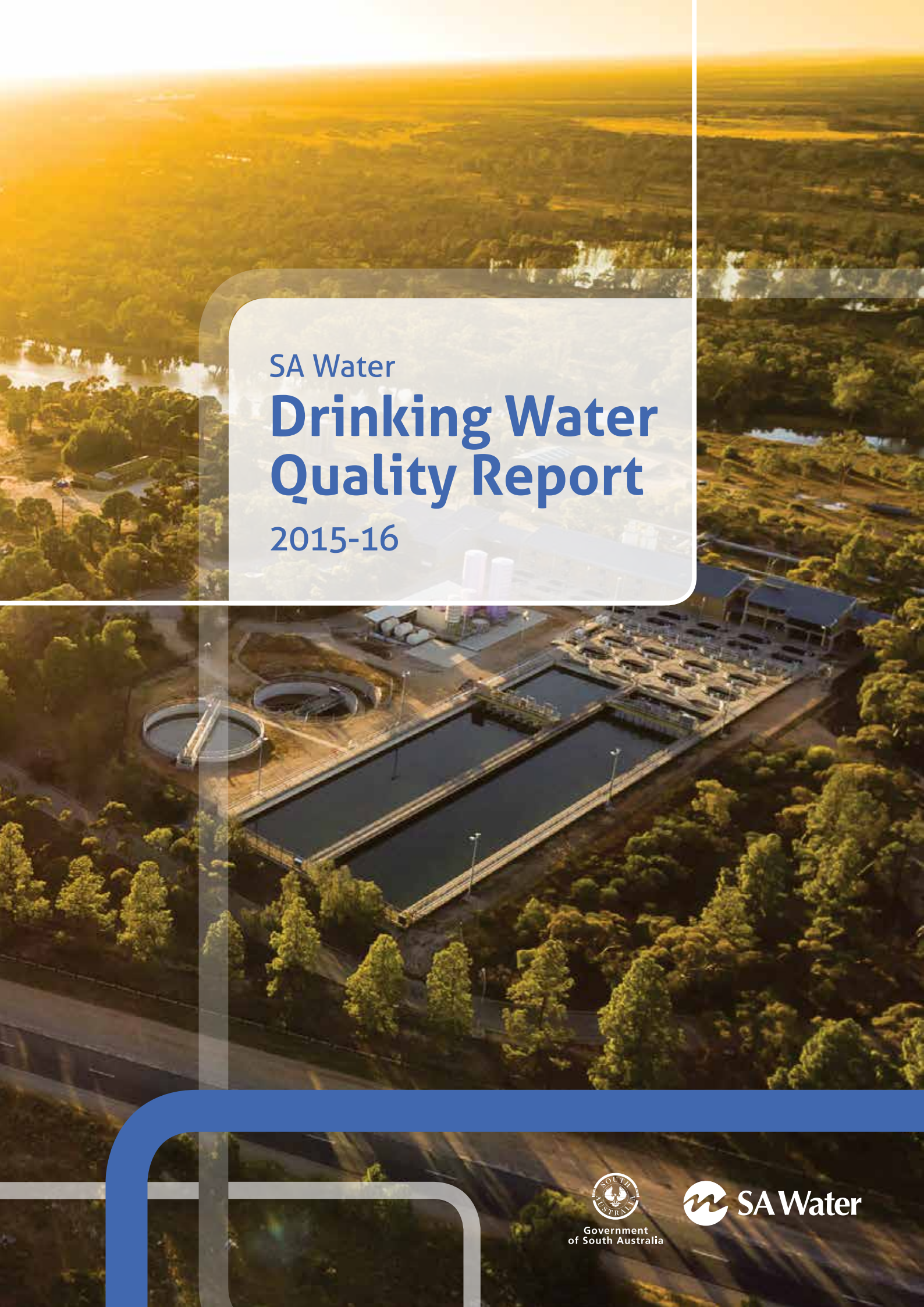

SA Water

Drinking Water Quality Report

2015-16

Government of South Australia

SA Water

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2015-16 HIGHLIGHTS

RAW WATER SOURCES
% of total water supplied

River Murray: 83.1%
Surface water: 8.0%
Seawater: 3.4%
Groundwater: 5.5%

SAFE DRINKING WATER ACT

We successfully completed the second round of yearly audits and inspections and met all legislative requirements.

INCIDENT MANAGEMENT

Incident response index exceeded the 85% target by 8%, achieving 93%. For details see page 38.

NUMBER OF ROUTINE WATER QUALITY TEST ANALYTES CARRIED OUT

357,387 (total)
85,017 (metropolitan Adelaide)
272,370 (regional)

TOTAL NUMBER OF ROUTINE WATER QUALITY TEST ANALYTES FOR HEALTH RELATED PERFORMANCE

42,355 (total)
12,789 (metropolitan Adelaide)
29,566 (regional)

TOTAL WATER DELIVERED
(drinking water)

227 billion litres

ESTIMATED POPULATION SERVED

1,194,000 in metropolitan Adelaide through 9,266 km of water mains.

490,000 in regional areas through 17,633 km of water mains.

DRINKING WATER QUALITY AND PERFORMANCE

42,355 of the routine samples collected from our drinking water supplies throughout South Australia were used to determine health-related compliance.

We achieved **99.96%** compliance with the *Australian Drinking Water Guidelines (ADWG)* health-related parameters in metropolitan Adelaide and **99.83%** in regional areas.

A MESSAGE FROM OUR CHIEF EXECUTIVE

SA Water is proud to deliver a reliable supply of safe, clean drinking water to our South Australian customers. Our day-to-day work puts the customer at the heart of everything we do. This year, in addition to meeting all legislative requirements with the *Safe Drinking Water Act 2011*, we have taken on a number of challenges that have helped us deliver an improved experience for our customers.

We have increased our investment in innovative technology to help us better understand our assets and to improve the quality of our water and services. Our experienced professionals have adopted this emerging technology, putting it to practical use so customers can be confident their drinking water is of the highest standard.

Aerial drones

We have started using aerial drones to give our Network Operations teams a birds' eye view of water catchment areas and infrastructure conditions. Fitted with cameras, the drones offer a more reliable and cost-efficient way to inspect assets and collect information while minimising any potential safety risks.

Spray lining trials

The 'spray lining' technique uses a specially-formulated material that lines the interior of a pipe. The liner, which lasts for 50 years, aims to increase the structural integrity of the pipe without it having to be replaced. Spray lining removes the need for excavation work, minimising impacts on traffic and costs associated with mains replacement.

Australian Water Quality Centre

Our world-class laboratories continued to provide comprehensive water quality testing of all our water supplies across the state, assuring that your drinking water is of the highest standard. As a national centre of excellence, the Australian Water Quality Centre (AWQC) is dedicated to ensuring and responding to the public health requirements relating to the provision of water and wastewater services for communities in Australia and across the world. This year our laboratories introduced new leading-edge technology which will improve our ability to manage source water quality. We also expanded upon our state-of-the-art laboratory facilities in Adelaide through the establishment of an AWQC laboratory in Melbourne in February 2016, enabling the Centre to better support the greater national water industry.

I hope you enjoy reading the report and welcome your feedback. Please email customerservice@sawater.com.au, or phone us on 1300 650 950.

And remember, if you see a leak or burst, call 1300 SA WATER.

Roch Cheroux,
Chief Executive

SA HEALTH STATEMENT

Drinking water provided to the public by SA Water in the 2015–16 reporting period was safe. Operation of the interagency Water/Wastewater Incident Notification and Communication Protocol was maintained successfully throughout the period. None of the incidents reported were considered to represent a risk to public health.

The total number of incidents reported by SA Water during the 2015–16 financial year was significantly lower than previous years. There were fewer cyanobacteria, disinfection by-product (DBP) and turbidity-related incidents compared to the previous reporting period.

Capital improvements to water treatment plants, addressing the causes of preventable incidents and optimising monitoring, have continued to reduce the number of notified incidents. Changes to the reporting criteria in the interagency Water/Wastewater Incident Notification and Communication Protocol also contributed to the decrease in incidents. Water quality incidents were notified by SA Water in a timely and appropriate manner and appropriate preventive measures were implemented.

SA Water collected a total of 42,355 test analytes in the reporting period from drinking water supplies to test for health-related compliance. Compliance with the Australian Drinking Water Guidelines (ADWG) for *E. coli* was achieved in 99.97% of metropolitan Adelaide samples and 99.95% of country samples. Compliance with the ADWG for all health-related parameters was 99.96% for metropolitan systems and 99.83% for country areas.

SA Water has met all obligations under the *Safe Drinking Water Act 2011* and Safe Drinking Water Regulations 2012.

ECONOMIC REGULATION

Economic regulation of SA Water commenced on 1 January 2013 in line with the requirements of the *Water Industry Act 2012*. The role of economic regulation is to ensure water and wastewater customers receive value for money for the services SA Water delivers.

The Essential Services Commission of South Australia (ESCOSA) is the independent regulator responsible for protecting the long term interests of customers with respect to price and service.

We performed satisfactorily under the economic regulatory regime in 2015–16 and worked hard to deliver against its service standards and the requirements under the regulatory framework.

We submitted a Regulatory Business Proposal (RBP 2016) to ESCOSA on 31 August 2015. This proposed levels of service and expenditure that will help us to set revenue levels (recovered costs from customers) for the 2020–24 regulatory period (second regulatory period). We were able to propose reduced prices for customers in the RBP 2016 as we had become more efficient (in the first regulatory period) and had proposed further efficiencies in the second regulatory period.

ESCOSA reviewed our proposal and determined the allowable revenue in June 2016. The revenue level was closely aligned with our proposal and reduced the average metropolitan residential customer's combined water and sewerage bill by $87 or 6.7%.

We will continue to work hard over this regulatory period to deliver on the commitments made in RBP 2016 and improve our services to customers.

SAFE DRINKING WATER LEGISLATION

South Australia's *Safe Drinking Water Act 2011* commenced on 1 March 2013. The audit and inspection schedule commenced on 1 July 2014. We successfully completed the second round of yearly audits and inspections and met all legislative requirements.

The Act provides the regulatory framework for drinking water providers in South Australia and is administered primarily by SA Health with assistance from local government. Provisions in the Act are underpinned by the ADWG and require drinking water providers to:

- Register with SA Health
- Develop and implement risk management plans
- Establish approved drinking water quality monitoring programs
- Notify of any incidents or non-compliance
- Audit and inspect to determine compliance with the Act
- Use National Association of Testing Authorities (NATA) accredited laboratories for sample testing
- Report water quality test results to SA Health and provide consumers with drinking water quality information.

We are registered as a drinking water provider and have approved monitoring programs and an incident notification protocol. We provided water quality testing reports for metropolitan and country water supplies each month which showed a high level of compliance. We successfully completed the second yearly audit in February 2016. We audited a representative sample of our drinking water supplies to satisfy the Act's requirements. These met the legislative requirement for all metropolitan, country and remote community drinking water supplies.

Our approach to managing drinking water quality, through our Drinking Water Quality Management System (DWQMS), is based on the ADWG Framework for Management of Drinking Water Quality. This means that we already satisfy most of the requirements outlined in the *Safe Drinking Water Act 2011*. This report addresses one of the Act's requirements – to report results and provide consumers with drinking water quality information – and outlines details of several other key components.

Further information on the *Safe Drinking Water Act 2011* can be found at: sahealth.sa.gov.au/safedrinkingwateract

THE SA WATER AND ALLWATER ALLIANCE

The Adelaide Services Alliance is an agreement between SA Water and Allwater to operate and maintain metropolitan Adelaide's water, wastewater and recycled water systems.

Allwater is a joint venture between Suez and Broadspectrum, each bringing a wide range of water expertise to the partnership.

The Alliance agreement has an extensive set of internal performance measures to track progress and drive continuous improvement across the full range of delivered services.

Delivering high quality water to Adelaide's customers is of paramount importance to all members of the Alliance. We conduct regular testing throughout the network to ensure the water produced at the Allwater-operated water treatment plants meets required standards. We collected 12,789 test analytes from the metropolitan Adelaide drinking water systems in the last financial year to determine health-related compliance. We achieved compliance in 99.96% of tests – a high performance result.

In total, more than 85,000 test analytes were conducted on metropolitan Adelaide's drinking water during 2015–16.

Allwater worked closely with us to take over operation of the Skye water supply system. They helped us to develop and construct a connection to the greater metropolitan Adelaide water network, decommission the previous bore water supply, clean the supply system, install new sampling points and make other improvements. A number of on-line chlorine analysers were installed at various points in the metropolitan Adelaide water network. These analysers will enable Allwater to better control levels of chlorine in the network.

We funded a number of capital projects at Allwater-operated metropolitan water treatment plants in 2015–16, including filter upgrades to improve water quality at Barossa, Anstey Hill and Hope Valley Water Treatment Plants, major control system upgrades at Myponga Water Treatment Plant, removal of raw water by-pass systems at a number of plants and relining and covering one of the treated water storages at Happy Valley Water Treatment Plant.

The Happy Valley Water Treatment Plant was voted as producing South Australia's best tasting water at the inaugural Water Industry Operators Association SA Interest Day and Taste Test, held in July 2015. Attendees judged the heats and selected four grand finalists, who were voted on by the organisers and sponsor.

DRINKING WATER QUALITY MANAGEMENT

We manage drinking water quality from catchment to tap in line with our Drinking Water Quality Management System to ensure a consistent and reliable supply of high quality, safe drinking water to our customers.

This management system is based on the Framework for Management of Drinking Water Quality outlined in the ADWG that is endorsed by the National Health and Medical Research Council (NHMRC). The framework outlines good drinking water supply management, based on the best available scientific evidence, that will assure drinking water quality and safety at the tap.

There are 12 elements within the framework which are considered best practice:

1. Commitment to drinking water quality management
2. Assessment of the drinking water supply system
3. Preventive measures for drinking water quality management
4. Operational procedures and process control
5. Verification of drinking water quality
6. Management of incidents and emergencies
7. Employee awareness and training
8. Community involvement and awareness
9. Research and development
10. Documentation and reporting
11. Evaluation and audit
12. Review and continual improvement.

Our Drinking Water Quality Policy underpins the corporation's commitment to deliver ongoing drinking water quality and improvement.

We use 'AQUALITY' to regularly assess our improvements against implementation of the 12 elements of the ADWG framework. AQUALITY is a measurement and evaluation tool developed by the Water Services Association of Australia (WSAA) as a key performance indicator. We improved our implementation percentage from 93.6% (2014-15) to 94.3% during 2015–16, exceeding the 2015–16 target of 94.0% (page 7).

This improved score was a result of the following actions:

- The Responsibility Matrix, which defines accountabilities and responsibilities associated with each key water quality process, was reviewed and endorsed by stakeholders.
- Maintenance of the management system documentation continued. This provides up-to-date information on managing water quality from catchment to tap.
- Additional water quality standards, guidelines and operational procedures were developed to enhance our response to potential water quality risks.
- Incident and emergency management scenarios and testing was undertaken, including debriefs and subsequent revision of emergency plans.
- A second successful external *Safe Drinking Water Act* audit was completed with no non-compliances.
- The Drinking Water Quality Management System Internal Audit Program continued to be developed and audits were undertaken.

FUTURE STRATEGIES THAT ARE PROPOSED FOR THE 2016–17 PERIOD INCLUDE:

- Continuing use of the AQUALITY tool to determine strategies that will help us to continue to meet and improve ADWG framework targets.
- Continuing to improve the framework across systems managed by our contractors. This will make sure that documentation, processes, procedures and practices are continually improved in order to maintain high water quality standards.
- Developing enhanced strategies and initiatives, in line with the *Safe Drinking Water Act 2011*, to meet regulatory requirements including risk processes, system auditing and reporting. These strategies will cover our operations, contractors and alliance partner Allwater.

Our progress in applying the Framework for Management of Drinking Water Quality (ADWG)

Framework element	Framework description	2014-15 Score (%) Target: 93.5	2015-16 Score (%) Target: 94.0
1	Commitment to drinking water quality management	100	100
2	Assessment of the drinking water supply system	98	98
3	Preventive measures for drinking water quality management	94	92
4	Operational procedures and process control	88	92
5	Verification of drinking water quality	97	98
6	Management of incidents and emergencies	97	99
7	Employee awareness and training	88	87
8	Community involvement and awareness	95	99
9	Research and development	94	92
10	Documentation and record keeping	100	99
11	Evaluation and audit	85	88
12	Review and continual improvement	85	86
Overall AQUALITY score		**93.6**	**94.3**

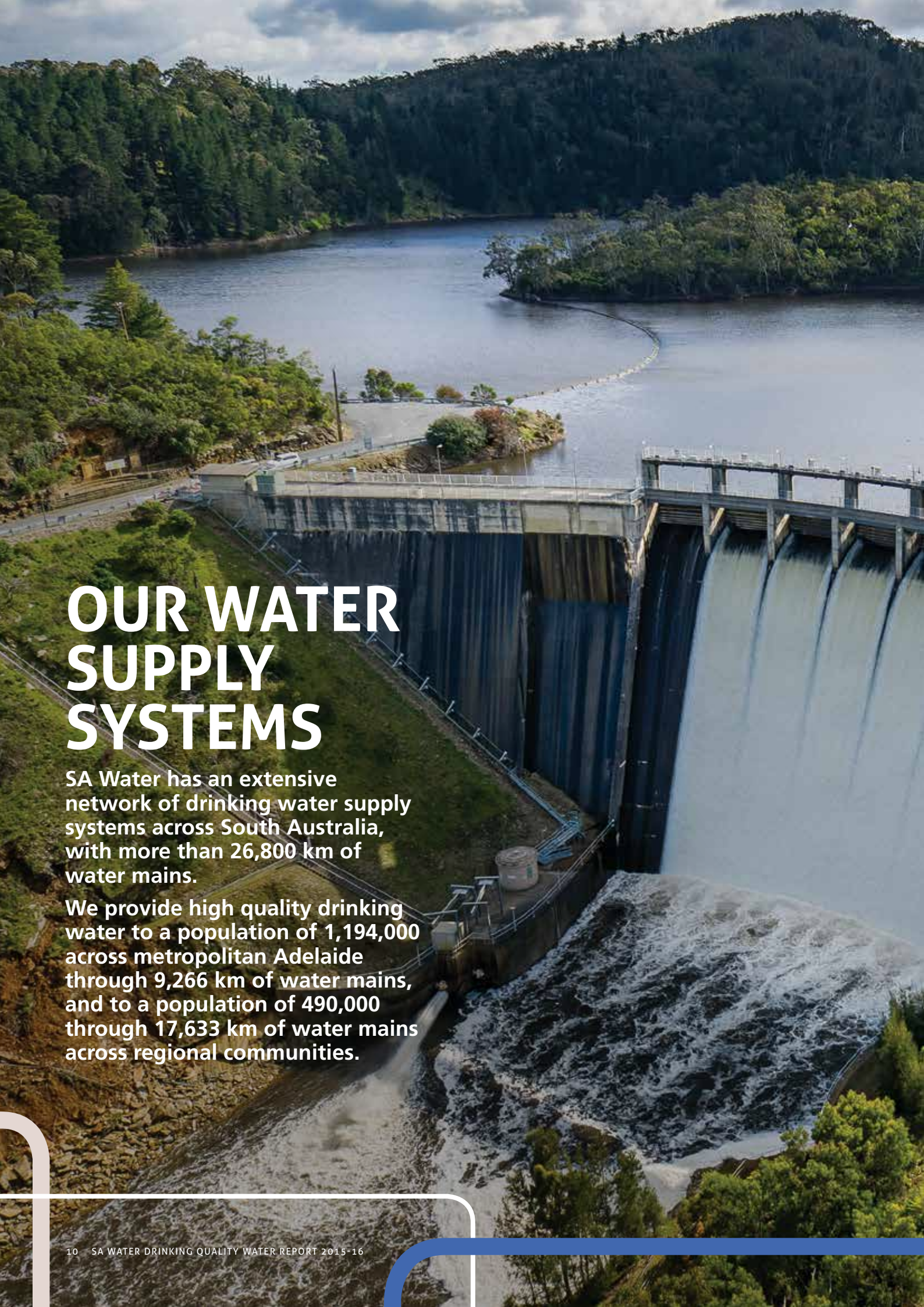
AQUALITY score across all elements

	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Achieved (%)	87.7	88.4	91.2	93.2	93.6	94.3
Target (%)	86.0	86.5	90.0	93.0	93.5	94.0

WE ARE APPLYING THE FRAMEWORK FOR MANAGEMENT OF DRINKING WATER QUALITY (ADWG):

1	**Commitment to drinking water quality management**	~ A drinking water quality policy, endorsed by the Chief Executive, is in place and has been communicated to employees. ~ We have implemented responsibility matrices that define roles, accountabilities and responsibilities for processes. We have identified legal/regulatory obligations and documented the requirements through a compliance manual.
2	**Assessment of the drinking water supply system**	~ A formal water quality hazard and risk assessment process is in place. ~ A new system platform has been developed to better manage risk tracking and coordination. ~ A document structure is in place that includes a description of the water supply system, a visual schematic, performance reporting and an operating plan which are reviewed and revised regularly.
3	**Preventive measures for drinking water quality management**	~ Water quality hazard identification, risk assessment, and risk mitigation are centrally managed and details accessible by all of our staff and select contractors. ~ Appropriately validated, monitored and telemetered critical limits are in place at critical control points.
4	**Operational procedures and process control**	~ Water quality procedures are in place to support reliable achievement of the target criteria, critical limits and water quality objectives. ~ Supervisory Control and Data Acquisition (SCADA) online monitoring is in place. SCADA allows us to continuously remotely monitor and control water and wastewater assets and infrastructure. ~ Processes are in place to make sure that water infrastructure procurement complies with Australian Standard / New Zealand Standard 4020: Testing of products for use in contact with drinking water. ~ We have continuous monitoring and staff alert systems with a 24/7 centralised Operational Control Centre.
5	**Verification of drinking water quality**	~ The Water Quality Monitoring Handbook outlines our philosophy for water quality monitoring in all systems and is based on the ADWG. Deviations from the ADWG are documented and have been approved by SA Health. ~ We conduct regular and event-based monitoring of water quality and analyse samples at a NATA accredited laboratory. ~ Processes are in place to capture customer feedback, including reports developed to analyse feedback to assist in determining appropriate responses.
6	**Management of incidents and emergencies**	~ We have defined multi-level alert and response protocols, including SA Health notification limits and methods. ~ We have direct reporting processes to ensure SA Health is notified of verified exceedances by SA Water's laboratory. ~ A formal root-cause analysis process and record-keeping system is in place. ~ We conduct incident and emergency scenarios and testing.
7	**Employee awareness and training**	~ A host of providers delivered extensive certified training in line with the National Water Package. ~ Water quality training courses were developed in accordance with the National Australian Qualifications Framework standard and presented to targeted staff covering topics such as water quality sampling, water quality testing, disinfection for operators and demonstration of knowledge of ADWG risk management principles. ~ Ongoing training program for water quality awareness, root cause analysis, incident management, corporate employee induction and odours in water supplies were reviewed and delivered to relevant staff.

