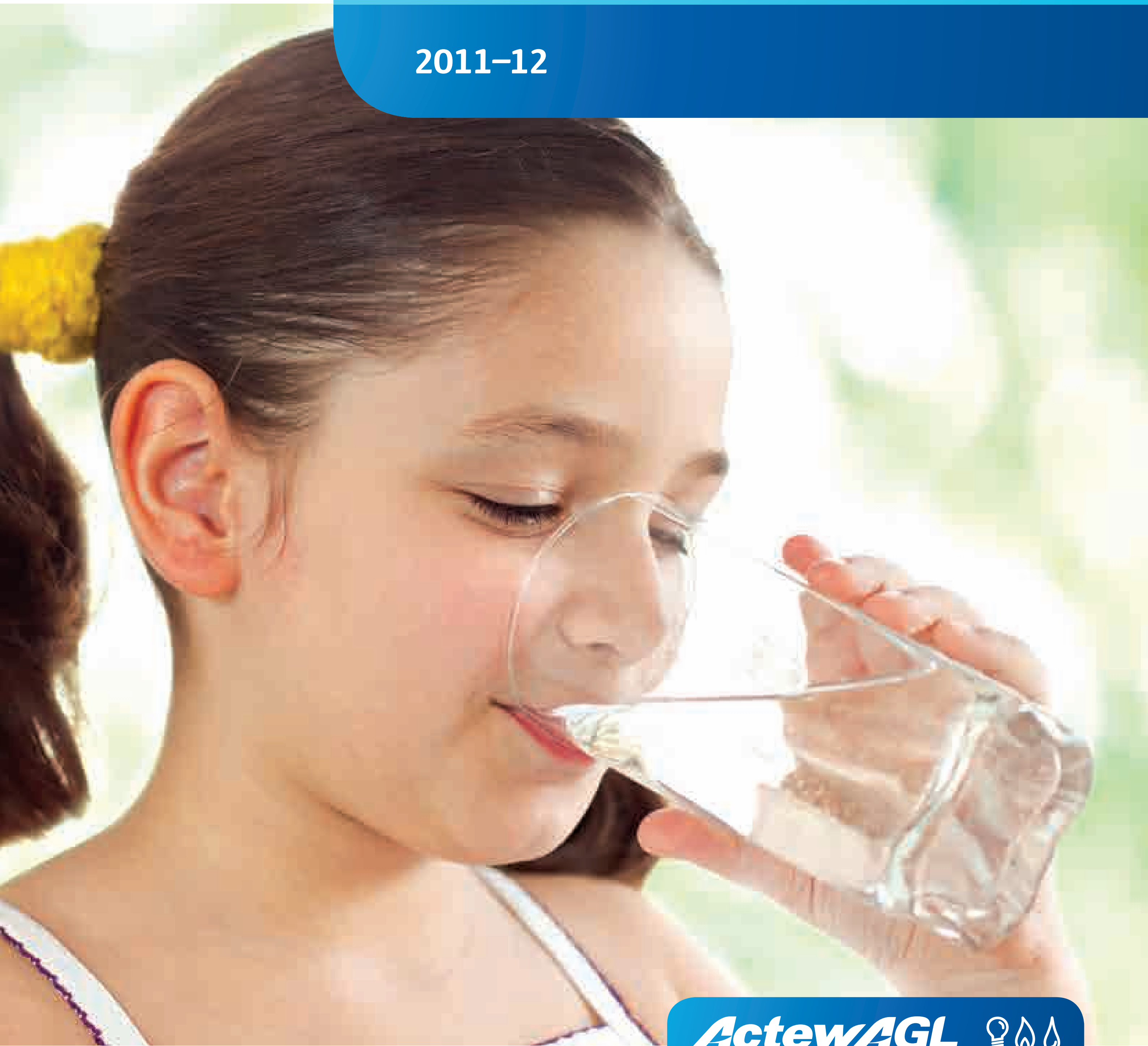
ActewAGL Annual Drinking Water Quality Report

2011–12



ActewAGL

for you

Contents

Summary

ActewAGL, on behalf of ACTEW Corporation, is committed to providing high quality water to the Canberra community. ActewAGL carries out an extensive water quality monitoring program that includes the catchments and storage reservoirs, treatment plants, service reservoirs and customers' taps. The information generated within this monitoring program assists ActewAGL in its operations and ensures that high quality water is delivered to Canberra and Queanbeyan.

During 2011–12 ActewAGL supplied 41,629 megalitres (ML) of drinking water to Canberra and Queanbeyan, representing a decrease in supply of two per cent compared to the 2010–11 period. Daily consumption ranged from a minimum of 89 ML in July 2011 to a maximum of 178 ML in January 2012. Average consumption was 276 litres per person per day.

The population of Canberra and Queanbeyan is currently increasing by approximately 1.8 per cent per year. Permanent Water Conservation Measures have been in place since November 2010. Rainfall at the Canberra Airport in 2011–12 was 23 per cent above the five-year average and total evaporation was 16 per cent below the five-year average. Reservoir storage volumes were higher at the end of 2011–12 than at the end of 2010–11 with Canberra's four storage reservoirs holding 99.3 per cent of their total capacity; this compares with 97.5 per cent of capacity at the end of June 2011.

This report covers the period of 1 July 2011 to 30 June 2012.

1. Canberra's drinking water supply system

ActewAGL relies on four storage reservoirs and the Murrumbidgee River for its drinking water supply. The Cotter River catchment to the south-west of Canberra has an area of 480 square kilometres (km^2) and forms a major part of Canberra's water supply. The Cotter River contains three storage reservoirs – Corin (70.9 gigalitres (GL)), Bendora (11.5 GL) and Cotter (3.9 GL). The majority of the catchment is within the Namadgi National Park and is protected from human and domestic animal activities and faecal contamination, as well as other pollutants associated with urban development.

The Queanbeyan River catchment, with an area of 873 km^2, contains the Googong reservoir (121.5 GL). This catchment, located to the south-east of Canberra, contains both developed and impacted land, which includes forestry reserves, rural pasture and rural residential properties. NSW state agencies and local government councils regulate land planning and manage activities in this catchment. Parks and Conservation Services (PCS) manage the immediate area around the Googong reservoir and recreational access to the water body and foreshore.

Water from the Murrumbidgee River is blended with water from Cotter and Bendora reservoirs for treatment. The Murrumbidgee catchment area of 6,826 km^2 is located to the south of Canberra and includes a wide variety of agricultural land uses, as well as the towns of Cooma, Numeralla, Bredbo and the suburbs of Tuggeranong.

ActewAGL operates two water treatment plants (WTP), Mount Stromlo WTP to the west of the city of Canberra and Googong WTP to the east. Mount Stromlo WTP receives water from the Cotter and Murrumbidgee catchments for treatment, while Googong WTP treats water from the Googong reservoir.

Treated water is delivered to customers through 47 service reservoirs, 23 pump stations and over 3,080 km of water mains. The network is operated using advanced remote monitoring and control systems.


Photo by Col Ellis

2. Managing Canberra's drinking water supply

ActewAGL applies a multiple-barrier approach throughout its operations to protect the water supply from contaminants, including pathogenic microorganisms. ActewAGL's monitoring program enables the early identification of possible points of entry of harmful microorganisms and other substances so the source can be appropriately managed and the risk eliminated.

The drinking water supply barriers include the following.

- Source water protection to reduce contamination risks to water sources.
- Pre-treatment in storage reservoirs through detention and settling of contaminants.
- Selective abstraction to ensure that raw water quality is appropriate for treatment.
- Enhanced water treatment capabilities.
- Disinfection of treated water before it enters the distribution system.
- Maintenance of a disinfection residual in treated water throughout the distribution system.
- Securing the distribution system against possible re-contamination.

ActewAGL's water quality monitoring program measures physical, chemical and microbiological parameters of the water supplied to customers. The water quality testing results are verified with the recommended levels in the *Australian Drinking Water Guidelines* (2004) (ADWG).

The ADWG establish the multiple-barrier approach as a fundamental principle in ensuring safe drinking water quality. The ADWG state the following.

"The drinking water system must have, and continuously maintain, robust multiple barriers appropriate to the level of potential contamination facing the raw water supply."

ActewAGL's International Standards-based (ISO 9001) quality system to help manage the risks to drinking water quality. In 2011–12, ActewAGL maintained the independent HACCP certification, ensuring that the management of Canberra's drinking water quality is undergoing continuous evaluation and improvement.

Management framework

On 1 July 2012 ACTEW, to be known as ACTEW Water, will assume direct responsibility from ActewAGL for the management and operation of the water and sewerage network.

Prior to 1 July 2012 ActewAGL operated the water supply system and supplied water to the Canberra region under a contractual arrangement with ACTEW Corporation Ltd (ACTEW) which owns the ACT's water and wastewater assets.

