



SA Water  
**Drinking Water  
Quality Report**  
2013-14



Government  
of South Australia





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# 2013-14 Highlights

## Raw water sources

% of total water supplied

**River Murray: 36%**

**Surface water: 30%**

**Seawater: 28%**

**Groundwater: 6%**

## Incident management

Achieved a significant decrease in incident notifications compared with **2012-13**.

Incident response index exceeded the 83% target by 11%, achieving **94%**.

For details see pages 38-39.

## Number of routine water quality tests carried out

**295 519**  
(total)

**49 529**  
(metropolitan Adelaide)

**245 990**  
(country)

## Total number of routine samples collected

(Includes samples for health-related compliance)

**103 884** (total)

**13 291** (metropolitan Adelaide)

**90 593** (country)

## Total water usage (raw water for treatment)

**213 926 ML**

## Population served

**1 173 000** in metropolitan Adelaide through **9 190 km** of water mains

**432 000** in country areas through **17 582 km** of water mains.

## Drinking water quality and performance

**43 862** of the routine samples collected from our drinking water supplies throughout South Australia were used to determine health-related compliance.

Achieved **99.81%** compliance with the Australian Drinking Water Guidelines (ADWG 2011) health-related parameters in metropolitan Adelaide and **99.85%** in country areas.

*E. coli* compliance at customer taps was **99.94%** in metropolitan Adelaide and **99.99%** in country areas.



# A Message from our Chief Executive



**John Ringham**  
Chief Executive

**Filling a glass of water from the tap might be a simple act, but delivering our customers a continuous, quality supply of water is much more complex. Our staff, infrastructure and resources are part of the process from catchment to tap, delivering more than 184 000 megalitres of water to customers every year.**

The outcomes showcased within this Drinking Water Quality Report highlight the advances SA Water continues to make. Our achievements in water treatment, testing, infrastructure, training and research demonstrate SA Water's commitment to improving South Australia's drinking water quality.

SA Water's work begins as soon as water arrives in our catchments. To safeguard these water sources, we collaborate with natural resources management agencies to effectively supervise land use around catchment areas. In 2013-14, flow meters were trialled at specific reservoirs to track water with the potential to carry catchment-derived pollutants. Results of these trials have assisted in the preparation of strategies to lower catchment risks.

Upgrades to water treatment plants across the state have assisted in minimising water quality issues. Changes to filters and filter control systems at a number of plants have significantly reduced turbidity incidents.

The past financial year has seen SA Water's Research and Innovation (R&I) group working on new water quality strategies, technologies and inter-organisation alliances. R&I's annual forum once again drew representatives from various government agencies, water industry organisations and water utilities across Australia, with delegates impressed by SA Water's achievements.

It's not just in the R&I arena where SA Water has been rewarded for its commitment to water quality in 2013-14, winning multiple awards for our delivery systems. In September, the Adelaide Desalination Plant (ADP) was awarded the Gold in the International Project Management Association (IPMA)'s Project Excellence in Mega-Sized Projects award. At a New Orleans event in October, the ADP won the Project Management Institute (PMI) Project of the Year Award, recognising the plant's world-class status. Designed to ensure water security across metropolitan Adelaide, SA Water's North South Interconnection System Project (NSISP) also won an Australian Institute of Project Management award in October 2013.

SA Water's 2013-14 business transformation process has seen us working towards greater efficiencies across our organisation, but one thing hasn't changed: we are committed to delivering safe, quality drinking water to our customers across South Australia. This report showcases the results of this commitment.

*I hope you enjoy reading the report and welcome your feedback. Please email [customerservice@sawater.com.au](mailto:customerservice@sawater.com.au) or phone us on 1300 650 950.*

**John Ringham**  
Chief Executive

# SA Health Statement

Drinking water provided to the public by SA Water in the 2013–14 reporting period was safe. Operation of the interagency *Water/Wastewater Incident Notification and Communication Protocol* was maintained successfully throughout the 2013–14 period. None of the incidents reported were considered to represent a risk to public health.

The number of incidents reported by SA Water during the 2013–14 financial year was significantly lower than the previous year. As a result of strategic upgrades to filters and filter control systems at a number of water treatment plants, the number of turbidity incidents reduced significantly. Notifications due to *Cryptosporidium* and *Giardia* detection also decreased as a result of the optimisation of monitoring procedures. In addition, the revision of incident criteria within the protocol also resulted in a decrease in incidents. SA Water's water quality incidents were reported in a timely and appropriate manner

and appropriate preventive measures were implemented.

SA Water collected a total of 43 862 samples from drinking water supplies in the reporting period to test for health-related compliance. Compliance with the *Australian Drinking Water Guidelines* (ADWG 2011) for *E. coli* was achieved in 99.94% of metropolitan Adelaide samples and 99.99% of country samples. Compliance with the ADWG for health-related parameters was 99.81% for metropolitan systems and 99.85% for country areas.

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



# Economic Regulation

On 1 January 2013, the Essential Services Commission of South Australia (ESCOSA) was appointed the economic regulator of water and sewerage retail services in South Australia. ESCOSA's primary objective is to protect the long-term interests of South Australian consumers with respect to the price, quality and reliability of water and sewerage retail services.

SA Water was issued a Retail Licence on 1 January 2013. SA Water changed its business to ensure it could comply with these new regulatory requirements while continuing to deliver the high quality of service expected by its customers.

ESCOSA made its first revenue determination for SA Water in May 2013, setting the maximum allowed revenues for drinking water and sewerage retail services for the period 1 July 2013 to 30 June 2016.

The revenue earned from these services enables SA Water to operate and invest in assets that supply quality services to our customers.

SA Water's health and environmental requirements are still set by SA Health and the Environment Protection Authority respectively. SA Water continues to comply with these requirements to ensure delivery of high quality water and sewerage services to the South Australian public.



# Safe Drinking Water Legislation

**South Australia's *Safe Drinking Water Act 2011* came into effect on 1 March 2013. Transitional provisions in the Act for existing drinking water providers, including SA Water, ended on 1 March 2014.**

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 (2011) and stipulate requirements for drinking water providers, including:

- Registration of drinking water providers with SA Health
- Development and implementation of risk management plans
- Establishment of approved drinking water quality monitoring programs
- Notification of incidents or non-compliance

- Audits and inspections to determine compliance with the Act
- Use of National Association of Testing Authorities (NATA) accredited laboratories for sample testing
- Reporting of water quality test results to SA Health and providing consumers with drinking water quality information.

SA Water registered its drinking water supply systems in May 2013, within the required registration period. As of 1 March 2014, all drinking water providers are required to have a risk management plan in place for the operation of their supplies. This includes approved monitoring programs and an incident protocol. SA Water met the legislative requirement for all metropolitan, country and remote community supplies it operated during the 2013–14 year.

At SA Water, our approach to managing drinking water quality through our Drinking Water Quality Management System (DWQMS) is based on the ADWG (2011) *Framework for Management of Drinking Water Quality*. This means SA Water already satisfies most of the requirements outlined in the *Safe Drinking Water Act*. Details of key components are outlined in this report, which in itself addresses one of the requirements of the Act – to report results and provide consumers with drinking water quality information.

Further information on the *Safe Drinking Water Act* can be found at: [www.sahealth.sa.gov.au/safedrinkingwateract](http://www.sahealth.sa.gov.au/safedrinkingwateract)





# The Adelaide Services Alliance

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

Allwater is a joint venture with partners Suez Environnement, Degrémont and Transfield Services, each bringing a wide range of water expertise to the partnership.

The Alliance contract has an extensive set of internal performance measures to track progress and drive 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. SA Water conducts regular testing throughout the network to ensure the water produced at the Allwater-operated treatment plants meets required standards. SA Water collected 13 291 samples from the metropolitan Adelaide drinking water systems last financial year to determine health-related compliance. Compliance was achieved in 99.81% of tests – a high performance result.

In total, more than 49 500 tests were conducted on metropolitan Adelaide's drinking water during 2013–14.

Allwater worked closely with SA Water and the operators of the Adelaide Desalination Plant to ensure desalinated water was effectively blended with Happy Valley water and distributed throughout the network via the North South Interconnection System. Allwater achieved its targets in relation to maintaining chlorine residual levels within the range specified by SA Water. A more frequent tank cleaning program also commenced, which will continue in future years.

SA Water funded a number of capital projects at Allwater-operated metropolitan water treatment plants in 2013–14, including filter and control system upgrades to improve water quality and a new state-of-the-art chlorination facility at Happy Valley Water Treatment Plant.

# Drinking Water Quality Management

SA Water manages drinking water quality from catchment to tap in line with our Drinking Water Quality Management System (DWQMS) 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 (2011) endorsed by the National Health and Medical Research Council (NHMRC). The framework provides benchmark water quality guidelines and values for the design of a structured and systematic approach to drinking water quality management, ensuring a safe and reliable water supply.

**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.

SA Water's Drinking Water Quality Policy and Small Communities Policy underpin the corporation's commitment to deliver ongoing drinking water quality and improvement.

To regularly assess our improvements against implementation of the 12 elements of the ADWG framework, SA Water uses 'AQUALITY', a measurement and evaluation tool developed by the Water Services Association of Australia (WSAA) as a key performance indicator. For the 2013-14 period, a target of 93% implementation of the framework was set and an actual implementation of 93.2% (up from 91.2% in 2012-13) was achieved (as outlined on page nine).

During 2013-14, SA Water achieved the following outcomes in relation to maintaining high water quality standards across our systems:

- Developed a process for maintaining accurate records of stakeholders and their roles and responsibilities
- Tested and verified a system risk assessment process (including measurement of uncertainties)
- Improved the Water Quality Hazard and Risk Register to incorporate process for reducing uncertainties
- Developed a web-based Water Quality Safety Plan (WQSP) making management and review of operational documents more efficient, effective and more user-friendly
- Completed the WQSP review cycle 2013-14
- Completed a third party external audit to ascertain compliance with the *Safe Drinking Water Act*
- Established robust operational and verification monitoring processes
- Developed training and personal

development plans to identify training needs and address succession planning

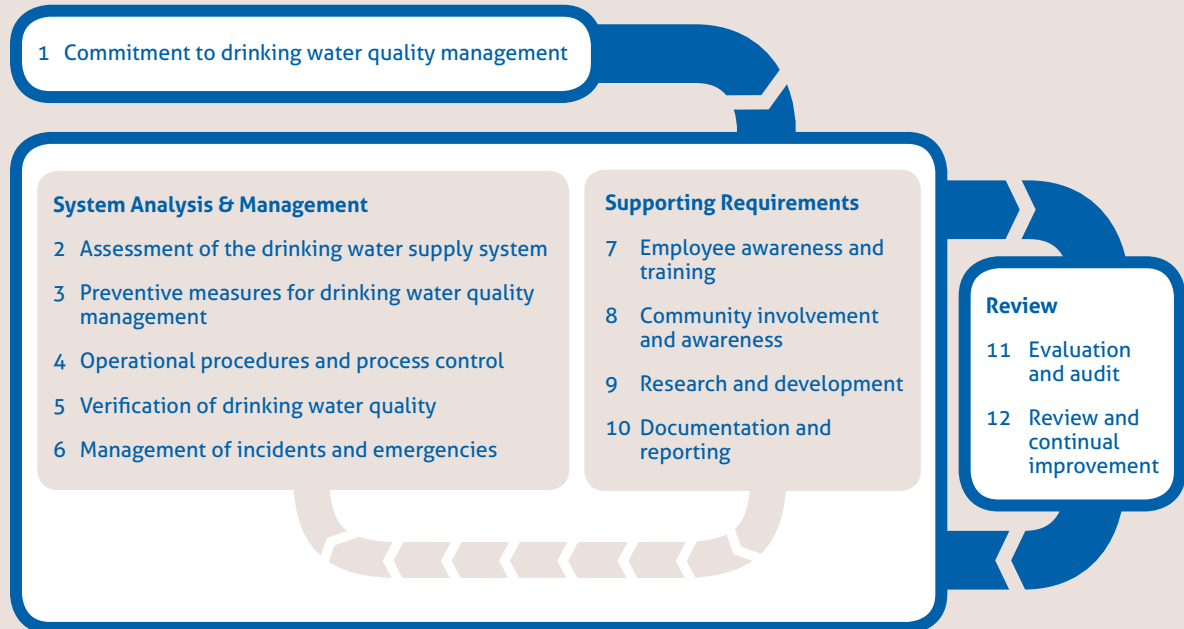
- Developed procedures in relation to the approval, purchase and delivery of chemicals used in the treatment process
- Improved processes for maintaining accurate records of stakeholders involved in water quality management, including their roles and responsibilities.

Future strategies proposed for the 2014-15 period include:

- Continued use of the 'AQUALITY' tool to determine strategies enabling us to meet our ADWG framework implementation targets
- Continued roll-out of the framework across systems managed by our contractors to ensure continuous improvement to documentation, processes, procedures and practices 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 SA Water operations, its contractors and alliance partner Allwater.



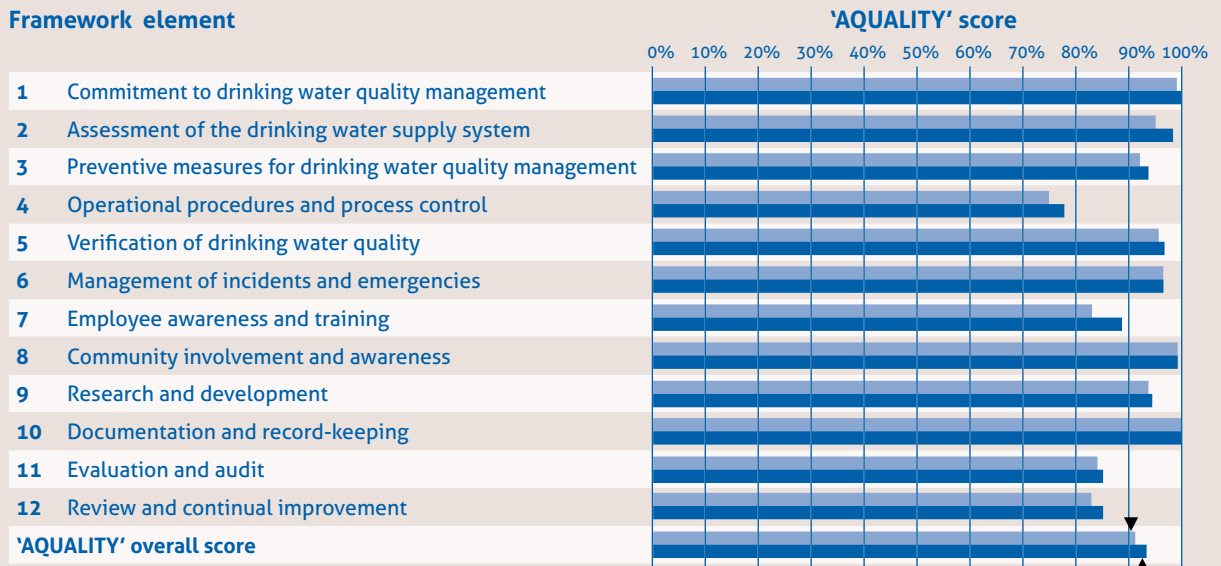
## The 12 elements included in the *Framework for Management of Drinking Water Quality (ADWG 2011)*



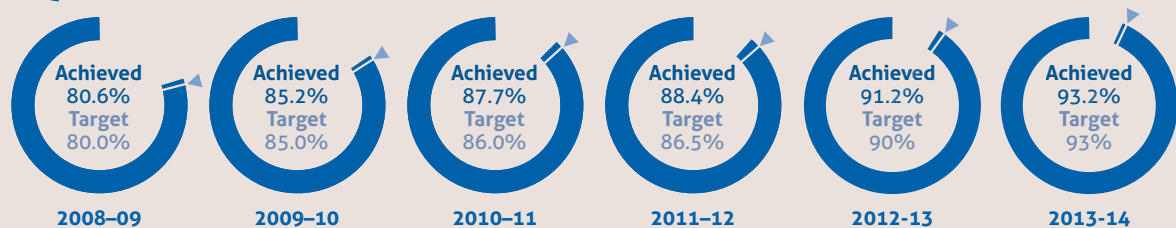
## SA Water's progress in implementing the *Framework for Management of Drinking Water Quality (ADWG 2011)*