8	**Community involvement and awareness**	~ A dedicated community involvement team made sure customer issues and concerns were assessed and responded to according to policy requirements. ~ A customer research and engagement initiative is in place to better understand customers and their experiences with SA Water and our Alliance partners. ~ We conducted a Community Investment Program that delivers regular education sessions on water quality and treatment to schools and community groups. ~ Our website (sawater.com.au) provides general information on key water quality parameters (including hardness data for dishwasher settings) and water quality performance data for all SA Water drinking water supply systems (for individual suburbs and townships).
9	**Research and development**	~ The Research and Innovation Services (R&IS) group undertook research to generate new knowledge, provide solutions to operational challenges and implement effective technologies to mitigate risk and improve operational performance. ~ Our research included collaborations with other water utilities, universities and external research providers – both locally, nationally and internationally – to ensure the delivery of optimum water quality solutions.
10	**Documentation and reporting**	~ The DWQMS has been developed to authorise, control and review water quality related documentation in accordance with ADWG requirements. ~ Our annual drinking water quality report details performance against the ADWG and outlines our commitment to delivering safe, reliable and high quality drinking water to South Australian communities. An overview of key performance targets, achievements and areas identified for improvement is included in the report.
11	**Evaluation and audit**	~ We reviewed long-term trends for key water quality parameters to help determine priorities for improving drinking water quality. ~ We programmed internal auditing across the water supply systems to assess the performance of drinking water quality management and against the ADWG framework requirements. ~ External audits were undertaken by a SA Health approved third party auditor (Registrar Accreditation Board and Quality Society of Australasia (RABQSA) certified) to measure compliance with the *Safe Drinking Water Act 2011* requirements. Furthermore, SA Water's contractors and alliance partners were also audited as part of this process.
12	**Review and continual improvement**	~ We reviewed the DWQMS as a whole, including the policy, objectives and performance measures, at a senior management level and within relevant operations business units to ensure its ongoing relevance and effectiveness in addressing any water quality issues. ~ The AQUALITY tool (WSAA developed) was used to report progress on the application of the DWQMS. ~ Actions arising from audits, root-cause analysis outcomes from incidents and agreed improvements were tracked and managed through a web based action and compliance system.



OUR WATER SUPPLY SYSTEMS

SA Water has an extensive network of drinking water supply systems across South Australia, with more than 26,800 km of water mains.

We provide high quality drinking water to a population of 1,194,000 across metropolitan Adelaide through 9,266 km of water mains, and to a population of 490,000 through 17,633 km of water mains across regional communities.

OUR WATER SUPPLY SOURCES

In South Australia, raw water for treatment is collected from four distinctly different sources: reservoirs, the River Murray, groundwater and the ocean.

RESERVOIRS

Water treatment plants supplying the Adelaide metropolitan area are supplied with raw water collected from the Mount Lofty Ranges catchment and supplemented with water from the River Murray. Once soils in the catchment are saturated as a result of rainfall, water runs off the land and into streams. The streams flow into reservoirs where this water, together with any water pumped from the River Murray, is stored and pumped or gravity fed to water treatment plants to be filtered, disinfected and transferred into the distribution network. Ten reservoirs, with a combined storage volume of almost 200 gigalitres at full capacity, and six water treatment plants service metropolitan Adelaide's water supply systems and beyond. Outside of the metropolitan area, Middle River Reservoir on Kangaroo Island supplies a water treatment plant which provides filtered and disinfected water to Kingscote and smaller communities along the transfer pipeline. In 2015–16, 8.0% of the water supplied by SA Water was provided by surface water (excluding the River Murray).

RIVER MURRAY

The River Murray is a key source of raw water for South Australia. Of our 67 drinking water supply systems, 33 source water either directly or indirectly from the River Murray, including 18 water treatment plants located along South Australia's reaches of the River Murray. The River Murray also supplements metropolitan Adelaide's reservoirs (with the exception of Myponga Reservoir) via two raw water pipelines: the Murray Bridge-Onkaparinga pipeline (48 km in length) and the Mannum-Adelaide pipeline (60 km in length).

Three major pipelines supply treated water from the River Murray to various regional communities:

- **The Morgan-Whyalla pipeline** (356 km long via Port Augusta and 281 km long via the undersea section from Baroota) is used to transfer treated River Murray water from the Morgan Water Treatment Plant to the Upper Spencer Gulf; significant areas of the mid-north, Yorke Peninsula and Eyre Peninsula.
- **The Swan Reach-Stockwell pipeline** (54 km in length) supplies treated water from the Swan Reach Water Treatment Plant to communities along its route, including those in the Barossa Valley; it also feeds into the Yorke Peninsula supply.
- **The Tailem Bend-Keith pipeline** (133 km in length) supplies treated water from the Tailem Bend Water Treatment Plant to 13 communities in the upper South East and around Lake Albert.

The percentage of water supplied to Adelaide from the River Murray varies from year to year, with the river providing about 40% of the city's water in an average year. During 2015–16, 83.1% of water supplied by SA Water was sourced from the River Murray.

GROUNDWATER

Groundwater is contained in underground water bodies known as aquifers. We have 31 drinking water supply systems that draw water from aquifers as their primary source of domestic water. Most of these are located in the South East, Eyre Peninsula and northern region of South Australia. The Blue Lake, which supplies the city of Mount Gambier, is included in this as it is a volcanic crater containing groundwater from local aquifer systems. The quality and volume of water that can be extracted from an aquifer varies from region to region. During 2015–16, almost 5.5% of the water we supplied was provided by groundwater.

SEAWATER

Desalinated drinking water from Adelaide Desalination Plant (ADP) was introduced into the distribution network in October 2011. Desalinated drinking water from the plant is pumped through a transfer pipeline to the Happy Valley Water Treatment Plant where it is blended with treated water from Happy Valley Reservoir before being delivered via the distribution network to Adelaide customers.

A desalination plant with an output of approximately 300 kilolitres of drinking water per day has been in operation on Kangaroo Island since 1999 supplying the Penneshaw community. In 2015–16, desalinated seawater accounted for 3.4% of South Australia's total water supply.

BRINGING CUSTOMERS IMPROVED SERVICES THROUGH NEW TECHNOLOGY

We introduced several new technologies during the 2015–16 financial year to improve the water quality and services provided to our South Australian customers. From below ground cameras to sophisticated intelligence gathering, we have gone to great lengths to use cutting edge technology.

Bore Inspections

Bore water pipes and infrastructure inspections are required when the water quality declines or there is a decrease in yield from a bore. We operate and maintain 149 bores in total and prior to this financial year bore inspections were outsourced.

This financial year, the Operations and Maintenance team started using specialised camera equipment to perform inspections of our bore casings. We have increased our internal capabilities by using the new camera technology and saved the business money.

Aerial Drones

The use of aerial drones has become increasingly popular amongst commercial businesses and government agencies. We have started using aerial drones to give the Network Operations department a birds' eye view of tank and pump station conditions. The drones are fitted with cameras and offer an alternative way to inspect assets and collect information while minimising work health and safety (WHS) risk. They can collect high-definition images and video of assets that can be viewed safely from the ground or in the office. Aerial drones have improved safety by carrying out tasks that would otherwise be hazardous or very time consuming, saving the business time and money. This technology has also allowed the River Murray Operations Unit to improve their mapping functionality.

Smart Metering

The launch of smart metering and the online web portal pilot attracted over 14 major business customers during the financial year. The portal allows business customers to observe water use at their sites in 15-minute intervals via data transmitted from a data logger attached to the SA Water meter.

The water use data benefits us and the customers, as the customers can gain a deeper understanding of water use across their sites and we can identify trends and incidents that can be discussed with both the customer and internal stakeholders.

DNA Source Tracking

The Australian Water Quality Centre (AWQC) implemented ground-breaking DNA technology which can identify the source of faecal contamination in water sources. By tracking environmental DNA, we can determine which animal (or organism) is present in, or impacting, a particular water source.

This technology allows utilities to eliminate or manage the source of faecal contamination. Better risk assessment and source water management can save hundreds of millions of dollars in infrastructure and water treatment costs.

Remotely Operated Underwater Vehicles

One vehicle is helping us learn more about our assets that lay beneath the water's surface. The remotely operated underwater vehicle (ROV) is a mini unmanned submarine equipped with high definition cameras. We use it to capture high-definition video and images of our underwater structures, such as parts of a weir, reservoir or water storage. One of the ROV's benefits is it can be operated from a trailer away from the water's edge. This provides a safer and more efficient alternative when divers aren't required.

We will use information gathered via the ROV at some sites to prioritise structure repairs or upgrades. This will be based on the condition of the assets as seen in the captured images or videos.

Spray Lining

In a South Australian first, we began a trial of a new technique to prolong the life of water mains. The 'spray lining' technique uses a specially-formulated material that lines the interior of a pipe. Spray lining offers significant benefits to our customers and community because it removes the need for excavation work and therefore minimises both traffic disruptions and the additional costs associated with mains replacement.

WATER TREATMENT

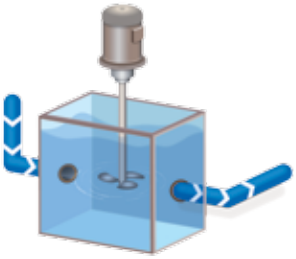
Numerous water treatment plants have been constructed in South Australia over the years to improve the quality of available water sources. The treatment program started with the construction of an iron removal plant at Kingston SE in 1963.

Today there are 42 operational water treatment plants, comprising:

- Six large conventional water treatment plants serving metropolitan Adelaide.
- Twenty-three water treatment plants serving country regions and towns. Earlier plants were of conventional design while more recent plants incorporate newer technologies such as ion exchange, membrane filtration and activated carbon adsorption.
- Ten iron removal plants in the South East.
- Two seawater desalination plants serving Adelaide and Penneshaw and one bore water desalination plant serving Hawker.

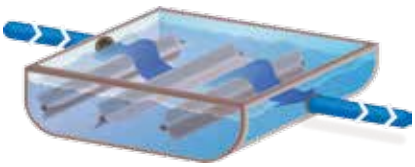
CONVENTIONAL WATER TREATMENT PLANTS

SA Water's conventional water treatment plants typically use a seven step process to deliver safe drinking water to our customers.



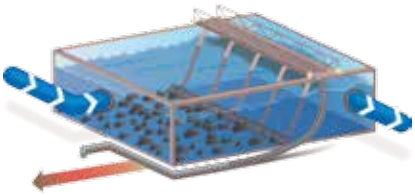
Step 1: Coagulation

A chemical (coagulant) is added to the untreated raw water and reacts with impurities such as small particles and dissolved organic matter. The coagulant traps the suspended particles and much of the dissolved organic material. The success of the treatment process very much depends on successful coagulation and SA Water is investing in the latest instrumentation to help maximise coagulation effectiveness.



Step 2: Flocculation

The coagulant combined with the captured particles is called 'floc'. Flocculation is a gentle mixing process that brings together the flocs formed in the coagulation step to form larger flocs that settle more easily. Water remains in the flocculation tanks for a minimum of 20–30 minutes.



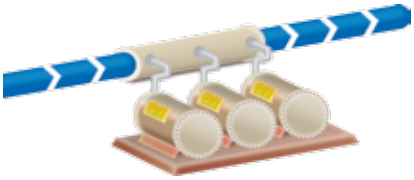
Step 3: Sedimentation

Water and suspended flocs pass slowly through sedimentation basins or clarifiers, where most of the floc settles to the bottom as a sludge. The clarified water (now containing only a small amount of very fine floc particles) continues on to the filters. The sludge is periodically removed from the basins for further treatment and disposal.

An alternative technique called Dissolved Air Floatation (DAF) is used at the Myponga Water Treatment Plant. This uses fine air bubbles to float floc to the surface to form a sludge blanket, which is periodically removed by overflowing the floatation tanks.

Step 4: Filtration

The remaining floc particles are removed by passing the clarified water through filtration media. The most common filters at the larger water treatment plants are deep beds of sand or a combination of sand and anthracite. In our newer and smaller water treatment plants, the final filtration step is achieved by forcing the clarified water through synthetic membranes.



Step 5: Disinfection

A chemical disinfectant is generally added at a point between the filters and the filtered water storage tank, to destroy any microorganisms that may not have been removed in the earlier flocculation and filtration stages. In South Australia, chlorine is the disinfectant of choice for supply systems with relatively short detention times of a day or two, while chloramine (produced by reacting chlorine and ammonia) is used in supply systems with longer pipeline infrastructure. Disinfection sometimes requires the pH of the water to be adjusted to enhance the performance of the disinfectant. In some applications, ultraviolet (UV) light is used to complement chemical disinfection.

Step 6: Fluoridation

Fluoride is added to major water supply systems at a concentration determined by SA Health to help prevent tooth decay.

Step 7: Storage and distribution

After disinfection, the finished water is transferred to covered water storage tanks, ready for distribution to SA Water's customers.

MAGNETIC ION EXCHANGE (MIEX®)

In some more challenging raw water supply systems, additional treatment requires the use of MIEX® – a specialised ion exchange resin which contains unique magnetic properties. MIEX® resin is added to the raw water to remove dissolved organic carbon (DOC) prior to employing conventional water treatment processes. DOC is found in all natural water sources and is the result of the decomposition of natural organic matter which can cause colour, taste and odour in drinking water.

The orange/brown colour of many surface waters is attributed to DOC compounds. The DOC is adsorbed onto the MIEX® resin and the resin's magnetic properties allow the loaded resin to combine and settle out. This settled resin is then collected and regenerated using a salt solution so that it can be reused. Pre-treatment employing the MIEX® process results in a significant reduction in chemical usage, sludge generation and the amount of chlorine required for effective disinfection and public health protection.

ULTRAVIOLET LIGHT (UV) DISINFECTION

Ultraviolet light is used to disinfect water in some water treatment plants. Exposure to adequate doses of UV light renders bacteria, viruses and protozoa non-pathogenic to humans. In the UV disinfection process, the water passes through reactors with sufficient UV lamps to deliver the required UV dose. The required UV dose is dependent on certain water quality factors such as clarity, dissolved compounds and microorganisms present. For a listing of the water treatment plants that employ UV disinfection please refer to the table on page 20-21.

IRON REMOVAL PLANTS (IRPS)

Many South Australian groundwater sources contain elevated iron concentrations. The presence of iron in water does not pose a risk to human health, but it can lead to brown discolouration and possible staining of fixtures and washing. IRPs are a simplified version of conventional water treatment plants, where chlorine is added to oxidise the iron to an insoluble form that precipitates naturally, forming small floc. The iron floc is removed from the water by filtration through sand media. SA Water is currently engaged in a program to upgrade many iron removal plants by installing facilities to capture and reprocess backwash water.

This will reduce the amount of groundwater extracted and minimise environmental impact. For a listing of IRPs please refer to the table on pages 20-21.

DESALINATION

Due to a lack of an alternative viable water supply, a small seawater desalination plant was constructed at Penneshaw on Kangaroo Island in 1999. Seawater is drawn into the plant through an intake pipe and pre-screened. UV disinfection is used to minimise biological growth and filters remove most of the particulate matter. The filtered seawater is forced under high pressure through reverse osmosis membranes that allow fresh water to pass through, with very little salt. The desalinated water is re-mineralised with carbon dioxide (CO_2) and marble chips to reduce its corrosive properties and improve taste prior to chlorine disinfection and distribution to customers.

The Adelaide Desalination Plant at Lonsdale also uses reverse osmosis with pre- and post-treatment. The plant first produced drinking water in 2011 and has the ability to produce up to 100 billion litres (100 GL) of drinking water each year. The water produced is transferred to the Happy Valley Water Treatment Plant, where it is blended with filtered water prior to distribution. The ratio of desalinated water in the blend can vary and the Happy Valley water quality can differ in characteristics, such as chlorine demand, so considerable care is exercised at Happy Valley to ensure that the blended water customers receive is of a consistently high quality.

The Hawker Desalination Plant is now providing Hawker residents with a long-term, sustainable solution to water quality and supply. Similar to the Adelaide and Penneshaw desalination plants the Hawker plant uses reverse osmosis with pre- (iron removal facility) and post- (pH correction facility) treatment. Desalinated water is then blended with a small amount of filtered groundwater to provide the necessary mineral balance to improve taste.

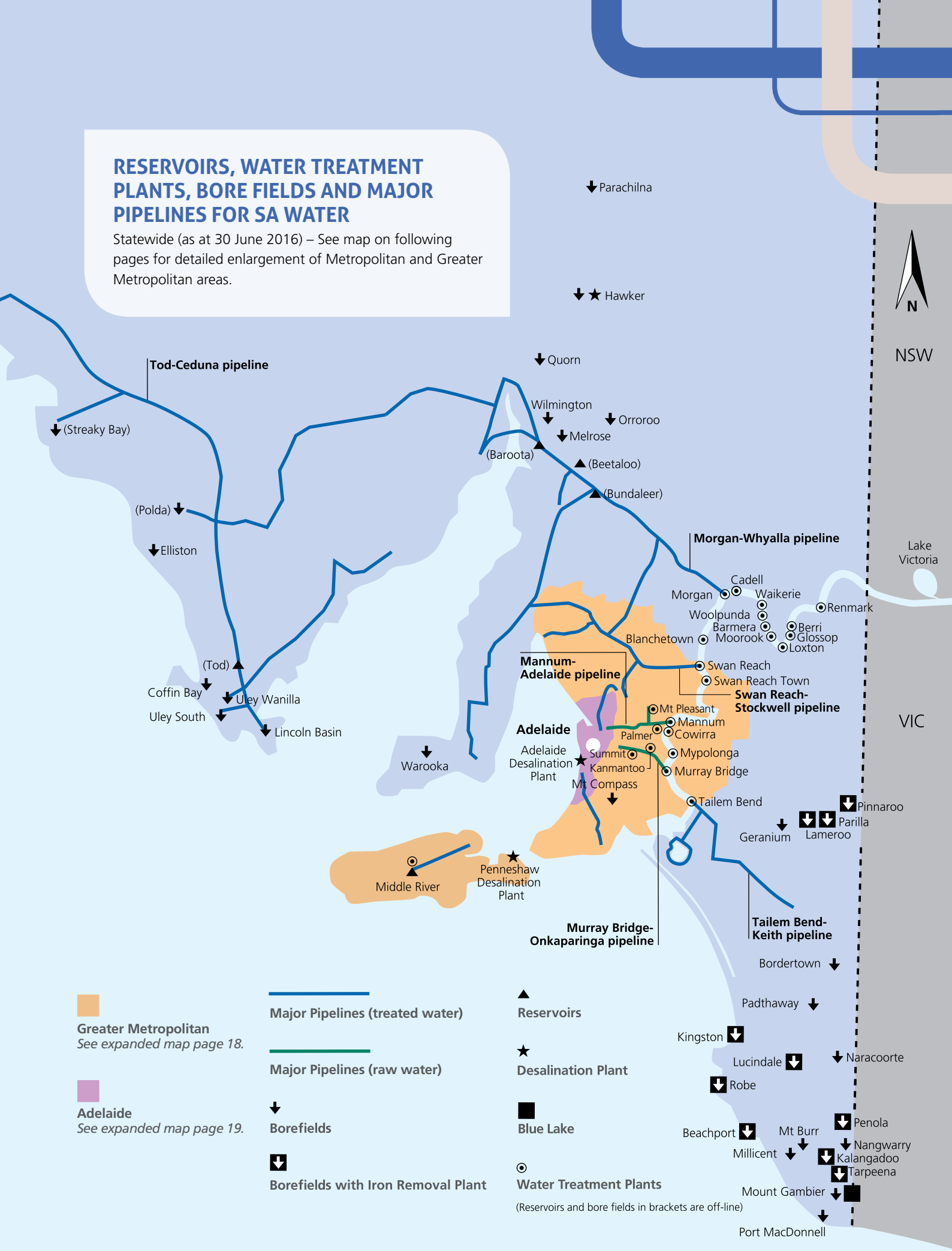
MEMBRANE FILTRATION

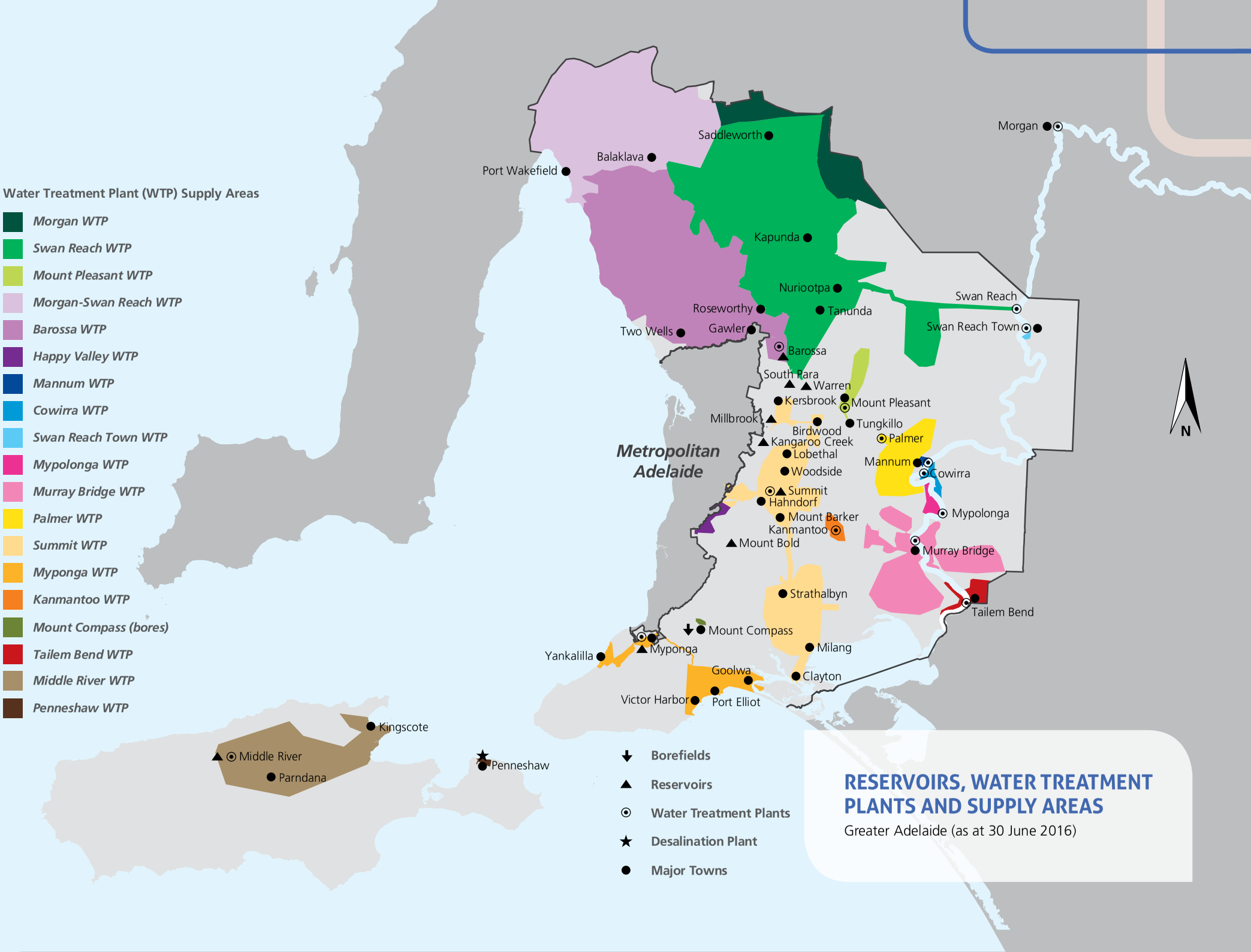
SA Water has strategically invested in membrane filtration plants, which represent the future of water treatment. The technology is mature and very competitive against traditional sand filtration processes. Typically, a membrane plant requires 30–40% less footprint area than traditional sand filters. Membrane filters are made of specialised polymers with very small pores. The pore size of membrane filters is typically less than 0.1 microns, which is about 50–100 times smaller than the thickness of a human hair. Membranes provide a direct physical barrier to waterborne pathogens, such as *Cryptosporidium*, which is resistant to chlorine disinfection. Pre-treated clean water is sucked through the membranes at low pressure, much like the suctioning action through a straw.