ACTEW also holds the Drinking Water Utilities Licence issued by ACT Health under the *Public Health Act 1997* and the Utilities Service Licence issued by Independent Competition and Regulatory Commission (ICRC) under the *Utilities Act 2000* (ACT). These licences allow ACTEW to operate a drinking water distribution and supply service. The contract between ACTEW and ActewAGL requires that drinking water be supplied in accordance with the Drinking Water Utilities Licence, the Utilities Service Licence, the ACT *Drinking Water Code of Practice* (2007) (DWCoP) and the ADWG.

ActewAGL operates the water supply system under an Integrated Management System to meet quality, environmental, regulatory and occupational health and safety requirements. This system is third-party certified and audited and complies with Australian and international standards AS/NZS ISO 9001, AS/NZS ISO 14001, AS4801 and Codex Alimentarius Alinorm 97/13a. ActewAGL uses a preventive management approach to ensure the risks to water quality are minimised. A key component is a Hazard Analysis and Critical Control Point (HACCP) system which covers water production from the catchment to the customer's tap. The externally certified HACCP system is designed specifically to suit the water supply process and enhance the organisation's ability to meet the challenges of managing drinking water quality from the catchment to the tap. HACCP works with ActewAGL's International Standards-based (ISO 9001) quality system to help manage the risks to drinking water quality. In 2011–12, ActewAGL maintained the independent HACCP certification, ensuring that the management of Canberra's drinking water quality is undergoing continuous evaluation and improvement.

The Integrated Management System incorporates HACCP, quality, environmental and occupational health and safety requirements, and contains procedures, processes and work instructions for operating and managing the water and sewerage network assets. The Integrated Management System has been under continual development and refinement as part of ActewAGL's continuous improvement program.

Photo by Col Ellis

3. Canberra's source water catchments

Canberra's source water catchments consist of Corin, Bendora and Cotter storage reservoirs on the Cotter River, Murrumbidgee River and the Googong storage reservoir on the Queanbeyan River. Rainfall in 2011–12 was 23 per cent above the five-year average with total evaporation at 16 per cent below the five-year average. Reservoir storage volumes remained high throughout the year and were at 99.3 per cent capacity at the end of June 2012. This is in comparison to the 97.5 per cent capacity held in July 2011.

Rainfall, evaporation and reservoir capacity for 2011–12

Total Rainfall (mm)	5 yr average rainfall (mm)	Evaporation (mm)	Total reservoir capacity
796	649	1346	99.3%

The Cotter River reservoirs currently have a combined capacity of 86.3 GL, which were 98.2 per cent full at the end of June 2012. During 2011–12, Bendora reservoir contributed to 86.2 per cent of total water supplied to Canberra and Queanbeyan. The enlarged Cotter Dam project progressed throughout 2011–12, and water was not abstracted from the Cotter storage reservoir during this time. The new dam will increase the capacity of the Cotter reservoir from 4 GL to 78 GL, bringing the combined capacity of the Cotter catchment to 160.4 GL.

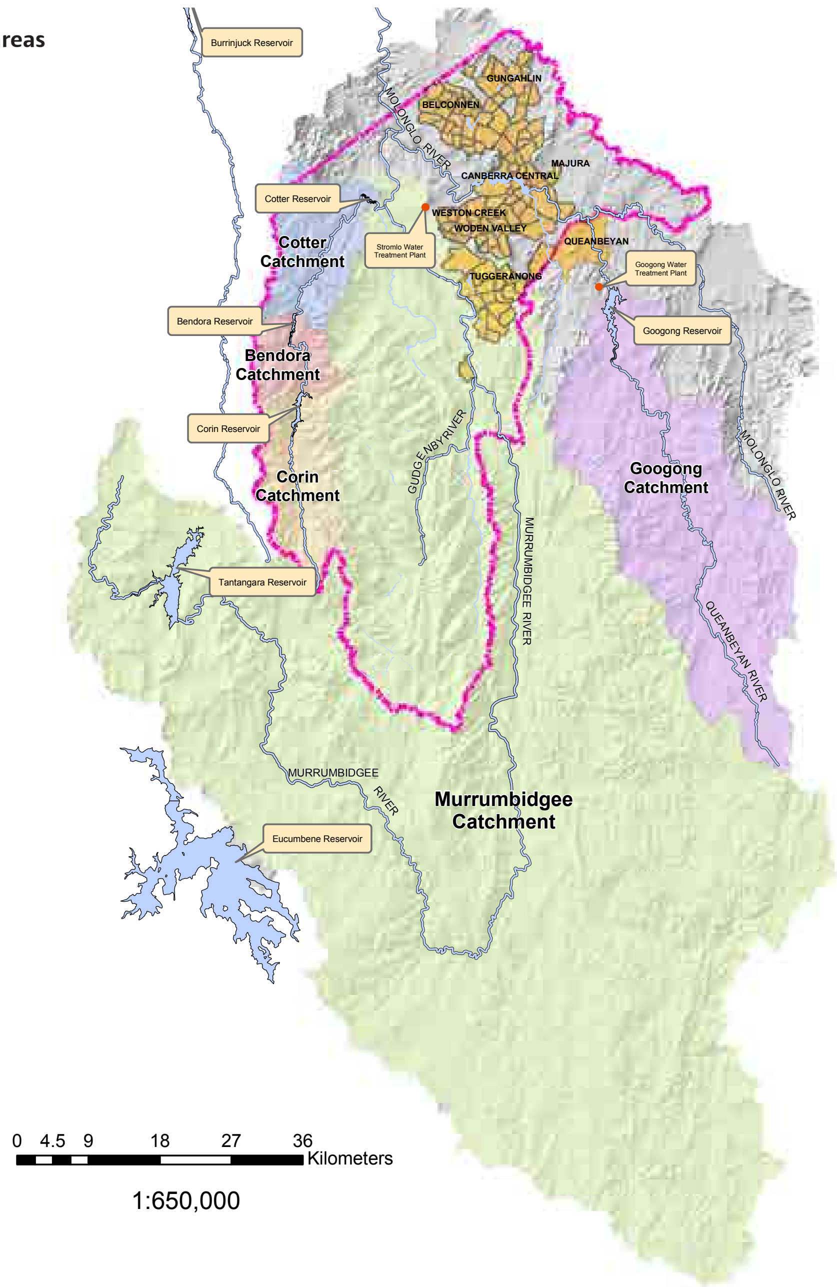
The Googong reservoir on the Queanbeyan River is currently the largest of the four water supply reservoirs. During 2011–12 Googong reservoir supplied approximately 13.8 per cent of Canberra's water. At the end of June 2012 Googong reservoir was at 100 per cent capacity.

When necessary, water may also be abstracted from the Murrumbidgee River and blended with water from the Cotter River catchment reservoirs for treatment at the Mount Stromlo WTP. During 2011–12 no water was abstracted from the Murrumbidgee River.

Source of drinking water supply for 2011–12

Cotter reservoir	Murrumbidgee River	Googong reservoir	Total abstracted
86.2%	0%	13.8%	41,790 ML

Catchment areas



Source Water Protection program

ActewAGL has adopted the ADWG recommendations to address and mitigate the contaminant hazards occurring within the catchments as a means to predict and assure the raw water quality abstracted to treatment for potable water.

The Source Water Protection program (SWPP) within ActewAGL is responsible for identifying and monitoring hazards within the catchments. The SWPP is actively involved in assessing the potential risks they present to the quality of the raw water supply and working toward reducing these risks. There are a number of opportunities available to the SWPP to achieve a reduction in risk within the catchments, in the areas of education, on ground action, grant incentives and governance.

Key objectives for the SWPP in 2011–12 included the following.

- Develop partnerships with key stakeholders in the pursuit of addressing contaminant hazards.
- Undertake on-ground works to protect water sources from potential contaminants.
- Improve community awareness of and provide capacity for the community to be involved in source water protection.

Achievements of 2011–12

In 2011–12, the SWPP continued to work towards achieving its goal to reduce the risks to raw water quality in the catchments.

Knowledge base and hazard assessment

A program to build contemporary knowledge base of hazards and physical condition of each catchment has been a central tenet of the SWPP. The information drives the decision making and prioritisation of work in the catchments to lower the risk of contamination of the source waters. During 2011–12, the SWPP focused on the Murrumbidgee River catchment upstream of Angle Crossing on the ACT and NSW border, building detailed spatial data on land use and condition of the catchment including potential hazards from pathogens, chemicals and sediment loads.

The SWPP built upon a hazard notification system that allows ActewAGL to receive regular updates from a range of stakeholders responsible for the management of potentially hazardous activities within the catchments such as broad scale pesticide use, hazard reduction burns, development applications and agrichemical policy.