■ end of June 2013  
 ■ end of June 2014  
 ▲ 'AQUALITY' implementation targets

### Framework element



### 'AQUALITY' score across all elements



## Examples of how SA Water is applying the Framework for Management of Drinking Water Quality (ADWG 2011)

1 / <b>Commitment to drinking water quality management</b>	<ul style="list-style-type: none"> <li>• A Drinking Water Quality Policy, endorsed by the Chief Executive, in place and communicated to employees</li> <li>• Responsibility matrices that define roles, accountabilities and responsibilities for quality processes are implemented</li> <li>• Communication and notification protocols with SA Health for water quality monitoring and incident response are in place and reviewed regularly</li> <li>• Drinking Water Compliance Manual has been reviewed and updated in consultation with the Crown Solicitor's Office.</li> </ul>
2 / <b>Assessment of the drinking water supply system</b>	<ul style="list-style-type: none"> <li>• Robust system risk assessment process developed</li> <li>• Web-based Water Quality Safety Plans (WQSP) documenting key characteristics of the water supply system reviewed and updated every two years</li> <li>• Document review cycle process developed and implemented</li> <li>• Advanced system analysis tools used to better understand water supply systems (e.g. hydrological, catchment, reservoir and distribution system water quality models)</li> <li>• Tools developed to identify trends and relationships in water quality data that may indicate potential water quality risks.</li> </ul>
3 / <b>Preventive measures for drinking water quality management</b>	<ul style="list-style-type: none"> <li>• Water quality hazard identification, risk assessment and risk mitigation centrally managed in a corporate Water Quality Hazard and Risk Register (WQH&amp;RR). The register is a customised, flexible, web-based platform that can be accessed and populated by all SA Water staff and select contractors</li> <li>• Water Quality Operating Plans (WQOP) improved to include critical control points and corresponding corrective actions to target limit deviations, ensuring water supply systems operate to a high standard.</li> </ul>
4 / <b>Operational procedures and process control</b>	<ul style="list-style-type: none"> <li>• Water quality procedures available to support reliable achievement of the target criteria, critical limits and water quality objectives</li> <li>• Response procedures developed to assist operators manage water quality in the event of exceedences in operational parameters or processes</li> <li>• Online monitoring of Supervisory Control and Data Acquisition (SCADA) in place. SCADA allows SA Water to continuously monitor and control water and wastewater assets and infrastructure remotely</li> <li>• Telemetry/SCADA systems provide rapid notification of deviations in water quality, with response procedures in place to respond 24 hours a day, seven days a week</li> <li>• All new infrastructure in contact with drinking water is compliant with Australian Standard 4020.</li> </ul>
5 / <b>Verification of drinking water quality</b>	<ul style="list-style-type: none"> <li>• SA Water's 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 in the handbook and have been approved by SA Health</li> <li>• Routine and event-based monitoring programs reviewed and updated each year for all water supply systems. This is designed to improve management and system understanding</li> <li>• Automated processes in place to flag out-of-specification monitoring results</li> <li>• Analytical quality control program in place to verify the performance of instruments used for the measurement of various parameters to maintain water quality</li> <li>• National Association of Testing Authorities (NATA) accredited laboratory performs analysis of all water samples</li> <li>• Process in place to capture customer feedback and complaints. Reports developed to analyse feedback and to help determine the appropriate responses to customers.</li> </ul>

- 6 / Management of incidents and emergencies**
- SA Health interagency *Water/Wastewater Incident Notification and Communication Protocol* in place and updated regularly
  - Internal Water Quality Incident and Emergency Management Protocol in place that integrates and consolidates the SA Health and SA Water requirements for identification, notification and response procedures
  - Web-based incident management system in place to record and generate notification of water quality incidents to a defined list of key SA Water personnel
  - Root cause analysis process conducted for every 'Priority Type 1' and 'Type 1' water quality incident notification
  - Emergency Management Manual and Emergency Management Plans in place and regularly updated
  - Incident notification and emergency response training included as part of water quality training
  - Specific training sessions provided to incident managers and other staff involved in the management of water quality incidents.
- 7 / Employee awareness and training**
- Water quality training courses developed in accordance with the National Australian Qualifications Framework (AQF) 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
  - Additional training modules being developed to the National AQF Standard, including operation of granular media filters and control of water quality in distribution systems
  - Ongoing training program for water quality awareness, root cause analysis, incident management, corporate employee induction, odours in water supplies and introduction to recycled water reviewed and delivered to relevant staff
  - Environmental awareness and environmental best practice training courses provided to staff as required
  - Weekly knowledge-sharing seminar series involving internal and external stakeholders implemented.
- 8 / Community involvement and awareness**
- Community involvement policy and procedure available on the corporate website
  - Dedicated community involvement team ensures customer issues and concerns are assessed and responded to according to policy requirements
  - Drinking Water Quality Report, including descriptions of relevant aspects of water quality management, is produced annually and made available to customers, regulators and stakeholders
  - SA Water Community Investment program delivers regular education sessions on water quality and treatment to school and community groups
  - SA Water's website ([www.sawater.com.au](http://www.sawater.com.au)) provides general water quality information (including hardness data for dishwasher settings), factsheets on key water quality parameters 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 (R&I) group brokers and undertakes research to generate new knowledge, provide solutions by measuring, clarifying and controlling operational challenges and implement effective technologies to mitigate risk, drive efficiency, improve performance and ensure the sustainable growth of our business
  - Research is conducted internally and through partnerships, collaborations and alliances with other water utilities, universities and external research providers – locally, nationally and internationally – to ensure the delivery of optimum water quality solutions
  - SA Water's research program is managed using a strategic planning framework that is supported by a series of planning groups with membership from business units across SA Water. Their role is to identify business issues, risks and knowledge gaps and prioritise research investment to address these challenges



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- 9 / Research and development continued**
- Beneficial outcomes and improvements to water quality management are implemented using operational and business champions who facilitate the transfer and smooth transition of new technologies into the business. Recent examples include water quality monitoring linked by telemetry, vertical profiling system for monitoring reservoir water quality, rapid methods for testing blue-green algal by-products, viability and genotyping methods for *Cryptosporidium*
  - To enhance technology transfer and the uptake of project outcomes, researchers regularly present at operational meetings, knowledge sharing seminars, conferences and workshops. SA Water also holds an annual R&I forum to showcase our business achievements, demonstrate the importance of research implementation and communicate the value of research.
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- 10 / Documentation and reporting**
- All information associated with drinking water quality management is available to staff online via SA Water's AquaNet (SA Water's intranet)
  - The DWQMS has been developed to authorise, control and review water quality related documentation
  - SA Water's annual Drinking Water Quality Report details performance against the ADWG and outlines SA Water's commitment to delivering safe, reliable and high quality drinking water to South Australian communities. Overviews of key performance targets, achievements and areas identified for improvement are included in the report
  - Regular reporting of water quality and management system performance is provided to the Corporate and Technical Water Quality Committees, including key risks, water quality performance, progress of improvements, incident response and audit results.
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- 11 / Evaluation and audit**
- Long-term trends for key water quality parameters are reviewed to help determine priorities for improving drinking water quality
  - All analytical results for water quality monitoring are stored in Waterscope (SA Water's database) and reports can be generated to enable validation to planned requirements
  - Internal auditing is programmed across the water supply systems to assess the performance of drinking water quality management and against the ADWG framework requirements
  - External audits are undertaken by independent third party auditors (qualified auditors under the Drinking Water Auditor Scheme – RABQSA). SA Water contractors and alliance partners are also audited as part of this process.
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- 12 / Review and continual improvement**
- The DWQMS as a whole, including the policy, objectives and performance measures, is reviewed at a senior management level and by relevant operations business units to ensure its ongoing relevance and effectiveness in addressing SA Water's water quality issues
  - WSAA-developed 'AQUALITY' tool used to report progress of the implementation of the ADWG framework within the content of the DWQMS
  - Water Quality Hazard and Risk Register (WQH&RR) endorsed by SA Water's Water Quality Committee to identify and manage significant water quality risks on an ongoing basis
  - Action Request and Compliance System in place to track the progress of actions arising from audits, root cause analysis outcomes from incidents and agreed improvements
  - Comprehensive asset management plans maintained to meet short-term and long-term needs
  - National and international links and partnerships have been established to ensure optimal water quality solutions are employed within the drinking water quality systems.
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# Our Water Supply Systems

SA Water has an extensive network of drinking water supply systems across South Australia, with more than 26 700 km of water mains.

We provide high quality drinking water to an estimated population of 1 173 000 across metropolitan Adelaide through 9 190 km of water mains, and to an estimated population of 432 000 through 17 528 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

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 2013–14, 30% of the water supplied by SA Water was provided by surface water.



### River Murray

The River Murray is a key source of raw water for South Australia. Of SA Water’s 68 drinking water supply systems, 34 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 Iron Triangle; significant areas of the mid-north, the Yorke Peninsula and the 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 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 2013–14, 36% of water supplied by SA Water was sourced from the River Murray.

### Groundwater

Groundwater is contained in underground water bodies known as aquifers. SA Water has 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

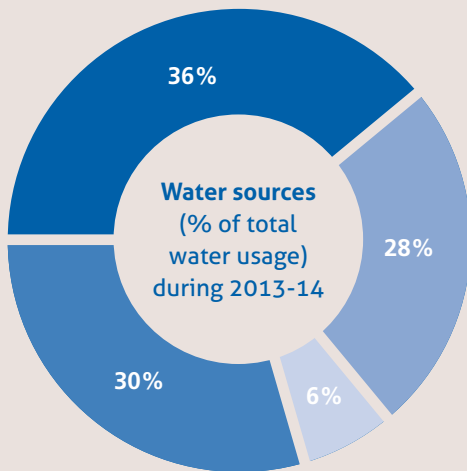
volume of water that can be extracted from an aquifer varies from region to region. During 2013–14, almost 6% of water supplied by SA Water was provided by groundwater.

### Seawater

Desalinated drinking water from 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 2013–14, desalinated seawater accounted for 28% of South Australia’s total water supply.



**Water sources**  
**(% of total water usage) during 2013–14**  
 (Total water usage: 213 926 ML)

- River Murray
- Reservoirs
- Seawater
- Groundwater



# Water treatment

A number of water treatment plants have been constructed in South Australia 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
- Eleven iron removal plants serving towns in the South East and Hawker
- Two seawater desalination plants serving Adelaide and Penneshaw.

## 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 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 treatment plants are deep beds of sand or a combination of sand and anthracite. In our newer and smaller 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 regional pipeline systems. 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 rate 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 an 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 organic material decomposition, which causes 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 disinfection

Ultraviolet (UV) 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 Drinking water supply system sources and treatment table on page 20.

### 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 discoloration and possible staining of fixtures and washing. IRPs are a simplified version of conventional 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 Drinking water supply system sources and treatment table on page 20.

### 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 remineralised with carbon dioxide (CO<sub>2</sub>) and marble chips to reduce its corrosive properties and improve taste prior to chlorine disinfection and distribution to customers.

The Adelaide Desalination Plant at Port Stanvac 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.





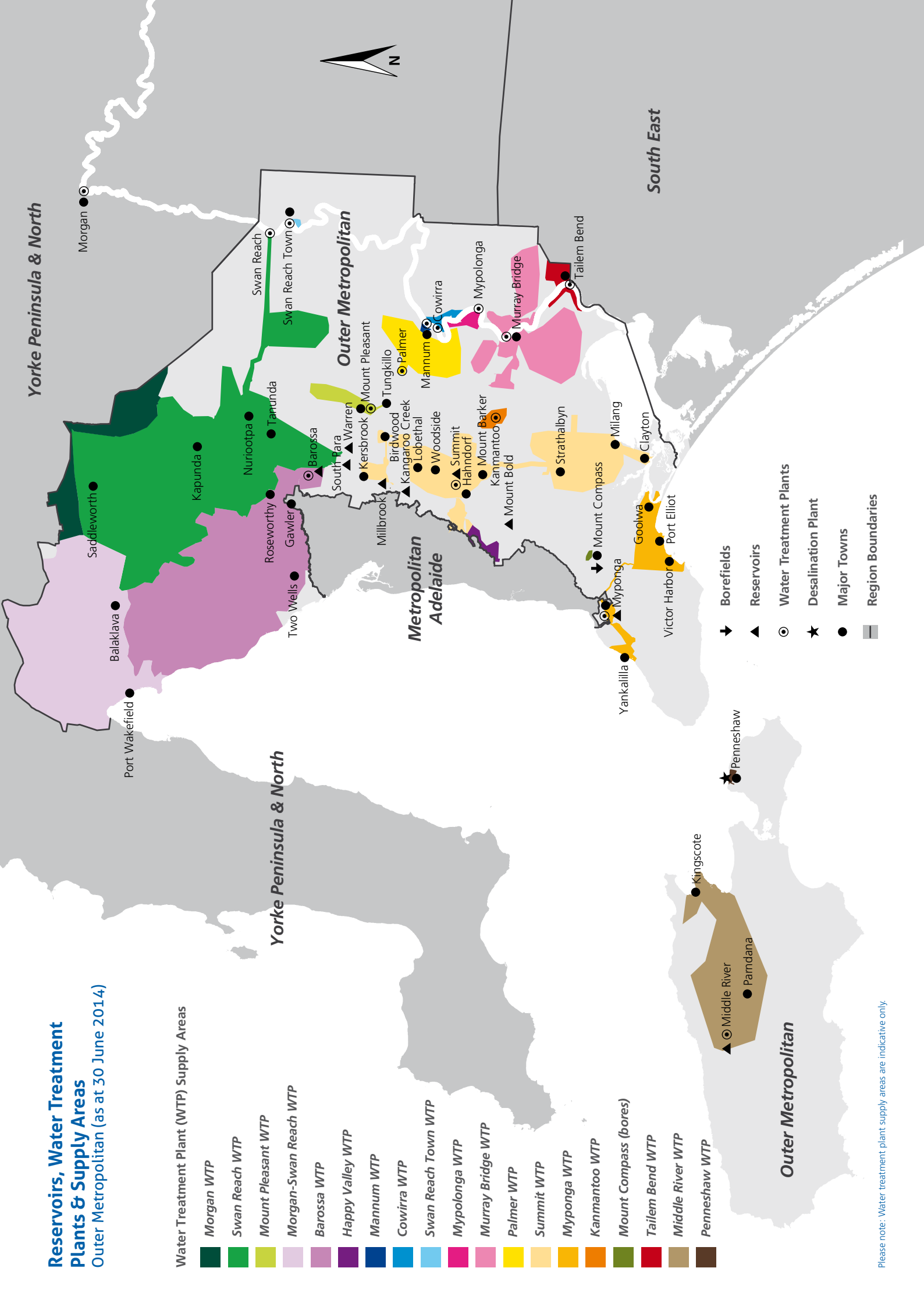
# Reservoirs, Water Treatment Plants & Supply Areas

## Outer Metropolitan (as at 30 June 2014)

Water Treatment Plant (WTP) Supply Areas

- Morgan WTP
- Swan Reach WTP
- Mount Pleasant WTP
- Morgan-Swan Reach WTP
- Barossa WTP
- Happy Valley WTP
- Mannum WTP
- Cowirra WTP
- Swan Reach Town WTP
- Mypolonga WTP
- Murray Bridge WTP
- Palmer WTP
- Summit WTP
- Myponga WTP
- Kanmantoo WTP
- Mount Compass (bores)
- Tailem Bend WTP
- Middle River WTP
- Penneshaw WTP

- Borefields
- Reservoirs
- Water Treatment Plants
- Desalination Plant
- Major Towns
- Region Boundaries



Please note: Water treatment plant supply areas are indicative only.

# Water Treatment Plant Supply Areas

## System Name

Water Treatment Plant (WTP)

**Barossa Metro**  
Barossa WTP

**North Metro**  
Anstey Hill / Happy Valley / Barossa / Little Para WTPs / ADP

**Anstey Hill Metro**  
Anstey Hill WTP

**East Metro**  
Anstey Hill / Happy Valley WTPs / ADP

**West Metro**  
Anstey Hill / Happy Valley / Hope Valley WTPs / ADP

**Central Metro**  
Happy Valley WTP / ADP

**South Metro**  
Happy Valley / Myponga WTPs / ADP

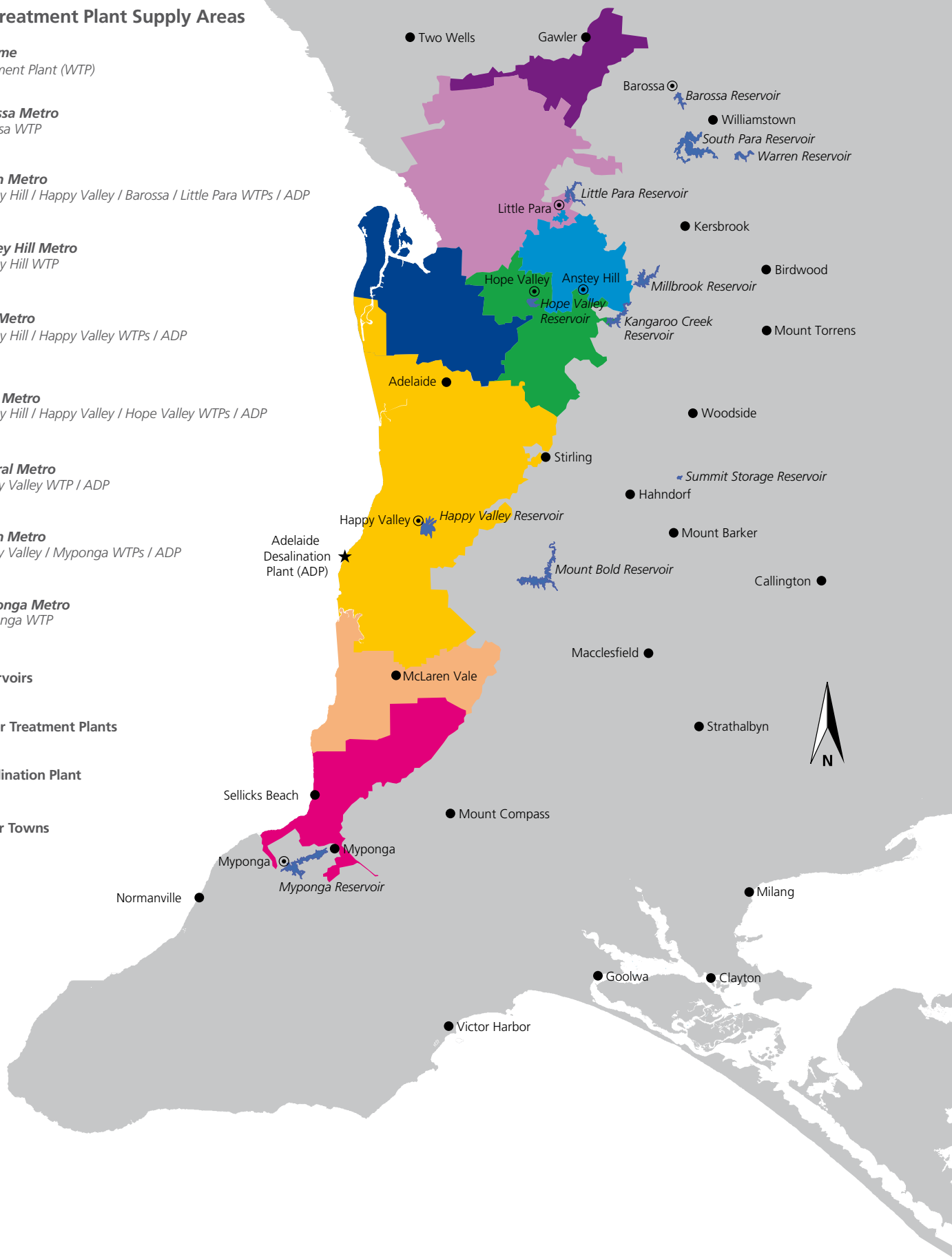
**Myponga Metro**  
Myponga WTP

 Reservoirs

 Water Treatment Plants

 Desalination Plant

 Major Towns



## Reservoirs, Water Treatment Plants & Supply Areas Metropolitan Adelaide (as at 30 June 2014)

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 (as at 30 June 2014)

The following table presents a listing of SA Water's country drinking water supply systems, their raw water sources and the type of water treatment/disinfection applied.