Membrane filters are regularly backwashed with air and clean water to remove accumulated solids. Chemical cleaning is required on a monthly basis to remove material not effectively removed by air and water backwash. Typical membrane life ranges from 3–8 years depending upon the quality of the raw water. SA Water employs membrane filtration at 11 facilities treating River Murray water, including Mount Pleasant (since 2000) and the Country Water Quality Improvement Program Stage 3 plants (since 2008).

RESERVOIRS, WATER TREATMENT PLANTS, BORE FIELDS AND MAJOR PIPELINES FOR SA WATER

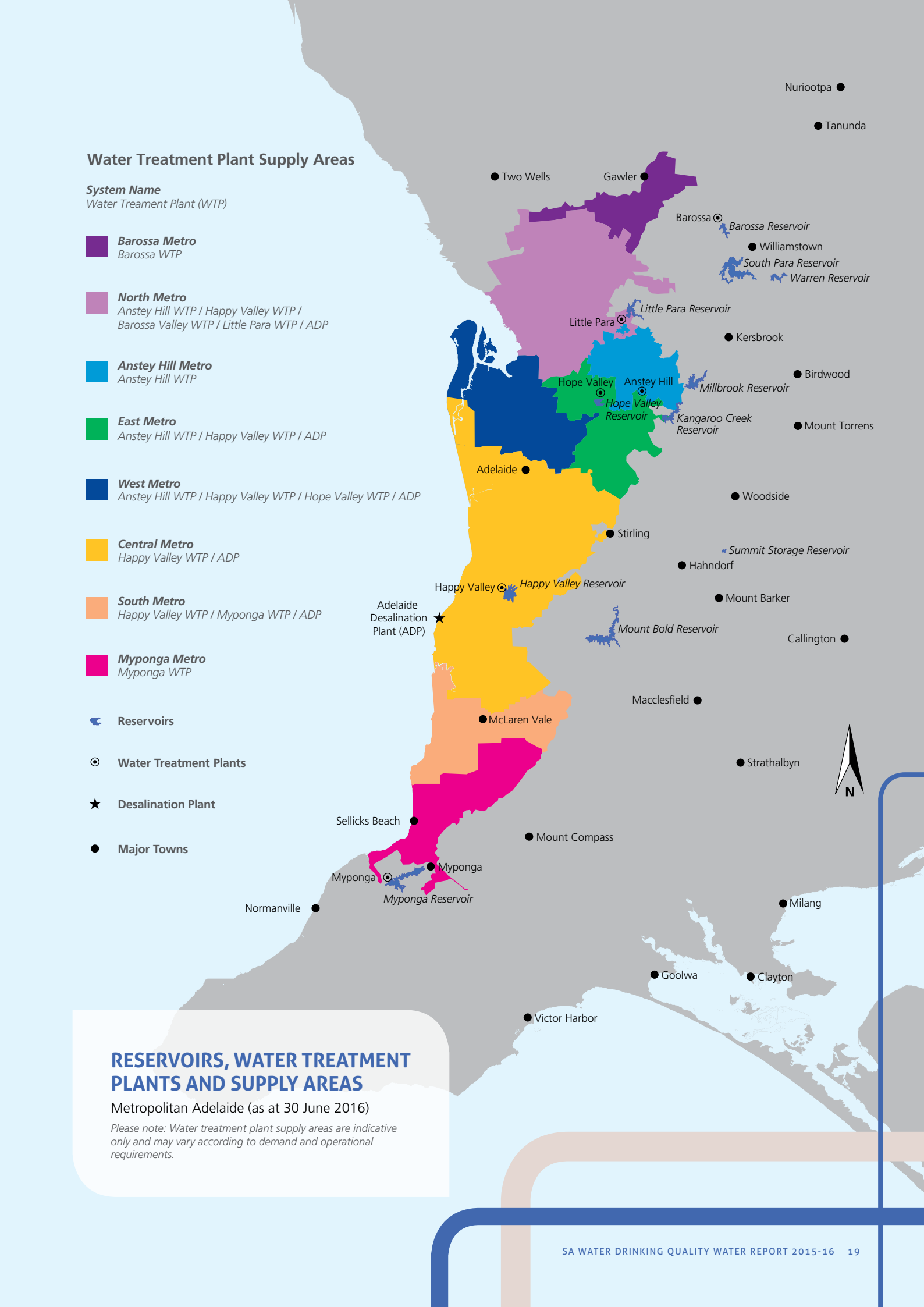
Statewide (as at 30 June 2016) – See map on following pages for detailed enlargement of Metropolitan and Greater Metropolitan areas.





RESERVOIRS, WATER TREATMENT PLANTS AND SUPPLY AREAS

Greater Adelaide (as at 30 June 2016)



RESERVOIRS, WATER TREATMENT PLANTS AND SUPPLY AREAS

Metropolitan Adelaide (as at 30 June 2016)

Please note: Water treatment plant supply areas are indicative only and may vary according to demand and operational requirements.

COUNTRY DRINKING WATER SUPPLY SYSTEM SOURCES AND TREATMENT

The following table lists our country drinking water supply systems, their raw water sources and the type of water treatment/disinfection applied.

Water supply system	Supply source	Treatment					Primary Disinfection				Fluoridation
		Conventional water treatment plant	Iron removal plant	Desalination plant	Membrane plant	MIEX® pre-treatment	Cl_2		NH_2Cl	UV	
							Gas (G)	Liquid (H)			
Barmera WTP	RM	✓ (RW)					✓ (G)			✓	✓
Barossa WTP#	Res/RM	✓ (AW)					✓ (G)				✓
Beachport IRP	Bores		✓ (SAW)				✓ (G)				
Berri WTP	RM	✓ (RW)					✓ (G)			✓	✓
Blanchetown WTP	RM				✓ (SAW)			✓ (H)			
Bordertown	Bores						✓ (G)				
Cadell WTP	RM				✓ (SAW)			✓ (H)			
Coffin Bay	Bores						✓ (G)				
Cowirra WTP	RM				✓ (SAW)			✓ (H)			
Elliston	Bores						✓ (G)				
Eyre South[1]	Bores						✓ (G)				
Eyre South /Morgan WTP[2]	Bores/RM	✓ (SAW) (Morgan WTP)					✓ (G) (at Eyre South bores)		✓ (G) (at Morgan WTP)		✓ (at Morgan WTP)
Geranium	Bores							✓ (H)			
Glossop WTP	RM				✓ (SAW)			✓ (H)			
Happy Valley WTP#	Res/RM/ ADP	✓ (AW)					✓ (G)				✓
Hawker Desalination WTP	Bores			✓ (SAW)			✓ (G)				
Kalangadoo IRP	Bores		✓ (SAW)					✓ (H)			
Kanmantoo WTP	RM				✓ (SAW)			✓ (H)			
Kingston SE IRP	Bores		✓ (SAW)				✓ (G)				
Lameroo IRP	Bores		✓ (SAW)					✓ (H)			
Loxton WTP	RM	✓ (RW)							✓ (G)	✓	✓
Lucindale IRP	Bores		✓ (SAW)				✓ (G)				
Mannum WTP	RM	✓ (RW)					✓ (G)			✓	✓
Melrose	Bores						✓ (G)				
Middle River WTP	Res	✓ (SAW)				✓	✓ (G)			✓	
Millicent	Bores						✓ (G)				
Moorook WTP	RM				✓ (SAW)			✓ (H)			
Morgan WTP	RM	✓ (SAW)							✓ (G)		✓
Morgan/Swan Reach WTP[3]	RM	✓ (Morgan WTP, SAW; Swan Reach WTP, RW)							✓ (G)	✓ (at Swan Reach WTP)	✓
Mt Burr	Bores							✓ (H)			
Mt Compass	Bores							✓ (H)			

COUNTRY DRINKING WATER SUPPLY SYSTEM SOURCES AND TREATMENT *continued*

Water supply system	Supply source	Treatment					Primary Disinfection				Fluoridation
		Conventional water treatment plant	Iron removal plant	Desalination plant	Membrane plant	MIEX® pre-treatment	Cl_2 Gas (G)	Cl_2 Liquid (H)	NH_2Cl	UV	
Mt Gambier	Blue Lake / Bores						✓ (G)				✓ (Blue Lake source only)
Mt Pleasant WTP[4]	RM	✓ (SAW)			✓ (SAW)	✓	✓ (G)				✓
Murray Bridge WTP	RM	✓ (RW)					✓ (G)			✓	✓
Mypolonga WTP	RM				✓ (SAW)			✓ (H)			
Myponga WTP#	Res	✓ (AW)					✓ (G)				✓
Nangwarry	Bores							✓ (H)			
Naracoorte	Bores						✓ (G)				
Orroroo	Bores						✓ (G)				
Padthaway	Bores							✓ (H)			
Palmer WTP	RM				✓ (SAW)			✓ (H)			
Parachilna	Bores							✓ (H)			
Parilla IRP	Bores		✓ (SAW)					✓ (H)			
Penneshaw WTP	Seawater			✓ (SAW)	✓			✓ (H)			
Penola IRP	Bores		✓ (SAW)				✓ (G)				
Pinnaroo IRP	Bores		✓ (SAW)				✓ (G)				
Port MacDonnell	Bores						✓ (G)				
Quorn	Bores						✓ (G)				
Renmark WTP	RM	✓ (RW)					✓ (G)			✓	✓
Robe IRP	Bores		✓ (SAW)				✓ (G)				
Summit WTP	RM	✓ (RW)							✓ (G)	✓	✓
Swan Reach WTP	RM	✓ (RW)							✓ (G)	✓	✓
Swan Reach Town WTP	RM				✓ (SAW)			✓ (H)			
Tailem Bend WTP	RM	✓ (RW)							✓ (G)	✓	✓
Tarpeena IRP	Bores		✓ (SAW)					✓ (H)			
Waikerie WTP	RM	✓ (RW)					✓ (G)			✓	✓
Warooka	Bores						✓ (G)				
Wilmington	Bores						✓ (G)				
Woolpunda WTP	RM				✓ (SAW)				✓ (H)		

 # Supplies both country and metropolitan systems

1 Eyre South – supplied by Lincoln Basin, Uley South and Uley Wanilla bore fields

2 Eyre South/Morgan WTP primarily supplied by Lincoln Basin, Uley South and Uley Wanilla bore fields and supplemented by Morgan WTP system

3 Morgan/Swan Reach WTP system supplied from Morgan WTP and Swan Reach WTP

4 Mount Pleasant has two streams of treatment

ADP ADELAIDE DESALINATION PLANT
AW OPERATED BY ALLWATER
CL_2 CHLORINE
G CHLORINE GAS
H CHLORINE LIQUID (SODIUM HYPOCHLORITE)
IRP IRON REMOVAL PLANT
MIEX® MAGNETIC ION EXCHANGE

NH_2Cl CHLORAMINE
Res RESERVOIR
RM RIVER MURRAY
RW OPERATED BY RIVERLAND WATER
SAW OPERATED BY SA WATER
UV ULTRAVIOLET
WTP WATER TREATMENT PLANT

METROPOLITAN ADELAIDE WATER TREATMENT PLANT SOURCES

THE FOLLOWING TABLE PRESENTS A LISTING OF METROPOLITAN ADELAIDE'S WATER TREATMENT PLANTS AND THEIR RAW WATER SOURCES.

Water treatment plant	Supply sources											
	River Murray	Barossa Reservoir	Happy Valley Reservoir	Hope Valley Reservoir	Little Para Reservoir	Myponga Reservoir	Kangaroo Creek Reservoir	Millbrook Reservoir	Mt Bold Reservoir	South Para Reservoir	Warren Reservoir	Seawater
Adelaide Desalination Plant												●
Anstey Hill	●*							●*				
Barossa	○	●								○	○	
Happy Valley	○		●						○			
Hope Valley	○			●			○	○				
Little Para	○				●			○				
Myponga						●						

● Direct supply (connected to a water treatment plant)
○ Indirect supply (serves as a source/storage feeding into a direct supply reservoir)
* Depending on operational configuration

METROPOLITAN ADELAIDE WATER QUALITY SYSTEMS AND TREATMENT

Water supply system	Supply source	Water treatment plant	Treatment		Primary disinfection	Fluoridation
			Conventional water treatment plant	Desalination plant	Cl_2 Gas (G)	
Adelaide Desalination Plant#	Seawater	Adelaide Desalination Plant		✓ (AA)	✓ (G)	✓
Anstey Hill Metro	Res/RM	Anstey Hill WTP	✓ (AW)		✓ (G)	✓
Barossa Metro	Res/RM	Barossa WTP	✓ (AW)		✓ (G)	✓
Central Metro	Res/RM/ADP	Adelaide Desalination Plant Happy Valley WTP	✓ (AW)		✓ (G)	✓
East Metro	Res/RM/ADP	Adelaide Desalination Plant Anstey Hill WTP Happy Valley WTP	✓ (AW)		✓ (G)	✓
Myponga Metro	Res	Myponga WTP	✓ (AW)		✓ (G)	✓
North Metro	Res/RM/ADP	Adelaide Desalination Plant Anstey Hill WTP Barossa WTP Happy Valley WTP Little Para WTP	✓ (AW)		✓ (G)	✓
South Metro	Res/RM/ADP	Adelaide Desalination Plant Happy Valley WTP Myponga WTP	✓ (AW)		✓ (G)	✓
West Metro	Res/RM/ADP	Adelaide Desalination Plant Anstey Hill WTP Happy Valley WTP Hope Valley WTP	✓ (AW)		✓ (G)	✓

#	NOT ITS OWN SUPPLY SYSTEM (SUPPLIES TO HAPPY VALLEY WTP)	ADP	ADELAIDE DESALINATION PLANT	Res	RESERVOIR
AA	OPERATED BY ADELAIDEAQUA PTY (LTD)	AW	OPERATED BY ALLWATER	RM	RIVER MURRAY
		Cl_2	CHLORINE	WTP	WATER TREATMENT PLANT
		G	CHLORINE GAS		

DRINKING WATER SUPPLY SYSTEMS AND TOWNS/SUBURBS SUPPLIED

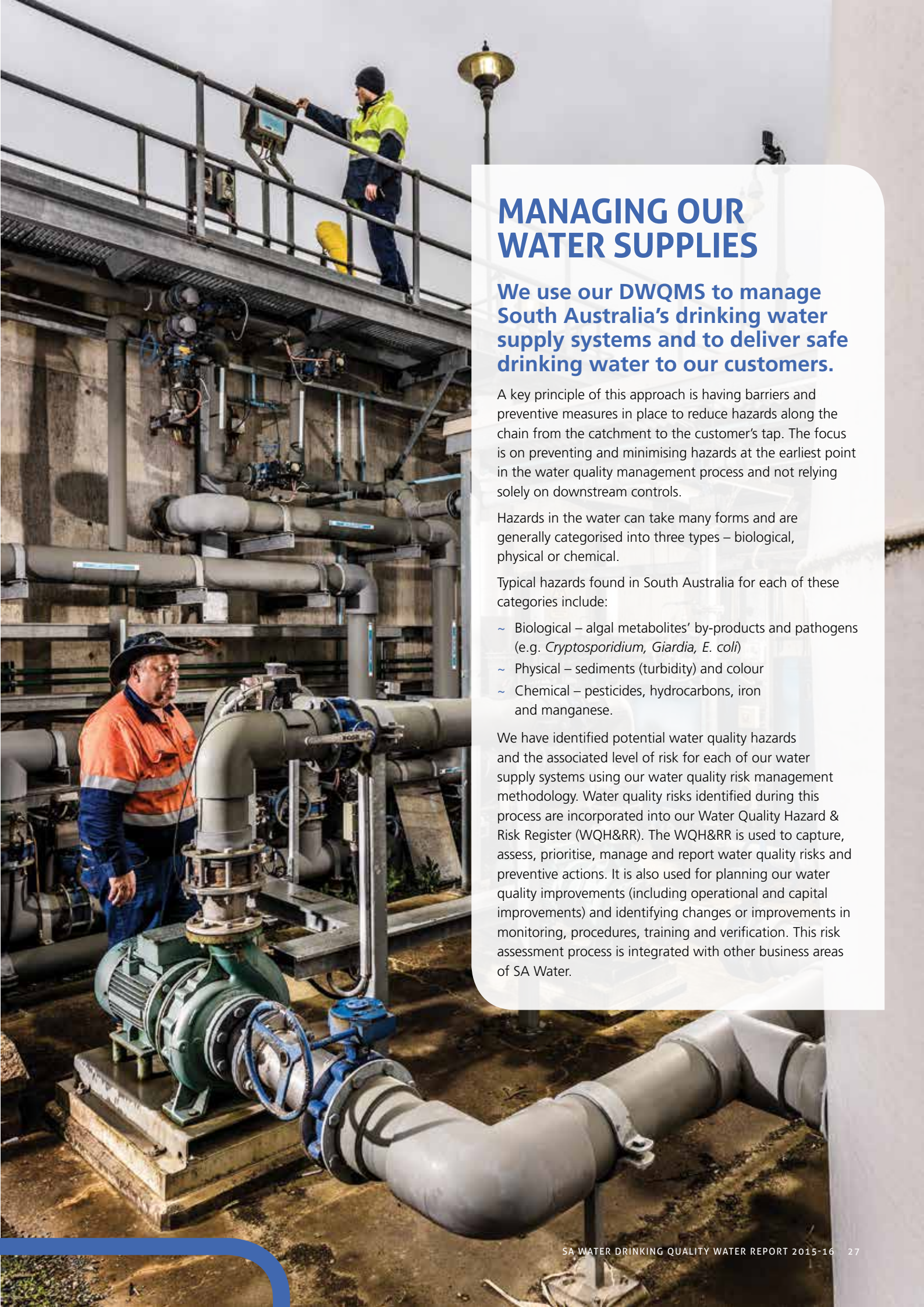
Water supply system	Towns supplied
Anstey Hill Metro	Banksia Park, Fairview Park, Golden Grove, Gulfview Heights, Highbury, Houghton, Inglewood, Lower Hermitage, Modbury Heights, Paracombe, Redwood Park, Ridgehaven, St Agnes, Surrey Downs, Tea Tree Gully, Upper Hermitage, Vista, Wynn Vale, Yatala Vale
Barmera WTP	Barmera, Cobdogla
Barossa Metro	Concordia, Evanston, Evanston Gardens, Evanston Park, Evanston South, Gawler, Gawler Belt, Gawler East, Gawler South, Gawler West, Hewett, Hillier, Kudla, Munno Para Downs, Reid, Willaston
Barossa WTP	Avon, Barabba, Dublin, Erith, Hamley Bridge, Kangaroo Flat, Lewiston, Lower Light, Mallala, Owen, Port Parham, Redbanks, Roseworthy, Two Wells, Wasleys, Wild Horse Plains, Windsor
Beachport IRP	Beachport
Berri WTP	Berri
Blanchetown WTP	Blanchetown
Bordertown	Bordertown
Cadell WTP	Cadell
Central Metro	Aberfoyle Park, Adelaide, Adelaide Airport, Ascot Park, Ashford, Beaumont, Bedford Park, Belair, Bellevue Heights, Black Forest, Blackwood, Blewitt Springs, Brighton, Brooklyn Park, Brown Hill Creek, Burnside, Camden Park, Chandlers Hill, Cherry Gardens, Christie Downs, Christies Beach, Clapham, Clarence Gardens, Clarence Park, Clarendon, Cleland, Clovelly Park, Colonel Light Gardens, Coromandel East, Coromandel Valley, Cowandilla, Crafers West, Craigburn Farm, Cumberland Park, Darlington, Daw Park, Dover Gardens, Dulwich, Eastwood, Eden Hills, Edwardstown, Everard Park, Flagstaff Hill, Flinders Park, Forestville, Frewville, Fulham, Fulham Gardens, Fullarton, Glandore, Glen Osmond, Glenalta, Glenelg, Glenelg East, Glenelg North, Glenelg South, Glengowrie, Glenside, Glenunga, Goodwood, Hackham, Hackham West, Hallett Cove, Happy Valley, Hawthorn, Hawthorndene, Hazelwood Park, Heathpool, Henley Beach, Henley Beach South, Highgate, Hilton, Hove, Huntfield Heights, Hyde Park, Keswick, Keswick Terminal, Kidman Park, Kings Park, Kingston Park, Kingswood, Kurralta Park, Leabrook, Leawood Gardens, Linden Park, Lockleys, Lonsdale, Lower Mitcham, Lynton, Malvern, Marino, Marion, Marleston, Marryatville, Melrose Park, Mile End, Mile End South, Millswood, Mitcham, Mitchell Park, Morphett Vale, Morphettville, Mount Osmond, Myrtle Bank, Netherby, Netley, Noarlunga Centre, Noarlunga Downs, North Brighton, North Plympton, Novar Gardens, Oaklands Park, O'Halloran Hill, Old Noarlunga, Old Reynella, Onkaparinga Hills, O'Sullivan Beach, Panorama, Park Holme, Parkside, Pasadena, Plympton, Plympton Park, Port Noarlunga, Reynella, Reynella East, Richmond, Seacliff, Seacliff Park, Seacombe Gardens, Seacombe Heights, Seaview Downs, Sheidow Park, Somerton Park, South Brighton, South Plympton, Springfield, St Georges, St Marys, Sturt, Thebarton, Toorak Gardens, Torrens Park, Torrensville, Trott Park, Tusmore, Underdale, Unley, Unley Park, Urrbrae, Warradale, Waterfall Gully, Wayville, West Beach, West Richmond, Westbourne Park, Woodcroft
Coffin Bay	Coffin Bay
Cowirra WTP	Cowirra, Neeta, Pompoota
East Metro	Ashton, Athelstone, Auldana, Castambul, Dernancourt, Erindale, Firle, Gilles Plains, Greenhill, Hectorville, Hillcrest, Holden Hill, Hope Valley, Horsnell Gully, Ingle Farm, Kensington Gardens, Kensington Park, Magill, Modbury, Modbury North, Montacute, Newton, Northfield, Northgate, Oakden, Para Hills, Para Vista, Paradise, Pooraka, Rosslyn Park, Rostrevor, Skye, St Morris, Stonyfell, Teringie, Tranmere, Valley View, Walkley Heights, Wattle Park, Windsor Gardens, Woodforde
Elliston	Elliston
Eyre South	Arno Bay, Cleve, Cowell, Cummins, Lipson, Louth Bay, North Shields, Port Neill, Port Lincoln, Tumby Bay, Ungarra, Yeelanna
Eyre South/Morgan WTP	Ceduna, Cungena, Haslam, Kyancutta, Minnipa, Poochera, Pygery, Smoky Bay, Streaky Bay, Thevenard, Warramboo, Wirrulla, Wudinna, Yaninee, Yantanabie
Geranium	Geranium
Glossop WTP	Glossop, Monash