In addition to hazard notification, ActewAGL continues to seek out information from community groups, the Governments and landholders working within the catchments about projects that deliver a positive contribution in the catchments. These inputs and actions contribute to ActewAGL's understanding of the overall condition of a catchment.

Education

Publishing articles and key source water protection messages in community-based and special interest newsletters is an avenue pursued by the SWPP to raise public awareness. In this period attention was focused on conveying information about the risk posed to water quality by livestock and how landholders can assist in the management of this risk.

In response to the extent of rural lands within the upper headwaters of the Googong Dam catchment, ActewAGL provided subsidised training to landholders through field days and land management courses from the NSW DPI PROfarm suite. In total, 22 properties have participated in these courses with many more people attending the field days.

Through provision of funding ActewAGL sponsored the running of three certificate level courses on the use and application of herbicides. Community volunteers, private landholders and weed management staff from both NSW and the ACT participated in this training. The focus of these courses targeted more efficient and effective use of herbicides to reduce the risk of waterway contamination.

Funding from the SWPP enabled the delivery of a seminar addressing management of impacts on horse agistment properties by a renowned technical expert. Twenty-one people representing both owners of agistment properties and those agisting their animals attended the seminar.

ActewAGL worked with the Lanyon cluster of schools contributing to teacher education and program development. The SWPP conducted four field days guiding 400 students through a tour of the treatment plant, a presentation on human impacts in the catchment and a practical water testing activity.

On ground action and response to hazards

ActewAGL upgraded hardware and electrical communications at a water gauging site at Tuggeranong Ponds overflow. This upgrade enables real time data on the overflow from the ponds into the Murrumbidgee River providing timely information on gauging the risk during periods when the Murrumbidgee River is being abstracted.

In conjunction with Greening Australia, ActewAGL commenced a program to reduce the risk of pathogen contamination to Burra Creek within the Googong catchment. Landholders are provided with incentives to support the installation of fencing on creeks where stock have direct access to and can defecate in the water. Planting in the fenced riparian zone can enhance the risk reduction achieved through fencing as the plants intercept runoff carrying faecal matter. This project is underway with eight landholders participating.

ActewAGL worked with Territory and Municipal Services (TAMS) to finalise the closure to the public thoroughfare at the Cotter River crossing on Vanity's Crossing Road. The river crossing at this point is the closest to the river and consequently bears the highest risk of contamination of the Cotter reservoir from motor vehicles. Gates and crash barriers were installed at key locations.

Funding supplied through the SWPP Grant scheme enabled the following community group activities.

- Numeralla Landcare Association removed a household rubbish tip buried in a creek channel that was being uncovered by erosion. The Landcare group removed the contaminants and put in place works to stabilise the erosion.
- Support for registration and insurance of the Southern ACT Catchment Group herbicide spray trailer enabled the trailer to be loaned to the community and landholders. Conditions of borrowing the trailer come with key source water protection requirements providing an opportunity to raise awareness of the potential of herbicides to contaminate water with the borrower at its point of use.

Cooperation

Through the SWPP relationships have been enhanced with government personnel responsible for:

a) strategies, policies and plans

b) regulation and compliance

c) monitoring and evaluation appropriate to the drinking water catchments.

ActewAGL continues to work closely with PCS to implement catchment protection elements in the Cotter, Murrumbidgee River corridor and Googong Foreshores.

The SWPP is an active participant in many catchment groups and this year contributed significantly through maintaining roles within the Southern ACT catchment Group and the management committee of the cross jurisdiction group Actions for Clean Water.

Source Water Protection plans for 2012–13

ACTEW Water, through the SWPP, will continue to pursue the objectives of this year.

Hazard management projects in progress will be finalised. Evaluation of these projects will inform future plans. The SWPP will continue to explore options and solutions that will achieve a reduction in the risk of contamination.

Subsidised training for rural landholders of NSW and ACT residing within the drinking water catchments will be provided to promote land management practices which protect water quality.

ACTEW Water will continue to operate a grant scheme to support community projects in hazard mitigation, education, awareness raising, training and capacity building to deliver key source water messages.

Work will continue through the existing governance structures to enhance collaboration on projects and programs, which reduce the hazards to water quality with ACT and NSW local governments.

Over the long term the SWPP will strengthen its understanding of the risk to water quality associated with population growth within Canberra and the ACT region.

Water quality in the raw water sources

ActewAGL undertakes an extensive sampling and analysis program, monitoring water quality in the storage reservoirs and the Murrumbidgee River. The program, which is developed in consultation with ACT Health, is continuously reviewed and managed to ensure it incorporates changes to the supply system and covers emerging issues in drinking water supply management.

The raw water storage reservoirs assist to stabilise water quality through detention and settling of contaminants, although there are times when high inflows stir-up sediments or currents mix the reservoirs. Water offtakes at approximately three metre intervals in each of the reservoirs enable the most suitable quality water to be abstracted for treatment.

Blue-green algae in the reservoirs

Blue-green algae occurs naturally in water bodies, however when conditions are favourable, they grow into excessive numbers termed blooms. Blue-green algae blooms of *Anabaena circinalis* and *Microcystis aeruginosa* can produce taste and odour compounds and toxins that are dangerous to humans and animals.

ActewAGL carries out regular monitoring of blue-green algae in all the raw water sources. The extent and frequency of monitoring varies with the seasons, as algal blooms are generally at their peak in the warmer months of the year. Agriculture and other development in the Googong and Murrumbidgee catchments increase the nutrient levels in the waterways making these raw water sources more susceptible to algal blooms.

ACT Health is consulted if elevated levels of blue-green algae are detected and the regular monitoring program is expanded. Management options available during blue-green algal blooms include selective depth abstraction of water for treatment, additional treatment (Googong WTP) and changing water sources.

In the warmer months of 2011–12 concentrations of blue-green algae in the Googong reservoir were elevated. Due to high storage volumes in the Cotter River reservoirs and low consumption, Googong WTP was not operated whilst blue-green algae levels were elevated. Taste and odour compound testing was carried out, as was testing for blue-green algae toxins, with none detected.

Pesticide and herbicide monitoring in drinking water supplies

Extensive monitoring for pesticides and herbicides is undertaken in all drinking water sources. Monitoring results from the four storage reservoirs and Murrumbidgee River did not return positive results for pesticides or herbicides during 2011–12.

ActewAGL is working hard with landholders, PCS and spraying contractors to increase the awareness of the risks to the aquatic environment and to drinking water through pesticide spraying within source water catchments. ActewAGL regularly consults with PCS who manage weed control within the catchments, to ensure the risks to water quality are monitored and controlled effectively.

Parameters monitored in raw water sources

Physicochemical	Chemical	Biological
Temperature	pH	Total coliforms
Conductivity	Dissolved oxygen	*E.coli*
Turbidity	Total and dissolved organic carbon	Heterotrophic bacteria
Alkalinity	Nitrogen incl. oxidised N and ammonia	Phytoplankton incl. blue-green algae
Colour	Phosphorus incl. phosphate	*Cryptosporidium and Giardia*
UV absorbance	Chlorophyll-a	
	Total and dissolved metals	
	Herbicides and pesticides	
	Polyaromatic hydrocarbons	

