		280	280	237	121	

Table 2: Cumulative water savings estimated to result from the implementation of the DMS activities

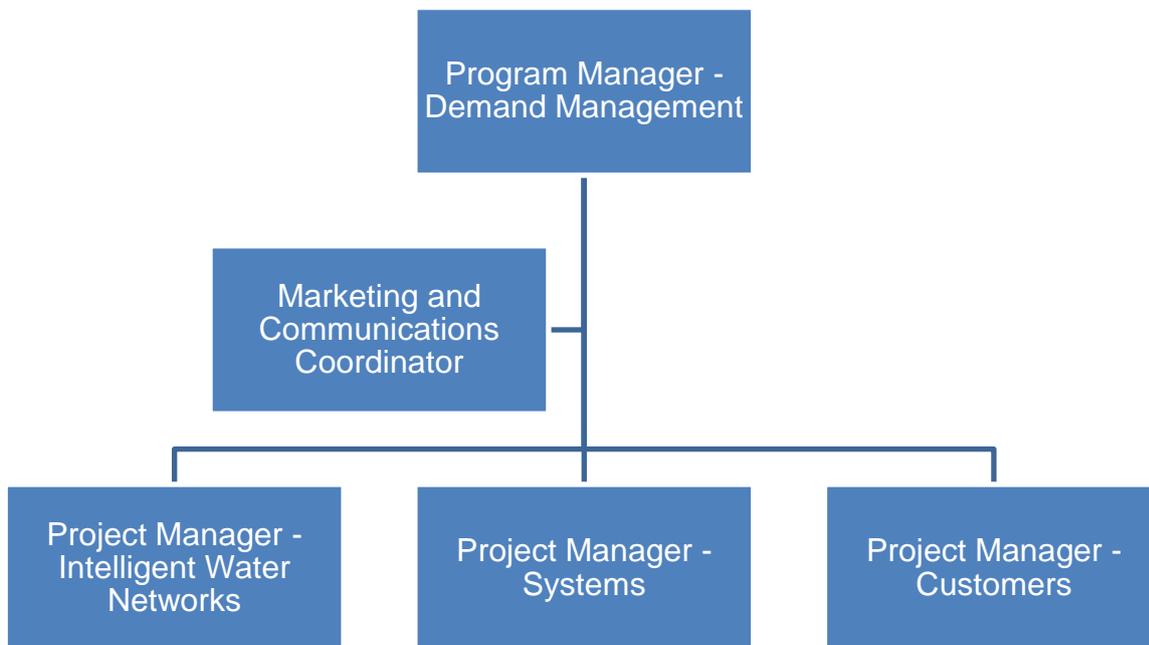
Initiative	Estimated water saving by year (ML)										
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/34	2024/25	2025/26
Water efficiency labelling and standards	22	44	87	131	174	218	218	218	218	218	218
Water efficient appliances for new residential developments		102	205	307	410	512	614	717	819	922	1024
Water efficient appliances for new non-residential developments		2	3	5	7	9	10	12	14	15	17
System leakage management		97	194	291	388	485	485	485	485	485	485
Recycled water schemes											
Intelligent water network monitoring											
Smart water meters and advanced water metering infrastructure											
Sub-metering of new multi-family dwellings	5	15	26	36	47	52	52	52	52	52	52
Water system pressure reduction		16	31	47	62	78	78	78	78	78	78
Streamlined data & billing management											
Community education programs		50	99	149	198	248	248	248	248	248	248
School water efficiency program		11	22	34	45	56	56	56	56	56	56
Rainwater tank information			3	7	10	14	17	17	17	17	17
Large water users audit and retrofit program		55	110	164	219	274	329	384	438	493	548
Tourist accommodation water efficiency retrofit program			30	59	89	118	148	148	148	148	148

Initiative	Estimated water saving by year (ML)										
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/34	2024/25	2025/26
Commercial kitchen 'smart rinse' fixtures retrofit			4	9	13	18	22	22	22	22	22
Commercial cooling tower tune-up			13	26	39	52	65	65	65	65	65
Waterless urinal retrofit			1	2	3	4	5	5	5	5	5
Residential retrofit program				9	17	26	34	43	43	43	43
Total		446	893	1,339	1,785	2,232	2,390	2,549	2,708	2,867	3,026

7. Resource requirements

7.1 Team structure

The DMS is part of the CWSS project, and as such it is proposed that DMS is a separate program. The team structure is as follows:



7.2 Portfolios

The project managers will be responsible for portfolios consisting of the various demand management actions, as identified by the table below. The portfolios Project Manager - Intelligent Networks and Project Manager – Customers are substantive, particularly in the initial years, and indicate the need for specific resources. Both are temporary full time positions that will likely be filled by external to Council’s existing staff. Project Manager - Systems is likely a part-time role to be completed by existing Council staff.