DRINKING WATER SUPPLY SYSTEMS AND TOWNS/SUBURBS SUPPLIED *continued*

Water supply system	Towns supplied
Happy Valley WTP	Chandlers Hill, Cherry Gardens, Clarendon, Coromandel East, Ironbank
Hawker Desalination WTP	Hawker
Kalangadoo IRP	Kalangadoo
Kanmantoo WTP	Callington, Kanmantoo
Kingston SE IRP	Kingston SE
Lameroo IRP	Lameroo
Loxton WTP	Loxton
Lucindale IRP	Lucindale
Mannum WTP	Mannum
Melrose	Melrose
Middle River WTP	Brownlow, Emu Bay, Kingscote, Parndana
Millicent	Millicent
Moorook WTP	Kingston on Murray, Moorook
Morgan WTP	Alford, Appila, Auburn, Blyth, Booborowie, Booleroo Centre, Bower, Brinkworth, Bute, Burra, Caltowie, Clare, Crystal Brook, Drake Peak, Eudunda, Farrell Flat, Georgetown, Gladstone, Gulnare, Hampden, Iron Knob, Jamestown, Kiepa, Kimba, Koolunga, Konanda, Kybunga, Laura, Leasingham, Lock, Merriton, Mintaro, Morgan, Mount Mary, Mundoora, Napperby, Narridy, Penwortham, Peterborough, Port Augusta, Port Broughton, Port Germein, Point Pass, Port Pirie, Redhill, Robertstown, Rudall, Sevenhill, Snowtown, Spalding, Stirling North, Sutherlands, Tickera, Warnertown, Watervale, Wirrabara, Whyalla, Yacka, Yongala
Morgan/ Swan Reach WTP	Ardrossan, Arthurton, Balaklava, Bowmans, Clinton, Coobowie, Curramulka, Edithburgh, Halbury, Hoyleton, Kadina, Lochiel, Maitland, Melton, Minlaton, Moonta, Paskeville, Pine Point, Price, Point Pearce, Port Hughes, Port Victoria, Port Vincent, Port Wakefield, South Kilkerra, Stansbury, Wallaroo, Wool Bay, Yorketown
Mount Burr	Mount Burr
Mount Compass	Mount Compass
Mount Gambier	Mount Gambier
Mount Pleasant WTP	Eden Valley, Mount Pleasant, Springton, Tungkillo
Murray Bridge WTP	Monarto, Monteith, Murray Bridge
Mypolonga WTP	Mypolonga, Wall Flat
Myponga Metro	Aldinga Beach, Myponga Beach, Sellicks Beach, Sellicks Hill, Willunga, Willunga South
Myponga WTP	Carrickalinga, Encounter Bay, Goolwa, Hayborough, Hindmarsh Island, Hindmarsh Valley, Lower Inman Valley, McCracken, Middleton, Myponga, Normanville, Port Elliot, Victor Harbor, Yankalilla
Nangwarry	Nangwarry
Naracoorte	Naracoorte
North Metro	Andrews Farm, Angle Vale, Blakeview, Bolivar, Brahma Lodge, Burton, Cavan, Craigmore, Davoren Park, Direk, Edinburgh, Edinburgh North, Elizabeth, Elizabeth Downs, Elizabeth East, Elizabeth Grove, Elizabeth North, Elizabeth Park, Elizabeth South, Elizabeth Vale, Globe Derby Park, Green Fields, Greenwith, Hillbank, MacDonald Park, Mawson Lakes, Munno Para, Munno, Para West, One Tree Hill, Para Hills West, Parafield, Parafield Gardens, Paralowie, Penfield, Penfield Gardens, Salisbury, Salisbury Downs, Salisbury East, Salisbury Heights, Salisbury North, Salisbury Park, Salisbury Plain, Salisbury South, Smithfield, Smithfield Plains, St Kilda, Virginia, Waterloo Corner
Orroroo	Orroroo
Padthaway	Padthaway
Palmer WTP	Caloote, Palmer

DRINKING WATER SUPPLY SYSTEMS AND TOWNS/SUBURBS SUPPLIED *continued*

Water supply system	Towns supplied
Parachilna	Parachilna
Parilla IRP	Parilla
Penneshaw WTP	Penneshaw
Penola IRP	Penola
Pinnaroo IRP	Pinnaroo
Port MacDonnell	Port MacDonnell
Quorn	Quorn
Renmark WTP	Cooltong, Paringa, Renmark
Robe IRP	Robe
South Metro	Aldinga, Maslin Beach, McLaren Flat, McLaren Vale, Moana, Port Noarlunga South, Port Willunga, Seaford, Seaford Heights, Seaford Meadows, Seaford Rise, Tatachilla, The Range, Whites Valley
Summit WTP	Aldgate, Balhannah, Blakiston, Bridgewater, Birdwood, Brukunga, Charleston, Clayton, Crafers, Crafers West, Dawesley, Forest Range, Gumeracha, Hahndorf, Heathfield, Ironbank, Kersbrook, Langhorne Creek, Lenswood, Littlehampton, Lobethal, Milang, Mount Barker, Mount Barker Springs, Mount Torrens, Nairne, Oakbank, Piccadilly, Stirling, Strathalbyn, Upper Sturt, Willyaroo, Wistow, Woodside, Verdun
Swan Reach WTP	Angaston, Cambrai, Freeling, Greenock, Kapunda, Keyneton, Lyndoch, Marrabel, Moculta, Nuriootpa, Riverton, Rowland Flat, Rhynie, Saddleworth, Sedan, Seppeltsfield, Shea-oak Log, Stockport, Stockwell, Tanunda, Tarlee, Templers, Towitta, Truro, Williamstown
Swan Reach Town WTP	Swan Reach
Tailem Bend WTP	Coomandook, Coonalpyn, Culburra, Jervois, Karoonda, Keith, Ki Ki, Meningie, Narrung, Salt Creek, Sherlock, Tailem Bend, Tintinara, Wynarka, Yumali
Tarpeena IRP	Tarpeena
Waikerie WTP	Waikerie
Warooka	Point Turton, Warooka
West Metro	Albert Park, Alberton, Allenby Gardens, Angle Park, Athol Park, Beulah Park, Beverley, Birkenhead, Blair Athol, Bowden, Broadview, Brompton, Campbelltown, Cheltenham, Clearview, College Park, Collinswood, Croydon, Croydon Park, Devon Park, Dry Creek, Dudley Park, Enfield, Ethelton, Evandale, Exeter, Felixstow, Ferryden Park, Findon, Fitzroy, Garden Island, Gepps Cross, Gilberton, Gillman, Glanville, Glynde, Grange, Greenacres, Hackney, Hampstead Gardens, Hendon, Hindmarsh, Joslin, Kensington, Kent Town, Kilburn, Kilkenny, Klemzig, Largs Bay, Largs North, Manningham, Mansfield Park, Marden, Maylands, Medindie, Medindie Gardens, Nailsworth, New Port, North Adelaide, North Haven, Norwood, Osborne, Ottoway, Outer Harbor, Ovingham, Payneham, Payneham South, Pennington, Peterhead, Port Adelaide, Prospect, Queenstown, Regency Park, Renown Park, Ridleyton, Rose Park, Rosewater, Royal Park, Royston Park, Seaton, Sefton Park, Semaphore, Semaphore Park, Semaphore South, St Clair, St Peters, Stepney, Taperoo, Tennyson, Thorngate, Torrens Island, Trinity Gardens, Vale Park, Walkerville, Welland, West Croydon, West Hindmarsh, West Lakes, West Lakes Shore, Wingfield, Woodville, Woodville Gardens, Woodville North, Woodville Park, Woodville South, Woodville West
Wilmington	Wilmington
Woolpunda WTP	Mantung, Woolpunda, Wunkar



MANAGING OUR WATER SUPPLIES

We use our DWQMS to manage South Australia's drinking water supply systems and to deliver safe drinking water to our customers.

A key principle of this approach is having barriers and preventive measures in place to reduce hazards along the chain from the catchment to the customer's tap. The focus is on preventing and minimising hazards at the earliest point in the water quality management process and not relying solely on downstream controls.

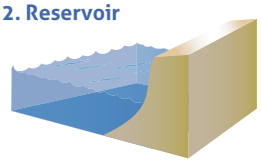
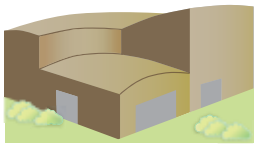
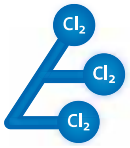
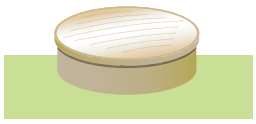
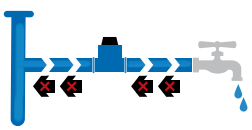
Hazards in the water can take many forms and are generally categorised into three types – biological, physical or chemical.

Typical hazards found in South Australia for each of these categories include:

- Biological – algal metabolites' by-products and pathogens (e.g. *Cryptosporidium, Giardia, E. coli*)
- Physical – sediments (turbidity) and colour
- Chemical – pesticides, hydrocarbons, iron and manganese.

We have identified potential water quality hazards and the associated level of risk for each of our water supply systems using our water quality risk management methodology. Water quality risks identified during this process are incorporated into our Water Quality Hazard & Risk Register (WQH&RR). The WQH&RR is used to capture, assess, prioritise, manage and report water quality risks and preventive actions. It is also used for planning our water quality improvements (including operational and capital improvements) and identifying changes or improvements in monitoring, procedures, training and verification. This risk assessment process is integrated with other business areas of SA Water.

The following table shows the barriers, water quality management objectives and preventive measures from catchment to tap.

Barrier	Water quality management objective	Possible hazard(s)	Example of work to prevent/minimise hazard(s)
1. Catchment 	Minimise introduction of hazards into source water	~ Pathogens ~ Pesticides ~ Hydrocarbons ~ Iron and manganese ~ Sediments ~ Nutrients ~ Dissolved organic carbon	~ Provided updated 'catchment barrier status' (condition) reports for key supply catchments in the Mount Lofty Ranges Watershed and selected groundwater systems ~ Established sampling stations to investigate catchment-derived nutrient inputs into Happy Valley Reservoir ~ Continued to test new, potentially more targeted and cost effective analysis methods for enhancing catchment risk assessments (e.g. DNA sampling efforts in reservoirs and key catchments) ~ Participated in planning policy review for Mount Lofty Ranges Watershed ~ Continued to collaboratively work with government and fishing community to enable recreational fishing in up to five offline reservoirs.
2. Reservoir 	Minimise introduction of hazards and remove some hazards	~ Pathogens ~ Pesticides ~ Hydrocarbons ~ Iron and manganese ~ Algal by-products including taste and odour compounds	~ Aeration to reduce reservoir stratification ~ Vertical profilers that measure key water quality parameters at set depth intervals throughout water column ~ Multiple offtake management – picking the best possible water quality.
3. Treatment 	Remove most hazards	~ Iron and manganese ~ Chemicals ~ Algal by-products including taste and odour compounds ~ Pathogens	~ Mount Pleasant WTP – replacement of alum coagulant with aluminium chlorohydrate to greatly reduce irreversible fouling of membrane filters and improve plant performance ~ Upgrade to backwash system at Robe Iron Removal Plant to improve environmental performance ~ Upgrade to alum dosing system at Morgan WTP to improve treatment performance with challenging River Murray water ~ Upgrades to numerous on-line water quality analysers at Morgan WTP to improve plant reliability and treatment performance.
4. Disinfection 	Neutralise microbiological hazards and algal by-products	~ Algal by-products ~ Pathogens	~ Upgrade at Robe Iron Removal Plant – transition from chloramines to chlorine to improve disinfection performance and eliminate scale formation issues in operating plant ~ Pinnaroo Disinfection upgrade – installation of a liquid hypochlorite dosing system to improve control of chlorine residuals for low network demand flows ~ Upgrade at Lincoln Gap storage – chemical dosing order change (chlorine followed by ammonia) to improve chloramine stability and network water quality performance.
5. Chlorine Residual Maintenance* 	Manage microbiological hazards throughout systems	~ Pathogens	~ Mootra tank (Morgan-Whyalla system) – surplus to network operational requirements and flagged for decommissioning. Instead of demolishing the tank, an agreement was negotiated with the Cunyarie Water Trust to take over the asset. Water quality improvement for affected water supply network at low cost to SA Water. ~ Upper Paskeville storage – new water recirculation and mixing system installed at the 100ML storage to improve chloramine residual stability and network performance.
6. Closed System* 	Prevent introduction of hazards	~ Pathogens ~ Chemicals	~ Re-lining and re-roofing of tanks on the Morgan-Whyalla Pipeline ~ Trial of a new product to re-line a water main using spray technology ~ Re-roofing Berri low level tank ~ New 2 ML tank constructed and commissioned in Burra.
7. Backflow Prevention* 	Prevent introduction of hazards	~ Pathogens ~ Chemicals	~ A number of interfaces between non-potable and potable systems were upgraded to prevent inadvertent contamination of drinking water supplies.

* Barriers collectively known as distribution system

WATER QUALITY 2015–16

CATCHMENT MANAGEMENT

We adopt the multi-barrier approach for the delivery of safe drinking water to our customers. We recognise the primary barrier for source water protection is the drinking water supply catchment, essentially representing the first step in the water quality treatment chain.

We use a pragmatic approach to encourage the adoption of sound land management practices in an effort to protect our source waters in the supply catchments, by implementing effective catchment management practices and collaborating with natural resource management agencies.

Most other water utilities around Australia do not experience the same challenges we do in protecting our source water supplies. Around 90% of our drinking water supply catchments are privately owned; intensively developed; subject to a number of land uses; and are co-managed by other agencies. Eyre Peninsula is an exception as we own significant land around the borefields. SA Water also depends on the River Murray for raw water supply but despite this, our influence on catchment management within the Murray Darling Basin is limited to policy and planning input along with many other stakeholders. In the Mount Lofty Ranges Watershed, we actively manage reservoir reserves which provide narrow buffer zones around our supply reservoirs.

It is essential for us to work closely with other government agencies to drive mutually beneficial outcomes for water quality and water supply security. We do this by initiating and participating in a number of collaborative projects and water quality improvement initiatives. This collaborative approach ensures we effectively achieve our obligations under the ADWG in the most efficient manner possible.

During 2015–16, we have continued our strong focus on a number of catchment water quality investigation and improvement projects critical to our business. Our key projects ranged from innovative, emerging analytical techniques to provide multiple lines of evidence to better quantify water quality impacts to exploring the actual effects of mitigation strategies of pathogen risks.

CATCHMENT MANAGEMENT INVESTMENT STANDARD

A coordinated research effort between the United States-based Water Research Foundation and WSAA examined the role and value proposition of catchment management as an early treatment step in a multi-barrier system. As a result, we can now develop a 'catchment management investment standard'. This will help to refine, on a case-by-case basis, the value of targeted interventions in supply catchments and provide the customer and broader community with more economic water treatment solutions.

BUSHFIRES AND PRESCRIBED BURNS ON SA WATER LAND

In 2015–16, we continued to implement our extensive annual bushfire prevention maintenance regime across our landholdings to manage the ever-present bushfire risk. We collaborated with other agencies (Department or Environment, Water and Natural Resources, Country Fire Service and ForestrySA) on bushfire prevention, suppression and prescribed burning under our agreements. We undertook an extensive prescribed burn program on SA Water-managed land as set out in the Code of Practice for Fire Management on Public Land in South Australia, incorporating a due diligence environmental and water quality risk assessment approach.

On 25 November 2015 the Pinery bushfire burnt approximately 86,000 hectares in the lower mid-north of the state. The fire impacted on SA Water infrastructure including Redbanks storage but did not extend to any drinking water supply catchments. There were no other major bushfire events in 2015–16.

Our Natural Assets and Operations and Maintenance teams continue to implement and monitor post-fire action plans for the areas burnt out during the Sampson Flat (Millbrook Reservoir Reserve) and Bangor (Beetaloo Reservoir Reserve) bushfires. This work has involved repairing and replacing installed erosion control structures, photo points to monitor regeneration and targeted direct-seeding. Water quality sampling also continues to further quantify the risk of pathogen, nutrient and sediment exports during large rainfall runoff events in bushfire affected catchments.

CATCHMENT BARRIER STATUS

The catchment barrier status reports sit within the DWQMS. They are progressive reports that provide a snapshot assessment of catchment conditions and they are used to provide a benchmark to measure change, analyse trends over time, identify high and low risks to water quality, and help us make decisions about and plan our drinking water supply catchments. These reports are a useful tool for communicating water quality risks from a drinking water supply perspective to relevant stakeholders. These reports also helps other natural resource management agencies to prioritise water quality improvement initiatives government-wide. We have continued to review and update these reports in order to assess the catchments' effectiveness as a barrier in protecting, maintaining and enhancing drinking water quality.

CRYPTOSPORIDIUM RISK IN OUR DRINKING WATER SUPPLY CATCHMENTS

Our *Cryptosporidium* risk assessment is applied across all barriers of our key drinking water supply systems. It highlighted the need to implement a range of pathogen mitigation works. We are driving these works through a number of short-term and long-term projects that are investigating the infectivity, speciation and mobility of *Cryptosporidium* in both our surface and groundwater catchments. One of our key projects in the Mount Lofty Ranges watershed is evaluating the effectiveness of stock exclusion (primarily through watercourse fencing and juvenile stock exclusion from watercourses) on reducing *Cryptosporidium* in our water supply sources. We have also continued to investigate *Cryptosporidium* infectivity and speciation in our catchments associated with water supply to Anstey Hill, Hope Valley and Little Para Water Treatment Plants. This includes a research project on the impacts of bushfires on *Cryptosporidium* and changes to water quality risk profiles. We have initiated a trial investigating the physical and chemical factors governing the attachment and transport behaviour of *Cryptosporidium* through porous media in an attempt to better understand the risk of contaminant transfer in groundwater systems. We have also explored two additional approaches to improve our water quality risk assessments and include more cost effective sampling methods. We started to use so called 'passive samplers' that stay in the watercourse for one month to adsorb (and amplify) low concentrations of chemicals. These samplers can provide a snapshot of the impact of failures of onsite wastewater treatment systems (OWTS). We specifically targeted chemicals that could be found in human waste such as caffeine, anti-depressants and other pharmaceutical and personal care products.

In addition, emerging analytical DNA analysis techniques help us to gain more specific insight into the exact sources and types of *E.coli* in our source waters, which ultimately will enable us to be more targeted in our abatement measures.

ACID SULPHATE SOIL IMPACTS NEAR RIVER MURRAY OFFTAKES

We continued to assess the potential impact of acid sulphate soil derived pollution in River Murray wetlands on our offtakes in 2015–16. Whilst the 'millennium' drought has eased concerns in relation to low river flows and the drying out of wetlands, the legacy of the drought is still present five years later. SA Water, through the SA River Murray Sustainability research project, continued to work with the University of Adelaide and the Environment Protection Authority (EPA) to investigate different irrigation schemes at its Mobilong and Toora sites (located in the Lower River Murray Reclaimed Irrigation Area) and mechanisms to reverse land salinisation. Through the project we have identified preferred irrigation techniques to improve soil condition and tested a range of treatments for salinised sites at Mobilong. The project, due for completion in 2016–17, aims to optimise the irrigation approach to minimise salinisation and acid sulphate soil leaching to the River Murray near our offtakes. The outcomes of the project, together with ongoing engagement with key stakeholders including local council, adjoining landholders and the EPA, will help us to develop a long-term strategy for the site.

NUTRIENT MITIGATION FROM COX CREEK WETLAND SYSTEM

We continue to play a vital role in an inter-agency nutrient mitigation project in the Cox Creek wetland system. This project is essential to reduce nutrient inputs into the Happy Valley Reservoir and ultimately help lower the risk of algal blooms occurring. The project involves a maintenance program, which includes routine dredging and removal of sediments, and harvesting of macrophytes to remove excess nutrients.

These measures were confirmed as successful/effective in a PhD thesis published in 2011.

The Scouts Australia's Woodhouse Activity Camp and various schools continue to benefit from this wetland system through educational programs and tours that focus on evaluating the social and environmental benefits provided by wetlands, riparian rehabilitation and catchment protection.

We also initiated a project to investigate the spatial and temporal characteristics of nutrient delivery from upstream catchments to the Happy Valley Reservoir.

These catchment areas are heavily developed for livestock grazing, horticulture and residential purposes, and have been identified as key contributors of high nutrient loads delivered via rainfall-runoff events. We have established new monitoring sites with auto-sampling stations at strategic locations within these catchments to capture peak flow run-off events.

PUBLIC ACCESS TO RESERVOIR RESERVES

We continue to implement our public access and land use policy in recognition of the role our narrow reservoir land buffer zones play as part of the multi-barrier approach to water quality protection. The policy balances the basic principle of water quality protection against providing some limited access for public benefit. In 2015–16, access permits were approved for a variety of low impact purposes including scientific research, film production, biological surveys and education.

In line with the 2014 election commitment by the Minister for Water and the River Murray to open up to five offline, inland reservoirs to recreational fishing activities, SA Water has worked with RecFishSA, councils and the community to progress this endeavour. Of the five reservoirs earmarked to date, Warren and Bundaleer reservoirs have been advanced to a stage of recreational infrastructure design. We have co-sponsored Port Lincoln High School to undertake preliminary ecological and water quality investigations in order to advance Tod Reservoir for recreational fishing, while it is off limits due to dam safety upgrade works.

The enhancement of recreational fishing activities will continue to be managed in the spirit of community collaboration and water quality protection.