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

Water supply system	Supply source	Treatment					Disinfection			Fluoridation
		Conventional water treatment plant	Iron removal plant	Desalination plant	Membrane plant	MIEX® pre-treatment	Cl <sub>2</sub>	NH <sub>2</sub> Cl	UV	
Mt Pleasant WTP	RM	✓ (SAW)			✓	✓	✓		✓	
Murray Bridge WTP	RM	✓ (RW)				✓		✓	✓	
Mypolonga WTP	RM				✓ (SAW)	✓				
Myponga WTP #	Res	✓ (AW)				✓			✓	
Nangwarry	Bores					✓				
Naracoorte	Bores					✓				
Orroroo	Bores					✓				
Padthaway	Bores					✓				
Palmer WTP	RM				✓ (SAW)	✓				
Parachilna	Bores					✓ (back-up only)		✓		
Parilla IRP	Bores		✓ (SAW)			✓				
Penneshaw WTP	Seawater			✓ (SAW)	✓	✓				
Penola IRP	Bores		✓ (SAW)			✓				
Pinnaroo IRP	Bores		✓ (SAW)			✓				
Port Lincoln <sup>4</sup>	Bores					✓				
Port MacDonnell	Bores					✓				
Quorn	Bores					✓				
Renmark WTP <sup>5</sup>	RM	✓ (RW)				✓		✓	✓	
Robe IRP	Bores		✓ (SAW)					✓		
Summit WTP	RM	✓ (RW)						✓	✓	
Swan Reach WTP	RM	✓ (RW)						✓	✓	
Swan Reach Town WTP	RM				✓ (SAW)	✓				
Tailem Bend WTP	RM	✓ (RW)						✓	✓	
Tarpeena IRP	Bores		✓ (SAW)			✓				
Waikerie WTP	RM	✓ (RW)				✓		✓	✓	
Warooka	Bores					✓				
Wilmington	Bores					✓				
Woolpunda WTP	RM				✓ (SAW)			✓		

**AW** Operated by Allwater

**Cl<sub>2</sub>** Chlorine

**IRP** Iron removal plant

**MIEX®** Magnetic Ion Exchange

**NH<sub>2</sub>Cl** Chloramine

**Res** Reservoir

**RM** River Murray

**RW** Operated by Riverland Water

**SAW** Operated by SA Water

**UV** Ultraviolet

**WTP** Water Treatment Plant

# Supplies both country and metropolitan systems

<sup>1</sup> Eyre South – supplied by Lincoln Basin, Uley South and Uley Wanilla borefields

<sup>2</sup> Eyre South/Morgan WTP – primarily supplied by Lincoln Basin, Uley South and Uley Wanilla borefields and supplemented by Morgan WTP system

<sup>3</sup> Morgan/Swan Reach WTP system supplied from Morgan WTP and Swan Reach WTP

<sup>4</sup> Port Lincoln system supplied by Lincoln Basin, Uley Wanilla and Uley South borefields

<sup>5</sup> Renmark WTP – includes supply to Cooltong



# Metropolitan Adelaide water treatment plant sources (as at 30 June 2014)

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
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

Water supply system	Supply source	Treatment					Disinfection			Fluoridation
		Conventional water treatment plant	Iron removal plant	Desalination plant	Membrane plant	MIEX® pre-treatment	Cl <sub>2</sub>	NH <sub>2</sub> Cl	UV	
Adelaide Desalination Plant	Seawater			✓ (AA)	✓		✓			✓

AA Operated by Adelaide Aqua



# Metropolitan Adelaide water quality systems and treatment (as at 30 June 2014)

Water supply system	Supply source	Treatment					Disinfection			Fluoridation
		Conventional water treatment plant	Iron removal plant	Desalination plant	Membrane plant	MIEX® pre-treatment	Cl <sub>2</sub>	NH <sub>2</sub> Cl	UV	
<b>Anstey Hill Metro</b>	Res/RM	✓ (AW)					✓			✓
<b>Barossa Metro</b>	Res/RM	✓ (AW)					✓			✓
<b>Central Metro</b>	Res/RM/ADP	✓ (AW)					✓			✓
<b>East Metro</b>	Res/RM/ADP	✓ (AW)					✓			✓
<b>Myponga Metro</b>	Res	✓ (AW)					✓			✓
<b>North Metro</b>	Res/RM/ADP	✓ (AW)					✓			✓
<b>South Metro</b>	Res/RM/ADP	✓ (AW)					✓			✓
<b>West Metro</b>	Res/RM/ADP	✓ (AW)					✓			✓

**ADP** Adelaide Desalination Plant  
**AW** Operated by Allwater  
**Cl<sub>2</sub>** Chlorine

**MIEX®** Magnetic Ion Exchange  
**NH<sub>2</sub>Cl** Chloramine  
**Res** Reservoir

**RM** River Murray  
**UV** Ultraviolet



## Drinking water supply systems and towns/suburbs supplied (as at 30 June 2014)

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, Erith, Dublin, 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, Craighburn 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, Tasmore, 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



Water supply system	Towns supplied
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, Tumby Bay, Ungarra, Yeelanna
Eyre South/Morgan WTP	Ceduna, Cungena, Haslam, Kyancutta, Minnipa, Poochera, Pygery, Smoky Bay, Streaky Bay, Thevenard, Warrambo, Wirrulla, Wudinna, Yaninee, Yantanabie
Geranium	Geranium
Glossop WTP	Glossop, Monash
Happy Valley WTP	Chandlers Hill, Cherry Gardens, Clarendon, Coromandel East, Ironbank
Hawker IRP	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, Mundooro, 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



Water supply system	Towns supplied
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
Parachilna	Parachilna
Parilla IRP	Parilla
Penneshaw WTP	Penneshaw
Penola IRP	Penola
Pinnaroo IRP	Pinnaroo
Port Lincoln	Port Lincoln
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

Water supply system	Towns supplied
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 Drinking Water Quality Management System (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 (Microcystin) 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), 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)
<b>1. Catchment</b> 	Minimise introduction of hazards into source water	<ul style="list-style-type: none"> <li>• Pathogens</li> <li>• Pesticides</li> <li>• Hydrocarbons</li> <li>• Iron and manganese</li> <li>• Sediments</li> <li>• Nutrients</li> <li>• Dissolved organic carbon</li> </ul>	<ul style="list-style-type: none"> <li>• Assessed the 'catchment barrier status' for all supply catchments in the Mount Lofty Ranges watershed and catchments recharging SA Water's groundwater supply systems</li> <li>• Reviewed SA Water's land management plans and public access policy to continue to support water quality protection</li> <li>• Commenced pathogen investigation and mitigation projects in catchments delivering source water to Anstey Hill and Hope Valley water treatment plants</li> <li>• Reviewed the 10-year waste control project in the Mount Lofty Ranges watershed. The project has been successful in reducing pathogen inputs into the drinking water supply catchments</li> <li>• Collaborated proactively with South Australian natural resource management and land-use planning agencies to achieve adequate protection of drinking water supply areas.</li> </ul>
<b>2. Reservoir</b> 	Minimise introduction of hazards and remove some hazards	<ul style="list-style-type: none"> <li>• Pathogens</li> <li>• Pesticides</li> <li>• Hydrocarbons</li> <li>• Iron and manganese</li> <li>• Algal by-products including taste and odour compounds</li> </ul>	<ul style="list-style-type: none"> <li>• Increased understanding of algal bloom dynamics and control in specific reservoirs</li> <li>• The installation of telemetry-linked flow meters at key reservoirs</li> <li>• Management of cyanobacterial (blue-green algal) blooms in Myponga and Little Para Reservoirs without the need to apply copper sulphate.</li> </ul>
<b>3. Treatment</b> 	Remove most hazards	<ul style="list-style-type: none"> <li>• Iron and manganese</li> <li>• Chemicals</li> <li>• Algal by-products including taste and odour compounds</li> <li>• Pathogens</li> </ul>	<ul style="list-style-type: none"> <li>• Completion of water treatment plant filter upgrades at Hope Valley and Happy Valley water treatment plants</li> <li>• Monitoring and control system upgrade at Anstey Hill, Hope Valley and Happy Valley water treatment plants</li> <li>• Middle River Aeration.</li> </ul>
<b>4. Disinfection</b> 	Neutralise microbiological hazards and algal by-products	<ul style="list-style-type: none"> <li>• Algal by-products</li> <li>• Pathogens</li> </ul>	<ul style="list-style-type: none"> <li>• Upgrade of Happy Valley chlorination plant</li> <li>• Upgrade of Robe water supply disinfection and storage</li> <li>• Installation of new chlorination plant at Minnipa.</li> </ul>
<b>5. Chlorine Residual Maintenance*</b> 	Manage microbiological hazards throughout systems	<ul style="list-style-type: none"> <li>• Pathogens</li> </ul>	<ul style="list-style-type: none"> <li>• Water supply system operational changes, for example altering tank levels and taking tanks offline to reduce water age in the distribution systems, leading to improved maintenance of disinfection residuals</li> <li>• Naracoorte disinfection station upgrade and new bore supply relay.</li> </ul>
<b>6. Closed System*</b> 	Prevent introduction of hazards	<ul style="list-style-type: none"> <li>• Pathogens</li> <li>• Chemicals</li> </ul>	<ul style="list-style-type: none"> <li>• Replacement of old infrastructure and improved procedures to maintain integrity of closed systems, including improved/new training in water quality procedures.</li> </ul>
<b>7. Backflow Prevention*</b> 	Prevent introduction of hazards	<ul style="list-style-type: none"> <li>• Pathogens</li> <li>• Chemicals</li> </ul>	<ul style="list-style-type: none"> <li>• Installation of backflow prevention devices.</li> </ul>

\* Barriers collectively known as distribution system

# Water Quality 2013–14

SA Water continued to enhance water quality management strategies for our catchment areas, reservoirs, groundwater systems and the River Murray during 2013–14. This included working collaboratively with South Australian and interstate government agencies, such as the Department of Environment, Water and Natural Resources (DEWNR), the Environment Protection Authority (EPA) and the Murray Darling Basin Authority (MDBA). The following sections provide an outline of SA Water's key strategies and new initiatives relating to water quality and our progress during 2013–14.

## Catchments, land management and source water

### Catchment Management

The first barrier for source water protection is the drinking water supply catchment. Most SA Water catchment areas are privately owned, intensively developed and co-managed by other agencies. To protect our source waters, SA Water works closely with planning and natural resource management agencies to advocate for suitable land use policies in our supply catchments

and encourage the adoption of sound land management practices. Through the initiation of, and participation in, collaborative projects and water quality improvement initiatives we aim to achieve additional, mutual water quality outcomes. This approach ensures we effectively and efficiently achieve our obligations under the ADWG. During 2013–14, we have

focused on specific catchment water quality improvement projects identified as critical to mitigate our pathogen risks in particular. We are using our working relationships with other government agencies, as well as at the higher policy and planning level, to ensure water quality improvement measures can be delivered in a pragmatic manner.





Key water treatment and distribution projects in 2013–14 are summarised in the following table:

<b>Public access to reservoir reserves</b>	<p>Around 90% of South Australia’s drinking water supply catchments are privately owned, with the exception of Eyre Peninsula where SA Water owns significant land around borefields. As a result, only narrow buffer zones exist around SA Water infrastructure, as represented by reservoir reserves. In recognition of the role played by these buffer zones in the multi-barrier approach to water quality protection, SA Water has developed a public access and land use policy. The policy is regularly reviewed and balances the basic principle of water quality protection against providing some limited access for public benefit. In 2013–14, access permits were approved for a variety of low impact purposes including scientific research, film production, biological surveys and education.</p>
<b>Bushfires and prescribed burns on SA Water land</b>	<p>SA Water continued to implement its extensive annual bushfire prevention maintenance regime across its landholdings in 2013–14 to manage the ever-present bushfire risk. In addition, SA Water continued its collaboration on bushfire prevention and suppression as well as prescribed burning under its agreement with other agencies (DEWNR, CFS and ForestrySA). Similar to previous years, SA Water has successfully achieved its prescribed burn targets on SA Water land as set out in the <i>Code of Practice for Fire Management on Public Land in South Australia</i>, incorporating a due diligence environmental and water quality risk assessment approach.</p> <p>In addition to a number of small bushfire events on SA Water land, a major bushfire in the mid-north of the state (reported in the media as ‘the Bangor fire’) burnt in excess of 30 000 hectares in early 2014. This area included almost all of the Beetaloo Reservoir Reserve, which is known as a uniquely preserved area with a high biodiversity value. Immediately following the fire, SA Water developed a post fire action plan for the reserve and updated the annual land management works program accordingly. This work is aimed at ensuring optimal land management and water quality outcomes as well as helping to determine post-fire landscape changes and drive cost-effective investments going forward.</p>
<b>Catchment barrier status</b>	<p>As part of SA Water’s Drinking Water Quality Management System (DWQMS), pollutant risks originating from the first barrier for water quality – the surface and groundwater drinking water supply catchments – are assessed using a combination of field investigations and semi-quantitative and quantitative risk analysis methods. The first two-year review of our ‘catchment barrier status’ report was conducted, which included several drinking water supply catchments in the Mount Lofty Ranges watershed. The reports are a key knowledge resource of catchment flows and pollutant export. As such, they are used to effectively communicate water quality risks from a drinking water supply perspective to internal and external stakeholders. This, in turn, helps other natural resource management agencies to prioritise whole-of-government water quality improvement initiatives.</p>
<b>Catchment risk assessment</b>	<p>In 2013–14, the Catchment Team reviewed its 10-year old catchment risk assessment (CRA) method, which led to the development of a new approach. The revised CRA method has brought together spatial information, water quality data, expert knowledge and modelling results to assess the potential risk to water quality from current pollution sources across some of the highest-developed drinking water catchments. In 2014–15, the assessment will be further refined and trialled on key drinking water systems.</p>

### **Cryptosporidium risk in our drinking water supply catchments**

As a result of SA Water's *Cryptosporidium* risk assessment across all barriers for our key water supply systems, the Catchment Team is driving the implementation of pathogen mitigation works in SA Water's drinking water catchments. A number of projects are currently underway in the Mount Lofty Ranges, including investigating the effectiveness of fencing and juvenile stock removal near watercourses. We have also established new monitoring sites to investigate *Cryptosporidium* infectivity and speciation in some catchments, which deliver source water to the Anstey Hill, Hope Valley and Little Para water treatment plants. The results of this study will be used to improve our understanding of pathogen risks from our drinking water catchments.

### **Waste control program**

The review of the 10-year waste control project in the Mount Lofty Ranges watershed (2011) has concluded that the septic audit and upgrade services project had been successful in reducing pathogen inputs into the drinking water supply catchments. With limited opportunities to sewer certain areas in the watershed due to steep terrain or distance to main sewer lines, influencing landholders to adequately maintain or improve their onsite waste water management (septic) systems (OWMS) is a sound way to minimise pathogen pollution that originates from residential use. SA Water continues to be a strong driver and contributor to the now relabelled and ongoing waste control program.