4. Securing Canberra's drinking water supply

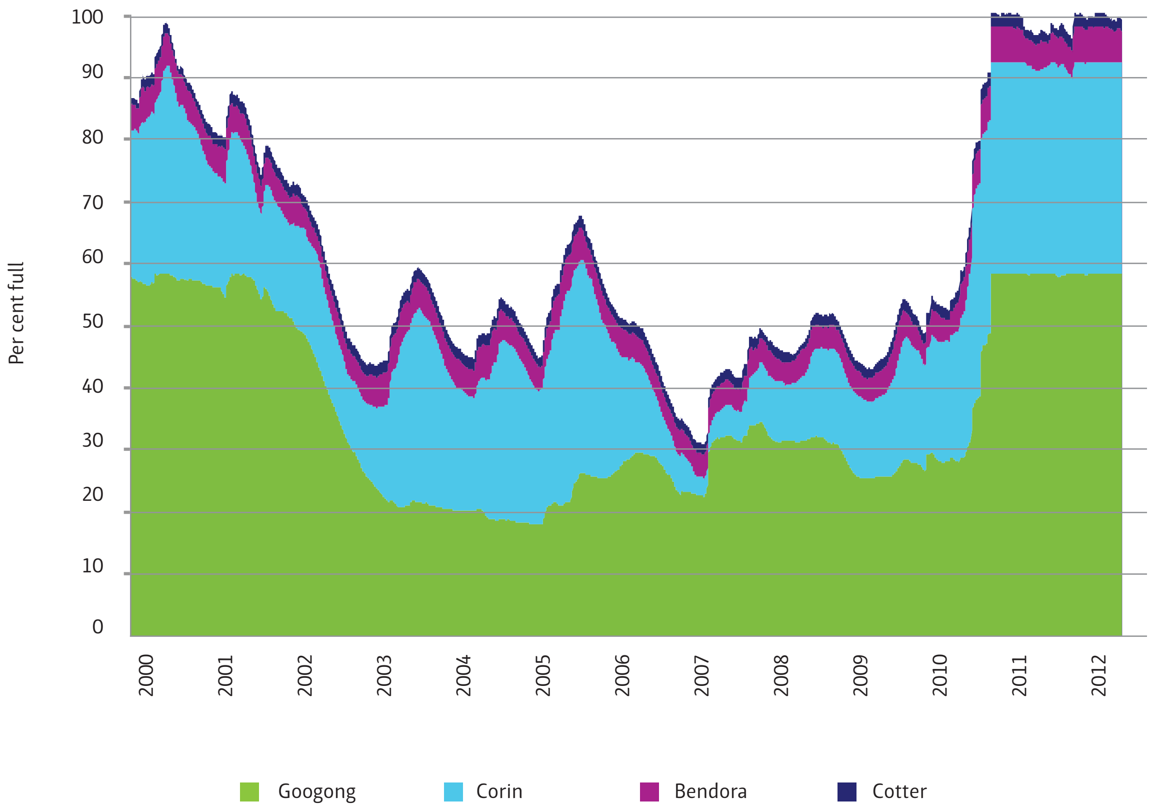
During 2011–12, higher then average rainfall resulted in continued high volumes in the ACT's storage reservoirs. As of 30 June 2012 storage reservoir volumes were at 99.3 per cent.

Reservoir storage levels at 30 June 2012

Corin reservoir	Bendora reservoir	Cotter reservoir	Googong reservoir
100%	86.8%	100%	100%

ActewAGL supplied 41,790 ML of drinking water to Canberra and Queanbeyan during 2011–12, representing a decrease in supply of two per cent compared to the 2010–11 period. The most recent estimates put Canberra's population at 370,729 and Queanbeyan at 41,686, representing an increase of approximately two per cent since June 2011. On average, daily consumption ranged from a minimum of 89 ML in July to a maximum of 178 ML in January. Per capita consumption was 276 litres per person per day.

4.1 Reservoir storage as a percentage of the combined capacity of Corin, Bendora, Cotter and Googong dams from 2000–12.



Water security projects

ActewAGL and ACTEW continued to provide high quality drinking water to the ACT and Queanbeyan, and maintained an ongoing focus on ensuring water security, as well as addressing the issues of drought, climate change and variability.

Cotter Dam

Despite some very challenging conditions, considerable progress has been made to enlarge the Cotter Dam, with 50 metres (m) of the total 80 m constructed by 30 June 2012.

The project continued to experience delays due to above average rainfall, the most significant of which was caused by severe flooding in late February and early March 2012. This flood event resulted in a two metre high torrent of water coming over the new wall and halting construction for approximately two months.

Good progress was made on other aspects of the project, including the intake tower and the artificial fish habitat. The intake tower has now reached its full height of 65m and much of the internal fit out, including installation of the valves and pipe work, has been completed.

It is expected that the mass concrete placement for the new wall will be completed by the end of 2012. The final structural works, commissioning, site demobilisation and rehabilitation will be completed by April 2013.

The Murrumbidgee to Googong Water Transfer

Significant progress was also achieved during the year on the Murrumbidgee to Googong Water Transfer, with the installation and construction of all major infrastructure including 11.8 km of pipe, the mini-hydro turbine and generator, high lift and low lift pump stations, fish egg filtration screens, all major mechanical equipment, and earthworks and landscaping completed.

Construction of the pipeline has been completed and commissioning of the project is scheduled to conclude in August 2012.

Water restrictions

Permanent Water Conservation Measures have been in place since 1 November 2010.

The Queanbeyan City Council implemented water restrictions and conservation measures identical to the ACT program.

Photo by Col Ellis

5. Water treatment operations

ActewAGL operates two WTPs – the Mount Stromlo WTP treating water from the Cotter River catchment reservoirs and the Murrumbidgee River, and the Googong WTP treating water from Googong reservoir on the Queanbeyan River.

Under ActewAGL's HACCP-based water quality management system a number of critical control points are applied in the supply system to manage contaminants in drinking water and ensure the ACT and Queanbeyan receive high-quality water. Five of these exist in the WTP operations, highlighting the importance of the water treatment operations to the delivery of high-quality water.

In 2011–12 the Mount Stromlo WTP supplied 86.2 per cent of Canberra's water, which equates to a total of 36 GL. The Googong WTP supplied a total of 13.8 per cent or 5 GL of Canberra's water in 2011–12.

WTP operations for supply of drinking water for 2011–12

	Volume supplied	Proportion of total
Mount Stromlo	36 GL	86.2 %
Googong	5 GL	13.8%

Mount Stromlo WTP

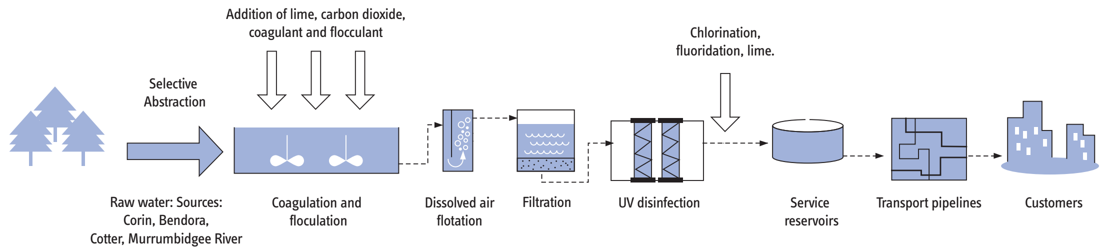
Mount Stromlo WTP has a treatment capacity of 250 ML of water per day. Treatment processes are designed to remove contaminants in drinking water and ensure that the ACT and Queanbeyan receive high-quality water. The WTP can operate in two treatment process modes – direct filtration and dissolved air flotation and filtration (DAFF). The dissolved air flotation treatment step is an optional treatment step which enhances treatment capabilities when poorer raw water quality is treated. The treatment process is listed below.

- Pre-treatment for pH adjustment and stabilisation with lime and carbon dioxide.
- Coagulation by liquid alum and a polymer coagulant aid.
- Flocculation.
- Dissolved air flotation (if enabled).
- Filtration.
- Disinfection by UV light.
- Disinfection by chlorination.
- pH adjustment and stabilisation with lime.
- Fluoridation by sodium fluorosilicate.

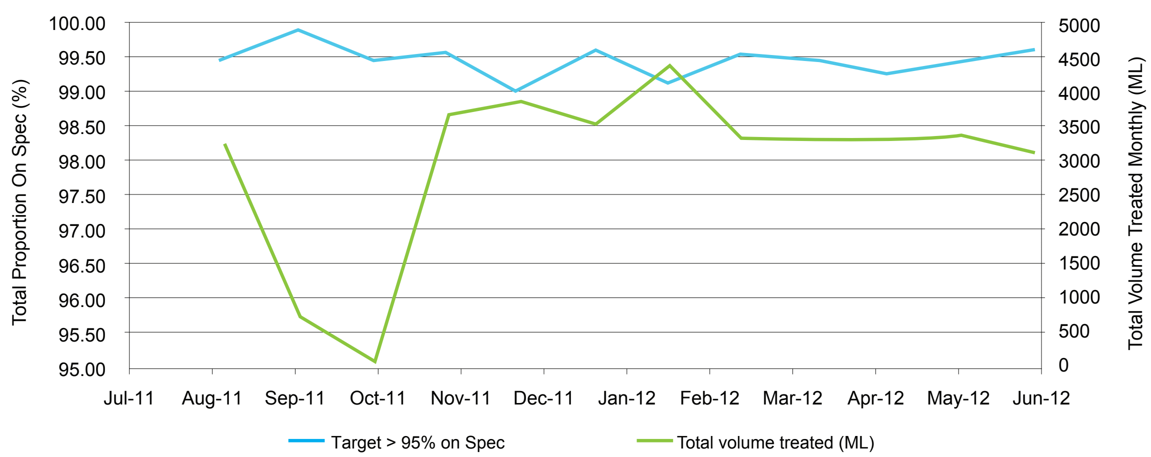
UV disinfection is used at the Mount Stromlo WTP to further reduce the risk of pathogens entering the drinking water supply. The UV system contains three parallel treatment trains, each of which have three banks of high-intensity, medium-pressure ultraviolet lamps. The quality of filtered water input to the units is monitored online and each UV reactor includes sensors to continuously measure the UV irradiance in the water to ensure that an adequate UV dose is achieved. The power of each lamp is automatically regulated to ensure the required dose is maintained based on flow rate.