MOUNT LOFTY RANGES PLANNING POLICY REVIEW AND ONSITE WASTEWATER TREATMENT SYSTEMS

We are a key stakeholder in the planning policy review effort for the Mount Lofty Ranges water protection zone (watershed), led by the Department of Planning, Transport and Infrastructure. The review aims to provide primacy of development controls for watershed-related clauses, but also attempts to enable additional economic opportunities in line with the Premier's economic goals.

We acknowledge the outcomes of the planning review will likely see an increase in tourism in the area and there is potential for increased impacts of pollution, especially through additional OWTS. We will therefore continue to remain a key stakeholder and contributor to the existing Waste Control Program (WCP) which is major mitigation initiative to combat pathogen pollution in our source waters. The WCP is an essential program charged with the assessment and rectification of OWTS, around 48% of which have the potential to leak if not maintained.

RESERVOIRS AND THE RIVER MURRAY

Initiatives and improvements to source water quality management have a catchment to tap focus and aim to take advantage of new and existing technology to provide services to the community at the lowest possible cost.

RESERVOIRS

Real-time water quality monitoring

Access to real-time water quality data is essential to respond effectively to risks associated with algal blooms and reservoir inflows. Vertical water quality profiling systems, located at strategic reservoirs, provide real-time data for temperature, turbidity, total cyanobacteria, chlorophyll, pH, conductivity and dissolved oxygen. The information gathered enables water quality managers to:

- Track the flow of water which has the potential to carry catchment-derived pollutants into reservoirs
- Identify the location of the best water quality within a vertical profile of a reservoir
- Manipulate the water quality supplied to water treatment plants through the use of variable offtakes; ensuring the best possible water quality is selected
- Reduce reliance on algaecides as a method of managing algal blooms
- Optimise the effectiveness of algaecide treatment
- Reduce the frequency and reliance on manual grab sampling.

Management of cyanobacteria in reservoirs

The control of certain types of cyanobacteria in reservoirs is an ongoing operational issue for water utilities worldwide with reliance placed on the application of algaecides. Where possible, SA Water continued to manage cyanobacterial blooms without algaecide. This is achieved through a strategy that includes *in situ* field measurements of key water quality parameters; optimised management of multiple offtakes; and enhanced water treatment plant processes, including the application of powdered activated carbon to remove cyanobacteria-derived taste and odour compounds.

Although copper-based algaecides are safe, they are not always effective and are expensive. Investigations have identified sodium percarbonate as a potential alternative and an application trial is in progress.

RIVER MURRAY

Water quality monitoring

Fluctuating water quality has the potential to impact the treatment processes that make sure customers are supplied with high quality drinking water. We use a customised monitoring program and an automated reporting mechanism to immediately identify situations requiring action. Data gathered as part of this program enhances treatment processes and ensures customer satisfaction is not compromised.

WATER QUALITY MONITORING AND TESTING

We perform extensive water quality monitoring, including field and laboratory tests, across metropolitan and regional South Australia from catchment to tap to ensure the quality of our product. We monitor for health and aesthetic compliance as well as operational monitoring to optimise water quality. Samples are collected by trained field staff to ensure samples are taken correctly and field results have a high degree of integrity. Laboratory analyses are carried out by SA Water's AWQC in accordance with ISO 9001 Quality Systems and the requirements of NATA.

The following table summarises monitoring and testing activities in our water supply systems during 2015–16

Number of sample taps and test analytes – metropolitan and country water supply systems (2015–16)

Drinking water systems	Metropolitan	Country	Total
Supply systems	8	59	67
Customer taps	189	284	473
Catchment to tap sample taps*	378	894	1,272
Catchment to tap routine test analytes	85,017	272,370	357,387

**Includes drinking water customer taps*

DRINKING WATER QUALITY AND PERFORMANCE

During 2015–16, we demonstrated robust management of water quality by consistently providing clean, safe drinking water to our customers in a complex operational environment.

The following table and graph provide a summary of our performance for health-related parameters of routine samples at customer taps during 2015–16.

Metropolitan and country drinking water supply systems health related performance (2015–16)

Health related parameters	Metropolitan systems (number of test analytes)	Country systems (number of test analytes)
Samples free from *E. coli*	99.97% (3,514)	99.95% (7,938)
Samples compliant with ADWG health parameters*	99.96% (12,789) 2015–16 target: 100%	99.83% (29,566) 2015–16 target: 99.80%

**Includes performance against E. coli*

Note that direct exceedance of the ADWG were used to calculate this and not the 95th percentiles for compliance of individual chemical parameters.

We analysed a total of 42,355 routine test analytes from customer taps in our drinking water supplies throughout South Australia to determine health-related compliance.

- We achieved 99.97% *E. coli* compliance at customer taps in metropolitan Adelaide for the 2015–16 financial year across 3,514 samples taken from our eight metropolitan supply systems.
- We achieved 99.95% *E. coli* compliance at customer taps in country South Australia for the 2015–16 financial year across 7,938 samples taken from our 59 country supply systems.

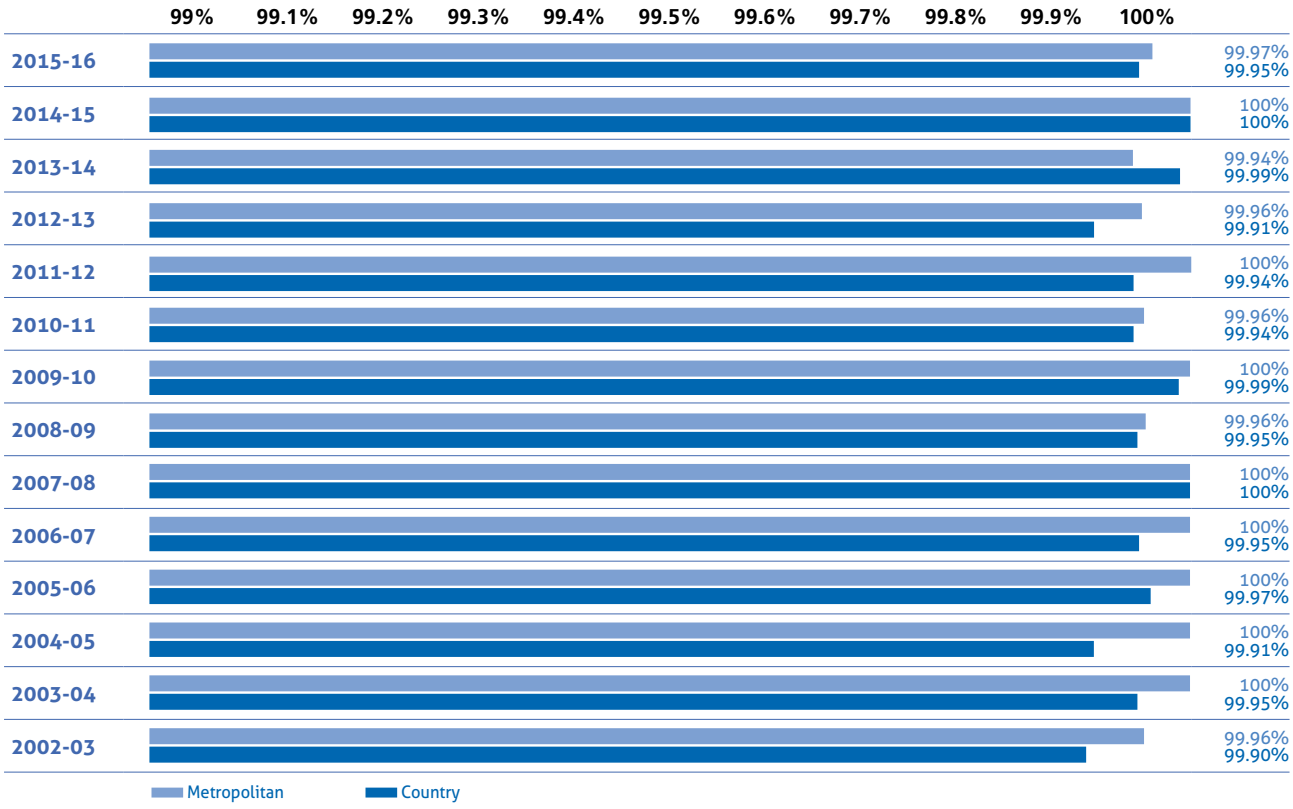
The ADWG recognise that occasional *E. coli* detections may occur in drinking water. In accordance with the guidelines and the interagency Water/Wastewater Incident Notification and Communication Protocol, all detections were immediately communicated to SA Health, investigated by SA Water and corrective actions implemented as agreed with SA Health. All follow-up samples were clear of *E. coli*, verifying minimal risk to customers.

Compliance with the ADWG health-related parameters was 99.96% for metropolitan Adelaide and 99.83% in the country areas.

Although we aim for 100% compliance, the ADWG recognises that occasional exceedances may occur. Where there are sufficient samples from a 12 month period, the 95th percentile statistic should be used to determine performance against a guideline value.

During 2015–16 we identified distribution systems where we were below target and proactively implemented management strategies to address these situations, including working with SA Health. Immediate corrective action was taken to investigate any potential risks to public health. Such measures included flushing of systems, additional disinfection, immediate follow-up sampling and close communication with SA Health.

***E. coli* compliance at metropolitan and country drinking water supply system customer taps since 2002 (customer tap samples free from *E. coli*)**



CUSTOMER PARTICIPATION AND STRATEGY

Water quality customer enquiries or complaints are received through the Customer Service Centre. All water quality customer complaints are treated seriously, with the highest priority given to health-related complaints. Health-related complaints are directed to the Operations and Maintenance group and targeted to be attended within one hour. Complaints of a health concern are also often directed to SA Health for advice or information.

In 2015–16 we received a total of 517 metropolitan customer complaints and 207 regional customer complaints relating to drinking water.

We have achieved better water quality outcomes in the distribution system and a dramatic decrease in customer complaints since the mid-1990s by focusing on water quality impacts in the network and continually improving our knowledge of the system operation and causes of water quality problems.

During 2015–16 we surveyed the satisfaction of customers who had a recent service experience with us. In this survey, we asked customers to rate their satisfaction with the quality of their water. Overall, we achieved a satisfaction result of 79% for overall water quality. There has been no change in this result from the 2014–15 financial year.

THE EVOLUTION OF THE RIGHT DOSE

Since the late 1990s we have been constantly looking at better ways to manage coagulation in our water treatment processes. This challenge exists because we are dealing with dynamic water sources.

In a partnered effort, SA Water (through the AWQC), University of South Australia Ventures and Allwater have worked together to developed and implement a coagulation dose prediction software package, which has been distributed to treatment facilities across South Australia. Officially named the Water Treatment Control for Coagulation (WTC-Coag), the software package is commonly referred to as the Coagulation App.

The Coagulation App has been developed in an effort to find better ways to meet water quality targets, improve efficiency and reduce treatment costs. By doing this, our customers are the winners, with improved water quality and reduced running costs potentially leading to reduced water prices.

The Coagulation App uses sophisticated programming and testing to identify the optimum treatment required for various water sources. The benefits of running water treatment plants at optimum conditions include:

- Better treated water quality
- Avoids over dose and under dose
- Lower chemical usage
- Reduced sludge production
- Reduction of sludge disposal costs
- Lower greenhouse gas emissions.

The Coagulation App can also be used during the rapid water quality change period to guide operators in alum dosing alterations. This is essential in order to achieve treated water goals while avoiding excessive costs.

The development and implementation of the Coagulation App further empowers our water treatment plant operators to make the right decisions as quickly as possible. It allows operators to control and adjust dosages with more confidence than ever.

INCIDENT MANAGEMENT

We are committed to applying the Australian Drinking Water Guidelines (ADWG) Framework for Management of Drinking Water Quality, which includes two components for incident and emergency management: communication and incident and emergency response protocols.

We have a Water Quality Incident and Emergency Management Protocol in place and a web-based incident management system to record and generate notifications of water quality incidents. These are in line with the interagency Water/Wastewater Incident Notification and Communication Protocol that is maintained by SA Health to adopt the principles of ADWG and satisfy requirements of the *Safe Drinking Water Act 2011* and Safe Drinking Water Regulations 2012.

SA Health defines three types of health-related incident classifications based upon a precautionary approach:

- **Priority Type 1 incident notification** – an incident that, without immediate appropriate response or intervention, could cause serious risk to human health and is likely to require immediate interagency meetings to consider responses. Procedures for Type 1 incident notifications also apply.
- **Type 1 incident notification** – an incident that, without appropriate response or intervention, could cause serious risk to human health.
- **Type 2 incident notification** – an incident that, without appropriate response or intervention, represents a low risk to human health.

A comparative summary of the Priority Type 1, Type 1 and Type 2 incident notifications reported against the interagency *Water/Wastewater Incident Notification and Communication Protocol.*

Reporting period	Priority Type 1	Type 1	Type 2
2015–16	4	32	74
2014–15	1	43	84
2013–14	3	34	87
2012–13	4	67	89
2011–12	2	88	121
2010–11	5	111	172
2009–10	9	88	135

Note: These notifications do not include wastewater, recycled water, non-drinking supply and Remote Communities incidents.

All Priority Type 1 and Type 1 notifications were immediately reported to SA Health, while all Type 2 notifications were reported within 24 hours, in line with the interagency Water/Wastewater Incident Notification and Communication Protocol. The numbers of incident notifications decreased overall in 2015–16 when compared with 2014–15 figures. There was a slight increase in Priority Type 1 incidents but a significant decrease in Type 1 and Type 2 notifications this financial year. The decreased number of incident notifications was primarily due to a decrease in algae, disinfection by-products and water treatment plant turbidity failures.

During 2015–16, we continued our focus on early detection and reporting to external agencies, briefing the Minister for Water and the River Murray, ensuring prompt corrective action and addressing the causes of preventable Type 1 notifications, such as turbidity failures and disinfection by-products. Strategies employed to achieve this include optimisation of our drinking water quality monitoring program and capital improvements such as upgrades to filters and filter control systems.

We continued our proactive water quality management of targeted individual water supply systems and detection and management of risks during 2015–16. Changes in reporting criteria issued by SA Health in the interagency Water/Wastewater Incident Notification and Communication Protocol also occurred and contributed to a change in reporting requirements.

INCIDENT RESPONSE INDEX (IRI)

The purpose of the IRI is to drive and guide correct responses when a Type 1 or Priority Type 1 incident is detected. The IRI is assessed against a number of criteria, with each component in the IRI designed to help manage water quality incidents, including reporting, initial response and longer term preventive measures. The overall 2015–16 strategic target for the IRI is at least 85% compliance.

Criteria used in the incident response index (based on total reportable SA Health Priority Type 1 and Type 1 incident notifications)

Incident reported to relevant agencies by phone immediately (less than one hour)	**Overall strategic 2015–16 target:** **At least 85%**
Incident entered into the incident management system (IMS) in less than two hours	
Initial effective response taken within three hours	
Written report to Minister for Water and the River Murray by 3pm next business day	
Root cause analysis completed within 10 working days	
Preventive actions implemented within agreed timeframes	

The continual review and improvement of our incident management processes has positively impacted on our water quality incident response and overall performance, maintaining a score well above our target.

The incident response index (IRI) results achieved in country and metropolitan areas in 2015–16 compared to 2014–15

System	IRI 2015–16 financial year	IRI 2014–15 financial year
Country	92%	97%
Metropolitan	97%	94%
Overall (weighted combined country and metropolitan)	93%	97%

During 2016–17, we will:

- Implement our new online incident management system for reporting and management of water quality incidents and hazards
- Continue to work collaboratively with SA Health in the review and update of the interagency Water/ Wastewater Incident Notification and Communication Protocol
- Conduct refresher training on the Water Quality Incident and Emergency Management Protocol for country and metropolitan incident managers
- Maintain the IRI target at 85%.

RESEARCH AND INNOVATION

We focus on smart investment to ensure a consistent and reliable supply of high quality, safe drinking water. This also delivers value for money for customers and ensures the needs of current and future generations of South Australians are met. Investment in research and innovation is at the core of smart investment, allowing SA Water to monitor and respond to the trends shaping the world, our natural environment and the water industry.

Focused research drives efficiencies, allowing us to do things better, faster and cheaper without compromising quality or safety. Research is essential to allow us to better understand and cost-effectively control risks. These can be risks to the systems used to deliver water and wastewater services or risks that adversely affect public health or the environment. All of this research supports smart investment, providing new knowledge and technologies that allows us to make wise investment decisions with an eye on the future, including best practice for managing assets, workforce and technology.

Our research program is delivered by the Research and Innovation Services (R&IS) group and is nationally and internationally recognised for excellence. The research is often supported using internal funds that are leveraged to win competitively funded grants from bodies including the Australian Research Council, Water Research Australia and the Water Research Foundation (USA). This approach reduces the cost of research, providing a benefit to customers. We have strong relationships with institutes, universities and water utilities in Australia and internationally, and a partnership approach ensures that we invest in research wisely by building on existing knowledge and not duplicating efforts. The current research program has been planned to sit within the aims of SA Water Strategy (2016–2024) to ensure it complies with our mission to deliver safe, sustainable and affordable water services for the community. Each project or activity is closely reviewed at the development stage for alignment with the current business goals which are defined by the Outcomes for Success.

KEY RESEARCH PROJECTS

Customer perceptions

Work by the R&IS group in this area supports our goals to achieve Great Customer Experience and Safe, Clean Water. There is currently an extensive program of customer-focused research to help us understand the relationships between customer perceptions and objective measures of water quality. In partnership with Customer and Community Relations group, R&IS manages the *'Take the Tap Test'* at public events. This involves directly engaging with customers via blind water tasting. The engagement is an opportunity to talk directly to a large number of customers and build recognition of our products and water quality improvement efforts. It is estimated over 5,000 customers participated in this program in 2015-16, with very favourable responses. Interestingly, analysis of results from this testing shows only 30% of people can tell the difference between tap water and bottled water.

Blue-green algal control

Blue-green algae cause problems in drinking water storages, wastewater systems and recreational waters such as the River Torrens. Control of these algae using chemicals like copper sulphate is expensive and can have adverse effects upon the environment. We have been working extensively on research to identify alternative algal control methods. One option being evaluated is the new algaecide sodium percarbonate, which promises to be cheaper and more environmentally friendly than copper sulphate. Preliminary field testing of this new algaecide is very promising and work is ongoing to complete testing and obtain the necessary regulatory licences to use this product.

ALLIANCES AND PARTNERSHIPS

Our R&IS group has productive collaborations with national (e.g. Adelaide University, University of South Australia, Murdoch University, University of New South Wales, CSIRO) and international organisations (e.g. National Cheng Kung University (Taiwan), Vienna University of Technology, the Research Centre for Ecology and Environmental Sciences (Beijing) and Beijing Water Authority, China). These have resulted in successful bids to win competitive grant funding from a wide range of bodies including the Australian Research Council Linkage Grants Scheme, Water Research Australia, the Water Research Foundation (USA) and the Premier's Research and Industry Fund. Some of these collaborations have been formally recognised through Memoranda of Understanding, with the aim of initiating joint research programs in areas of common interest and of mutual benefit to our respective organisations.

HIGHLIGHTS

Granular activated carbon (GAC) filters are used in drinking water treatment plants to remove compounds that cause unpleasant tastes and odours in water. Research evaluated the performance of GAC sampled from the filters of two River Murray water treatment plants. Despite being in use for 7–8 years, the GAC was still removing taste and odour compounds. This finding has allowed the current GAC filters at 10 country water treatment plants to be used for another year, deferring expenditure of $576k for the scheduled replacement of these GAC filters.

New coagulants were trialled for use in drinking water treatment both in the laboratory and at the Mount Pleasant Water Treatment Plant. The new coagulants show promise to minimise the fouling of ultrafiltration membranes and result in a significant increase in membrane life (from 2–3 years to >5 years). This increase in membrane life will reduce replacement costs and result in savings at our water treatment plants using ultrafiltration.

Hazard identification and risk assessment are key elements of the ADWG, ensuring that appropriate levels of drinking water treatment are used to protect public health. Cost-effective methods are needed to identify sources of faecal contamination since these are the major sources of pathogens of human health concern. A new DNA-based technology, Next Generation Sequencing (NGS), was successfully used to analyse stormwater and identify which animals caused faecal contamination of the water. Following on from this success, a new major research project, funded by SA Water, other water utilities and Water Research Australia, will extend this NGS technique to the analysis of drinking water sources. In addition, the AWQC has made an investment in NGS technology so that this service will be available to support SA Water and its customers.

GLOSSARY OF WATER QUALITY TERMINOLOGY

Algae	A diverse group of simple photosynthetic organisms with no true roots, stems or leaves. They occur mostly in freshwater and marine environments and range in size from unicellular to multicellular forms.
Algal bloom	A rapid growth of algae in aquatic environments often triggered by an input of high levels of nutrients (particularly nitrogen and phosphorus) and an increase in temperature. Blue-green algae (or cyanobacteria) are of most concern to SA Water. Algal blooms frequently cause environmental problems and can create challenges for water treatment.
Alum	An aluminium sulphate-based chemical used as a coagulant in the water treatment process.
Ammonia (NH_3)	A highly soluble compound resulting from the decomposition of organic matter containing nitrogen. Usually only found in small concentrations in surface waters.
Aquifer	A layer or section of earth or rock that contains fresh water (known as groundwater), or any water that is stored naturally underground or that flows through rock or soil, supplying springs and wells.
Australian Drinking Water Guidelines (ADWG)	Drinking water guidelines established by a joint committee of the National Health and Medical Research Council and Agricultural Resource Management Council of Australia and New Zealand, published in 2011. These national guidelines provide a framework and benchmark water quality values for best practice in drinking water supply operations.
Australian Water Quality Centre (AWQC)	A business unit of SA Water which provides a comprehensive range of water and wastewater analytical services. The AWQC also undertakes investigations and consultancies on a commercial basis on a wide range of water quality and treatment technology issues. The AWQC has been National Association of Testing Authorities accredited since 1974 and obtained quality system certification to ISO 9001 in 1997. For more information, visit awqc.com.au.
Blue-green algae	See cyanobacteria.
Catchment	An area of land surrounding a water storage. The run-off water from rain falling over the catchment drains into the storage and collects nutrients, minerals and other contaminants (including microorganisms) from the surface of the land.
Chloramination	The application of chlorine and ammonia to create monochloramine (NH_2Cl), a stable disinfectant that is added to drinking water to kill bacteria or to oxidise undesirable compounds. Chloramines persist for a longer time than chlorine and as a result are used in longer water distribution systems.
Chlorination	The disinfection of water through the application of chlorine (Cl) as part of the water treatment process. Chlorination kills microorganisms and oxidises undesirable compounds.
Chlorine – Free	The residual formed with chlorine dosage once all the chlorine demand has been satisfied. This chlorine is free to kill/inactivate microorganisms.
Chlorine – Total	Total chlorine is the sum of combined and free chlorine.