### **Monitoring and assessment of long term impacts of acid sulphate soils near River Murray water offtakes**

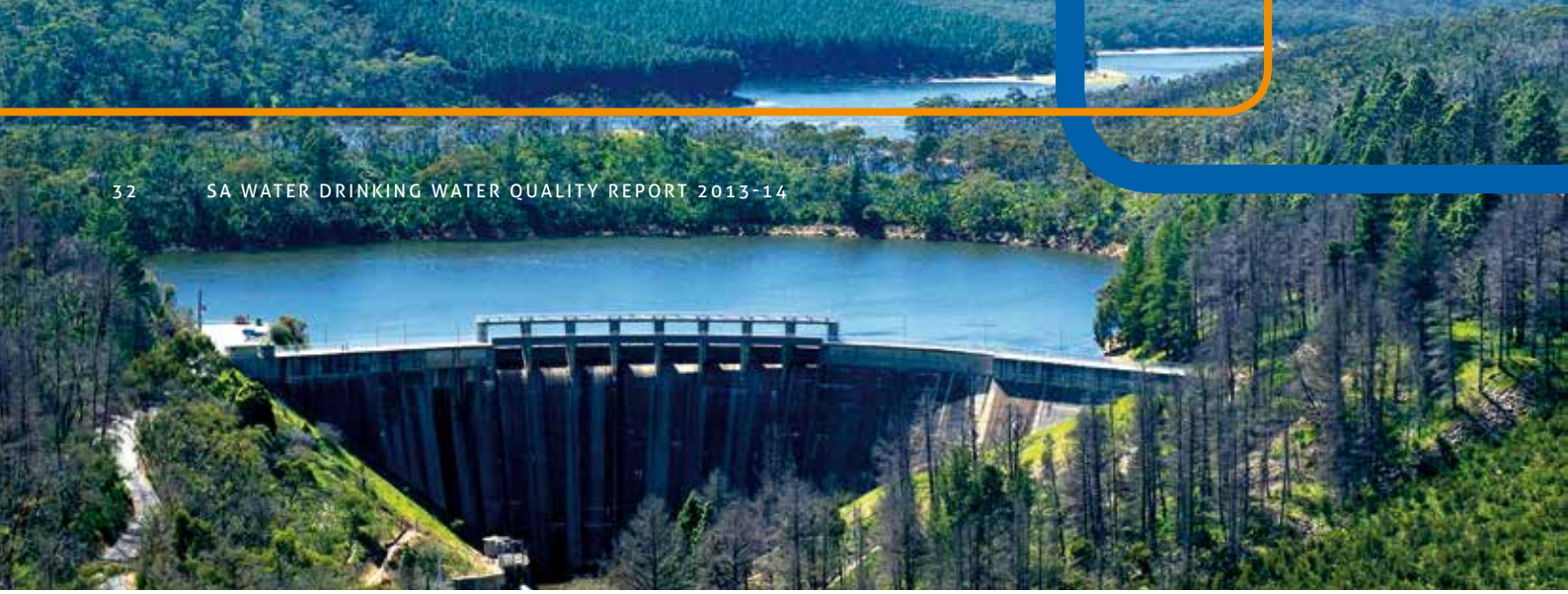
The assessment of the potential impact of acid sulphate soil-derived pollution in the River Murray on SA Water offtakes has continued through 2013–14. This information is useful to reassess the risk profile to SA Water's raw water offtakes in the Lower Murray Reclaimed Irrigation Area (LMRIA) over time. This year, SA Water has particularly focused on investigating future land use options for its Mobilong and Toora sites, both located in the LMRIA. In collaboration with the SA EPA, a land use condition assessment was undertaken to determine potential future land uses that could help to achieve two primary objectives: improve saline and acidic subsurface soil condition over time and avoid negative impacts on River Murray water quality. SA Water continued to sponsor the monitoring of acidified salt drains to examine the potential for groundwater quality improvements over time.

### **Nutrient mitigation from Cox Creek wetland system**

The Cox Creek wetland system is part of an inter-agency nutrient mitigation project which has been in operation since 2006. SA Water continues its maintenance program at the wetland to ensure nutrient inputs into the Happy Valley Reservoir are reduced, and ultimately lower the risk of algal blooms. The frequency of the maintenance cycle (dredging of sediments every two to three years and annual harvesting of macrophytes to remove excess nutrients) was confirmed through a PhD thesis in 2011. Dredging of the Brookes Bridge Sedimentation Basin occurred in 2011 and 2013, and at Scouts Australia's Woodhouse Activity Camp (Woodhouse) wetland in 2013. School tours are now run through the wetland with educational signs throughout to explain the benefits of wetlands, riparian rehabilitation and catchment protection.

### **Mount Lofty Ranges Watershed – Water Quality Improvement Program**

In 2013–14, the EPA continued a process of involving relevant stakeholders in developing environmental values for the Adelaide and Mount Lofty Ranges Natural Resources Management region and a water quality improvement program for the Mount Lofty Ranges watershed. SA Water remains a collaborator in the project.



## Reservoirs and the River Murray

During 2013–14, we continued with improvements to existing source water quality management strategies and implemented new initiatives. New initiatives had a “catchment to tap” focus; were designed to take advantage of new and existing technology; and ensured services were provided to the community at the lowest possible cost.

Key water treatment and distribution projects in 2013–14 are summarised in the following table:

### Water quality monitoring

Fluctuating water quality has the potential to impact the treatment processes in place to ensure customers are supplied with water of the highest possible quality. In 2013–14 SA Water customised a monitoring program and developed an automated reporting mechanism to immediately identify any situation of concern. Data gathered as part of this program enables the enhancement of treatment processes to ensure customer satisfaction is not compromised.

### Flow meters at reservoir inlets

The installation of telemetry-linked flow meters at key reservoirs was completed in 2012–13 and the use of the meters was trialled as an operational tool in 2013–14. The meters track the flow of water which has the potential to carry catchment-derived pollutants into our reservoirs. The information provided by the flow meters has enabled SA Water to customise a management strategy to mitigate this catchment-derived risk.

### Management of cyanobacteria in reservoirs

The control of certain types of algae in reservoirs is an ongoing operational issue for water utilities worldwide, with reliance placed on the application of algaecides including copper sulphate.

Where possible we continued to manage cyanobacteria (blue-green algal) blooms without the need to apply copper sulphate. This was achieved through an alternative management strategy incorporating *in situ* field measurements of key water quality parameters, optimised management of the multiple offtakes and enhanced water treatment plant processes including the application of powdered activated carbon (PAC) to remove cyanobacteria-derived taste and odour compounds.

Although the use of copper-based algaecides is safe, it is sometimes ineffective and comes at a cost. Finding an alternative has significant operational benefits; investigations have identified stabilised hydrogen peroxide as the most promising replacement and SA Water is now progressing towards a reservoir application trial.

### River Murray and catchment sample pumps

The installation of 11 new sample pumps at River Murray offtakes and three key reservoir inlet locations was completed in 2013–14. Each of our 17 River Murray offtakes and five of our reservoir inlet catchment monitoring sites are now equipped with sample pumps. These sample pumps ensure all samples collected as part of monitoring programs are representative of their source.

## Groundwater supplies

During 2013–14, we continued with our program to secure the volume and quality of groundwater available for town water supplies.

Key water treatment and distribution projects in 2013–14 are summarised in the following table:

<b>IRP backwash optimisation</b>	<p>A key groundwater initiative enhanced in 2013–14 was the optimisation of the backwash process at six Iron Removal Plants (IRPs) at Lameroo, Pinnaroo, Parilla, Penola, Tarpeena and Lucindale. This involved improving the operation of the backwashing process by reducing the frequency of backwashing while maintaining treatment quality.</p> <p>In addition to this, the backwash water can now be recycled to the head of the plant to be treated and the sludge handling process has improved. These two improvements make the plants more environmentally friendly and sustainable.</p>
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## Water treatment and distribution

In 2013–14, SA Water commenced a number of projects designed to improve the quality of the drinking water to its customers across the state.

Key water treatment and distribution projects in 2013–14 are summarised in the following table:

<b>Completion of water treatment plant filter upgrades</b>	<p>The Hope Valley and Happy Valley water treatment plants began an upgrade of their filters in 2013. New underdrain systems and replacement of filter media has enabled a more robust barrier for the protection against pathogen transport.</p>
<b>Monitoring and control system upgrade at Anstey Hill, Hope Valley and Happy Valley water treatment plants</b>	<p>These upgrades enable the existing infrastructure at each of these plants to function in a way that provides enhanced particle and pathogen removal. The key focus areas at the plants were plant controls and improved water quality monitoring.</p>
<b>Happy Valley chlorination plant upgrade</b>	<p>A new upgraded chlorination plant was completed to meet the new safety requirements.</p>
<b>Middle River aeration</b>	<p>Following extensive trialling, a packed tower aerator was installed at the Middle River Water Treatment Plant to help manage disinfection by-product development throughout the distribution network.</p>
<b>Robe water supply disinfection and storage</b>	<p>A new treated water storage tank has been constructed at Robe along with an upgrade to the existing disinfection station. This project significantly improves water quality, with added water security for our customers.</p>
<b>Naracoorte bore supply relay and disinfection</b>	<p>A new relay main was constructed at Naracoorte along with an upgrade to the existing disinfection station. This project significantly improves the safety of the drinking water to its customers.</p>
<b>Hawker Desalination Plant design and development</b>	<p>A new desalination plant in Hawker will commence use early in the 2014-15 financial year. This project will enhance the palatability of the drinking water supply to the township.</p>
<b>New chlorination plant at Minnipa</b>	<p>A new booster chlorination plant was installed and commissioned at Minnipa on the Eyre Peninsula to ensure safe drinking water to customers on the Tod-Ceduna pipeline.</p>



## Water quality monitoring and testing

To ensure the quality of our product, SA Water performs extensive water quality monitoring across metropolitan and country South Australia, from catchment to tap, including field and laboratory tests. 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 Australian Water Quality Centre (AWQC) in accordance

with ISO 9001 Quality Systems and the requirements of the National Association of Testing Authorities (NATA).

The following table summarises monitoring and testing activities in our drinking water supply systems during 2013–14.

Number of samples and tests – metropolitan and country drinking water supply systems (2013–14)

	Metropolitan	Country	Total
<b>Drinking water supply systems</b>	8	60	68
<b>Customer taps</b>	188	330	518
<b>Total sample taps</b>	376	1 025	1 401
<b>Total number of routine samples *</b>	13 291	90 593	103 884
<b>Total number of routine tests</b>	49 529	245 990	295 519

\* Includes distribution networks and water treatment plants



# Drinking water quality and performance

During 2013–14, SA Water demonstrated robust management of water quality by consistently providing clean, safe drinking water to our customers in a complex operational environment. This included the Adelaide Desalination Plant (ADP) providing 28% of South Australian’s drinking water in 2013–14 financial year.

The following table and graph provide a summary of our performance for health and aesthetic-related parameters of routine samples at customer taps during 2013–14.

## Metropolitan and country drinking water supply systems health related performance (2013–14)

Health related parameters	Metropolitan systems (number of samples)	Country systems (number of samples)
<b>Samples free from <i>E. coli</i></b>	99.94% (3 499)	99.99% (8 084)
<b>Samples compliant with ADWG health parameters *</b>	99.81% (12 828) 2013–14 target: 100%	99.85% (31 034) 2013–14 target: 99.80%

\* Includes performance against *E. coli* and total/soluble metals. Note that direct exceedances of the *Australian Drinking Water Guidelines* were used to calculate this and not the 95th percentiles for compliance of individual chemical parameters.

We collected a total of 43 862 routine samples from our drinking water supplies throughout South Australia to determine health-related compliance.

- We achieved 99.94% *E. coli* compliance at all customer taps in metropolitan Adelaide for the 2013–14 financial year across 3 499 samples taken from our eight metropolitan supply systems (i.e. 3 497 samples out of the 3 499 collected were free of *E. coli*)
- We achieved 99.99% *E. coli* compliance at all customer taps in regional South Australia for the 2013–14 financial year across 8 084 samples taken from our 60 country supply systems (i.e. 8 083 samples out of the 8 084 collected were free of *E. coli*).

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.

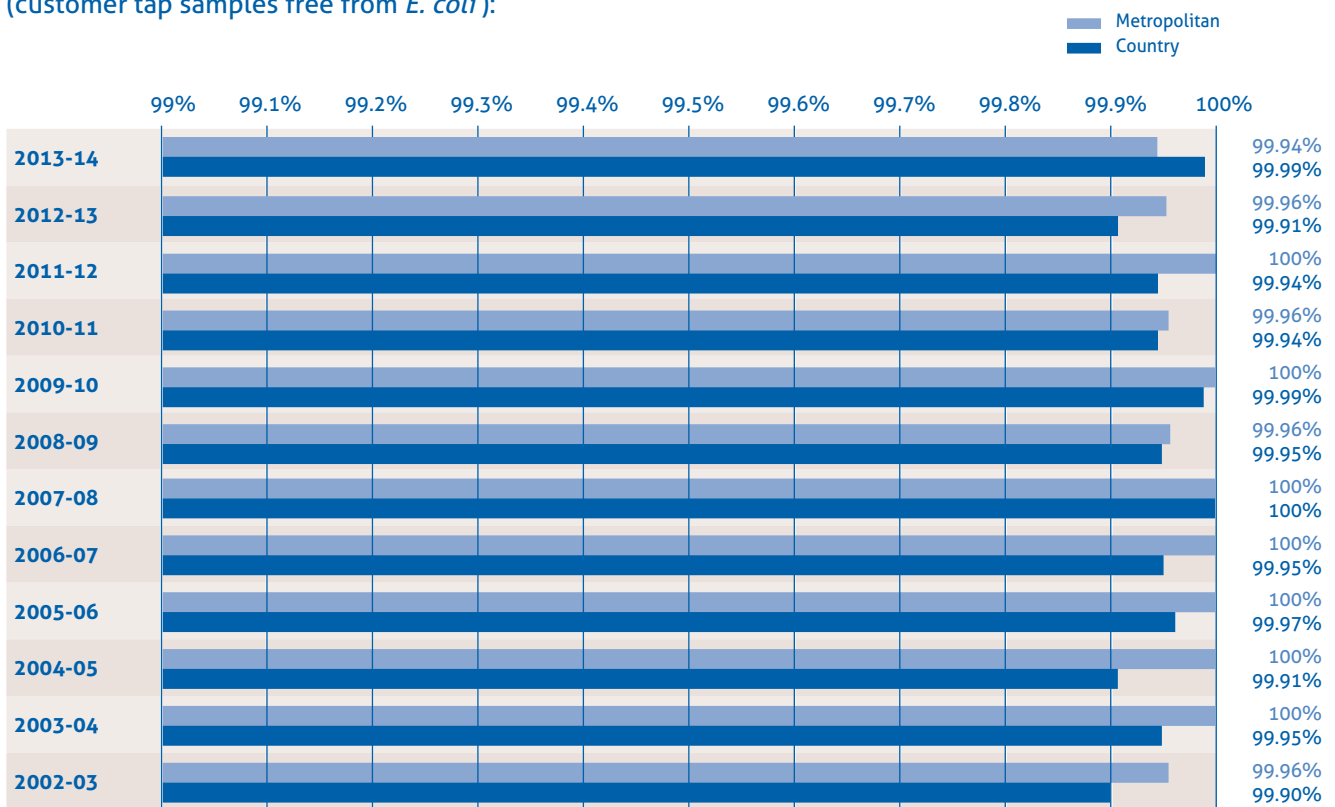
Compliance with the ADWG health-related parameters was 99.81% for metropolitan Adelaide and 99.85% in the country areas.

The minimum ADWG requirements for health-related parameters is 95% overall compliance. SA Water targets a higher percentage than this –

100% in metropolitan Adelaide and 99.8% for country areas – as we are continuously striving to achieve zero exceedances in all our drinking water systems. During 2013–14 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*):

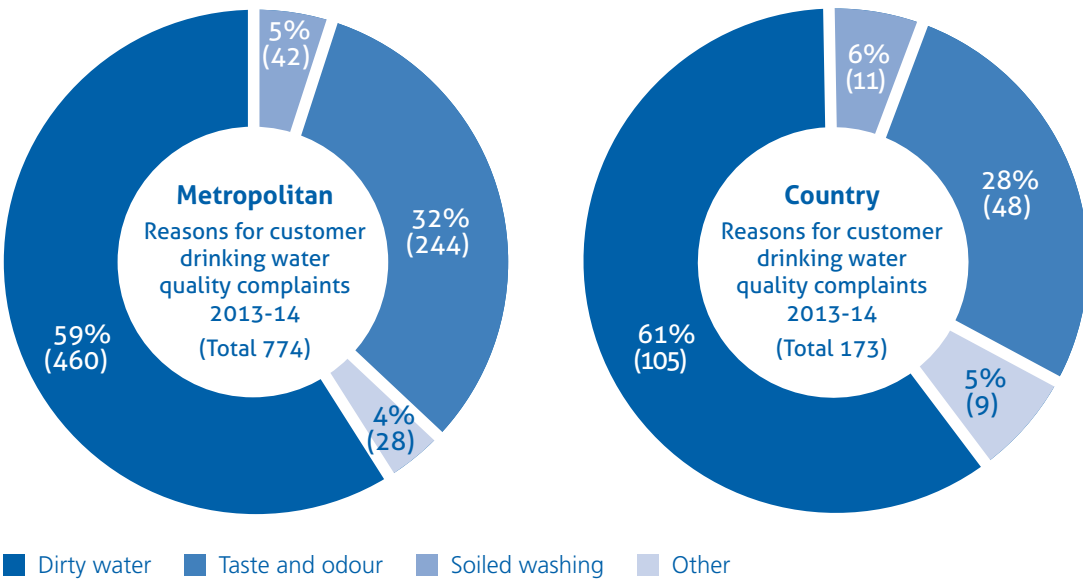


# Customer satisfaction

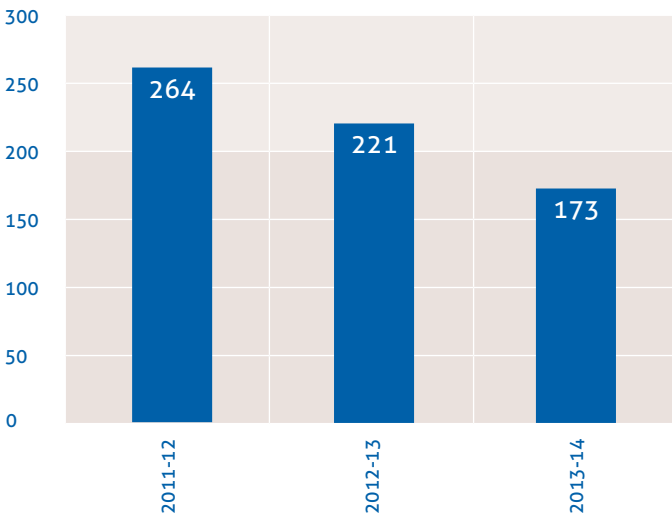
In 2013-14 a total of 774 metropolitan customer complaints and 173 country customer complaints relating to drinking water were received.

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.

This reduction in water quality customer complaints from country regions can be seen in the graph at the bottom of the page.



Customer drinking water quality complaints in country regions over the past three years:





# Incident management

SA Water is committed to the application of the *Australian Drinking Water Guidelines (ADWG 2011) Framework for Management of Drinking Water Quality* which includes two components for the management of incidents and emergencies: communication and incident and emergency response protocols.