The UV system continued to reliably meet performance standards greater than 95 per cent. In 2011–12, total proportion of water on specification was greater than 99 per cent (figure 5.1).

Process flow diagram of Mount Stromlo WTP.



5.1 Mount Stromlo WTP UV disinfection performance

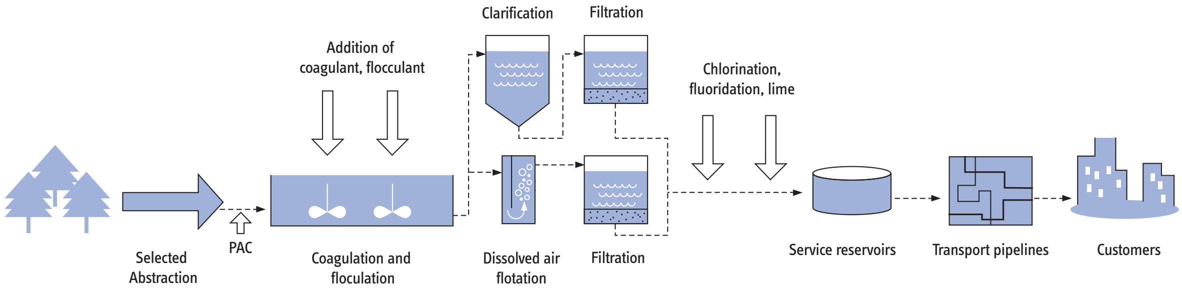


Googong WTP

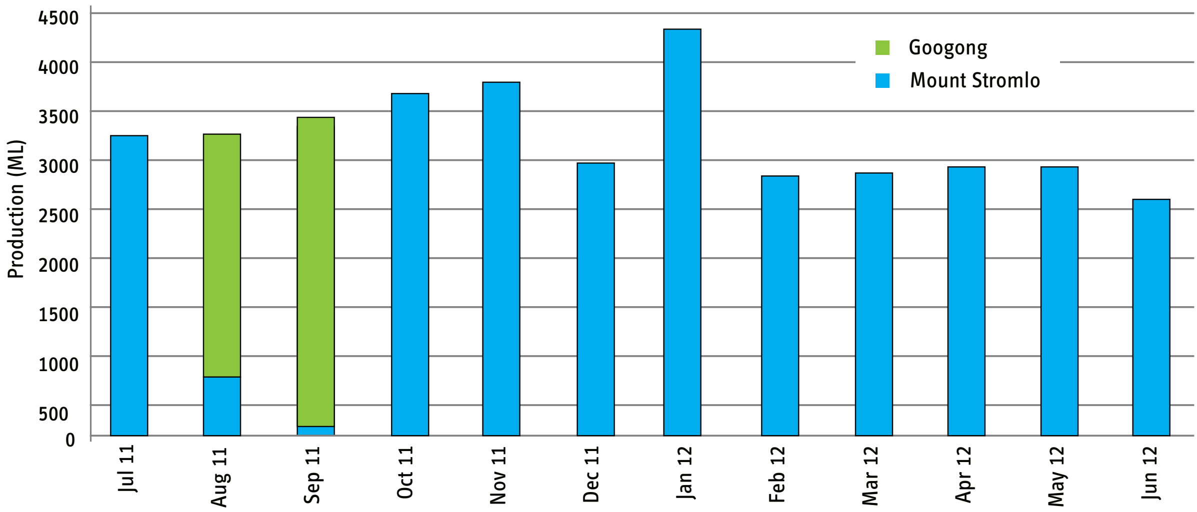
Googong WTP has a treatment capacity of 270 ML of water per day. Googong WTP continues to be used in conjunction with Mount Stromlo WTP to meet summer peak demand and enable essential maintenance works to be carried out at Mount Stromlo WTP. The treatment process is designed to eliminate contaminants in drinking water and ensure that the ACT and Queanbeyan receive high-quality water. The treatment process is listed below.

- Optional powdered-activated carbon for taste and odour compound removal, if required.
- Coagulation by liquid alum and a polymer coagulant aid.
- Flocculation.
- Dissolved air flotation and filtration (augmented plant) or clarification and filtration (original plant), depending on operational mode.
- Disinfection by chlorination.
- pH adjustment and stabilisation with lime.
- Fluoridation by sodium fluorosilicate.

Process flow diagram of Googong WTP.



5.2 Treated water production



Mount Stromlo and Googong WTP performance

Extensive monitoring of process operations are required to ensure optimum performance of the treatment plants. Online analysers enable continual monitoring of key water quality parameters, which means that changes in the raw or processed water quality are quickly identified and addressed. Chlorine, pH, turbidity, UV dose and fluoride are all monitored continuously to ensure the treatment processes are operating correctly. Regular laboratory monitoring includes analysis of *E. coli, Cryptosporidium* and *Giardia* in both untreated (raw) and treated (final) waters. Figure 5.2 shows average treated water quality values for both WTPs. The ADWG health guideline is the concentration or measure of a water quality characteristic that, based on present knowledge, does not result in any significant risk to the health of the consumer over a lifetime of consumption (ADWG).

Treated water quality during 2011-12

Parameter	ADWG Health guideline	Mount Stromlo WTP	Googong WTP
Chlorine (mg/L)			
- Free	–	1.45	1.85
- Total	5	1.48	2.04
pH*	6.5 – 8.5	7.3	7.4
Turbidity (NTU)*	5	0.30	0.67
Fluoride (mg/L)	1.5	0.85	0.76
*Cryptosporidium***	–	ND	ND
*Giardia***	–	ND	ND
E. coli (MPN/100mL)	<1	<1	<1

*aesthetic value only, no current ADWG health value; **No guideline value set; ND not detected

Chlorine disinfection

All drinking water processed by the treatment plants is disinfected using chlorine. This chemical is widely used in treatment plants throughout the world to control microbiological contaminants, such as bacteria and viruses. Chlorine is added to Canberra's water at a concentration sufficient enough to disinfect the water leaving the treatment plant and to provide a free chlorine residual that will continue to protect against contamination in the distribution network. The ADWG health guideline is 5 mg/L and the aesthetic value is 0.6 mg/L, which is based on an odour threshold. Some customers are sensitive to the taste or smell of chlorine and ActewAGL endeavours to manage chlorination to optimise the concentration at the customer's tap.

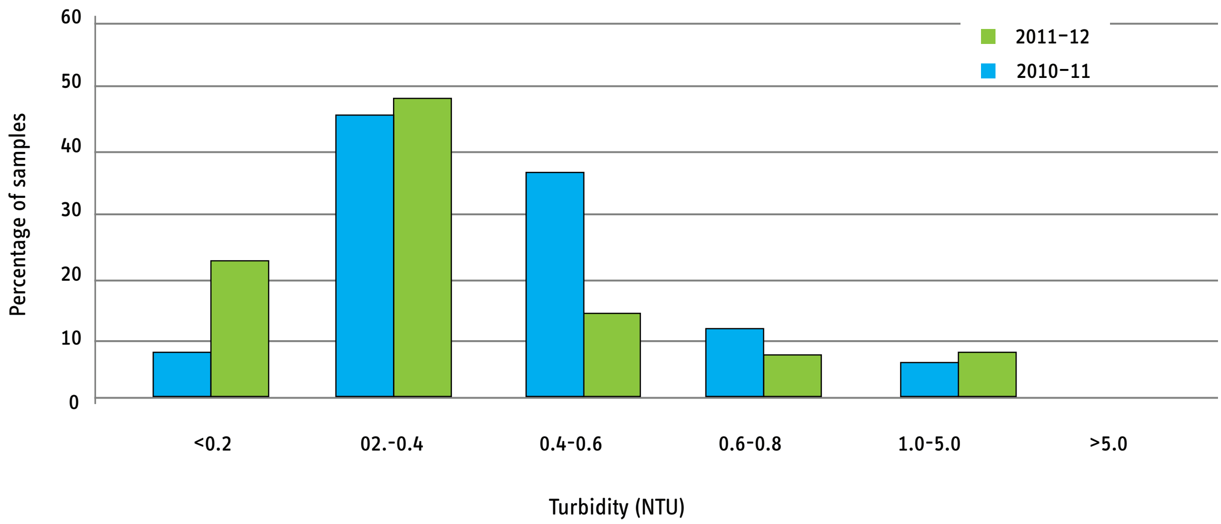
Turbidity

Turbidity is a measurement of the suspended and dissolved particulates in water. These include suspended colloidal particles, clay and silt. Water with a high level of turbidity often has a muddy or milky appearance. The ADWG does not outline a health value for turbidity, however, the aesthetic value is 5 nephelometric turbidity units (NTU) – a level of turbidity that is just noticeable in a glass of water.