GLOSSARY OF WATER QUALITY TERMINOLOGY *continued*

Coliforms	Coliform bacteria are used as one of the indicators of the quality of drinking water and the possible presence of disease-causing microorganisms. These bacteria are killed by chlorine.
Colour	See True colour.
Cryptosporidium	A parasitic protozoan (microorganism) which can cause gastroenteritis (stomach upsets) in humans. These organisms occur in the gut of infected warm-blooded animals and can be introduced into source water through faecal contamination.
Customer tap	Strategically placed sampling location in a water distribution system to enable verification of water quality in the distribution system as supplied to customers; typically located near a water meter.
Cyanobacteria (blue-green algae)	Single-celled, filamentous or colony-forming organisms which are widely distributed in freshwater and marine environments. Under favourable conditions of light, temperature and nutrient supply, extensive growth of cyanobacteria may occur, leading to blooms. Cyanobacteria blooms frequently result in environmental problems and can create challenges for water treatment.
Desalination	A water treatment process used to convert highly saline water into water suitable for human consumption. Treatment involves passing saline water through membranes at a high pressure.
Disinfection	Inactivation (killing) of pathogens or organisms capable of causing infectious disease by physical or chemical processes, including chlorination.
Disinfection byproducts (DBPs)	Products of reactions between disinfectants, particularly chlorine and naturally occurring organic material.
Dissolved organic carbon (DOC)	DOC is derived from organic materials (such as decomposed plant matter) which may give water a brownish appearance.
Drinking water	Water that is suitable for human consumption.
Drinking Water Quality Management System (DWQMS)	SA Water's DWQMS is used to ensure our drinking water supplies are managed effectively to provide high quality drinking water and to ensure the protection of public health.
Essential Services Commission of South Australia (ESCOSA)	The independent regulator responsible for protecting the long term interests of customers with respect to price and service
Escherichia coli (E. coli)	The most common thermotolerant (heat tolerant) coliform present in faeces, which is regarded as the most specific indicator of recent faecal contamination. *E. coli* can be killed by standard disinfection practices.
Filtration	A process for removing particles by passing water through a porous barrier, such as a screen, membrane, sand or gravel. Often used in conjunction with a coagulant (e.g. alum) to settle contaminants.
Fluoride (F)	Fluoride is regarded as a useful constituent of drinking water, particularly for the prevention of tooth decay. Fluoride has been added to Adelaide's water supply since 1971. Concentration is maintained within the recommended levels set by SA Health.
Giardia	A parasitic protozoan (microorganism) found in untreated surface water and removed by filtration. It can cause gastroenteritis (stomach upsets) in humans. These microorganisms occur in the gut of infected warm-blooded animals and can be introduced into source waters through faecal contamination.
Gigalitre (GL)	A metric unit of volume equal to one thousand million (1,000,000,000) litres or 1,000 megalitres.
Groundwater	Water beneath the earth's surface (often between saturated soil and rock) that supplies bores, wells or springs.
Incident Management System (IMS)	IMS is SA Water's web-based incident management tool for the reporting and management of all incidents.
Inflows	Water flowing from catchments into reservoirs through streams, rivers and creeks.

GLOSSARY OF WATER QUALITY TERMINOLOGY *continued*

Iron (Fe)	An element which, when found in water, leads to a brownish discolouration. Limits on the amount of iron in water are usually due to taste and appearance factors rather than any detrimental health effects.
Kilolitre (kL)	A metric unit of volume equal to 1,000 litres.
Magnetic Ion Exchange (MIEX®)	An ion exchange resin that is designed to remove dissolved organic carbon from water as part of the water treatment process.
Manganese (Mn)	Manganese in a water supply may affect taste, cause staining of clothes, produce deposits in pipes and contribute to turbidity.
Megalitre (ML)	A metric unit of volume equal to one million (1,000,000) litres or 1,000 kilolitres.
Microorganisms	Organisms invisible to the unaided eye.
Monitoring	An ongoing observation and testing program to assess potential changes in circumstances.
National Association of Testing Authorities (NATA)	NATA is Australia's national laboratory accreditation authority. NATA accreditation recognises and promotes facilities competent in specific types of testing, measurement, inspection and calibration.
National Health and Medical Research Council (NHMRC)	NHMRC is Australia's peak body for supporting health and medical research for developing health advice for the Australian community, health professionals and governments, and for providing advice on ethical behaviour in health care and in the conduct of health and medical research.
Naturally occurring	Present in the natural environment as minerals, elements, salts and other substances.
Nephelometric Turbidity Unit (NTU)	A measure of turbidity in water.
Nitrate (NO_3)	The most stable form of combined nitrogen in water. Present in surface waters in small amounts, the major sources are from human and animal wastes.
Nitrogen (N)	Nitrogen is an essential nutrient for plant growth. It is used in fertilisers and is present in sewage effluent. High levels of nutrients (including nitrogen) can lead to excessive algal growth in lakes, rivers and reservoirs.
Non-drinking supply	Water that is not suitable for human consumption.
Nutrients	Compounds required for growth by plants and other organisms. Major nutrients for plant growth are phosphorus and nitrogen.
Organic	Substances that come from animal or plant sources and always contain carbon.
Pathogens	Disease-causing organisms in humans such as bacteria and viruses.
pH	The pH value indicates if a substance is acidic, neutral or alkaline. It is calculated from the number of hydrogen ions present and is measured on a scale from zero to 14. A pH greater than seven is alkaline, less than seven is acidic and seven is neutral. The pH of public water supplies should be slightly alkaline to minimise corrosion.
Phosphorus (P)	Phosphorus is an essential nutrient for plant growth. High levels of phosphorus can lead to excessive algal growth in lakes, rivers and reservoirs and can be due to inputs from human activity such as fertiliser run-off and land clearing.
Protozoa	Single-celled organisms that feed on other, smaller microorganisms. A number of these (such as some types of *Giardia* and *Cryptosporidium*) are responsible for waterborne diseases.
Reservoir	A natural or artificial body of water used as a storage for water supply.
SA Health Water/Wastewater Incident Notification and Communication Protocol	An agreement between SA Health and SA Water which covers incident notification and reporting requirements.
Source water	Water prior to any treatment or disinfection.
Supervisory Control and Data Acquisition (SCADA)	Software package that allows for remote continuous monitoring and control of water and wastewater assets and infrastructure.
Total dissolved solids (TDS)	A measure of inorganic salts and small amounts of organic matter that are dissolved in water. Usually determined by converting electrical conductivity to TDS values.
Total hardness	Total hardness is the sum of the concentrations of calcium and magnesium ions expressed as calcium carbonate ($CaCO_3$) equivalent. Waters with a high mineral content (a total hardness in excess of 200 mg/L) are considered hard.

GLOSSARY OF WATER QUALITY TERMINOLOGY *continued*

Treatment (water)	The filtration and disinfection processes employed to produce drinking water.
Trihalomethanes (THMs)	Compounds that may occur in a chlorinated water supply as a by-product of organic materials present in the water reacting with chlorine.
True colour	Colour is mainly due to the presence of dissolved substances from organic matter in water, such as decaying leaves and vegetation. True colour refers to the colour of water after particles of organic matter have been removed through filtration and is the measurement of the extent to which light is absorbed by the water. True colour is measured in Hazen Units (HU).
Turbidity	Refers to the presence of suspended solids in water causing a muddy or discoloured appearance. Turbidity is measured in Nephelometric Turbidity Units (NTU).
Ultraviolet (UV)	Natural UV light from the sun or artificial UV light from low and medium pressure mercury lamps will inactivate pathogens, depending on contact time and light intensity. The water must be relatively clear and of low turbidity and dissolved compounds.
Water Quality Hazard and Risk Register (WQH&RR)	A web-based register that centrally manages water quality hazard identification, risk assessment and risk mitigation.
Water Services Association of Australia (WSAA)	Australia's peak body for the Australian urban water industry. Its members provide water services to over 15 million Australians.
Water supply system	The complete system that provides a water supply to customers. It includes all infrastructure from catchment to tap, including the source water, water storage reservoirs, water treatment plants and distribution networks.
Water treatment plant (WTP)	A water treatment plant that improves water quality by removing impurities through filtration and disinfection.

WATER QUALITY DATA 2015–16

Water quality data and water quality information is available on our website.

We are actively enhancing the way we provide water quality information to our customers.

We provide the following water quality information on our website www.sawater.com.au:

- Performance data for our drinking water supply systems, including data on the quality of drinking water supplied to individual suburbs and towns, updated monthly
- Information on common water quality problems experienced by customers including information on solving the issue and finding the source.

This report covers the period of 1 July 2015 to 30 June 2016.

TABLE 1

2015–16 Metropolitan Adelaide source water quality (inlets to water treatment plants)

	Anstey Hill WTP				Hope Valley WTP			
	Samples	Min	Max	Ave	Samples	Min	Max	Ave
Colour – True [456nm] [HU]	13	5	14	8	12	11	24	17
Dissolved Organic Carbon [mg/L]	52	2.2	6.7	3.5	45	5.4	8.7	7.1
Fluoride [mg/L]	13	<0.1	0.17	0.11	12	0.24	0.29	0.26
Hardness – Total [mg/L]	13	76	125	92	13	120	168	140
Nitrate as Nitrogen [mg/L]	26	0.012	0.307	0.122	26	<0.005	0.181	0.055
pH Units	13	6.8	8.2	7.5	12	7.3	8.5	7.9
Phosphorus – Total [mg/L]	26	0.021	0.065	0.04	26	0.007	0.036	0.019
Total Dissolved Solids [mg/L]	13	140	310	192	12	300	410	353
Turbidity [NTU]	13	11	45	29	12	1.2	4.9	2.6

	Barossa WTP				Little Para WTP			
	Samples	Min	Max	Ave	Samples	Min	Max	Ave
Colour – True [456nm] [HU]	13	15	26	19	8	8	13	10
Dissolved Organic Carbon [mg/L]	52	8.9	10.7	10.0	36	4.5	7.1	5.6
Fluoride [mg/L]	13	0.26	0.37	0.32	8	0.24	0.28	0.26
Hardness – Total [mg/L]	13	115	143	126	13	106	152	130
Nitrate as Nitrogen [mg/L]	25	<0.005	0.019	0.008	26	<0.005	0.211	0.049
pH Units	13	7.4	8.1	7.7	8	7.0	7.9	7.6
Phosphorus – Total [mg/L]	25	0.010	0.047	0.018	26	0.012	0.048	0.030
Total Dissolved Solids [mg/L]	13	350	420	385	8	290	350	325
Turbidity [NTU]	13	0.3	0.8	0.6	8	3.4	14	8.8

	Happy Valley WTP				Myponga WTP			
	Samples	Min	Max	Ave	Samples	Min	Max	Ave
Colour – True [456nm] [HU]	13	9	26	16	13	29	48	38
Dissolved Organic Carbon [mg/L]	52	3.6	6.6	4.9	52	10.2	13.3	11.7
Fluoride [mg/L]	13	0.17	0.23	0.20	13	0.18	0.85	0.26
Hardness – Total [mg/L]	13	64	108	85	13	125	139	131
Nitrate as Nitrogen [mg/L]	26	<0.005	0.069	0.020	26	0.014	0.101	0.045
pH Units	14	7.0	8.2	7.8	13	7.2	8.2	7.8
Phosphorus – Total [mg/L]	26	0.022	0.124	0.038	26	0.017	0.054	0.028
Total Dissolved Solids [mg/L]	13	210	300	258	13	380	470	413
Turbidity [NTU]	13	3.9	11	5.2	13	1.0	3.2	1.8

TABLE 2

2015–16 Metropolitan Adelaide distribution system customer tap water quality against ADWG

	Anstey Hill Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	302	<0.1	1.4	0.5	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	302	<0.1	1.4	0.5	75.2
Colour – True [HU]		≤ 15 [HU]	26	<1	1	1	100
E. coli [per cfu/100mL]	++	–	302	0	0	0	100
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	8	0.25	0.98	0.82	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	8	50	80	62	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	8	0.0013	0.0118	0.0059	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	8	0.0001	0.0013	0.0007	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	8	0.0001	0.0013	0.0007	100
pH Units		6.5–8.5 [pH units]	26	7.1	7.9	7.3	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	8	160	250	199	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	62	42	137	75	100
Turbidity [NTU]		≤ 5 [NTU]	26	<0.1	0.20	0.11	100

	Barossa Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	142	<0.1	1.0	0.3	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	142	<0.1	1.0	0.3	95.8
Colour – True [HU]		≤ 15 [HU]	26	<1	2	1	100
E. coli [per cfu/100mL]	++	–	141	0	0	0	100
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	8	0.27	0.96	0.81	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	8	140	158	151	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	8	0.0025	0.010	0.0067	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	8	0.0006	0.0027	0.0014	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	8	0.0006	0.0027	0.0014	100
pH Units		6.5–8.5 [pH units]	26	7.1	7.5	7.3	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	8	400	470	435	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	46	138	239	180	100
Turbidity [NTU]		≤ 5 [NTU]	26	<0.1	0.20	0.12	100

	Central Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	1,495	<0.1	2.3	0.4	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	1,495	<0.1	2.3	0.4	84.9
Colour – True [HU]		≤ 15 [HU]	118	<1	3	1	100
E. coli [per cfu/100mL]	++	–	1,453	0	0	0	100
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	37	0.55	1.10	0.88	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	37	72	124	94	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	37	0.0012	0.0605	0.008	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	37	0.0001	0.0228	0.0012	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	37	0.0001	0.0228	0.0012	100
pH Units		6.5–8.5 [pH units]	118	7.1	7.9	7.4	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	77	150	330	270	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	236	9	237	113	100
Turbidity [NTU]		≤ 5 [NTU]	118	<0.1	0.76	0.13	100

++ *E. coli should not be detected in samples of drinking water. Although we aim for 100% compliance, the ADWG recognise that occasional detections may occur. In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.*

TABLE 2 *continued*

2015–16 Metropolitan Adelaide distribution system customer tap water quality against ADWG

	East Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	400	<0.1	1.3	0.4	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	400	<0.1	1.3	0.4	80.5
Colour – True [HU]		≤ 15 [HU]	39	<1	<1	<1	100
E. coli [per cfu/100mL]	++	–	399	0	0	0	100
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	12	0.66	0.99	0.86	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	12	48	117	77	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	12	0.0023	0.0157	0.0068	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	12	0.0002	0.0030	0.0007	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	12	0.0002	0.0030	0.0007	100
pH Units		6.5–8.5 [pH units]	39	7.0	8.1	7.4	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	12	160	310	232	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	75	36	188	93	100
Turbidity [NTU]		≤ 5 [NTU]	50	<0.1	0.30	0.10	100

	Myponga Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	104	<0.1	0.7	0.1	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	104	<0.1	0.7	0.1	99
Colour – True [HU]		≤ 15 [HU]	14	<1	2	1	100
E. coli [per cfu/100mL]	++	–	104	0	0	0	100
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	5	0.69	1.00	0.84	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	5	78	133	103	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	5	0.0029	0.0079	0.0048	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	5	<0.0001	0.0012	0.0007	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	5	<0.0001	0.0012	0.0007	100
pH Units		6.5–8.5 [pH units]	14	7.3	7.8	7.5	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	5	230	470	308	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	53	77	314	185	92.5
Turbidity [NTU]		≤ 5 [NTU]	14	<0.1	0.22	0.12	100

	North Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	492	<0.1	1.4	0.4	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	492	<0.1	1.4	0.4	83.9
Colour – True [HU]		≤ 15 [HU]	51	<1	2	1	100
E. coli [per cfu/100mL]	++	–	492	0	1	0	99.8
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	16	0.16	0.95	0.81	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	16	50	160	102	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	16	0.0023	0.0117	0.0052	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	16	0.0001	0.0014	0.0006	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	16	0.0001	0.0014	0.0006	100
pH Units		6.5–8.5 [pH units]	51	7.0	7.9	7.4	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	16	160	480	300	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	93	42	224	116	100
Turbidity [NTU]		≤ 5 [NTU]	51	<0.1	0.20	0.10	100

++ *E. coli should not be detected in samples of drinking water. Although we aim for 100% compliance, the ADWG recognise that occasional detections may occur. In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.*

TABLE 2 *continued*

2015–16 Metropolitan Adelaide distribution system customer tap water quality against ADWG

	South Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	105	<0.1	0.7	0.2	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	105	<0.1	0.7	0.2	98.1
Colour – True [HU]		≤ 15 [HU]	13	<1	1	1	100
E. coli [per cfu/100mL]	++	–	105	0	0	0	100
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	4	0.29	0.99	0.62	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	4	75	113	95	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	4	0.0046	0.0121	0.0083	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	4	0.0003	0.0011	0.0007	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	4	0.0003	0.0011	0.0007	100
pH Units		6.5–8.5 [pH units]	14	7.1	7.7	7.4	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	4	210	310	265	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	40	71	167	118	100
Turbidity [NTU]		≤ 5 [NTU]	14	<0.1	0.20	0.10	100

	West Metro System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	520	<0.1	1.3	0.4	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	520	<0.1	1.3	0.4	83.3
Colour – True [HU]		≤ 15 [HU]	79	<1	3	1	100
E. coli [per cfu/100mL]	++	–	518	0	0	0	100
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	27	0.43	1.00	0.81	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	27	67	165	113	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	27	0.0018	0.060	0.0122	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	27	0.0003	0.0147	0.0015	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	27	0.0003	0.0147	0.0015	100
pH Units		6.5–8.5 [pH units]	81	7.0	7.9	7.3	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	75	150	440	294	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	134	6	231	137	100
Turbidity [NTU]		≤ 5 [NTU]	79	<0.1	0.40	0.10	100

	Metropolitan Metro System – Total Distribution System						
Parameter	**Health Guideline**	**Aesthetic Guideline**	**Samples**	**Min**	**Max**	**Ave**	**% Compliance**
Chlorine Residual – Free [mg/L]	≤ 5 [mg/L]	–	3,560	<0.1	2.3	0.4	100
Chlorine Residual – Free [mg/L]		≤ 0.6 [mg/L]	3,560	<0.1	2.3	0.4	84.5
Colour – True [HU]		≤ 15 [HU]	366	<1	3	1	100
E. coli [per cfu/100mL]	++	–	3,514	0	1	0	100
Fluoride [mg/L]	≤ 1.5 [mg/L]	–	117	0.16	1.10	0.83	100
Hardness – Total [mg/L]		≤ 200 [mg/L]	117	48	165	100	100
Iron – Total [mg/L]		≤ 0.3 mg/L]	117	0.0012	0.0605	0.0081	100
Manganese – Total [mg/L]	≤ 0.5 [mg/L]	–	117	<0.0001	0.0228	0.0011	100
Manganese – Total [mg/L]		≤ 0.1 [mg/L]	117	<0.0001	0.0228	0.0011	100
pH Units		6.5–8.5 [pH units]	369	7.0	8.1	7.3	100
Total Dissolved Solids [mg/L]		≤ 600 [mg/L]	205	150	480	283	100
Trihalomethanes – Total [µg/L]	≤ 250 [µg/L]	–	739	6	314	122	99.5
Turbidity [NTU]		≤ 5 [NTU]	378	<0.1	0.76	0.12	100

++ *E. coli should not be detected in samples of drinking water. Although we aim for 100% compliance, the ADWG recognise that occasional detections may occur. In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.*

TABLE 3

2015–16 Country source water quality

	Total Dissolved Solids [mg/L]			Hardness - Total [mg/L]			Dissolved Organic Carbon [mg/L]			pH Units		
System	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
Barmera WTP	100	180	136	N/A	N/A	N/A	2.1	4.6	3.4	7.1	8.7	7.7
Barossa WTP	340	420	380	115	143	126	9.1	10.6	10	7.3	8.4	7.8
Beachport IRP	620	670	645	259	282	269	0.8	0.8	0.8	7.2	7.4	7.3
Berri WTP	91	180	126	N/A	N/A	N/A	2	5	3.4	6.8	8.6	7.5
Blanchetown WTP	120	210	164	N/A	N/A	N/A	1.9	5	3.4	7.1	8.3	7.7
Bordertown	370	620	477	210	288	244	0.5	1.1	0.7	7.1	7.4	7.2
Cadell WTP	120	240	160	N/A	N/A	N/A	2.1	5.2	3.4	7	8.3	7.6
Coffin Bay	340	470	381	211	236	222	<0.3	0.4	0.3	7.5	7.9	7.8
Cowirra WTP	140	230	171	N/A	N/A	N/A	2.3	5.3	3.5	6.8	8	7.4
Elliston	560	1,000	768	262	342	301	0.4	0.5	0.5	7.3	7.5	7.4
Eyre South	430	1,300	674	219	514	305	0.4	0.9	0.6	7	7.8	7.4
Geranium	1,400	1,500	1,423	537	595	571	0.5	0.8	0.7	6.8	7	7
Glossop WTP	91	180	126	N/A	N/A	N/A	2	5	3.4	6.8	8.6	7.5
Happy Valley WTP	210	300	249	64	108	85	3.6	6.9	4.9	7.3	8.9	8.1
Hawker Desalination WTP	2,000	2,500	2,268	896	974	943	0.5	0.5	0.5	7.1	7.2	7.2
Kalangadoo IRP	510	530	520	336	347	342	1.1	1.1	1.1	7.1	7.1	7.1
Kanmantoo WTP	140	230	178	44	60	52	2.5	5.8	3.9	6.9	7.8	7.3
Kingston SE IRP	770	1,200	904	204	235	219	0.8	1	0.9	7.3	7.5	7.4
Lameroo IRP	900	1,000	946	225	243	235	0.4	0.5	0.5	7.5	7.7	7.6
Loxton WTP	97	170	129	N/A	N/A	N/A	2.1	8.2	3.8	6.8	8.6	7.8
Lucindale IRP	780	810	791	305	311	308	2	2.1	2.1	7.3	7.4	7.3
Mannum WTP	140	230	170	43	61	49	2.6	8.7	3.9	6.5	8.3	7.4
Melrose	1,200	1,700	1,458	273	403	337	0.5	0.5	0.5	7.3	7.6	7.4
Middle River WTP	280	720	479	39	109	71	9	21.3	13.4	6.3	7.6	7
Millicent	520	690	591	315	389	344	0.8	1.2	1.1	7.3	7.5	7.4
Moorook WTP	100	190	136	N/A	N/A	N/A	2.2	5.7	3.7	7.1	8.6	7.7
Morgan WTP	110	210	159	34	52	44	2.3	5.3	3.5	7.4	9	7.9
Mt Burr	400	480	436	258	335	308	0.5	0.6	0.6	7.1	7.5	7.3
Mt Compass	120	260	188	39	60	50	<0.3	<0.3	<0.3	6.1	7	6.5
Mt Gambier	340	630	520	165	310	238	0.7	1.8	1	7.3	8.5	8
Mt Pleasant WTP	140	230	170	43	61	49	1.9	8.7	3.5	6.5	8.3	7.4
Murray Bridge WTP	140	230	178	44	60	52	2.5	5.8	3.9	6.9	7.8	7.3
Mypolonga WTP	140	230	178	N/A	N/A	N/A	2.3	5.1	3.6	6.9	7.6	7.2
Myponga WTP	200	450	393	125	139	131	11	13.6	12.1	7.2	8.3	7.9
Nangwarry	540	770	633	339	451	389	0.7	1	0.9	6.9	7.1	7
Naracoorte	1,200	1,300	1,213	319	370	339	1.5	1.9	1.6	7.6	7.7	7.7
Orroroo	1,800	2,100	1,927	680	725	700	0.5	0.6	0.6	7.1	7.3	7.2
Padthaway	1,200	1,600	1,420	542	570	554	0.6	0.8	0.7	7	7.1	7
Palmer WTP	140	230	170	43	61	49	2.6	8.7	3.9	6.5	8.3	7.4
Parachilna	790	820	803	302	311	307	0.3	0.3	0.3	7.5	7.6	7.6
Parilla IRP	630	670	641	177	186	182	0.4	0.4	0.4	7.6	7.7	7.6
Penneshaw WTP	33,000	35,000	34,458	N/A	N/A	N/A	<0.5	1.4	0.8	6.9	7.8	7.2
Penola IRP	130	660	618	295	332	315	1.1	2.9	2	7.2	8	7.4
Pinnaroo IRP	670	770	702	235	257	246	0.4	0.5	0.5	7.3	7.6	7.5
Port MacDonnell	670	690	680	18	21	20	1.1	1.2	1.2	8.2	8.3	8.3
Quorn	1,000	1,300	1,197	463	541	513	0.5	1	0.7	6.8	7.1	7
Renmark WTP	84	140	108	31	41	35	2.1	5.8	3.8	6.8	9.2	7.6
Robe IRP	610	1,100	784	57	143	106	1	1.3	1.1	7.4	8.4	7.6

TABLE 3 *continued*

2015–16 Country source water quality

	Total Dissolved Solids [mg/L]			Hardness - Total [mg/L]			Dissolved Organic Carbon [mg/L]			pH Units		
System	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**
Summit WTP	140	230	178	44	60	52	2.5	5.8	3.9	6.9	7.8	7.3
Swan Reach Town WTP	130	230	163	N/A	N/A	N/A	2.3	4.9	3.5	7.3	8.5	7.8
Swan Reach WTP	130	220	163	38	56	46	2.4	5.7	3.8	7	8.3	7.8
Tailem Bend WTP	140	250	194	51	67	56	2.4	5.4	3.7	7	7.9	7.4
Tarpeena IRP	610	720	659	389	411	399	0.8	1	0.9	7.1	7.2	7.1
Waikerie WTP	110	190	145	N/A	N/A	N/A	2.4	5.1	3.6	7.1	8.3	7.6
Warooka	690	770	736	324	348	337	0.8	1	0.9	7.4	7.6	7.5
Wilmington	280	460	331	90	262	155	0.6	2.7	1.5	6.1	7.5	6.7
Woolpunda	100	200	143	N/A	N/A	N/A	2.2	5.6	3.4	7.1	8.2	7.7

Notes: N/A: Not applicable.