SA Water has a *Water Quality Incident and Emergency Management Protocol* in place and a web-based incident management system to record and generate notification of water quality incidents. These are in line with the SA Health interagency *Water/Wastewater Incident Notification and Communication Protocol* and are maintained to adopt the principles of ADWG 2011 and to 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
<b>2013-14</b>	<b>3</b>	<b>34</b>	<b>87</b>
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, environmental and non-drinking water supply incidents.

All Priority Type 1 and Type 1 notifications were immediately reportable to SA Health, while all Type 2 notifications were reportable within 24 hours, in line with the interagency *Water/Wastewater Incident Notification and Communication Protocol*.

We had a significant decrease in incident notifications in 2013-14. Changes in reporting criteria issued by SA Health in the interagency *Water/Wastewater Incident Notification and Communication Protocol* also contributed to a change in reporting requirements.

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 proactive water quality management of targeted individual water supply systems and detection and management of risks continued during 2013-14.

During 2013-14, 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 disinfection failures or inadequate treatment facilities of groundwater. Strategies employed to achieve this include capital improvements and improving the robust operation of water supply systems.

## 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 assist with the management of water quality incidents, including reporting, initial response and

longer term preventive measures. The overall 2013-14 strategic target for the IRI is at least 83% 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 2013-14 target:  at least 83%
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 3 pm next business day	
Root cause analysis completed within 10 working days	
Preventive actions implemented within agreed timeframes	

## The Incident Response Index achieved in country and metropolitan areas and overall for 2013-14 compared to 2012-13.

System	Incident response index (IRI) 2013-14 financial year	Incident response index (IRI) 2012-13 financial year
Country	94%	92%
Metropolitan	96%	98%
<b>Overall (weighted combined country and metropolitan)</b>	<b>94%</b>	<b>94%</b>

### During 2014-15, we will:

- Conduct an external audit of our incident management system to confirm compliance with requirements of the Safe Drinking Water Act and regulations
- Continue to work collaboratively with SA Health in the review and update of the interagency *Water/Wastewater Incident Notification and Communication Protocol*
- Progress the integration of our water quality incident management process with environmental, wastewater and recycled water incident management requirements to streamline the process for our incident managers
- Conduct refresher training on the *Water Quality Incident and Emergency Management Protocol* for country and metropolitan incident managers
- Increase the IRI target to 84%.

# Research and Innovation

SA Water, through its Research and Innovation (R&I) network, has developed a national and international reputation for high quality science, research and technical innovation.

The industry acknowledges SA Water as a leader in strategic and applied water research. To communicate outcomes from SA Water's research program across the business, and more broadly to other members of the water industry, R&I coordinate an annual forum.

The success of the 2013 Forum was confirmed by the attendance of 130 guests including 40 external delegates and keynote speaker Professor Amit Pramanik from Water Environment Research Foundation (United States). Representatives from many other SA Government and water industry organisations attended the forum including Department of Environment Water and Natural Resources (DEWNR), SA Health, the Goyder Institute, Water Services Association of Australia, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Water Research Australia, Allwater (Suez Environment, Degremont and Transfield Services) and a strong contingent of research managers from other water utilities across Australia (Western Australia, Victoria, New South Wales and Queensland). This reaffirms the relevance and effectiveness of SA Water's research program to our business, the state and the water industry in Australia.

## SA Water strategic direction and business alignment

SA Water's research activity focuses on delivering targeted outputs that drive business efficiency, underpin innovation, reduce risk and provide high-level technical advice to the business to improve services to

our customers. Our strategic priority areas are:

- **Customers and community** – customer perception of water quality
- **Quality and delivery** – public health and risk mitigation; water and wastewater treatment and distribution system management
- **Planning for the future** – environment, climate variability and sustainability
- **Business success** – energy efficiency, asset management and infrastructure investment.

Research delivery involves reviewing, developing and facilitating the transfer of new knowledge and technologies developed both inside and outside of SA Water into operational outcomes.

## Key research projects

SA Water's research portfolio is diverse and addresses key business and strategic priorities across the entire water cycle. One project that will benefit SA Water operations is the development of software for coagulant dose prediction. Optimal coagulation is critical for the efficient removal of contaminants from drinking water. Over-dosing with coagulants may still achieve high quality water but at higher cost. Under-dosing with coagulations will result in poorer quality water and increase the chance pathogens such as *Cryptosporidium* breaking through into the water supply or increase the formation of disinfection by-products (DBPs) due to the presence of higher levels of organic carbon in the water. This project is linked to another research project reviewing the use of online water quality analysers that can be used to provide information on real-time dosing control of coagulants, providing further opportunities for efficiency improvement and cost reduction.

Water utilities disinfect drinking water to protect public health from

waterborne pathogens and also to maintain the quality of the water being distributed through pipes by minimising bacterial regrowth in the pipe networks. However, disinfectants such as chlorine or chloramine can react with organic compounds in the water to produce DBPs, which have the potential for adverse health effects. SA Water has undertaken research to identify approaches for minimising DBP formation and to also assess current DBP monitoring approaches. A key outcome is that an alternative approach to disinfection, using two-stage chlorination, has the potential to reduce the formation of trihalomethanes (THMs), which are a key DBP monitored for current guideline compliance. The research has also demonstrated conventional water treatment using coagulation will reduce the formation of THMs and enhanced coagulation can further reduce DBP formation.

SA Water has undertaken innovative research assessing and managing health risks associated with waterborne contaminants, including *Cryptosporidium* and cyanobacteria ('blue-green algae'), which aims to address impending health regulation and water quality requirements. Cyanobacteria can form blooms in reservoirs and rivers. Aside from being unsightly, these blooms can represent a risk to public health if the cyanobacteria are toxin producers, or they can affect the aesthetic quality of the water if they produce compounds that cause an unacceptable taste or odour in the water. SA Water R&I has been active in investigating methods to reduce bloom formation or to treat blooms if they occur. Current research projects are assessing the use of ultrasound for destroying algal cells and the use of a chemical compound – stabilised hydrogen peroxide – for treating algal blooms. Recent research outcomes have shown stabilised hydrogen peroxide is effective in killing





cyanobacteria and appears to also be a cost effective option. Current research is trialling the use of this agent in the field to further evaluate its effectiveness and to also ensure that any environmental impacts are minimised.

### Alliances and partnerships

SA Water's R&I group has celebrated significant achievements in the national and international arena. These include receiving competitive funding grants from a wide range of funding bodies such as the Australian Research Council Linkage Grants Scheme, Water Research Australia, the Water Research Foundation (USA) and more recently the Premier's Research and Industry Fund. Such success has enabled us to forge and enhance alliances with new and existing collaborative partners.

Members of SA Water's R&I group are well represented on many of the decision-supporting committees of our collaborative partners, highlighting our impact and influence. In addition, SA Water has signed a Memorandum of Understanding with the Vienna University of Technology to initiate joint research programs in areas of common interest and of mutual benefit to our respective organisations.

### Highlights

- Gayle Newcombe, Manager Customer Value and Water Quality, was the winner of the Michael Flynn award for best paper at the Australian Water Association Ozwater Convention and Exhibition, May 2014, Brisbane. The paper was entitled: "Taste and Odour in Drinking Water – What do our customers really want?"

- Tim Kildea, Senior Marine Scientist, received the award for the best paper at the Australian Water Association's 16th Annual SA Branch Conference, August 2013, Adelaide. The paper was entitled "Environmental Performance of the Adelaide Desalination Plant"
- Anna Wilson, an Honours student enrolled through Flinders University and hosted by the Sourcewater and Environment Research team, won the 2013 Australian Water Association (AWA) SA Research Branch Hodgson Award and the 2014 AWA National Undergraduate Water Prize for her project on the development of rapid tools for *Cryptosporidium* species identification. Anna conducted her research at the SA Water R&I laboratories and was supported by an SA Water-sponsored scholarship.



# Employee Awareness and Training

The water industry workforce must adapt its skills to manage Australia’s highly variable rainfall, frequent water shortages and floods.

Efficient use of limited water resources is essential for South Australia’s long-term sustainability and commercial viability. SA Water staff receive internal training to fulfil statutory and legislative requirements but also to ensure safe drinking water and safe sanitation services are provided efficiently.

SA Water has undergone an extensive restructure over the past 12 months with changes in respective reporting roles and responsibilities. Changes

notwithstanding, internal training is now more accurately targeted to fulfil ADWG needs.

Training is either nationally accredited or SA Water specific and is driven by ADWG, AGWR and potential national certification registration requirements. SA Water endeavours to be a national leader with regards to sustainable water operations, best environmental practice and Integrated Water Management practice.

Training undertaken during 2013–14 is summarised below:

## Internal, competency-based training

- Overview of water quality awareness (understanding the risk management principles of the ADWG)
- Integrated incident management procedures, water quality, environmental, Work Health and Safety (WHS), operational and security
- Odours in drinking water supplies
- Disinfection of mains
- Integrated root cause analysis
- Recycled water (understanding the risk management principles of the ADWG)
- Native vegetation guidelines
- Best practice operating procedures
- Environmental management for project managers
- Environmental management awareness
- Disinfection system awareness
- Incident management system awareness
- Incident management protocols (Training course for nominated incident managers)

## Nationally accredited, competency-based training

- Water sampling (NWP 218B)
- Disinfection for operators
- Work safely with liquefied chlorine gas
- Optimisation of water quality in distribution networks (NWP 317B)
- Monitor, operate and control granular media filtration processes (NWP 354B)
- Demonstrate knowledge of the risk management principles of the *Australian Drinking Water Guidelines* (NWP 279)
- Monitor, operate and control wastewater treatment processes (NWP 346B)
- Network Core Knowledge (NWP 226B Prepare and restore worksite; NWP 301B Organise personal work priorities and development; NWP303B Contribute to OHS hazards and risk assessment)
- Operate, maintain and repair valves (NWP 221A Operate basic flow control devices; NWP 310B Monitor and operate water distribution systems)
- Read, monitor and install meters (Boundary Work; NWP 223A Read, monitor and install meters).

The national certification strategy is aimed at ensuring employees within the water industry are professionally trained and certified accordingly. SA Water embraces the certification initiative and is working towards the training and upskilling of employees in partnership with South Australian-based training organisations.



# 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.

## Aluminium (Al)

A naturally-occurring element in soils which can enter water from catchments.

## Ammonia (NH<sub>3</sub>)

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), any water that is stored naturally underground or that follows 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 (NHMRC) and Agricultural Resource Management Council of Australia and New Zealand (ARMCANZ), 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 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 (NATA) accredited since 1974 and obtained quality system certification to ISO 9001 in 1997.

## Blue-green algae

See cyanobacteria.

## Calcium (Ca)

A naturally occurring element that can enter water from catchments. It may also be added to water in the treatment process to reduce the acidity levels or increase the capacity of water to buffer pH changes.

## Catchment

An area of land surrounding 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 followed by ammonia to create monochloramine (NH<sub>2</sub>Cl), 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, wastewater and industrial waste through the application of chlorine (Cl) as part of the water treatment process. Chlorination kills microorganisms and oxidises undesirable compounds.

## 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.

### *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.

### Faecal coliforms

Bacteria which inhabit the intestines of humans and other mammals and are present in faeces. Faecal coliforms are used as an indicator of human and animal waste contamination and 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.

### Geosmin

An organic compound with a distinct earthy/musty smell, produced by certain blue-green algae, which can impart an unpleasant smell and taste to water.

### *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 1000 megalitres.

### Groundwater

Water beneath the earth's surface (often between saturated soil and rock) that supplies bores, wells or springs.

### Heavy metals

Individual metals and metal compounds that negatively affect people's health. These occur naturally in the environment and include arsenic and selenium. In very small amounts, many of these metals are necessary to support life. However, in larger amounts, they become toxic.

### Incident Management System (IMS)

The Incident Management System (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.



### 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.

### 2-Methyl Isoborneol (MIB)

An earthy/musty smelling organic compound produced by certain blue-green algae, which can impart an unpleasant smell/taste to water.

### 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<sub>3</sub>)

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 water

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.

### Parasite

An organism that relies on a host organism to grow.

### Pathogens

Disease-causing organisms 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.

## Salinity

The concentration of salts in water, mostly sodium chloride. Salinity can affect potability, water use for irrigation and industrial purposes as well as aquatic life.

## Source water

Water prior to any treatment or disinfection.

## Suspended solids

Particles suspended in water that may be removed by sedimentation or filtration.

## 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<sub>3</sub>) equivalent. Waters with a high mineral content (a total hardness in excess of 200mg/L) are considered hard.

## 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. 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 pressure mercury lamps will kill pathogens, depending on contact time and light intensity. The water must be relatively clear of low turbidity and dissolved compounds.

## Water cycle

The water cycle is the simplest natural cycle on earth involving the transfer of water between water bodies (e.g. oceans and lakes) and the atmosphere. Water evaporates from water bodies into the atmosphere. The water vapour rises and cools, forming droplets that join together to form clouds (condensation). As the droplets join together and become heavier they fall to earth as rain or other forms of precipitation. The rain can then infiltrate the soil into groundwater aquifers or flow as surface runoff into water bodies and the cycle begins again.

## 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, treatment plants and distribution networks.

## Water treatment plant (WTP)

A treatment plant that improves water quality by removing impurities through filtration and disinfection.

# Water Quality Data 2013-14

## Water quality data and fact sheets on SA Water's 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](http://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
- Fact sheets that provide easy-to-read descriptions about the nature of key water quality parameters, the factors that may influence their presence in water and the effects that they can have on water quality.

This report covers the period of 1 July 2013 to 30 June 2014.







**Table 1**  
2013-14 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	9	52	24	7	10	52	36
Dissolved Organic Carbon [mg/L]	53	3.7	11.6	6.8	27	5.9	10.1	8.8
Fluoride [mg/L]	13	0.10	0.23	0.16	7	0.25	0.31	0.28
Hardness - Total [mg/L]	13	102	121	113	13	132	165	150
Nitrate as Nitrogen [mg/L]	26	0.088	0.322	0.206	26	<0.005	0.033	0.008
pH Units	13	7.4	8.0	7.7	7	7.6	8.6	8.2
Phosphorus - Total [mg/L]	26	0.02	0.077	0.046	26	0.013	0.071	0.033
Total Dissolved Solids [mg/L]	13	110	360	244	7	330	390	360
Turbidity [NTU]	13	3.6	93.0	47.8	7	0.8	5.0	2.8

	Barossa WTP				Little Para WTP			
	Samples	Min	Max	Ave	Samples	Min	Max	Ave
Colour - True [456nm] [HU]	13	15	26	22	7	16	36	23
Dissolved Organic Carbon [mg/L]	53	8.4	11.1	9.6	27	6.6	9.1	7.8
Fluoride [mg/L]	13	0.27	0.36	0.32	7	0.25	0.27	0.26
Hardness - Total [mg/L]	13	115	132	121	13	112	134	126
Nitrate as Nitrogen [mg/L]	26	<0.005	0.049	0.020	26	0.093	0.414	0.212
pH Units	13	7.2	7.9	7.7	7	7.7	8.0	7.8
Phosphorus - Total [mg/L]	26	0.008	0.052	0.019	26	0.021	0.061	0.033
Total Dissolved Solids [mg/L]	13	360	400	378	7	320	330	327
Turbidity [NTU]	13	0.5	1.1	0.7	7	5.1	11.0	8.7

	Happy Valley WTP				Myponga WTP			
	Samples	Min	Max	Ave	Samples	Min	Max	Ave
Colour - True [456nm] [HU]	13	18	65	51	13	43	118	83
Dissolved Organic Carbon [mg/L]	53	6.4	10.1	8.8	53	10.8	16.7	14.2
Fluoride [mg/L]	13	0.23	0.32	0.28	13	0.14	0.23	0.19
Hardness - Total [mg/L]	14	103	124	113	14	103	136	114
Nitrate as Nitrogen [mg/L]	43	<0.005	0.215	0.048	53	0.035	0.282	0.140
pH Units	13	7.6	8.4	7.9	13	7.0	7.9	7.5
Phosphorus - Total [mg/L]	43	0.025	0.087	0.050	53	0.029	0.143	0.083
Total Dissolved Solids [mg/L]	13	290	320	305	13	330	410	357
Turbidity [NTU]	13	2.1	9.9	5.0	13	1.8	5.6	3.4

**Table 2**  
2013–14 Metropolitan Adelaide distribution system customer tap water quality against 2011 ADWG

Anstey Hill Metro System							
Parameter	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]	-	299	<0.1	1.5	0.4	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	299	<0.1	1.5	0.4	81.3
Colour - True [HU]		≤ 15[HU]	26	<1	5	2	100
<i>E. coli</i> [per/100mL]	++	-	298	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]	-	7	0.78	0.98	0.88	100
Hardness - Total [mg/L]		≤ 200[mg/L]	6	47	146	92	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	8	0.0039	0.0121	0.0075	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]	-	8	0.0002	0.0007	0.0004	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	8	0.0002	0.0007	0.0004	100
pH Units		6.5 - 8.5[pH units]	30	7.0	7.9	7.5	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	13	180	400	292	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]	-	61	39	252	132	98.4
Turbidity [NTU]		≤ 5[NTU]	26	<0.1	0.28	0.16	100

Barossa Metro System							
Parameter	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]	-	144	<0.1	1.0	0.3	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	144	<0.1	1.0	0.3	91.7
Colour - True [HU]		≤ 15[HU]	26	<1	2	1	100
<i>E. coli</i> [per/100mL]	++	-	142	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]	-	8	0.82	0.90	0.86	100
Hardness - Total [mg/L]		≤ 200[mg/L]	6	139	153	146	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	8	0.0011	0.0220	0.0098	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]	-	8	0.0004	0.0019	0.0010	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	8	0.0004	0.0019	0.0010	100
pH Units		6.5 - 8.5[pH units]	29	7.1	7.5	7.3	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	12	410	440	423	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]	-	46	156	243	187	100
Turbidity [NTU]		≤ 5[NTU]	26	<0.1	0.29	0.14	100