Initiative	Project Manager – Intelligent Water Networks	Project Manager – System	Project Manager – Customers
Regulatory and Council initiatives			
Water efficiency labelling and standards			✓
Water efficient appliances for new residential developments			✓
Water efficient appliances for new non-residential developments			✓
System leakage management plan		✓	
Recycled water schemes		✓	
Intelligent water networks			
IWN monitoring	✓		
Smart water meters and advanced water metering infrastructure	✓		
Sub-metering of new multi-family dwellings			✓
Water system pressure reduction		✓	
Streamlined data & billing management	✓		
Water education programs			
Community education programs			✓
School water efficiency program			✓
Rainwater tank information			✓
Water efficiency upgrades and retrofits			
Large water users audit and retrofit program			✓
Tourist accommodation water efficiency retrofit program			✓
Commercial kitchen ‘Smart Rinse’ fixtures retrofit			✓
Commercial cooling tower tune-up			✓
Waterless urinal retrofit			✓
Residential retrofit program			✓

8. Measurable indicators and review

8.1 Key indicators

Many of the actions and initiatives require the update or completion of plans, programs or the enactment of Council initiatives, such as by local laws. These include school and community education programs, water efficient appliances for new developments, and implementing SLMPs. The status is either completed or not completed.

Specific actions that have variable performance measures include the IWN project components, and the water efficiency upgrade and retrofit programs. These high-importance actions with variable outcomes will be measured as shown in the table below.

Action	Activity	Measurement
Large water users audit and retrofit program	Project planning completed	Y/N
	% large users audited	%
	% large users retrofitted	%
IWN monitoring	Pilot completed	Y/N
	Amount water saved	ML
	Total costs saving	\$
	Net cost saving	\$

Ultimately, the measure of success of the DMS is achieving the reduction in use per day per capita. The target profile is indicated in the following table.

Year	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26
Total per capita (L/c/d)	418	412	405	398	392	386	383	381	380	378	377

8.2 Review and status monitoring

The DMS is a live document, with activities implemented over multi-year timeframes. The progress of the DMS will be reviewed periodically to ensure that the required outcomes are being achieved.

As the first issue of the DMS document, the content of this section is limited mainly to future actions. However, once the DMS is progressing and the document is revised, this section will summarise the following:

- Completed actions / progress since last review
- Performance against plan (schedule)
- Significant changes since last review
- Identified upcoming issues
- Significant risks
- Timing of the next revision

8.3 Next revision

The next revision of the DMS document will be issued no later than July 2016, unless otherwise requested by Council.

9. Conclusion

The DMS is a key component of the CWSS in that the reduction in the total demand for potable water is a key initial step in achieving the balance between demand and supply.

The DMS documents initiatives that are planned for implementation that addresses both residential and non-residential uses through focussed actions. The actions and initiatives encompass the specific parts and components recommended by the WSAG.

The initiatives are grouped into the following categories based on similarity of action:

- Regulatory and Council initiatives
- Intelligent water networks
- Water education programs
- Water efficiency upgrades and retrofits

The implementation of the initiatives and actions are planned over a 10-year period with the majority of activity in the initial one to two years to complete discrete projects and establish ongoing programs of works. The cumulative water saving benefit resulting from implementation of the DMS over the timeframe is estimated to generate a diminishing total use per capita:

Year	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26
Total per capita (L/c/d)	418	412	405	398	392	386	383	381	380	378	377

Successful implementation of the DMS will be supported by the communications and marketing strategy being developed for the CWSS. The related aim of the communications and marketing strategy is to build the cultural change capacity of people to modify their behaviour to reduce demand. It will also require appropriate staff resourcing, likely to involve temporary dedicated project managers and team members, for at least the establishment period over the initial one to two years.

The DMS is consistent with the relevant recommendations of the final report of the WSAG that Council has adopted as the CWSS. It is also consistent with the key water supply planning principles adopted by the WSAG.