The Mount Stromlo WTP is very effective at reducing the levels of turbidity in raw water. The Googong WTP has slightly different treatment capabilities and its final water has slightly higher levels of turbidity.

The distribution of turbidity results for monitoring at both WTPs is shown in figure 5.3. The turbidity readings remain below the ADWG aesthetic guideline of 5 NTU.

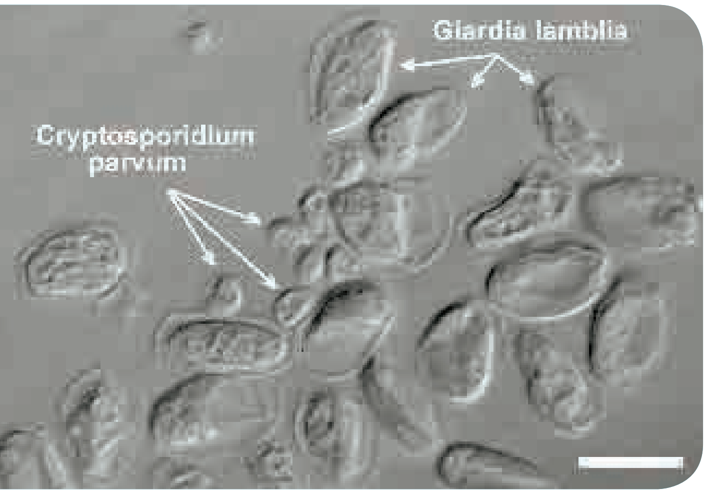
5.3 Treated water turbidity



Cryptosporidium and *Giardia*

Cryptosporidium and *Giardia* are microorganisms that can cause gastroenteritis. Infected people show either no symptoms or can suffer diarrhoea, vomiting and fever and healthy people usually recover fully. There is a background level of infection by *Cryptosporidium* and *Giardia* in the community. These naturally occurring organisms are usually spread through contact with pets, farm animals or people who are already infected.

Cryptosporidium and *Giardia*; Bar represents 1 µm



Testing methods for *Cryptosporidium* and *Giardia* are complex and if detected, it is difficult to confirm whether they are infectious to humans. ActewAGL undertakes a routine monitoring program for *Cryptosporidium* and *Giardia* at the WTPs in the raw and final treated water. All detections are reported to ACT Health, which determines the level of public risk and is responsible for informing the public if there is a health concern (see section 9 Cooperation between ACT Health and ActewAGL).

As shown in the tables below, *Cryptosporidium* and *Giardia* were not detected in any raw or final waters being treated at the WTPs.

Due to the lower levels of catchment protection and little detention time associated with the Murrumbidgee River water, frequent monitoring for *Cryptosporidium* and *Giardia* is carried out at the abstraction point. Furthermore, rainfall events can instigate additional monitoring if necessary. During 2011–12, two samples taken from the Murrumbidgee River abstraction site were positive for *Cryptosporidium*. No samples were positive for *Giardia*. The UV disinfection process at the Mount Stromlo WTP is specifically designed to target these microorganisms.

Mount Stromlo WTP – Cotter and Murrumbidgee catchment source

Test	Sample point	Number of samples	Number samples positive
Cryptosporidium	Bendora raw water	11	0
	Final water	11	0
Giardia	Bendora raw water	11	0
	Final water	11	0

Googong WTP – Queanbeyan River catchment source

Test	Sample point	Number of samples	Number samples positive
Cryptosporidium	Raw water	1	0
	Final water	2	0
Giardia	Raw water	2	0
	Final water	2	0

Murrumbidgee River water

Test	Sample point	Number of samples	Number samples positive
Cryptosporidium	Murrumbidgee raw water	17	2
Giardia	Murrumbidgee raw water	17	0

Fluoride

The Drinking Water Utility Licence, issued by ACT Health, requires that *fluoride is added to the ACT's drinking water network at a concentration between 0.6 and 1.1 mg/L of drinking water.* "The aim of water fluoridation is the adjustment of the natural fluoride concentration in fluoride deficient water to that recommended for optimal dental health" (NHMRC 2007). In 2011–12 fluoride concentrations were maintained in the treated water at an average of 0.8 mg/L.

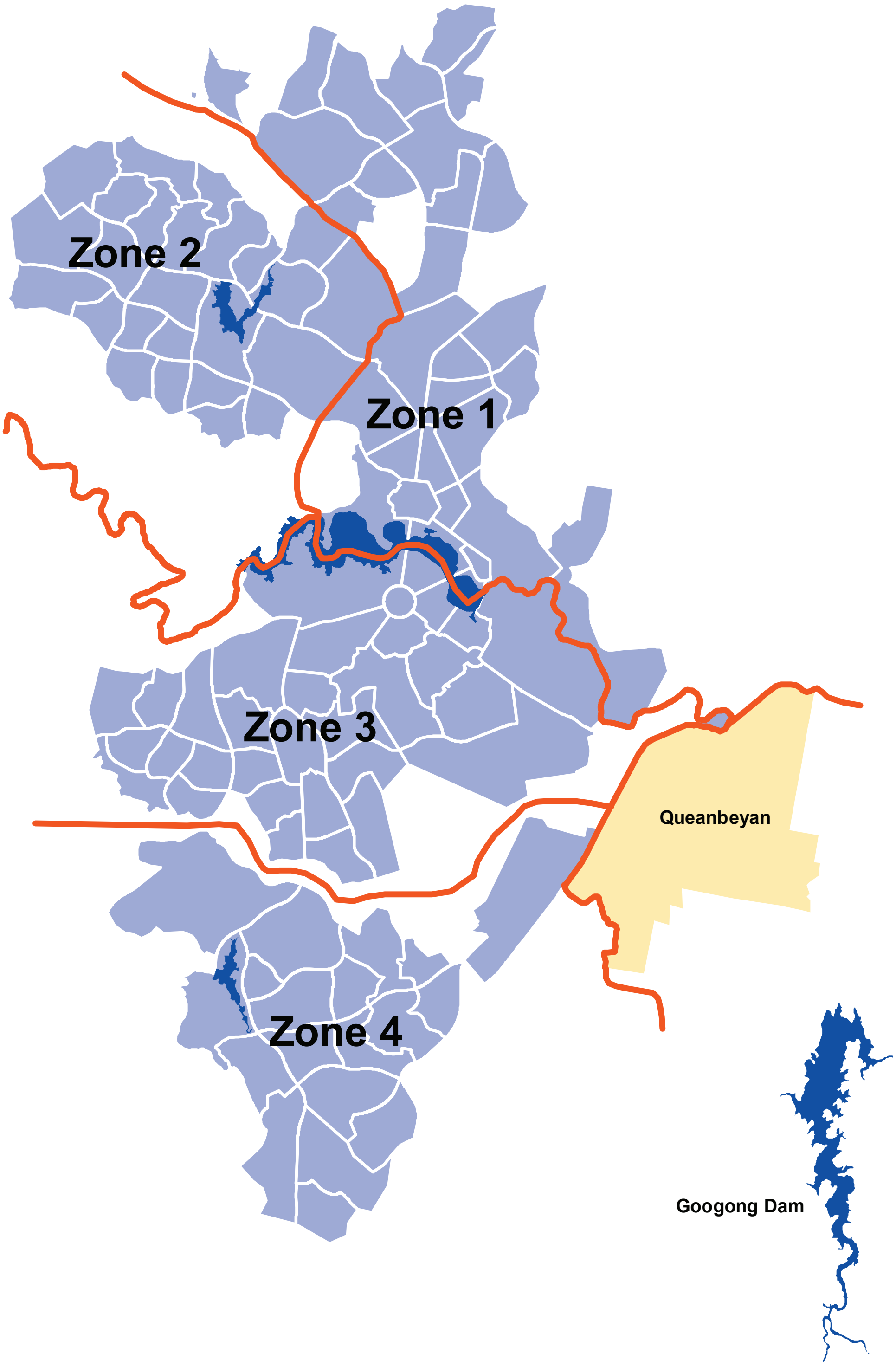
6. The distribution system

The drinking water distribution system is operated with a number of physical and disinfection barriers in place to minimise the potential for contamination of the water. Sewerage mains are generally buried deeper than the water network, minimising the risk of contamination through groundwater. The positive pressure in the water mains is an effective barrier, preventing contaminants entering the network. Additionally, backflow prevention devices are installed at customer supply points to protect against contaminants entering the network.

ActewAGL maintains a free residual chlorine concentration in the water distribution network to protect against microbiological contamination of the water between the WTP and the customer's tap.