Central Metro System							
Parameter	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]	-	1,428	<0.1	1.9	0.4	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	1,428	<0.1	1.9	0.4	85.0
Colour - True [HU]		≤ 15[HU]	117	<1	3	1	100
<i>E. coli</i> [per/100mL]	++	-	1,428	0	2	0	99.9
Fluoride [mg/L]	≤ 1.5[mg/L]	-	36	0.80	1.10	0.87	100
Hardness - Total [mg/L]		≤ 200[mg/L]	27	65	104	83	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	36	0.0013	0.0565	0.0102	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]	-	36	0.0002	0.0072	0.0015	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	36	0.0002	0.0072	0.0015	100
pH Units		6.5 - 8.5[pH units]	136	7.0	8.0	7.6	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	59	120	330	203	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]	-	234	<4	178	80	100
Turbidity [NTU]		≤ 5[NTU]	117	<0.1	1.60	0.16	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**2013–14 Metropolitan Adelaide distribution system customer tap water quality against 2011 ADWG *continued*

Parameter	East Metro System						
	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]	-	391	<0.1	1.1	0.4	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	391	<0.1	1.1	0.4	88.0
Colour - True [HU]		≤ 15[HU]	40	<1	4	1	100
<i>E.coli</i> [per/100mL]	++	-	391	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]	-	13	0.8	1.0	0.9	100
Hardness - Total [mg/L]		≤ 200[mg/L]	10	69	130	86	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	13	0.0018	0.0890	0.0133	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]	-	13	0.0002	0.0070	0.0016	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	13	0.0002	0.0070	0.0016	100
pH Units		6.5 - 8.5[pH units]	46	7.0	7.9	7.6	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	20	110	480	240	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]	-	75	12	249	112	100
Turbidity [NTU]		≤ 5[NTU]	40	<0.1	0.6	0.2	100

Parameter	Myponga Metro System						
	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]	-	101	<0.1	1.0	0.2	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	101	<0.1	1.0	0.2	95.0
Colour - True [HU]		≤ 15[HU]	13	<1	2	1	100
<i>E.coli</i> [per/100mL]	++	-	101	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]	-	4	0.8	1.0	0.9	100
Hardness - Total [mg/L]		≤ 200[mg/L]	3	116	120	118	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	4	0.0037	0.0144	0.0097	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]	-	4	0.0008	0.0023	0.0016	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	4	0.0008	0.0023	0.0016	100
pH Units		6.5 - 8.5[pH units]	16	7.1	7.6	7.3	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	7	390	450	409	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]	-	51	167	348	228	76.5
Turbidity [NTU]		≤ 5[NTU]	13	0.10	0.18	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**2013–14 Metropolitan Adelaide distribution system customer tap water quality against 2011 ADWG *continued*

Parameter	North Metro System						
	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]	-	512	<0.1	1.4	0.3	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	512	<0.1	1.4	0.3	89.5
Colour - True [HU]		≤ 15[HU]	54	<1	4	1	100
<i>E.coli</i> [per/100mL]	++	-	512	0	4	0	99.8
Fluoride [mg/L]	≤ 1.5[mg/L]	-	17	0.2	1.1	0.8	100
Hardness - Total [mg/L]		≤ 200[mg/L]	13	73	153	130	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	17	0.0037	0.0412	0.0111	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]	-	17	0.0003	0.0011	0.0006	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	17	0.0003	0.0011	0.0006	100
pH Units		6.5 - 8.5[pH units]	86	7.1	8.0	7.5	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	35	160	420	323	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]	-	94	61	264	149	94.7
Turbidity [NTU]		≤ 5[NTU]	54	<0.1	0.33	0.15	100

Parameter	South Metro System						
	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]	-	103	<0.1	0.8	0.2	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	103	<0.1	0.8	0.2	97.1
Colour - True [HU]		≤ 15[HU]	13	<1	2	1	100
<i>E.coli</i> [per/100mL]	++	-	103	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]	-	4	0.82	0.92	0.86	100
Hardness - Total [mg/L]		≤ 200[mg/L]	3	75	88	81	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	4	0.0038	0.0059	0.0052	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]	-	4	0.0005	0.0010	0.0007	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	4	0.0005	0.0010	0.0007	100
pH Units		6.5 - 8.5[pH units]	14	7.2	8.0	7.7	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	6	150	240	187	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]	-	39	27	216	105	100
Turbidity [NTU]		≤ 5[NTU]	13	<0.1	0.31	0.15	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**2013–14 Metropolitan Adelaide distribution system customer tap water quality against 2011 ADWG *continued*

Parameter	West Metro System						
	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]	-	523	<0.1	1.3	0.4	100
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	523	<0.1	1.3	0.4	82.0
Colour - True [HU]		≤ 15[HU]	78	<1	4	1	100
<i>E.coli</i> [per/100mL]	++	-	523	0	0	0	100
Fluoride [mg/L]	≤ 1.5[mg/L]	-	24	0.77	1.10	0.87	100
Hardness - Total [mg/L]		≤ 200[mg/L]	18	64	155	106	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	24	0.0017	0.0499	0.0108	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]	-	24	0.0004	0.0072	0.0017	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	24	0.0004	0.0072	0.0017	100
pH Units		6.5 - 8.5[pH units]	88	7.0	8.0	7.5	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	40	140	400	256	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]	-	131	10	277	117	96.9
Turbidity [NTU]		≤ 5[NTU]	78	<0.1	0.55	0.16	100

Parameter	Metropolitan Adelaide - Total Distribution System						
	Health Guideline	Aesthetic Guideline	Samples	Min	Max	Ave	% Compliance
Chlorine Residual - Free [mg/L]		≤ 0.6[mg/L]	3 501	<0.1	1.9	0.3	86.1
Chlorine Residual - Free [mg/L]	≤ 5[mg/L]		3 501	<0.1	1.9	0.3	100
Colour - True [HU]		≤ 15[HU]	367	<1	5	1	100
<i>E.coli</i> [per/100mL]	++		3 498	0	4	0	99.9
Fluoride [mg/L]	≤ 1.5[mg/L]		113	0.24	1.10	0.85	100
Hardness - Total [mg/L]		≤ 200[mg/L]	86	47	155	102	100
Iron - Total [mg/L]		≤ 0.3[mg/L]	114	0.0011	0.0890	0.0104	100
Manganese - Total [mg/L]		≤ 0.1[mg/L]	114	0.0002	0.0072	0.0013	100
Manganese - Total [mg/L]	≤ 0.5[mg/L]		114	0.0002	0.0072	0.0013	100
pH Units		6.5 - 8.5[pH units]	445	7.0	8.0	7.5	100
Total Dissolved Solids [mg/L]		≤ 600[mg/L]	192	110	480	266	100
Trihalomethanes - Total [µg/L]	≤ 250[µg/L]		731	<4	348	121	97.0
Turbidity [NTU]		≤ 5[NTU]	367	<0.1	1.60	0.15	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**  
2013-14 Country source water quality

System	Total Dissolved Solids [mg/L]			Hardness - Total [mg/L]			Dissolved Organic Carbon [mg/L]			pH Units		
	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
Barmera WTP	88	340	176	N/A	N/A	N/A	3.3	7.3	4.9	7.5	8.2	7.8
Barossa WTP	230	430	360	115	132	121	8.5	10.6	9.5	7.2	8.4	7.9
Beachport IRP	620	670	644	271	278	275	1.0	1.0	1.0	7.3	7.6	7.4
Berri WTP	88	310	173	N/A	N/A	N/A	3.0	7.4	4.8	6.9	8.0	7.7
Blanchetown WTP	100	330	196	N/A	N/A	N/A	3.5	7.7	5.1	7.2	8.1	7.7
Bordertown	390	600	470	<2	292	241	0.7	1.5	0.9	7.0	7.5	7.2
Cadell WTP	97	340	194	N/A	N/A	N/A	3.1	7.7	5.1	7.2	8.1	7.7
Coffin Bay	340	480	383	211	250	222	0.5	0.5	0.5	7.6	7.9	7.7
Cowirra WTP	110	320	199	N/A	N/A	N/A	3.5	8.3	5.3	6.8	8.2	7.5
Elliston	560	990	768	264	342	301	0.6	0.6	0.6	7.3	7.6	7.5
Eyre South	420	840	593	258	410	312	0.8	1.1	0.9	7.0	7.7	7.5
Geranium	1 200	1 500	1 400	574	612	593	0.9	1.0	1.0	6.7	7.1	6.9
Glossop WTP	88	310	173	N/A	N/A	N/A	3.0	7.4	4.8	6.9	8.0	7.7
Happy Valley WTP	290	320	305	103	124	113	6.8	10.2	8.9	7.2	8.6	8.0
Hawker Desalination WTP	2 100	2 500	2 288	847	1 010	953	0.6	0.7	0.6	7.1	7.2	7.2
Kalangadoo IRP	500	540	523	341	360	351	1.2	1.3	1.2	7.1	7.3	7.2
Kanmantoo WTP	120	330	211	38	113	72	4.2	9.3	5.9	6.9	7.8	7.4
Kingston SE IRP	760	1 400	965	216	246	230	1.0	1.1	1.1	7.3	7.6	7.5
Lameroo IRP	900	990	941	222	240	232	0.5	0.6	0.6	7.4	7.6	7.5
Loxton WTP	98	330	185	N/A	N/A	N/A	3.0	8.3	4.8	7.5	8.3	7.9
Lucindale IRP	770	810	794	304	323	314	2.1	2.5	2.3	7.3	7.6	7.4
Mannum WTP	110	320	197	38	108	66	4.3	8.0	5.9	6.9	7.9	7.5
Melrose	1 200	1 900	1 504	273	430	329	0.5	0.7	0.6	7.2	7.5	7.4
Middle River WTP	190	580	371	25	90	59	10.4	20.7	13.9	6.4	7.5	7.0
Millicent	520	720	596	332	363	349	1.2	1.5	1.4	7.4	7.7	7.5
Moorook WTP	90	330	176	N/A	N/A	N/A	3.5	8.3	5.5	7.3	8.2	7.8
Morgan WTP	94	350	199	31	105	66	3.1	8.4	5.1	7.2	9.2	8.1
Mt Burr	390	480	440	268	356	308	0.5	0.7	0.6	7.2	7.5	7.3
Mt Compass	120	260	172	40	61	50	<0.3	<0.3	<0.3	6.0	6.5	6.3
Mt Gambier	340	630	522	152	320	243	0.8	1.8	1.1	7.3	8.4	8.0
Mt Pleasant WTP	110	320	197	38	108	66	3.3	8.0	5.4	6.9	7.9	7.5
Murray Bridge WTP	120	330	211	38	113	72	4.2	9.3	5.9	6.9	7.8	7.3
Mypolonga WTP	120	330	208	N/A	N/A	N/A	3.6	7.8	5.3	6.9	7.9	7.4
Myponga WTP	320	410	353	103	136	114	11.7	16.3	14.4	7.2	8.0	7.6
Nangwarry	490	740	626	337	429	382	1.0	1.3	1.2	7.0	7.2	7.1
Naracoorte	1 200	1 300	1 235	331	387	352	1.7	1.9	1.8	7.6	7.8	7.7
Orroroo	1 800	2 100	1 950	672	758	720	0.5	0.7	0.6	7.1	7.7	7.3
Padthaway	660	1 500	1 414	564	651	607	0.9	1.0	1.0	7.0	7.2	7.1
Palmer WTP	110	320	197	38	108	66	4.3	8.0	5.9	6.9	8.0	7.5
Parachilna	790	830	816	318	341	326	<0.3	0.5	0.4	7.4	7.7	7.6
Parilla IRP	620	660	638	180	198	189	0.5	0.6	0.6	7.2	8.0	7.6
Penneshaw WTP	33 000	37 000	34 981	N/A	N/A	N/A	N/A	N/A	N/A	6.7	7.1	6.9
Penola IRP	620	660	643	309	374	342	1.4	3.0	1.9	7.1	7.4	7.3
Pinnaroo IRP	660	1 400	885	241	476	295	0.6	0.7	0.7	7.1	7.7	7.4
Port Lincoln	430	1 300	685	170	534	295	0.4	1.0	0.7	7.2	7.9	7.4
Port MacDonnell	660	720	689	8	22	15	1.3	1.3	1.3	8.2	8.3	8.3
Quorn	1 000	1 400	1 223	479	536	510	0.7	1.1	0.9	6.8	7.2	7.0
Renmark WTP	81	240	145	29	84	50	2.9	9.1	5.3	7.0	7.8	7.5
River Murray	53	3 900	220	29	125	64	2.5	9.3	5.2	6.7	9.3	7.7
Robe IRP	670	990	861	67	128	90	1.0	1.5	1.2	7.5	8.0	7.8
Summit WTP	120	330	211	38	113	72	4.2	9.3	5.9	6.9	7.8	7.3
Swan Reach Town WTP	100	360	196	N/A	N/A	N/A	3.4	8.1	5.3	7.3	8.1	7.7
Swan Reach WTP	100	350	193	36	103	62	3.3	8.9	5.8	7.3	8.0	7.7
Tailem Bend WTP	120	420	221	39	125	73	3.5	7.4	5.7	6.7	8.0	7.4
Tarpeena IRP	600	730	675	400	421	413	1.0	1.1	1.1	7.1	7.3	7.2
Waikerie WTP	95	410	191	N/A	N/A	N/A	3.4	8.1	5.6	7.2	8.1	7.8
Warooka	680	800	737	325	347	336	0.8	1.2	1.0	7.4	7.6	7.5
Wilmington	280	480	341	88	276	159	0.3	2.4	1.3	6.2	7.5	6.8
Woolpunda WTP	95	320	184	N/A	N/A	N/A	3.3	7.9	5.0	7.2	8.3	7.8