	Turbidity [NTU]			Colour – true [HU]			Nitrate as nitrogen [mg/L]			Phosphorous – total [mg/L]		
System	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**
Barmera WTP	5.8	58	22.4	5	17	8	N/A	N/A	N/A	N/A	N/A	N/A
Barossa WTP	<0.1	1.5	0.6	14	26	19	<0.005	0.026	0.009	<0.005	0.047	0.016
Beachport IRP	1.9	3.6	2.7	<1	<1	<1	<0.005	0.008	0.007	0.038	0.047	0.043
Berri WTP	6.4	49	23.7	5	19	9	N/A	N/A	N/A	N/A	N/A	N/A
Blanchetown WTP	4.8	51	25.3	5	13	8	N/A	N/A	N/A	N/A	N/A	N/A
Bordertown	<0.1	41	2.3	<1	4	1	<0.005	0.424	0.148	<0.005	0.025	0.01
Cadell WTP	8.4	61	27.7	4	17	8	N/A	N/A	N/A	N/A	N/A	N/A
Coffin Bay	<0.1	0.2	0.1	<1	<1	<1	0.172	1.06	0.74	<0.005	0.017	0.011
Cowirra WTP	13	56	31.7	6	13	8	N/A	N/A	N/A	N/A	N/A	N/A
Elliston	<0.1	0.1	0.1	<1	<1	<1	2.51	4.33	3.42	<0.005	0.014	0.01
Eyre South	<0.1	130	1	<1	<1	<1	0.601	5.23	3.024	<0.005	0.019	0.009
Geranium	<0.1	0.1	0.1	<1	<1	<1	0.032	0.075	0.054	0.033	0.037	0.035
Glossop WTP	6.4	49	23.7	5	19	9	N/A	N/A	N/A	N/A	N/A	N/A
Happy Valley WTP	2.4	13	5.3	8	27	16	<0.005	0.115	0.024	0.021	0.502	0.04
Hawker Desalination WTP	7.9	14	10.3	<1	<1	<1	0.008	0.008	0.008	<0.005	0.007	0.006
Kalangadoo IRP	1.9	5.9	4.3	<1	<1	<1	<0.005	0.01	0.008	0.017	0.019	0.018
Kanmantoo WTP	14	66	33.9	6	13	8	N/A	N/A	N/A	0.054	0.266	0.101
Kingston SE IRP	3.4	15	9.4	<1	2	1	<0.005	0.024	0.013	0.005	0.01	0.008
Lameroo IRP	1.9	4.4	3	<1	<1	<1	<0.005	<0.005	<0.005	0.045	0.055	0.05
Loxton WTP	5.7	52	22.1	5	20	9	<0.005	0.051	0.01	0.033	0.131	0.071
Lucindale IRP	0.3	7.8	5.1	<1	2	2	0.012	0.017	0.015	0.045	0.05	0.048
Mannum WTP	12	59	31.5	5	13	8	<0.005	0.152	0.06	0.04	0.182	0.094
Melrose	<0.1	1.3	0.2	<1	<1	<1	0.337	0.883	0.61	0.017	0.019	0.018
Middle River WTP	2.1	22	7.2	87	210	141	<0.005	0.297	0.117	0.011	0.081	0.028
Millicent	0.2	100	4.4	<1	4	2	<0.005	0.09	0.045	0.008	0.017	0.014
Moorook WTP	6.1	60	24.8	5	18	8	<0.000	0.066	0.01	0.038	0.094	0.068
Morgan WTP	1.1	46	21	5	33	9	N/A	N/A	N/A	0.03	0.095	0.058
Mt Burr	<0.1	0.4	0.1	<1	<1	<1	1.17	1.37	1.27	0.036	0.038	0.037
Mt Compass	<0.1	3.9	0.3	<1	<1	<1	0.037	0.051	0.044	0.016	0.031	0.024
Mt Gambier	0.1	120	7.1	<1	3	2	<0.005	3.46	2.557	<0.005	0.07	0.019
Mt Pleasant WTP	7.1	59	30	5	17	8	<0.005	0.152	0.06	0.04	0.182	0.094
Murray Bridge WTP	14	66	33.9	6	13	8	N/A	N/A	N/A	0.054	0.266	0.101
Mypolonga WTP	14	59	31.1	6	13	9	N/A	N/A	N/A	N/A	N/A	N/A
Myponga WTP	0.7	8.9	1.9	29	58	38	0.014	0.101	0.049	0.013	0.065	0.029

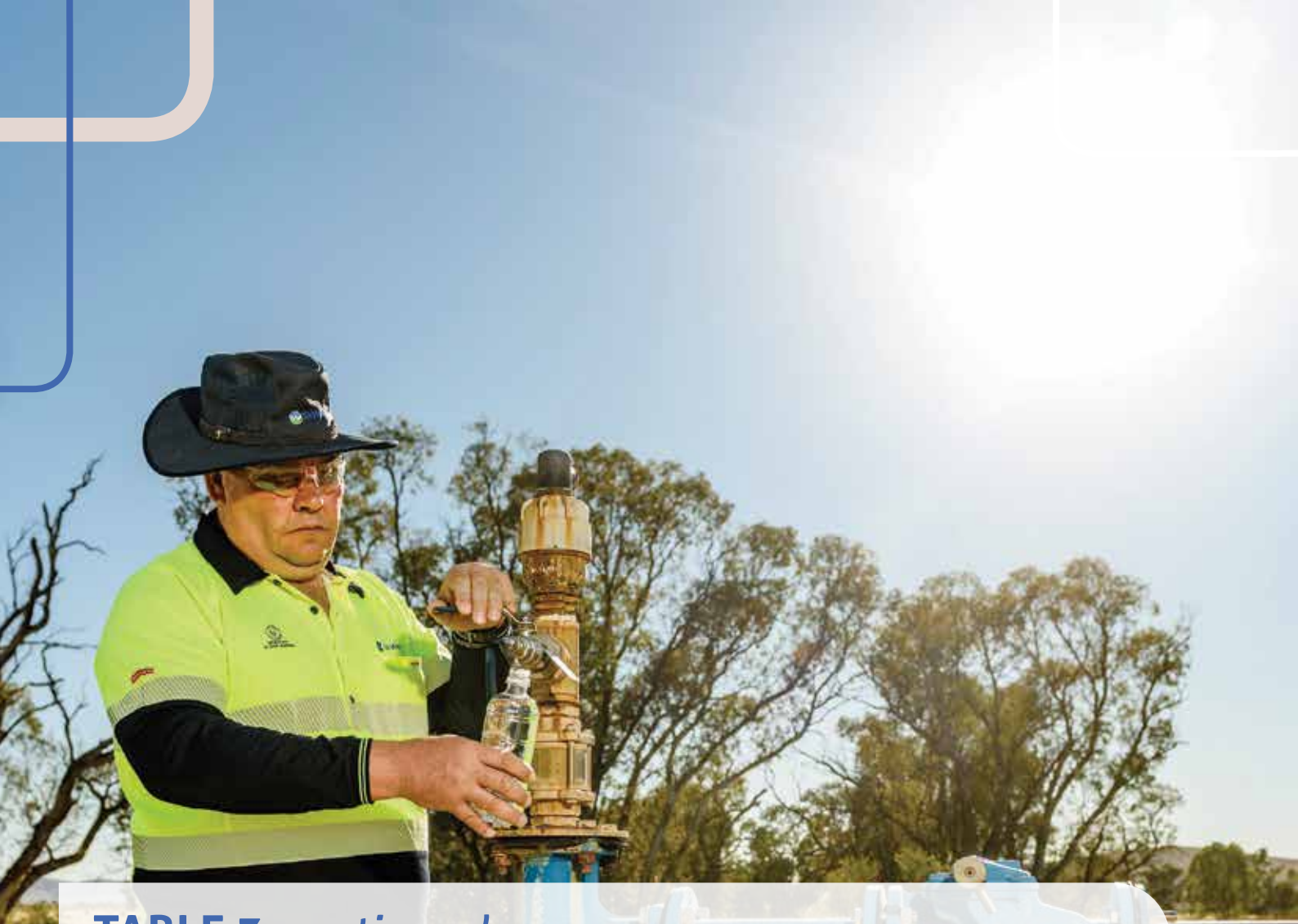


TABLE 3 *continued*

2015–16 Country source water quality

	Turbidity [NTU]			Colour – true [HU]			Nitrate as nitrogen [mg/L]			Phosphorous – total [mg/L]		
System	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**
Nangwarry	<0.1	0.4	0.2	<1	<1	<1	0.489	3.07	1.78	<0.005	0.021	0.013
Naracoorte	0.2	2	0.5	4	6	5	<0.005	<0.005	<0.005	0.049	0.07	0.059
Orroroo	<0.1	0.7	0.1	<1	<1	<1	0.031	0.044	0.038	0.015	0.016	0.016
Padthaway	0.1	8.8	1.1	<1	<1	<1	0.036	0.073	0.055	0.013	0.021	0.017
Palmer WTP	12	59	31.5	5	13	8	<0.005	0.152	0.06	0.04	0.182	0.094
Parachilna	<0.1	0.3	0.1	<1	<1	<1	1.3	1.3	1.3	<0.005	<0.005	<0.005
Parilla IRP	1.4	3.3	2.3	<1	2	1	<0.005	<0.005	<0.005	0.027	0.035	0.031
Penneshaw WTP	<0.1	4.7	0.3	N/A	N/A	N/A	N/A	N/A	N/A	0.013	0.026	0.019
Penola IRP	6.4	14	10.9	1	4	2	<0.005	<0.005	<0.005	0.026	0.034	0.03
Pinnaroo IRP	0.3	4	2.6	<1	<1	<1	<0.005	<0.005	<0.005	0.042	0.057	0.052
Port MacDonnell	<0.1	1	0.2	3	8	5	<0.005	<0.005	<0.005	0.178	0.178	0.178
Quorn	<0.1	7.9	0.4	<1	<1	<1	0.102	0.132	0.118	0.019	0.023	0.021
Renmark WTP	5.8	70	24.5	6	26	9	<0.005	0.126	0.016	0.032	0.208	0.077
Robe IRP	0.2	1.9	0.8	<1	5	1	<0.005	0.012	0.006	0.036	0.213	0.076
Summit WTP	14	66	33.9	6	13	8	N/A	N/A	N/A	0.054	0.266	0.101
Swan Reach Town WTP	6	47	24.8	6	12	8	N/A	N/A	N/A	N/A	N/A	N/A
Swan Reach WTP	4.2	55	24.9	5	15	8	<0.005	0.288	0.031	0.039	0.441	0.103
Tailem Bend WTP	17	140	43.1	6	25	9	<0.005	0.323	0.137	0.053	1.09	0.144
Tarpeena IRP	0.4	19	6.4	<1	<1	<1	<0.005	<0.005	<0.005	0.05	0.058	0.054
Waikerie WTP	7.7	54	25.4	6	16	8	<0.005	0.131	0.021	0.051	0.337	0.093
Warooka	<0.1	0.2	0.1	<1	<1	<1	0.048	3.77	1.39	0.007	0.015	0.012
Wilmington	<0.1	1.3	0.4	<1	2	1	0.008	0.232	0.121	0.012	0.084	0.054
Woolpunda	5.5	50	27.2	5	15	8	N/A	N/A	N/A	N/A	N/A	N/A

Notes: N/A: Not applicable.

TABLE 4

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	E. coli 100 mL		Chlorine residual – free [mg/L]*			
System	Samples	Health compliance %	Min	Max	Ave	Health compliance %
ADWG value		++				≤ 5
Target		100% Free				100%
Barmera WTP	106	100	1.1	2.6	1.9	100
Barossa WTP	377	99.7	<0.1	2.7	0.6	100
Beachport IRP	65	100	0.1	1.5	1.0	100
Berri WTP	88	100	0.7	2.4	1.7	100
Blanchetown WTP	53	100	0.9	2.0	1.4	100
Bordertown	67	100	0.5	1.5	1.1	100
Cadell WTP	52	100	0.6	1.9	1.1	100
Coffin Bay	66	100	0.6	1.7	1.1	100
Cowirra WTP	66	100	0.2	2.0	1.1	100
Elliston	103	100	0.7	2.3	1.1	100
Eyre South	343	100	0.6	2.5	1.1	100
Eyre South/Morgan WTP	338	100	0.9	2.6	1.6	100
Geranium	51	100	0.4	2.0	1.1	100
Glossop WTP	101	100	1.0	2.4	1.6	100
Happy Valley WTP	65	100	<0.1	1.8	0.8	100
Hawker Desalination WTP	52	100	1.0	1.6	1.3	100
Kalangadoo IRP	65	98.5	0.5	1.1	0.8	100
Kanmantoo WTP	79	100	0.6	1.6	1.1	100
Kingston SE IRP	66	100	0.5	1.3	1.0	100
Lameroo IRP	52	100	0.6	1.6	1.2	100
Loxton WTP	78	100	N/A	N/A	N/A	–
Lucindale IRP	65	100	0.3	1.7	0.9	100
Mannum WTP	119	100	0.1	2.7	1.3	100
Melrose	52	100	0.5	1.9	1.4	100
Middle River WTP	116	100	<0.1	1.5	0.6	100
Millicent	78	100	0.3	1.2	0.8	100
Moorook WTP	106	100	0.9	2.7	1.8	100
Morgan / Swan Reach WTP	518	100	N/A	N/A	N/A	–
Morgan WTP	937	100	N/A	N/A	N/A	–
Mt Burr	65	98.5	0.4	1.1	0.8	100
Mt Compass	65	100	0.6	1.7	1.1	100
Mt Gambier	155	100	0.5	1.5	0.9	100
Mt Pleasant WTP	131	100	0.3	1.7	1.1	100
Murray Bridge WTP	159	100	<0.1	3.9	1.5	100
Mypolonga WTP	65	100	0.1	2.6	1.9	100
Myponga WTP	224	100	<0.1	1.5	0.2	100
Nangwarry	65	100	0.1	1.2	0.8	100
Naracoorte	78	100	<0.1	0.9	0.5	100
Orroroo	52	100	0.6	2.0	1.3	100
Padthaway	66	100	0.3	1.6	1.0	100
Palmer WTP	115	100	0.2	2.0	1.1	100
Parachilna	50	100	0.3	2.1	1.1	100
Parilla IRP	52	100	0.5	1.7	1.0	100
Penneshaw WTP	64	100	0.5	1.8	1.4	100
Penola IRP	66	100	0.2	1.4	1.0	100
Pinnaroo IRP	65	100	0.8	2.0	1.2	100
Port MacDonnell	65	98.5	0.2	1.0	0.7	100

TABLE 4 *continued*

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	E. coli 100 mL		Chlorine residual – free [mg/L]*			
System	**Samples**	**Health compliance %**	**Min**	**Max**	**Ave**	**Health compliance %**
ADWG value		++				≤ 5
Target		100% Free				100%
Quorn	51	100	0.7	1.7	1.2	100
Renmark WTP	222	100	<0.1	2.9	1.6	100
Robe IRP	65	100	0.2	1.4	0.8	100
Summit WTP	482	100	N/A	N/A	N/A	–
Swan Reach Town WTP	66	100	0.2	1.6	1.0	100
Swan Reach WTP	488	100	N/A	N/A	N/A	–
Tailem Bend WTP	315	100	N/A	N/A	N/A	–
Tarpeena IRP	64	100	0.5	1.4	0.8	100
Waikerie WTP	77	100	0.6	2.5	1.5	100
Warooka	52	100	0.4	1.7	1.1	100
Wilmington	52	100	0.3	2.0	0.8	100
Woolpunda	78	100	N/A	N/A	N/A	–

++ E. coli should not be detected in samples of drinking water. Although we aim for 100% compliance, the ADWG recognise that occasional detections may occur. In accordance with the guidelines any detection is immediately investigated and corrective action implemented as agreed with SA Health.
*Notes: *Chlorinated systems only. N/A: Not applicable*

	Chlorine residual – total [mg/L]**				Total dissolved solids [mg/L]			
System	**Min**	**Max**	**Ave**	**Health compliance %**	**Min**	**Max**	**Ave**	**Aesthetic compliance %**
ADWG value				≤ 5				≤600
Target				100%				
Barmera WTP	N/A	N/A	N/A	–	130	200	166	100
Barossa WTP	N/A	N/A	N/A	–	400	490	444	100
Beachport IRP	N/A	N/A	N/A	–	630	650	640	0
Berri WTP	N/A	N/A	N/A	–	130	180	150	100
Blanchetown WTP	N/A	N/A	N/A	–	160	200	186	100
Bordertown	N/A	N/A	N/A	–	450	540	498	100
Cadell WTP	N/A	N/A	N/A	–	130	180	163	100
Coffin Bay	N/A	N/A	N/A	–	400	430	418	100
Cowirra WTP	N/A	N/A	N/A	–	170	210	200	100
Elliston	N/A	N/A	N/A	–	800	880	828	0
Eyre South	N/A	N/A	N/A	–	520	560	540	100
Eyre South/Morgan WTP	N/A	N/A	N/A	–	360	480	431	100
Geranium	N/A	N/A	N/A	–	1,400	1,500	1,425	0
Glossop WTP	N/A	N/A	N/A	–	140	180	156	100
Happy Valley WTP	N/A	N/A	N/A	–	230	310	273	100
Hawker Desalination WTP	N/A	N/A	N/A	–	370	420	388	100
Kalangadoo IRP	N/A	N/A	N/A	–	520	530	525	100
Kanmantoo WTP	N/A	N/A	N/A	–	150	210	183	100
Kingston SE IRP	N/A	N/A	N/A	–	830	900	858	0
Lameroo IRP	N/A	N/A	N/A	–	930	1,000	965	0

TABLE 4 *continued*

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	Chlorine residual – total [mg/L]**				Total dissolved solids [mg/L]			
System	**Min**	**Max**	**Ave**	**Health compliance %**	**Min**	**Max**	**Ave**	**Aesthetic compliance %**
ADWG value				**≤ 5**				**≤600**
Target				**100%**				
Loxton WTP	2.5	4.1	3.4	100	130	180	153	100
Lucindale IRP	N/A	N/A	N/A	–	780	800	790	0
Mannum WTP	N/A	N/A	N/A	–	160	190	175	100
Melrose	N/A	N/A	N/A	–	1,500	1,500	1,500	0
Middle River WTP	N/A	N/A	N/A	–	450	690	550	75
Millicent	N/A	N/A	N/A	–	580	610	593	75
Moorook WTP	N/A	N/A	N/A	–	140	220	173	100
Morgan / Swan Reach WTP	1.5	3.6	2.8	100	170	200	182	100
Morgan WTP	0.6	4.0	2.8	100	130	240	195	100
Mt Burr	N/A	N/A	N/A	–	430	440	433	100
Mt Compass	N/A	N/A	N/A	–	200	250	224	100
Mt Gambier	N/A	N/A	N/A	–	340	370	351	100
Mt Pleasant WTP	N/A	N/A	N/A	–	160	250	200	100
Murray Bridge WTP	N/A	N/A	N/A	–	180	240	213	100
Mypolonga WTP	N/A	N/A	N/A	–	170	210	193	100
Myponga WTP	N/A	N/A	N/A	–	430	500	460	100
Nangwarry	N/A	N/A	N/A	–	620	660	638	0
Naracoorte	N/A	N/A	N/A	–	1,200	1,200	1,200	0
Orroroo	N/A	N/A	N/A	–	1,900	2,000	1,925	0
Padthaway	N/A	N/A	N/A	–	1,500	1,500	1,500	0
Palmer WTP	N/A	N/A	N/A	–	160	200	180	100
Parachilna	N/A	N/A	N/A	–	800	830	810	0
Parilla IRP	N/A	N/A	N/A	–	640	660	645	0
Penneshaw WTP	N/A	N/A	N/A	–	140	180	162	100
Penola IRP	N/A	N/A	N/A	–	630	640	635	0
Pinnaroo IRP	N/A	N/A	N/A	–	680	710	690	0
Port MacDonnell	N/A	N/A	N/A	–	680	700	690	0
Quorn	N/A	N/A	N/A	–	1,100	1,200	1,150	0
Renmark WTP	N/A	N/A	N/A	–	110	160	133	100
Robe IRP	N/A	N/A	N/A	–	720	780	760	0
Summit WTP	1.5	4.1	3.1	100	180	270	210	100
Swan Reach Town WTP	N/A	N/A	N/A	–	170	190	178	100
Swan Reach WTP	1.9	4.1	3.1	100	150	220	182	100
Tailem Bend WTP	<0.1	3.8	2.4	100	190	340	233	100
Tarpeena IRP	N/A	N/A	N/A	–	670	680	675	0
Waikerie WTP	N/A	N/A	N/A	–	130	180	163	100
Warooka	N/A	N/A	N/A	–	740	770	758	0
Wilmington	N/A	N/A	N/A	–	300	320	310	100
Woolpunda	<0.1	3.0	1.7	100	150	230	173	100