The Canberra distribution system is divided into four water quality zones:

- water quality zone 1 – north Canberra and Gungahlin
- water quality zone 2 – Belconnen
- water quality zone 3 – south Canberra, Woden and Weston Creek
- water quality zone 4 – Tuggeranong



Distribution service reservoirs

In 2011–12, ActewAGL operated 47 service reservoirs located throughout the city. These reservoirs receive water from the WTPs via bulk supply and trunk mains and provide storage for between 450 ML and 680 ML of water depending on demand. All Canberra service reservoirs are secure structures to ensure the integrity of the supply system is maintained and to prevent contamination from birds and other animals. Regular inspections are carried out to assess their external condition and the security of the site. Reservoir cleaning is also routinely undertaken every five years, during which the reservoir is emptied, cleaned and inspected internally.

Frequent water quality monitoring occurs at each reservoir which includes the parameters, total coliforms and *E.coli*, heterotrophic bacteria, temperature and chlorine concentrations to verify that the water quality complies with ADWG and to optimise system operations.

Service reservoirs monitoring

	No. of Samples
E.coli	776
Total Coliforms	776
Heterotrophic bacteria	768
Temperature	768
Free Chlorine	766

Water quality at customers' taps

Ensuring that high-quality water is delivered to customers is a priority to ActewAGL. A comprehensive routine water quality monitoring program based on the ADWG verifies water quality throughout the distribution system. Each month 84 random customer garden taps are monitored from a pool of over 320 sites throughout Canberra suburbs, representing the four water quality zones. Garden taps are used as they are easily accessible, provide static sample points in the distribution system allowing historical data acquisition, and they enable verification of the actual water received by customers.

Customer taps monitoring

Physicochemical	Chemical	Biological
Temperature	pH	Total coliforms
Conductivity	Chlorine	*E.coli*
Turbidity	Fluoride	Heterotrophic bacteria
Alkalinity	Hardness	Phytoplankton incl. blue-green algae
Colour	Metals	Cryptosporidium and Giardia
Total dissolved solids	Trihalomethanes	
	Plasticisers	
	Polycyclic aromatic hydrocarbons	
	Haloacetic acids	

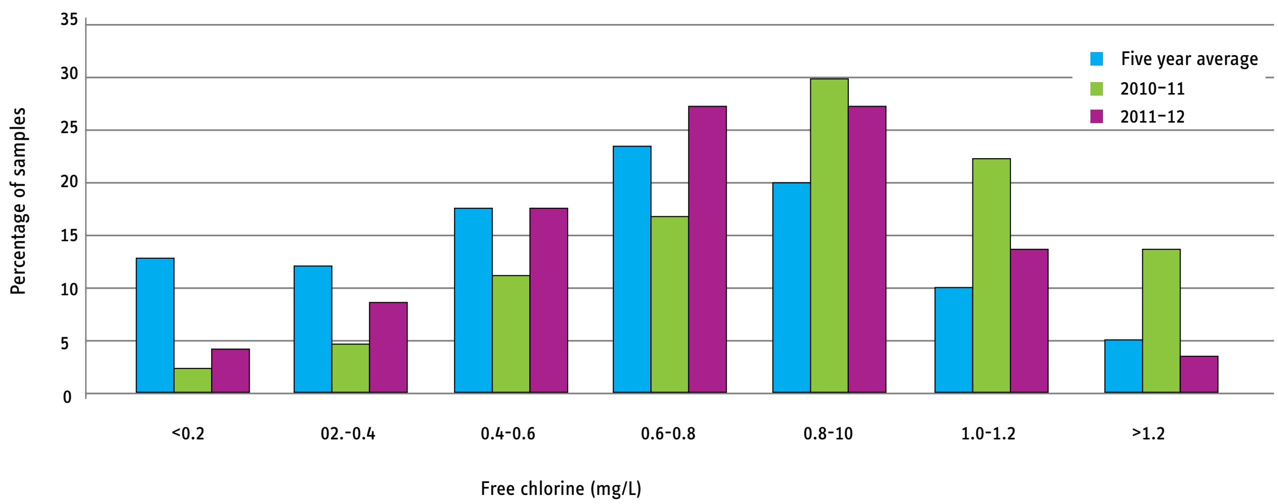
Disinfection in the distribution system

Chlorine is added to water in the final stages of treatment at the Mount Stromlo and Googong WTPs. Water entering the distribution system needs to contain an appropriate free chlorine concentration, termed 'disinfection residual', when delivered to customers' taps. This ensures that chlorine continues to provide protection against microbiological contamination in the distribution network. Chlorine and bacterial levels are frequently monitored in the distribution system.

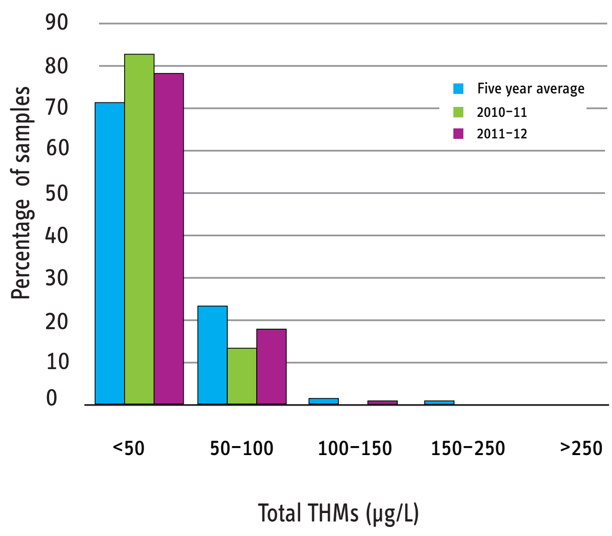
The concentrations of free chlorine at customers' taps in 2011–12 were predominantly between 0.4 and 1.0 mg/L (see figure 6.1). The ADWG's health guideline level is well above this at 5 mg/L; however, the ADWG has an aesthetic guideline of 0.6 mg/L, which is based on an odour threshold. Some customers may be able to detect chlorine at lower concentrations. As the concentration of chlorine is relied upon to preserve water quality through the distribution system, maintenance of chlorine residual in drinking water is a high priority.

While chlorine protects against microbiological contamination, it also reacts with naturally occurring organic matter to form a range of undesirable organic compounds including trihalomethanes (THMs). The ADWG states that total THMs should not exceed 0.25 mg/L and although system performance should encourage a reduction in THMs, disinfection should not be compromised, as non-disinfected water poses a significantly greater public health risk. High THM concentrations may indicate the presence of other chlorination by-products. The distribution of THM results for 2011–12 are shown in figure 6.2. The typical THM levels in Canberra's drinking water remain well below ADWG levels.