**Table 3**  
2013-14 Country source water quality *continued*

System	Turbidity [NTU]			Colour - True [HU]			Nitrate as Nitrogen [mg/L]			Phosphorus - Total [mg/L]		
	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
Barmera WTP	15.0	120.0	58.7	8	39	17	N/A	N/A	N/A	N/A	N/A	N/A
Barossa WTP	0.3	1.5	0.7	15	30	22	<0.005	0.059	0.023	0.008	0.052	0.018
Beachport IRP	0.4	4.5	3.1	<1	<1	<1	<0.005	0.005	<0.005	0.037	0.043	0.040
Berri WTP	15.0	100.0	58.2	7	38	17	N/A	N/A	N/A	N/A	N/A	N/A
Blanchetown WTP	24.0	120.0	60.5	8	33	16	N/A	N/A	N/A	N/A	N/A	N/A
Bordertown	<0.1	26.0	1.8	<1	2	1	<0.005	0.448	0.103	<0.005	0.094	0.020
Cadell WTP	38.0	120.0	63.5	7	35	17	N/A	N/A	N/A	N/A	N/A	N/A
Coffin Bay	<0.1	0.3	0.1	<1	<1	<1	0.144	1.290	0.691	0.010	0.014	0.012
Cowirra WTP	31	110	62	9	41	16	N/A	N/A	N/A	N/A	N/A	N/A
Elliston	<0.1	0.5	0.1	<1	<1	<1	2.850	3.900	3.375	0.010	0.011	0.011
Eyre South	<0.1	6.1	0.5	<1	<1	<1	2.610	5.440	3.846	0.010	0.023	0.017
Geranium	<0.1	0.2	0.1	<1	<1	<1	0.027	0.070	0.049	0.035	0.095	0.065
Glossop WTP	15.0	100.0	58.2	7	38	17	N/A	N/A	N/A	N/A	N/A	N/A
Happy Valley WTP	1.7	12.0	5.3	18	70	52	<0.005	0.228	0.050	0.023	0.108	0.054
Hawker Desalination WTP	7.4	14.0	11.4	<1	<1	<1	<0.005	<0.005	<0.005	0.006	0.010	0.008
Kalangadoo IRP	2.0	6.4	4.0	<1	<1	<1	<0.005	<0.005	<0.005	0.010	0.017	0.014
Kanmantoo WTP	33.0	110.0	69.1	9	30	16	N/A	N/A	N/A	0.007	0.351	0.168
Kingston SE IRP	0.6	33.0	11.8	<1	2	1	<0.005	0.006	0.005	<0.005	0.015	0.009
Lameroo IRP	1.5	4.8	2.8	<1	<1	<1	<0.005	<0.005	<0.005	0.044	0.050	0.047
Loxton WTP	14.0	110.0	57.4	7	38	17	<0.005	0.219	0.024	0.038	0.404	0.155
Lucindale IRP	0.4	10.0	6.6	1	2	2	<0.005	<0.005	<0.005	0.035	0.037	0.036
Mannum WTP	32.0	120.0	68.6	9	32	16	<0.005	0.292	0.091	0.077	0.300	0.182
Melrose	<0.1	1.8	0.6	<1	<1	<1	0.305	0.741	0.587	0.021	0.030	0.025
Middle River WTP	6.3	31.0	11.7	148	233	183	0.006	0.367	0.169	0.018	0.259	0.042
Millicent	0.2	19.0	2.5	<1	4	2	<0.005	0.051	0.031	0.010	0.022	0.017
Moorook WTP	12.0	170.0	61.4	8	36	17	<0.005	0.209	0.018	0.053	0.298	0.145
Morgan WTP	0.5	130.0	31.4	1	48	10	<0.005	0.302	0.028	0.008	0.251	0.108
Mt Burr	<0.1	0.5	0.2	<1	<1	<1	0.186	1.370	0.814	0.022	0.043	0.031
Mt Compass	<0.1	0.5	0.2	<1	<1	<1	0.043	0.055	0.049	0.009	0.026	0.018
Mt Gambier	0.1	24.0	2.3	<1	2	1	<0.005	3.690	2.814	<0.005	0.040	0.014
Mt Pleasant WTP	29.0	120.0	66.5	8	37	16	<0.005	0.292	0.091	0.077	0.300	0.182
Murray Bridge WTP	33.0	110.0	69.1	9	30	16	N/A	N/A	N/A	0.007	0.351	0.168
Mypolonga WTP	28.0	89.0	59.7	10	32	16	N/A	N/A	N/A	N/A	N/A	N/A
Myponga WTP	1.3	23.0	3.7	42	130	83	0.035	0.282	0.140	0.025	0.262	0.082
Nangwarry	<0.1	0.4	0.2	<1	<1	<1	0.275	3.070	1.673	0.010	0.017	0.014
Naracoorte	0.2	2.7	0.6	3	6	5	<0.005	0.019	0.009	0.048	0.063	0.056
Orroroo	<0.1	0.2	0.1	<1	<1	<1	0.026	0.036	0.031	0.012	0.013	0.013
Padthaway	0.2	1.8	0.6	<1	<1	<1	0.033	0.069	0.051	0.011	0.012	0.012
Palmer WTP	32.0	120.0	68.6	9	32	16	<0.005	0.292	0.091	0.077	0.300	0.182
Parachilna	<0.1	9.8	1.2	<1	<1	<1	1.400	1.500	1.463	<0.005	0.011	0.008
Parilla IRP	1.6	5.0	2.8	<1	<1	<1	<0.005	<0.005	<0.005	0.028	0.036	0.032
Penneshaw WTP	0.1	0.8	0.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Penola IRP	6.6	15.0	11.1	1	3	2	<0.005	<0.005	<0.005	0.024	0.039	0.029
Pinnaroo IRP	2.2	28.0	6.5	<1	<1	<1	<0.005	<0.005	<0.005	0.053	0.079	0.066
Port Lincoln	<0.1	22.0	0.7	<1	<1	<1	0.269	6.110	3.313	<0.005	0.014	0.009
Port MacDonnell	<0.1	5.2	0.7	3	11	5	0.008	0.008	0.008	0.170	0.170	0.170
Quorn	<0.1	2.0	0.3	<1	<1	<1	0.106	0.136	0.117	0.016	0.023	0.019
Renmark WTP	17.0	130.0	61.9	8	42	17	<0.005	0.249	0.026	0.045	0.351	0.166
River Murray	5.5	170.0	57.1	6	80	17	<0.005	0.343	0.029	0.007	0.750	0.143
Robe IRP	<0.1	14.0	1.8	<1	2	1	<0.005	<0.005	<0.005	0.041	0.046	0.043
Summit WTP	33.0	110.0	69.1	9	30	16	N/A	N/A	N/A	0.007	0.351	0.168
Swan Reach Town WTP	29.0	110.0	61.9	9	33	16	N/A	N/A	N/A	N/A	N/A	N/A
Swan Reach WTP	22.0	120.0	63.6	8	35	16	<0.005	0.343	0.049	0.076	0.298	0.181
Tailem Bend WTP	25.0	89.0	58.2	10	31	16	N/A	N/A	N/A	0.060	0.750	0.173
Tarpeena IRP	<0.1	19.0	8.6	<1	<1	<1	<0.005	<0.005	<0.005	0.025	0.059	0.042
Waikerie WTP	19.0	120.0	60.8	8	38	17	<0.005	0.237	0.020	0.068	0.260	0.146
Warooka	<0.1	0.3	0.1	<1	<1	<1	2.320	3.190	2.755	0.011	0.014	0.013
Wilmington	<0.1	1.4	0.5	<1	2	1	0.036	0.198	0.136	0.009	0.091	0.049
Woolpunda WTP	19	130.0	65.9	8	35	17	N/A	N/A	N/A	N/A	N/A	N/A



**Table 4**  
2013-14 Country drinking water distribution systems – customer tap water quality against 2011 ADWG

System	<i>E. coli</i> /100 mL		Chlorine Residual – Free [mg/L]*			
	Samples	Health Compliance %	Min	Max	Ave	Health Compliance %
<b>ADWG Value</b>		<b>0</b>				<b>≤ 5</b>
<b>Target</b>		<b>100% free<sup>^</sup></b>				<b>100%</b>
Barmera WTP	98	100	0.5	3.8	1.7	100
Barossa WTP	405	100	<0.1	1.6	0.3	100
Beachport IRP	64	100	0.6	1.4	1.0	100
Berri WTP	91	100	0.1	2.5	1.5	100
Blanchetown WTP	51	100	0.5	1.8	1.3	100
Bordertown	65	100	0.8	1.5	1.1	100
Cadell WTP	52	100	0.5	1.5	1.0	100
Coffin Bay	65	100	0.9	2.0	1.3	100
Cowirra WTP	77	100	<0.1	3.1	0.9	100
Elliston	103	100	0.9	1.8	1.3	100
Eyre South	285	100	0.5	2.1	1.1	100
Eyre South/Morgan WTP	299	100	0.2	3.0	1.5	100
Geranium	52	100	0.6	2.2	1.3	100
Glossop WTP	104	100	0.5	2.1	1.4	100
Happy Valley WTP	65	100	<0.1	1.5	0.6	100
Hawker IRP	52	100	0.5	1.7	1.2	100
Kalangadoo IRP	57	100	0.2	1.4	0.9	100
Kanmantoo WTP	75	100	0.3	1.8	1.3	100
Kingston SE IRP	64	100	0.5	1.2	0.9	100
Lameroo IRP	50	100	0.4	1.6	0.9	100
Loxton WTP	78	100	N/A	N/A	N/A	-
Lucindale IRP	64	100	0.4	1.8	0.9	100
Mannum WTP	117	100	0.4	2.7	1.6	100
Melrose	51	100	1.1	1.7	1.4	100
Middle River WTP	116	100	<0.1	1.9	0.6	100
Millicent	81	100	0.5	1.2	0.8	100
Moorook WTP	101	100	0.2	2.9	1.7	100
Morgan/Swan Reach WTP	571	100	N/A	N/A	N/A	-
Morgan WTP	980	100	N/A	N/A	N/A	-
Mt Burr	65	100	0.6	1.0	0.8	100
Mt Compass	65	100	0.7	1.6	1.1	100
Mt Gambier	135	100	0.5	1.6	1.1	100
Mt Pleasant WTP	130	100	<0.1	1.7	1.0	100
Murray Bridge WTP	154	100	<0.1	3.8	1.6	100
Mypolonga WTP	65	100	0.3	2.5	1.9	100
Myponga WTP	220	99.5	<0.1	1.8	0.2	100
Nangwarry	54	100	0.2	1.3	0.9	100
Naracoorte	90	100	<0.1	2.5	0.4	100
Orroroo	51	100	1.1	2.0	1.4	100
Padthaway	65	100	0.4	1.4	1.1	100
Palmer WTP	117	100	0.6	2.2	1.4	100
Parachilna	52	100	<0.1	1.5	0.4	100
Parilla IRP	52	100	0.5	1.6	1.0	100
Penneshaw WTP	64	100	0.3	1.8	1.4	100
Penola IRP	78	100	0.1	1.7	1.0	100
Pinnaroo IRP	63	100	0.5	1.8	1.2	100
Port Lincoln	104	100	0.6	1.8	1.3	100
Port MacDonnell	57	100	0.4	1.1	0.8	100
Quorn	51	100	0.5	2.5	1.4	100
Renmark WTP	221	100	<0.1	2.4	1.2	100
Robe IRP	62	100	N/A	N/A	N/A	-
Summit WTP	502	100	N/A	N/A	N/A	-
Swan Reach Town WTP	64	100	<0.1	2.0	1.3	100
Swan Reach WTP	494	100	N/A	N/A	N/A	-
Tailem Bend WTP	314	100	N/A	N/A	N/A	-
Tarpeena IRP	53	100	0.5	1.4	1.0	100
Waikerie WTP	77	100	0.2	2.4	1.3	100
Warooka	48	100	<0.1	1.5	1.1	100
Wilmington	52	100	0.1	1.6	0.7	100
Woolpunda	77	100	N/A	N/A	N/A	-

**Table 4**2013-14 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

System	Chlorine Residual – Total [mg/L]**				Total Dissolved Solids [mg/L]			
	Min	Max	Ave	Health Compliance %	Min	Max	Ave	Aesthetic Compliance %
<b>ADWG Value</b>				≤ 4.5				≤ 600
<b>Target</b>				100%				100%
Barmera WTP	N/A	N/A	N/A	-	130	310	207	100
Barossa WTP	N/A	N/A	N/A	-	410	480	435	100
Beachport IRP	N/A	N/A	N/A	-	630	660	650	0.0
Berri WTP	N/A	N/A	N/A	-	120	320	195	100
Blanchetown WTP	N/A	N/A	N/A	-	190	300	250	100
Bordertown	N/A	N/A	N/A	-	490	580	540	100
Cadell WTP	N/A	N/A	N/A	-	130	350	225	100
Coffin Bay	N/A	N/A	N/A	-	360	420	393	100
Cowirra WTP	N/A	N/A	N/A	-	150	330	235	100
Elliston	N/A	N/A	N/A	-	820	840	833	0.0
Eyre South	N/A	N/A	N/A	-	510	580	536	100
Eyre South/Morgan WTP	N/A	N/A	N/A	-	430	540	466	100
Geranium	N/A	N/A	N/A	-	1 400	1 500	1 425	0.0
Glossop WTP	N/A	N/A	N/A	-	140	280	194	100
Happy Valley WTP	N/A	N/A	N/A	-	190	270	218	100
Hawker IRP	N/A	N/A	N/A	-	2 200	2 200	2 200	0.0
Kalangadoo IRP	N/A	N/A	N/A	-	520	540	530	100
Kanmantoo WTP	N/A	N/A	N/A	-	150	340	243	100
Kingston SE IRP	N/A	N/A	N/A	-	440	1 200	925	25.0
Lameroo IRP	N/A	N/A	N/A	-	920	990	955	0.0
Loxton WTP	2.2	3.9	3.4	100	150	380	233	100
Lucindale IRP	N/A	N/A	N/A	-	770	800	785	0.0
Mannum WTP	N/A	N/A	N/A	-	170	340	238	100
Melrose	N/A	N/A	N/A	-	1 400	1 500	1 475	0.0
Middle River WTP	N/A	N/A	N/A	-	390	520	455	100
Millicent	N/A	N/A	N/A	-	540	620	568	75.0
Moorook WTP	N/A	N/A	N/A	-	130	230	200	100
Morgan/Swan Reach WTP	<0.1	4.3	2.3	100	160	370	244	100
Morgan WTP	<0.1	3.9	2.6	100	150	390	258	100
Mt Burr	N/A	N/A	N/A	-	440	450	448	100
Mt Compass	N/A	N/A	N/A	-	180	230	203	100
Mt Gambier	N/A	N/A	N/A	-	340	600	363	100
Mt Pleasant WTP	N/A	N/A	N/A	-	190	360	256	100
Murray Bridge WTP	N/A	N/A	N/A	-	150	340	250	100
Mypolonga WTP	N/A	N/A	N/A	-	140	330	238	100
Myponga WTP	N/A	N/A	N/A	-	390	450	415	100
Nangwarry	N/A	N/A	N/A	-	590	650	625	25.0
Naracoorte	N/A	N/A	N/A	-	1 200	1 200	1 200	0.0
Orroroo	N/A	N/A	N/A	-	2 000	2 000	2 000	0.0
Padthaway	N/A	N/A	N/A	-	1 400	1 500	1 450	0.0
Palmer WTP	N/A	N/A	N/A	-	150	240	205	100
Parachilna	N/A	N/A	N/A	-	780	830	810	0.0
Parilla IRP	N/A	N/A	N/A	-	630	640	638	0.0
Penneshaw WTP	N/A	N/A	N/A	-	140	270	195	100
Penola IRP	N/A	N/A	N/A	-	630	660	645	0.0
Pinnaroo IRP	N/A	N/A	N/A	-	690	710	703	0.0
Port Lincoln	N/A	N/A	N/A	-	420	560	524	100
Port MacDonnell	N/A	N/A	N/A	-	670	710	693	0.0
Quorn	N/A	N/A	N/A	-	1 100	1 300	1 200	0.0
Renmark WTP	N/A	N/A	N/A	-	110	260	182	100
Robe IRP	0.5	1.9	1.2	100	720	940	863	0.0
Summit WTP	0.2	3.9	2.4	100	170	330	244	100
Swan Reach Town WTP	N/A	N/A	N/A	-	130	350	230	100
Swan Reach WTP	0.1	3.7	2.4	100	140	370	237	100
Tailem Bend WTP	<0.2	3.8	2.3	100	160	370	269	100
Tarpeena IRP	N/A	N/A	N/A	-	640	680	668	0.0
Waikerie WTP	N/A	N/A	N/A	-	140	240	213	100
Warooka	N/A	N/A	N/A	-	750	780	765	0.0
Wilmington	N/A	N/A	N/A	-	290	310	303	100
Woolpunda	<0.1	2.2	0.6	100	170	340	238	100

**Table 4**2013-14 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

System	Colour - True [HU]				Turbidity [NTU]			
	Min	Max	Ave	Aesthetic Compliance %	Min	Max	Ave	Aesthetic Compliance %
<b>ADWG Value</b>				≤ 15				≤ 5
<b>Target</b>								
Barmera WTP	<1	2	1	100	0.1	0.4	0.2	100
Barossa WTP	<1	2	1	100	<0.1	1.7	0.2	100
Beachport IRP	<1	<1	<1	100	<0.1	0.6	0.2	100
Berri WTP	<1	2	1	100	0.1	1.6	0.2	100
Blanchetown WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Bordertown	<1	<1	<1	100	<0.1	0.3	0.1	100
Cadell WTP	<1	2	1	100	<0.1	0.2	0.1	100
Coffin Bay	<1	<1	<1	100	<0.1	0.4	0.1	100
Cowirra WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Elliston	<1	<1	<1	100	<0.1	0.1	0.1	100
Eyre South	<1	<1	<1	100	<0.1	0.5	0.1	100
Eyre South/Morgan WTP	<1	<1	<1	100	<0.1	4.3	0.3	100
Geranium	<1	<1	<1	100	<0.1	0.2	0.1	100
Glossop WTP	<1	<1	<1	100	<0.1	0.1	0.1	100
Happy Valley WTP	<1	<1	<1	100	<0.1	1.1	0.2	100
Hawker IRP	<1	<1	<1	100	<0.1	0.1	0.1	100
Kalangadoo IRP	<1	<1	<1	100	<0.1	0.4	0.1	100
Kanmantoo WTP	<1	<1	<1	100	0.4	2.1	0.8	100
Kingston SE IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Lameroo IRP	<1	<1	<1	100	<0.1	0.3	0.1	100
Loxton WTP	<1	3	2	100	<0.1	0.2	0.1	100
Lucindale IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Mannum WTP	<1	1	1	100	<0.1	0.6	0.2	100
Melrose	<1	<1	<1	100	<0.1	0.4	0.1	100
Middle River WTP	<1	3	1	100	<0.1	0.3	0.2	100
Millicent	<1	<1	<1	100	<0.1	0.4	0.2	100
Moorook WTP	<1	<1	<1	100	<0.1	0.4	0.1	100
Morgan/Swan Reach WTP	<1	3	1	100	<0.1	4.0	0.2	100
Morgan WTP	<1	3	2	100	<0.1	1.5	0.2	100
Mt Burr	<1	<1	<1	100	<0.1	0.2	0.1	100
Mt Compass	<1	<1	<1	100	<0.1	1.4	0.2	100
Mt Gambier	<1	4	1	100	<0.1	11.0	0.3	98.7
Mt Pleasant WTP	<1	<1	<1	100	<0.1	0.3	0.1	100
Murray Bridge WTP	<1	2	1	100	<0.1	2.2	0.3	100
Mypolonga WTP	<1	1	1	100	<0.1	0.3	0.1	100
Myponga WTP	<1	4	2	100	<0.1	0.9	0.2	100
Nangwarry	<1	<1	<1	100	<0.1	1.2	0.2	100
Naracoorte	1	6	5	100	<0.1	1.1	0.3	100
Orroroo	<1	<1	<1	100	<0.1	0.3	0.1	100
Padthaway	<1	<1	<1	100	0.1	0.3	0.2	100
Palmer WTP	<1	<1	<1	100	<0.1	0.2	0.1	100
Parachilna	<1	<1	<1	100	<0.1	1.4	0.3	100
Parilla IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Penneshaw WTP	<1	<1	<1	100	<0.1	5.0	0.6	100
Penola IRP	<1	<1	<1	100	<0.1	0.2	0.1	100
Pinnaroo IRP	<1	1	1	100	<0.1	0.3	0.1	100
Port Lincoln	<1	<1	<1	100	<0.1	0.2	0.1	100
Port MacDonnell	<1	1	1	100	0.1	1.0	0.4	100
Quorn	<1	<1	<1	100	<0.1	0.2	0.1	100
Renmark WTP	<1	1	1	100	<0.1	3.5	0.2	100
Robe IRP	<1	1	1	100	<0.1	0.2	0.1	100
Summit WTP	<1	3	2	100	<0.1	0.4	0.1	100
Swan Reach Town WTP	<1	<1	<1	100	<0.1	0.4	0.2	100
Swan Reach WTP	<1	4	2	100	<0.1	1.5	0.2	100
Tailem Bend WTP	1	4	2	100	<0.1	0.4	0.1	100
Tarpeena IRP	<1	<1	<1	100	<0.1	0.8	0.2	100
Waikerie WTP	<1	3	1	100	0.1	0.3	0.2	100
Warooka	<1	<1	<1	100	<0.1	0.2	0.1	100
Wilmington	<1	<1	<1	100	<0.1	1.0	0.3	100
Woolpunda	<1	3	2	100	0.1	6.6	0.6	96.2