*Notes: ** Chlorinated systems only. N/A: Not applicable*

TABLE 4 *continued*

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	Colour – true [HU]				Turbidity [NTU]			
System	**Min**	**Max**	**Ave**	**Aesthetic compliance %**	**Min**	**Max**	**Ave**	**Aesthetic compliance %**
ADWG value				**≤ 15**				**≤5**
Target								
Barmera WTP	<1	<1	<1	100	<0.1	0.4	0.2	100
Barossa WTP	<1	3	1	100	<0.1	1.1	0.2	100
Beachport IRP	<1	<1	<1	100	<0.1	0.7	0.1	100
Berri WTP	<1	<1	<1	100	<0.1	2.3	0.2	100
Blanchetown WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Bordertown	<1	<1	<1	100	<0.1	0.7	0.1	100
Cadell WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Coffin Bay	<1	<1	<1	100	<0.1	0.1	0.1	100
Cowirra WTP	<1	<1	<1	100	<0.1	0.1	0.1	100
Elliston	<1	<1	<1	100	<0.1	0.2	0.1	100
Eyre South	<1	<1	<1	100	<0.1	1.0	0.1	100
Eyre South/Morgan WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Geranium	<1	<1	<1	100	<0.1	0.2	0.1	100
Glossop WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Happy Valley WTP	<1	<1	<1	100	<0.1	0.5	0.2	100
Hawker Desalination WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Kalangadoo IRP	<1	<1	<1	100	<0.1	0.1	0.1	100
Kanmantoo WTP	<1	<1	<1	100	<0.1	1.6	0.3	100
Kingston SE IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Lameroo IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Loxton WTP	<1	2	1	100	<0.1	0.2	0.1	100
Lucindale IRP	<1	<1	<1	100	<0.1	0.5	0.1	100
Mannum WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Melrose	<1	<1	<1	100	<0.1	0.3	0.1	100
Middle River WTP	<1	2	1	100	<0.1	0.4	0.2	100
Millicent	<1	2	1	100	<0.1	0.6	0.3	100
Moorook WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Morgan / Swan Reach WTP	<1	2	1	100	<0.1	2.1	0.2	100
Morgan WTP	<1	2	1	100	<0.1	2.4	0.2	100
Mt Burr	<1	<1	<1	100	<0.1	0.3	0.1	100
Mt Compass	<1	<1	<1	100	<0.1	0.4	0.2	100
Mt Gambier	<1	<1	<1	100	<0.1	0.7	0.2	100
Mt Pleasant WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Murray Bridge WTP	<1	<1	<1	100	<0.1	2.0	0.2	100
Mypolonga WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Myponga WTP	<1	3	2	100	<0.1	0.5	0.2	100
Nangwarry	<1	<1	<1	100	<0.1	0.3	0.1	100
Naracoorte	<1	<1	<1	100	<0.1	1.3	0.3	100
Orroroo	<1	<1	<1	100	<0.1	0.1	0.1	100
Padthaway	<1	<1	<1	100	<0.1	0.2	0.2	100

TABLE 4 *continued*

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	Colour – true [HU]				Turbidity [NTU]			
System	**Min**	**Max**	**Ave**	**Aesthetic compliance %**	**Min**	**Max**	**Ave**	**Aesthetic compliance %**
ADWG value				**≤ 15**				**≤5**
Target								
Palmer WTP	<1	2	1	100	<0.1	0.7	0.1	100
Parachilna	<1	<1	<1	100	<0.1	0.3	0.1	100
Parilla IRP	<1	<1	<1	100	<0.1	0.3	0.1	100
Penneshaw WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Penola IRP	<1	<1	<1	100	<0.1	0.5	0.1	100
Pinnaroo IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Port MacDonnell	<1	<1	<1	100	<0.1	0.6	0.2	100
Quorn	<1	<1	<1	100	<0.1	0.2	0.1	100
Renmark WTP	<1	<1	<1	100	<0.1	0.4	0.1	100
Robe IRP	<1	<1	<1	100	<0.1	1.0	0.1	100
Summit WTP	<1	3	1	100	<0.1	8.5	0.1	99.7
Swan Reach Town WTP	<1	2	1	100	<0.1	0.6	0.1	100
Swan Reach WTP	<1	3	1	100	<0.1	0.5	0.1	100
Tailem Bend WTP	<1	3	1	100	<0.1	0.5	0.1	100
Tarpeena IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Waikerie WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Warooka	<1	<1	<1	100	<0.1	0.1	0.1	100
Wilmington	<1	<1	<1	100	<0.1	0.5	0.2	100
Woolpunda	<1	2	1	100	<0.1	3.9	0.4	100

	pH units				Trihalomethanes – total [µg/L]			
System	**Min**	**Max**	**Ave**	**Aesthetic compliance %**	**Min**	**Max**	**Ave**	**Health compliance %**
ADWG value				**6.5–8.5**				**≤250**
Target								**100%**
Barmera WTP	7.1	7.8	7.5	100	44	116	69	100
Barossa WTP	7.0	9.3	7.5	97.1	45	337	200	83.8
Beachport IRP	7.4	7.7	7.6	100	31	35	33	100
Berri WTP	7.3	7.6	7.4	100	38	82	54	100
Blanchetown WTP	7.3	7.9	7.6	100	46	116	69	100
Bordertown	7.0	7.6	7.3	100	10	34	18	100
Cadell WTP	7.2	7.9	7.5	100	26	117	68	100
Coffin Bay	7.3	8.0	7.8	100	7	18	12	100
Cowirra WTP	7.1	8.6	7.9	92.9	75	144	98	100
Elliston	7.0	7.9	7.5	100	8	11	9	100
Eyre South	7.1	7.9	7.5	100	8	28	17	100
Eyre South/Morgan WTP	7.4	8.0	7.9	100	25	186	93	100
Geranium	6.9	7.3	7.1	100	4	10	7	100
Glossop WTP	7.2	8.0	7.7	100	44	104	69	100
Happy Valley WTP	7.2	8.2	7.7	100	113	186	165	100
Hawker Desalination WTP	8.0	8.2	8.1	100	7	9	8	100
Kalangadoo IRP	7.1	7.3	7.2	100	12	42	34	100
Kanmantoo WTP	7.3	8.0	7.6	100	52	140	81	100
Kingston SE IRP	7.4	7.6	7.5	100	25	38	31	100
Lameroo IRP	7.6	7.9	7.7	100	16	24	21	100
Loxton WTP	8.3	8.9	8.6	48.7	N/A	N/A	N/A	–

TABLE 4 *continued*

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	pH units				Trihalomethanes – total [µg/L]			
System	**Min**	**Max**	**Ave**	**Aesthetic compliance %**	**Min**	**Max**	**Ave**	**Health compliance %**
ADWG value				**6.5–8.5**				**≤250**
Target								**100%**
Lucindale IRP	7.3	7.6	7.5	100	93	114	102	100
Mannum WTP	7.1	7.9	7.5	100	19	87	56	100
Melrose	7.3	7.9	7.5	100	5	18	11	100
Middle River WTP	7.3	7.6	7.4	100	86	260	170	94.9
Millicent	7.3	7.5	7.4	100	61	72	67	100
Moorook WTP	7.2	8.4	7.8	100	47	96	69	100
Morgan / Swan Reach WTP	8.1	9.5	9.1	3.4	N/A	N/A	N/A	–
Morgan WTP	6.9	9.4	8.8	16.5	31	164	91	100
Mt Burr	7.5	7.8	7.7	100	7	16	11	100
Mt Compass	7.0	7.8	7.3	100	<4	<4	<4	100
Mt Gambier	8.0	8.3	8.2	100	8	42	21	100
Mt Pleasant WTP	7.0	7.9	7.4	100	33	168	88	100
Murray Bridge WTP	7.0	8.8	7.7	95.5	34	195	96	100
Mypolonga WTP	7.1	7.8	7.4	100	42	189	106	100
Myponga WTP	7.1	7.9	7.4	100	157	296	224	80.7
Nangwarry	7.2	7.4	7.4	100	13	21	17	100
Naracoorte	7.6	7.8	7.7	100	161	230	186	100
Orroroo	7.4	7.9	7.6	100	4	5	5	100
Padthaway	7.2	7.6	7.4	100	9	28	16	100
Palmer WTP	7.2	7.9	7.4	100	36	123	74	100
Parachilna	7.8	7.9	7.9	100	<4	<4	<4	100
Parilla IRP	7.6	7.8	7.7	100	17	22	19	100
Penneshaw WTP	7.6	8.4	8.1	100	<4	23	9	100
Penola IRP	7.3	7.5	7.4	100	62	76	70	100
Pinnaroo IRP	7.1	7.6	7.4	100	10	13	11	100
Port MacDonnell	7.9	8.3	8.1	100	83	91	88	100
Quorn	7.0	7.2	7.1	100	5	11	7	100
Renmark WTP	7.0	9.8	7.9	75	30	137	72	100
Robe IRP	7.6	7.8	7.7	100	43	63	51	100
Summit WTP	8.0	9.2	8.8	7.1	N/A	N/A	N/A	–
Swan Reach Town WTP	7.4	7.9	7.6	100	43	155	81	100
Swan Reach WTP	7.3	9.5	8.9	8	N/A	N/A	N/A	–
Tailem Bend WTP	7.2	9.6	8.7	26.5	N/A	N/A	N/A	–
Tarpeena IRP	7.4	7.7	7.6	100	30	54	40	100
Waikerie WTP	7.4	8.0	7.7	100	41	111	73	100
Warooka	7.3	7.8	7.5	100	20	30	25	100
Wilmington	6.2	7.6	6.7	61.5	17	65	33	100
Woolpunda	7.7	9.5	8.7	53.8	N/A	N/A	N/A	–

TABLE 4 *continued*

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	Fluoride [mg/L]				Iron – total [mg/L]			
System	**Min**	**Max**	**Ave**	**Health compliance %**	**Min**	**Max**	**Ave**	**Aesthetic compliance %**
ADWG value				**≤1.5**				**≤0.3**
Target				**100%**				
Barmera WTP	0.8	1.0	0.9	100	0.0007	0.0418	0.0187	100
Barossa WTP	0.3	1.0	0.8	100	0.0044	0.0523	0.0228	100
Beachport IRP	0.2	0.3	0.2	100	0.0027	0.1468	0.0119	100
Berri WTP	0.8	0.9	0.9	100	0.0071	0.0745	0.0267	100
Blanchetown WTP	<0.1	0.1	0.1	100	0.0073	0.0201	0.0134	100
Bordertown	0.3	0.4	0.3	100	<0.0005	0.4391	0.0289	96
Cadell WTP	<0.1	0.1	0.1	100	0.0032	0.0059	0.0044	100
Coffin Bay	0.9	1.3	1.1	100	<0.0005	0.0038	0.0019	100
Cowirra WTP	<0.1	0.1	0.1	100	0.0058	0.0129	0.0087	100
Elliston	0.6	0.7	0.7	100	<0.0005	0.0009	0.0007	100
Eyre South	0.4	0.6	0.5	100	<0.0005	0.0086	0.0015	100
Eyre South/Morgan WTP	0.5	0.7	0.6	100	0.0011	0.0069	0.0029	100
Geranium	0.9	1.0	1.0	100	0.0020	0.0341	0.0156	100
Glossop WTP	<0.1	<0.1	<0.1	100	0.0138	0.0624	0.0242	100
Happy Valley WTP	0.8	1.0	0.9	100	0.0041	0.0137	0.0073	100
Hawker Desalination WTP	<0.1	0.1	0.1	100	<0.0005	0.0102	0.0031	100
Kalangadoo IRP	0.1	0.1	0.1	100	0.0015	0.0489	0.0100	100
Kanmantoo WTP	<0.1	0.1	0.1	100	0.0044	0.0602	0.0230	100
Kingston SE IRP	0.3	0.3	0.3	100	0.0008	0.0402	0.0048	100
Lameroo IRP	0.6	0.6	0.6	100	0.0170	0.0355	0.0234	100
Loxton WTP	0.9	0.9	0.9	100	0.0016	0.0028	0.0020	100
Lucindale IRP	0.3	0.3	0.3	100	0.0022	0.0310	0.0070	100
Mannum WTP	0.9	1.0	0.9	100	0.0062	0.0126	0.0096	100
Melrose	1.0	1.1	1.0	100	0.0005	0.0190	0.0075	100
Middle River WTP	<0.1	<0.1	<0.1	100	0.0160	0.0305	0.0244	100
Millicent	1.0	1.1	1.0	100	0.0179	0.0710	0.0505	100
Moorook WTP	<0.1	<0.1	<0.1	100	0.0091	0.0117	0.0103	100
Morgan / Swan Reach WTP	0.7	1.0	0.9	100	0.0016	0.0180	0.0080	100
Morgan WTP	0.6	1.0	0.9	100	0.0008	0.4024	0.0198	97.7
Mt Burr	0.3	0.3	0.3	100	0.0013	0.0050	0.0024	100
Mt Compass	0.2	0.3	0.3	100	0.0024	0.0054	0.0041	100
Mt Gambier	0.8	0.9	0.9	100	<0.0005	0.0376	0.0026	100
Mt Pleasant WTP	0.7	1.0	0.9	100	0.0006	0.0096	0.0053	100
Murray Bridge WTP	0.9	1.0	0.9	100	0.0010	0.0034	0.0025	100
Mypolonga WTP	<0.1	0.1	0.1	100	0.0077	0.0111	0.0089	100
Myponga WTP	0.2	0.9	0.5	100	0.0077	0.1799	0.0568	100
Nangwarry	0.1	0.2	0.1	100	0.0006	0.0040	0.0019	100
Naracoorte	1.1	1.2	1.2	100	0.0454	0.1484	0.0826	100
Orroroo	1.2	1.3	1.3	100	0.0044	0.0142	0.0104	100
Padthaway	0.1	0.1	0.1	100	0.0159	0.0276	0.0214	100
Palmer WTP	<0.1	0.1	0.1	100	0.0481	0.2376	0.1229	100
Parachilna	0.6	0.6	0.6	100	<0.0005	0.0024	0.0010	100

TABLE 4 *continued*

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	Fluoride [mg/L]				Iron – total [mg/L]			
System	**Min**	**Max**	**Ave**	**Health compliance %**	**Min**	**Max**	**Ave**	**Aesthetic compliance %**
ADWG value				**≤1.5**				**≤0.3**
Target				**100%**				
Parilla IRP	0.4	0.5	0.4	100	0.0019	0.1369	0.0187	100
Penneshaw WTP	<0.1	<0.1	<0.1	100	<0.0005	0.0006	0.0005	100
Penola IRP	0.2	0.2	0.2	100	0.0027	0.0399	0.0153	100
Pinnaroo IRP	0.7	0.7	0.7	100	0.0066	0.0262	0.0155	100
Port MacDonnell	0.8	0.8	0.8	100	<0.0005	0.0106	0.0042	100
Quorn	0.6	0.6	0.6	100	<0.0005	0.0057	0.0018	100
Renmark WTP	0.8	0.9	0.9	100	0.0024	0.0110	0.0054	100
Robe IRP	0.3	0.3	0.3	100	0.0015	0.1397	0.0132	100
Summit WTP	0.7	1.0	0.9	100	0.0006	0.0657	0.0081	100
Swan Reach Town WTP	<0.1	0.1	0.1	100	0.0141	0.0399	0.0255	100
Swan Reach WTP	0.8	0.9	0.9	100	0.0006	0.0068	0.0027	100
Tailem Bend WTP	0.8	1.1	0.9	100	0.0010	0.0652	0.0101	100
Tarpeena IRP	0.2	0.2	0.2	100	0.0038	0.0734	0.0126	100
Waikerie WTP	0.8	0.9	0.8	100	0.0130	0.0527	0.0292	100
Warooka	1.0	1.1	1.0	100	0.0005	0.0019	0.0009	100
Wilmington	0.2	0.2	0.2	100	0.0228	0.0451	0.0363	100
Woolpunda	<0.1	0.1	0.1	100	<0.0005	0.0029	0.0016	100

	Manganese – total [mg/L]					Hardness – total [mg/L]			
System	**Min**	**Max**	**Ave**	**Health compliance %**	**Aesthetic compliance %**	**Min**	**Max**	**Ave**	**Aesthetic compliance %**
ADWG value				**≤0.5**	**≤0.1**				**≤200**
Target				**100%**					
Barmera WTP	0.0016	0.0036	0.0027	100	100	37	53	43	100
Barossa WTP	0.0004	0.0044	0.0021	100	100	145	169	155	100
Beachport IRP	0.0002	0.0004	0.0003	100	100	262	278	269	0
Berri WTP	0.0019	0.0073	0.0036	100	100	37	48	40	100
Blanchetown WTP	0.0004	0.0008	0.0006	100	100	42	51	46	100
Bordertown	<0.0001	0.0036	0.001	100	100	243	290	257	0
Cadell WTP	0.0006	0.0014	0.0009	100	100	37	47	43	100
Coffin Bay	<0.0001	0.0003	0.0002	100	100	212	254	235	0
Cowirra WTP	0.0003	0.0005	0.0004	100	100	50	64	56	100
Elliston	<0.0001	<0.0001	<0.0001	100	100	297	316	308	0
Eyre South	<0.0001	0.0003	0.0001	100	100	241	270	256	0
Eyre South/Morgan WTP	<0.0001	0.0008	0.0003	100	100	155	216	193	41.7
Geranium	<0.0001	0.0002	0.0002	100	100	544	581	565	0
Glossop WTP	0.0004	0.0012	0.0005	100	100	37	51	42	100
Happy Valley WTP	0.0001	0.0004	0.0002	100	100	78	118	98	100
Hawker Desalination WTP	0.0001	0.0003	0.0002	100	100	112	135	121	100
Kalangadoo IRP	<0.0001	0.0002	0.0001	100	100	339	350	345	0
Kanmantoo WTP	0.0002	0.0054	0.0016	100	100	47	54	52	100
Kingston SE IRP	<0.0001	<0.0001	<0.0001	100	100	217	228	222	0
Lameroo IRP	0.0008	0.0014	0.001	100	100	228	235	232	0
Loxton WTP	0.0008	0.0023	0.0014	100	100	38	45	40	100
Lucindale IRP	<0.0001	<0.0001	<0.0001	100	100	299	316	307	0

TABLE 4 *continued*

2015–16 Country drinking water distribution systems – customer tap water quality against ADWG

	Manganese – total [mg/L]					Hardness – total [mg/L]			
System	**Min**	**Max**	**Ave**	**Health compliance %**	**Aesthetic compliance %**	**Min**	**Max**	**Ave**	**Aesthetic compliance %**
ADWG value				**≤0.5**	**≤0.1**				**≤200**
Target				**100%**					
Mannum WTP	0.0013	0.0029	0.002	100	100	44	52	48	100
Melrose	<0.0001	0.0005	0.0002	100	100	328	344	339	0
Middle River WTP	0.0004	0.0022	0.0013	100	100	62	115	80	100
Millicent	0.0005	0.0021	0.0014	100	100	314	382	345	0
Moorook WTP	0.0004	0.0006	0.0005	100	100	36	48	42	100
Morgan / Swan Reach WTP	0.0011	0.0028	0.0018	100	100	46	59	51	100
Morgan WTP	0.0011	0.0308	0.0031	100	100	40	77	54	100
Mt Burr	<0.0001	<0.0001	<0.0001	100	100	284	304	294	0
Mt Compass	0.0002	0.0003	0.0002	100	100	55	61	59	100
Mt Gambier	<0.0001	0.0002	0.0001	100	100	166	200	180	100
Mt Pleasant WTP	<0.0001	0.0017	0.0008	100	100	45	59	50	100
Murray Bridge WTP	0.0013	0.0025	0.002	100	100	49	58	54	100
Mypolonga WTP	0.0001	0.0004	0.0003	100	100	46	55	50	100
Myponga WTP	0.0007	0.0093	0.0047	100	100	127	139	134	100
Nangwarry	<0.0001	<0.0001	<0.0001	100	100	384	414	397	0
Naracoorte	0.0079	0.0263	0.0149	100	100	331	378	347	0
Orroroo	0.0001	0.0004	0.0003	100	100	679	712	697	0
Padthaway	0.0003	0.0007	0.0005	100	100	555	581	568	0
Palmer WTP	0.001	0.0032	0.0024	100	100	42	50	48	100
Parachilna	<0.0001	<0.0001	<0.0001	100	100	301	312	308	0
Parilla IRP	0.0001	0.0062	0.0018	100	100	177	189	184	100
Penneshaw WTP	<0.0001	0.0003	0.0002	100	100	54	76	64	100
Penola IRP	0.0002	0.0005	0.0004	100	100	308	325	317	0
Pinnaroo IRP	0.0004	0.001	0.0007	100	100	246	268	257	0
Port MacDonnell	0.0004	0.001	0.0006	100	100	22	26	24	100
Quorn	<0.0001	0.0002	0.0001	100	100	482	525	507	0
Renmark WTP	0.0004	0.0026	0.0017	100	100	33	52	39	100
Robe IRP	<0.0001	0.0002	0.0002	100	100	99	134	117	100
Summit WTP	0.0008	0.0069	0.0029	100	100	48	67	53	100
Swan Reach Town WTP	0.0008	0.001	0.0009	100	100	43	50	47	100
Swan Reach WTP	0.0005	0.0044	0.0014	100	100	40	55	49	100
Tailem Bend WTP	0.0002	0.0092	0.0014	100	100	52	81	62	100
Tarpeena IRP	0.0002	0.0012	0.0008	100	100	389	408	399	0
Waikerie WTP	0.0023	0.0037	0.003	100	100	38	50	45	100
Warooka	<0.0001	<0.0001	<0.0001	100	100	328	361	344	0
Wilmington	0.0006	0.0012	0.0009	100	100	115	146	126	100
Woolpunda	0.0002	0.0005	0.0003	100	100	39	45	42	100

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