**Table 4**2013-14 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

System	pH Units			Trihalomethanes - Total [µg/L]				
	Min	Max	Ave	Aesthetic Compliance %	Min	Max	Ave	Health Compliance %
<b>ADWG Value</b>				<b>6.5 - 8.5</b>				<b>≤ 250</b>
<b>Target</b>								<b>100%</b>
Barmera WTP	7.1	8.3	7.4	100	90	185	134	100
Barossa WTP	7.0	9.8	7.6	95.3	33	309	185	91.2
Beachport IRP	7.6	7.8	7.7	100	33	38	36	100
Berri WTP	7.1	7.5	7.4	100	68	153	108	100
Blanchetown WTP	7.2	7.8	7.5	100	75	161	108	100
Bordertown	7.0	7.4	7.2	100	6	10	8	100
Cadell WTP	7.2	7.7	7.5	100	62	185	104	100
Coffin Bay	7.4	8.1	7.8	100	5	9	7	100
Cowirra WTP	7.4	8.6	7.9	96.0	84	219	153	100
Elliston	7.6	7.8	7.7	100	7	12	9	100
Eyre South	7.2	8.0	7.6	100	11	24	19	100
Eyre South/Morgan WTP	7.4	8.2	7.9	100	22	281	167	92.3
Geranium	6.8	7.2	7.0	100	<4	7	6	100
Glossop WTP	7.3	8.0	7.6	100	72	164	113	100
Happy Valley WTP	7.5	8.7	7.9	96.2	89	183	132	100
Hawker IRP	7.2	7.4	7.3	100	29	49	37	100
Kalangadoo IRP	7.2	7.5	7.4	100	40	68	51	100
Kanmantoo WTP	7.1	7.7	7.5	100	58	132	98	100
Kingston SE IRP	7.5	7.7	7.6	100	29	42	35	100
Lameroo IRP	7.3	7.8	7.7	100	21	26	23	100
Loxton WTP	8.2	9.0	8.6	38.5	N/A	N/A	N/A	-
Lucindale IRP	7.4	7.7	7.6	100	89	110	101	100
Mannum WTP	7.0	7.8	7.4	100	80	155	115	100
Melrose	7.2	7.8	7.5	100	6	12	9	100
Middle River WTP	7.6	7.9	7.8	100	21	288	157	96.0
Millicent	7.3	7.6	7.5	100	49	63	55	100
Moorook WTP	7.2	8.2	7.8	100	62	143	101	100
Morgan/Swan Reach WTP	7.9	9.3	8.8	8	N/A	N/A	N/A	-
Morgan WTP	7	9.4	8.9	12.1	68	277	146	96.2
Mt Burr	7.6	8.0	7.8	100	8	13	10	100
Mt Compass	6.3	7.1	6.7	92.3	<4	4	4	100
Mt Gambier	7.3	8.3	8.2	100	9	43	23	100
Mt Pleasant WTP	7.1	7.7	7.4	100	73	158	112	100
Murray Bridge WTP	6.9	8.7	7.6	98.3	63	240	147	100
Mypolonga WTP	7.0	7.8	7.5	100	87	224	133	100
Myponga WTP	7.1	8.1	7.5	100	101	289	216	77.8
Nangwarry	7.2	7.7	7.4	100	13	21	17	100
Naracoorte	7.6	7.9	7.8	100	23	72	46	100
Orroroo	7.4	7.8	7.7	100	6	12	8	100
Padthaway	7.4	7.6	7.5	100	10	15	13	100
Palmer WTP	7.0	8.3	7.6	100	57	196	112	100
Parachilna	7.6	8.1	7.9	100	<4	5	4	100
Parilla IRP	7.4	8.0	7.7	100	17	21	18	100
Penneshaw WTP	7.8	8.3	8.1	100	<4	21	8	100
Penola IRP	7.4	7.6	7.5	100	56	82	69	100
Pinnaroo IRP	7.1	7.7	7.4	100	10	16	12	100
Port Lincoln	7.1	7.9	7.6	100	6	10	8	100
Port MacDonnell	7.9	8.4	8.2	100	70	88	83	100
Quorn	7.1	7.4	7.2	100	<4	10	6	100
Renmark WTP	7.1	9.7	7.8	83.0	60	278	131	97.4
Robe IRP	7.6	8.2	7.8	100	N/A	N/A	N/A	-
Summit WTP	7.6	9.0	8.4	76.3	N/A	N/A	N/A	-
Swan Reach Town WTP	7.4	8.0	7.7	100	82	151	112	100
Swan Reach WTP	8.0	9.1	8.5	59.5	N/A	N/A	N/A	-
Tailem Bend WTP	7.2	9.4	8.6	32.3	N/A	N/A	N/A	-
Tarpeena IRP	7.6	7.9	7.7	100	29	55	43	100
Waikerie WTP	7.4	7.7	7.5	100	94	185	134	100
Warooka	7.3	7.6	7.4	100	24	32	27	100
Wilmington	6.2	7.3	6.8	69.2	6	38	18	100
Woolpunda	7.8	9.4	8.6	53.8	N/A	N/A	N/A	-



**Table 4**2013-14 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

System	Fluoride [mg/L]				Iron - Total [mg/L]			
	Min	Max	Ave	Health Compliance %	Min	Max	Ave	Aesthetic Compliance %
<b>ADWG Value</b>				≤ 1.5				≤ 0.3
<b>Target</b>				<b>100%</b>				<b>100%</b>
Barmera WTP	0.8	1.0	0.9	100	0.0026	0.0359	0.0186	100.0
Barossa WTP	0.3	1.1	0.8	100	0.0045	0.4262	0.0475	95.8
Beachport IRP	0.2	0.3	0.3	100	<0.0005	0.2239	0.0118	100.0
Berri WTP	0.8	1.0	0.9	100	0.0084	0.0142	0.0119	100.0
Blanchetown WTP	<0.1	0.2	0.1	100	0.0090	0.0276	0.0180	100.0
Bordertown	0.3	0.4	0.3	100	<0.0005	0.0038	0.0017	100.0
Cadell WTP	<0.1	0.2	0.1	100	0.0023	0.0066	0.0038	100.0
Coffin Bay	1.1	1.4	1.2	100	0.0006	0.0032	0.0017	100.0
Cowirra WTP	<0.1	0.2	0.1	100	0.0068	0.0120	0.0090	100.0
Elliston	0.7	0.8	0.7	100	<0.0005	0.0047	0.0016	100.0
Eyre South	0.4	0.6	0.5	100	<0.0005	0.0017	0.0006	100.0
Eyre South/Morgan WTP	0.5	0.6	0.6	100	<0.0005	0.0400	0.0086	100.0
Geranium	1.0	1.0	1.0	100	0.0019	0.0121	0.0078	100.0
Glossop WTP	<0.1	0.2	0.1	100	0.0079	0.0246	0.0181	100.0
Happy Valley WTP	0.8	0.9	0.9	100	0.0040	0.0150	0.0083	100.0
Hawker IRP	0.7	0.9	0.7	100	0.0137	0.0715	0.0335	100.0
Kalangadoo IRP	0.1	0.1	0.1	100	0.0056	0.1178	0.0219	100.0
Kanmantoo WTP	0.1	0.2	0.1	100	0.0316	0.1169	0.0765	100.0
Kingston SE IRP	0.3	0.4	0.3	100	<0.0005	0.3261	0.0170	96.2
Lameroo IRP	0.6	0.6	0.6	100	0.0148	0.0784	0.0241	100.0
Loxton WTP	0.9	1.0	0.9	100	0.0011	0.0030	0.0018	100.0
Lucindale IRP	0.3	0.3	0.3	100	0.0006	0.0185	0.0044	100.0
Mannum WTP	0.8	0.9	0.9	100	0.0059	0.0297	0.0141	100.0
Melrose	1.0	1.1	1.0	100	0.0014	0.0051	0.0033	100.0
Middle River WTP	<0.1	0.1	0.1	100	0.0495	0.1195	0.0845	100.0
Millicent	0.9	1.3	1.0	100	0.0055	0.1072	0.0343	100.0
Moorook WTP	<0.1	0.1	0.1	100	0.0080	0.0300	0.0176	100.0
Morgan/Swan Reach WTP	0.8	0.9	0.8	100	0.0026	0.0172	0.0073	100.0
Morgan WTP	0.8	0.9	0.8	100	<0.0005	0.037	0.0061	100.0
Mt Burr	0.2	0.3	0.3	100	0.0014	0.0036	0.0024	100.0
Mt Compass	0.2	0.3	0.3	100	0.0053	0.0095	0.0073	100.0
Mt Gambier	0.2	0.9	0.7	100	<0.0005	0.2827	0.0126	100.0
Mt Pleasant WTP	0.8	1.2	0.9	100	0.0016	0.0179	0.0043	100.0
Murray Bridge WTP	0.8	0.9	0.9	100	0.0029	0.0035	0.0033	100.0
Mypolonga WTP	<0.1	0.2	0.1	100	0.0073	0.0117	0.0095	100.0
Myponga WTP	0.8	0.9	0.9	100	0.0129	0.0794	0.0412	100.0
Nangwarry	0.1	0.1	0.1	100	<0.0005	0.0027	0.0013	100.0
Naracoorte	1.1	1.2	1.2	100	0.0314	0.1150	0.0606	100.0
Orroroo	1.2	1.3	1.3	100	0.0048	0.0284	0.0128	100.0
Padthaway	0.1	0.2	0.1	100	0.0168	0.0296	0.0236	100.0
Palmer WTP	<0.1	0.1	0.1	100	0.0063	0.0252	0.0149	100.0
Parachilna	0.6	0.6	0.6	100	0.0008	0.0173	0.0058	100.0
Parilla IRP	0.4	0.5	0.4	100	0.0024	0.0156	0.0086	100.0
Penneshaw WTP	<0.1	0.1	0.1	100	<0.0005	0.0821	0.0214	100.0
Penola IRP	0.2	0.2	0.2	100	0.0023	0.0715	0.0203	100.0
Pinnaroo IRP	0.6	0.7	0.7	100	0.0062	0.6320	0.0483	96.2
Port Lincoln	0.4	0.6	0.5	100	<0.0005	<0.0005	<0.0005	100.0
Port MacDonnell	0.7	0.9	0.8	100	0.0040	0.0766	0.0224	100.0
Quorn	0.6	0.7	0.6	100	<0.0005	0.0038	0.0013	100.0
Renmark WTP	0.8	1.0	0.9	100	0.0022	0.0152	0.0064	100.0
Robe IRP	0.2	0.3	0.3	100	0.0016	0.0874	0.0102	100.0
Summit WTP	0.8	0.9	0.9	100	0.0018	0.0324	0.0072	100.0
Swan Reach Town WTP	0.1	0.2	0.1	100	0.0071	0.0330	0.0226	100.0
Swan Reach WTP	0.8	1.1	0.9	100	0.0015	0.0061	0.0028	100.0
Tailem Bend WTP	0.4	0.9	0.8	100	0.0011	0.0069	0.0031	100.0
Tarpeena IRP	0.2	0.2	0.2	100	0.0036	0.2418	0.0203	100.0
Waikerie WTP	0.8	0.9	0.9	100	0.0120	0.0500	0.0315	100.0
Warooka	1.1	1.2	1.2	100	<0.0005	0.0031	0.0015	100.0
Wilmington	0.2	0.2	0.2	100	0.0173	0.0479	0.0295	100.0
Woolpunda	<0.1	0.1	0.1	100	0.0032	0.0390	0.0156	100.0

**Table 4**2013-14 Country drinking water distribution systems – customer tap water quality against 2011 ADWG *continued*

System	Manganese - Total [mg/L]					Hardness - Total [mg/L]			
	Min	Max	Ave	Health Compliance %	Aesthetic Compliance %	Min	Max	Ave	Aesthetic Compliance %
	ADWG Value			≤ 0.5	≤ 0.1				≤ 200
Target			100%	100%					
Barmera WTP	0.0021	0.0058	0.0029	100	100	36	103	60	100.0
Barossa WTP	<0.0001	0.0442	0.0037	100	100	143	182	157	100.0
Beachport IRP	<0.0001	0.0002	0.0001	100	100	269	281	276	0.0
Berri WTP	0.0014	0.0028	0.0019	100	100	31	100	59	100.0
Blanchetown WTP	0.0005	0.0006	0.0006	100	100	49	103	74	100.0
Bordertown	<0.0001	<0.0001	<0.0001	100	100	259	294	280	0.0
Cadell WTP	0.0004	0.0006	0.0005	100	100	38	106	67	100.0
Coffin Bay	<0.0001	0.0005	0.0003	100	100	219	241	227	0.0
Cowirra WTP	0.0003	0.0009	0.0005	100	100	45	113	76	100.0
Elliston	<0.0001	<0.0001	<0.0001	100	100	310	315	312	0.0
Eyre South	<0.0001	0.0001	0.0001	100	100	244	307	269	0.0
Eyre South/Morgan WTP	<0.0001	0.0029	0.0008	100	100	211	272	229	0.0
Geranium	0.0001	0.0002	0.0002	100	100	545	595	578	0.0
Glossop WTP	0.0002	0.0006	0.0004	100	100	39	95	59	100.0
Happy Valley WTP	0.0004	0.0012	0.0007	100	100	81	122	95	100.0
Hawker IRP	0.0008	0.0061	0.0023	100	100	863	927	897	0.0
Kalangadoo IRP	0.0001	0.0004	0.0003	100	100	344	368	355	0.0
Kanmantoo WTP	0.0003	0.0011	0.0008	100	100	50	110	78	100.0
Kingston SE IRP	<0.0001	0.0002	0.0001	100	100	216	240	229	0.0
Lameroo IRP	0.0006	0.0008	0.0007	100	100	227	238	232	0.0
Loxton WTP	0.0009	0.0031	0.0018	100	100	42	90	63	100.0
Lucindale IRP	<0.0001	<0.0001	<0.0001	100	100	318	324	321	0.0
Mannum WTP	0.0019	0.0039	0.0029	100	100	50	100	70	100.0
Melrose	<0.0001	<0.0001	<0.0001	100	100	344	367	351	0.0
Middle River WTP	0.0018	0.0079	0.0033	100	100	45	78	61	100.0
Millicent	0.0002	0.0019	0.0007	100	100	325	343	335	0.0
Moorook WTP	0.0004	0.0007	0.0006	100	100	39	80	62	100.0
Morgan/Swan Reach WTP	0.0005	0.0028	0.0013	100	100	44	114	76	100.0
Morgan WTP	0.0002	0.0033	0.0007	100	100	45	119	79	100.0
Mt Burr	<0.0001	0.0003	0.0002	100	100	295	308	301	0.0
Mt Compass	0.0002	0.0003	0.0002	100	100	53	64	60	100.0
Mt Gambier	<0.0001	0.0130	0.0017	100	100	176	297	192	92.3
Mt Pleasant WTP	<0.0001	0.0014	0.0006	100	100	40	109	71	100.0
Murray Bridge WTP	0.0010	0.0032	0.0017	100	100	44	118	78	100.0
Mypolonga WTP	0.0003	0.0008	0.0004	100	100	42	115	77	100.0
Myponga WTP	0.0014	0.0178	0.0045	100	100	104	135	117	100.0
Nangwarry	<0.0001	0.0001	0.0001	100	100	377	442	397	0.0
Naracoorte	0.0095	0.0203	0.0134	100	100	345	363	358	0.0
Orroroo	0.0002	0.0006	0.0004	100	100	679	719	701	0.0
Padthaway	0.0004	0.0006	0.0005	100	100	550	645	585	0.0
Palmer WTP	0.0003	0.0011	0.0008	100	100	40	74	63	100.0
Parachilna	<0.0001	0.0004	0.0002	100	100	315	329	322	0.0
Parilla IRP	<0.0001	0.0003	0.0002	100	100	181	198	190	100.0
Penneshaw WTP	<0.0001	0.0079	0.0021	100	100	60	86	70	100.0
Penola IRP	0.0001	0.0006	0.0003	100	100	301	323	313	0.0
Pinnaroo IRP	0.0004	0.0038	0.0013	100	100	247	266	255	0.0
Port Lincoln	<0.0001	<0.0001	<0.0001	100	100	257	267	261	0.0
Port MacDonnell	0.0002	0.0016	0.0009	100	100	18	26	22	100.0
Quorn	<0.0001	<0.0001	<0.0001	100	100	505	541	517	0.0
Renmark WTP	0.0009	0.0037	0.0021	100	100	35	83	56	100.0
Robe IRP	0.0006	0.0011	0.0008	100	100	88	121	102	100.0
Summit WTP	0.0010	0.0081	0.0026	100	100	50	111	77	100.0
Swan Reach Town WTP	0.0003	0.0013	0.0008	100	100	41	107	67	100.0
Swan Reach WTP	0.0012	0.0033	0.0021	100	100	43	108	71	100.0
Tailem Bend WTP	0.0003	0.0004	0.0011	100	100	51	119	85	100.0
Tarpeena IRP	0.0002	0.2249	0.1126	100	50.0	403	422	411	0.0
Waikerie WTP	0.0021	0.0032	0.0024	100	100	43	78	63	100.0
Warooka	<0.0001	<0.0001	<0.0001	100	100	330	352	339	0.0
Wilmington	0.0004	0.0019	0.0008	100	100	104	130	115	100.0
Woolpunda	0.0004	0.0010	0.0006	100	100	54	104	71	100.0

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