6.1 Chlorine residual concentration at customers' taps



6.2 THMs at customers' taps

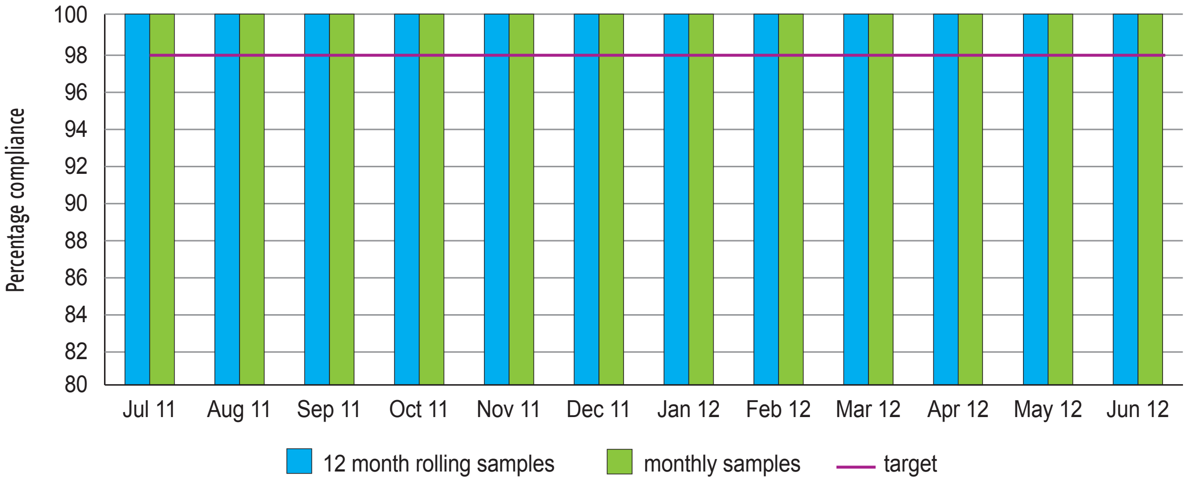


Microbiological contamination of drinking water

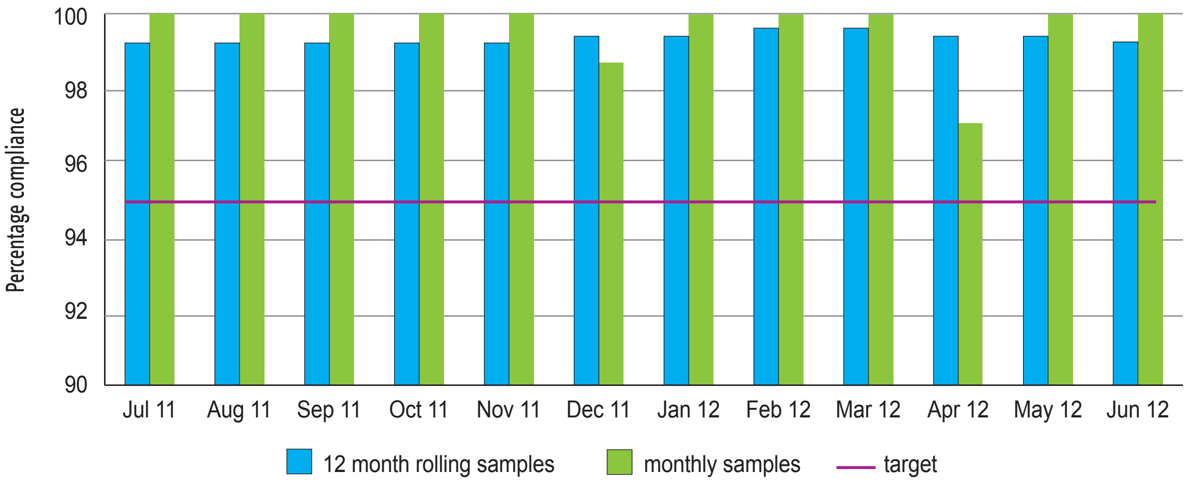
The biggest risk to drinking water is microbiological contaminants. The treatment process is designed to remove the microbiological contaminants that may be present in raw water sources. The faecal indicator bacteria *E. coli* is used to determine whether potential faecal contamination has occurred. If *E. coli* is present in drinking water, it may suggest that enteric pathogenic microorganisms are present.

The ADWG suggest that at least 98 per cent of scheduled samples contain no *E. coli.* During 2011–12, 100 per cent of samples returned no detections of *E. coli.* This equates to no sample containing *E.coli* out of a total of 978 samples, see figure 6.3.

6.3 *E. coli* compliance results at customers' taps



6.4 Total coliform compliance results at customers' taps



Total coliforms are monitored within the distribution system and at customers' taps. Total coliforms are not a specific indicator group for contamination as coliforms can grow naturally in water. Coliforms can be present in drinking water as a result of the presence of biofilms on surfaces, such as pipes and fixtures, or from contact with soil as a result of fractures or repair works. The presence and/or trends in total coliform numbers are used in operations as an indicator of system performance and as a forewarning of potential system problems. The recurring detection of any coliforms initiates corrective action through ActewAGL's quality system. Actions may include changing the chlorine dose at the WTPs, adjusting the operation of service reservoirs or flushing and re-chlorination where necessary.

Total coliforms are not required to be measured for compliance under the *Drinking Water Code (2007)* and no guideline is set for this group of bacteria in the ADWG. During 2011–12 total coliform results in Canberra were clear 99.4 per cent of the time. This is above ActewAGL's compliance target of 95 per cent, see figure 6.4.

Physical and chemical properties

The pH of drinking water

A pH value in the range of 6.5 to 8.5 is optimal for water supply systems. In 2011–12, 98.2 per cent of pH values measured at customer taps were within this range.

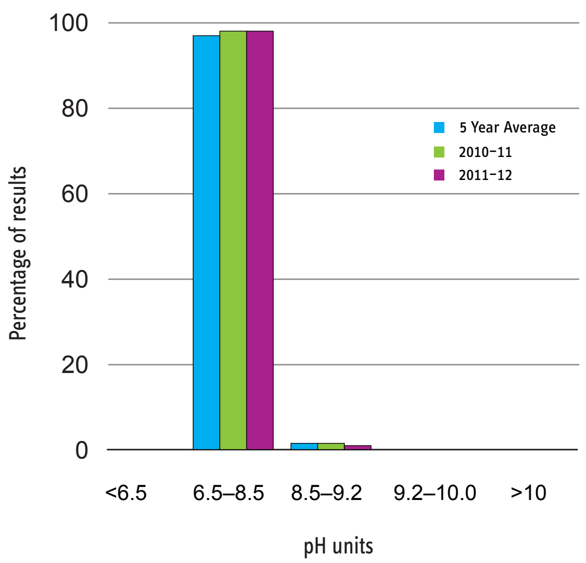
pH increases through the distribution system due to leaching of lime from cement lined pipes and concrete service reservoirs. This increase is generally proportional to the detention time of the water within the distribution network.

The control of pH within the distribution system has been enhanced by optimisation of processes at the WTPs. In particular, the improved buffering capacity of water from the upgraded Mount Stromlo WTP has continued to provide a positive impact on management of pH. The ADWG upper limit of 8.5 is set to minimise the potential for taste problems or scaling of water pipelines, however this is not of particular concern in Canberra due to the low mineral content of the drinking water.

Chlorine disinfection is also affected by pH. As pH increases the disinfection potential of chlorine decreases. However, as pH decreases the corrosion potential of the water increases, which may lead to increased levels of contaminants, for example, heavy metal, in the water and damage to assets. It is therefore necessary to balance pH in the network to minimise corrosion while ensuring effective disinfection is maintained. The ADWG advises that *"Chlorine disinfection efficiency is impaired above pH 8.0…"*. When high pH is detected in the customer tap sampling program the chlorine and microbiological results are reviewed to identify the appropriate corrective action to be taken. Generally the initial response is to review the supply path and if practical alter the operating level of the reservoir to reduce the detention time of the water in the network.

The distribution of pH results from monitoring at customers' taps is shown below.

6.5 pH levels recorded at customers' taps



Colour

Colour is mainly present in the water because of a range of natural organic compounds – from small hydrophilic acids, proteins and amino acids to larger humic and fulvic acids. These substances originate from organic matter through, or over which, the water has passed. The ADWG does not outline a health value, however, the aesthetic guideline for true colour is based on what is just noticeable in a glass of water.

Results are reported in platinum-cobalt units (Pt-Co), and the aesthetic guideline is 15 Pt-Co.

True colour results at customer taps for 2011–12 ranged from below analytical reporting limits (<1.0 Pt-Co units) to 5.0 Pt-Co units, with an average result of <1.0 Pt-Co units.

Turbidity

Turbidity is a measurement of the suspended and dissolved particulates in water. The ADWG does not outline a health value, however the aesthetic value is 5 nephelometric units (NTU) – a level of turbidity that is just noticeable in a glass.

The distribution of turbidity results for customer taps is shown in figure 6.6. Results for the period of 2011–12 for turbidity at customer taps ranged from 0.11 to 4.2 NTU with an average result of 0.3 NTU.

Iron

The ADWG aesthetic guideline value for iron is 0.3 mg/L, which is based on the taste threshold in water. The ADWG states that *"Insufficient data are available to determine a health-based guideline value for iron in drinking water"*. Iron is typically present in the water supply from the corrosion of iron or steel pipes or other components of the plumbing system.

Results for the period 2011–12 for iron concentrations at customer taps ranged from below analytical reporting limits (<0.02 mg/L) to 0.2 mg/L with an average result of <0.02 mg/L.

Manganese

Water percolating through soil and rocks can dissolve minerals that contain manganese. The ADWG health guideline value for manganese is 0.5 mg/L. Levels above the ADWG aesthetic guideline level of 0.1 mg/L, can cause undesirable taste and staining of clothes during washing. At concentrations above 0.1 mg/L manganese can also contribute to the formation of biofilms on the insides of pipes, which may detach during high flows and appear as black particles.

Results in 2011–12 for manganese monitoring at customer taps ranged from <0.001 mg/L to 0.12 mg/L with the average result being 0.004 mg/L.

Copper

Copper is found naturally in water, generally in low concentrations. Drinking water from customers' taps may contain higher levels of copper if the water has been in contact with copper plumbing and fixtures containing copper. Sometimes copper levels may increase if water remains stagnant in the plumbing system for long periods. Water that contains a high level of copper often has a blue/green appearance.

The ADWG sets an aesthetic limit of 1 mg/L for copper based on the potential for staining. The average copper value should not exceed 2 mg/L for health considerations. The guidelines state that *"Water that has been in stagnant contact (six hours or more) with copper pipes and fittings should not be used in the preparation of food and drink."*

Results in 2011–12 for copper monitoring at customer taps ranged from <0.001 mg/L to 0.22 mg/L with an average concentration of 0.024 mg/L.

7. Common water quality problems

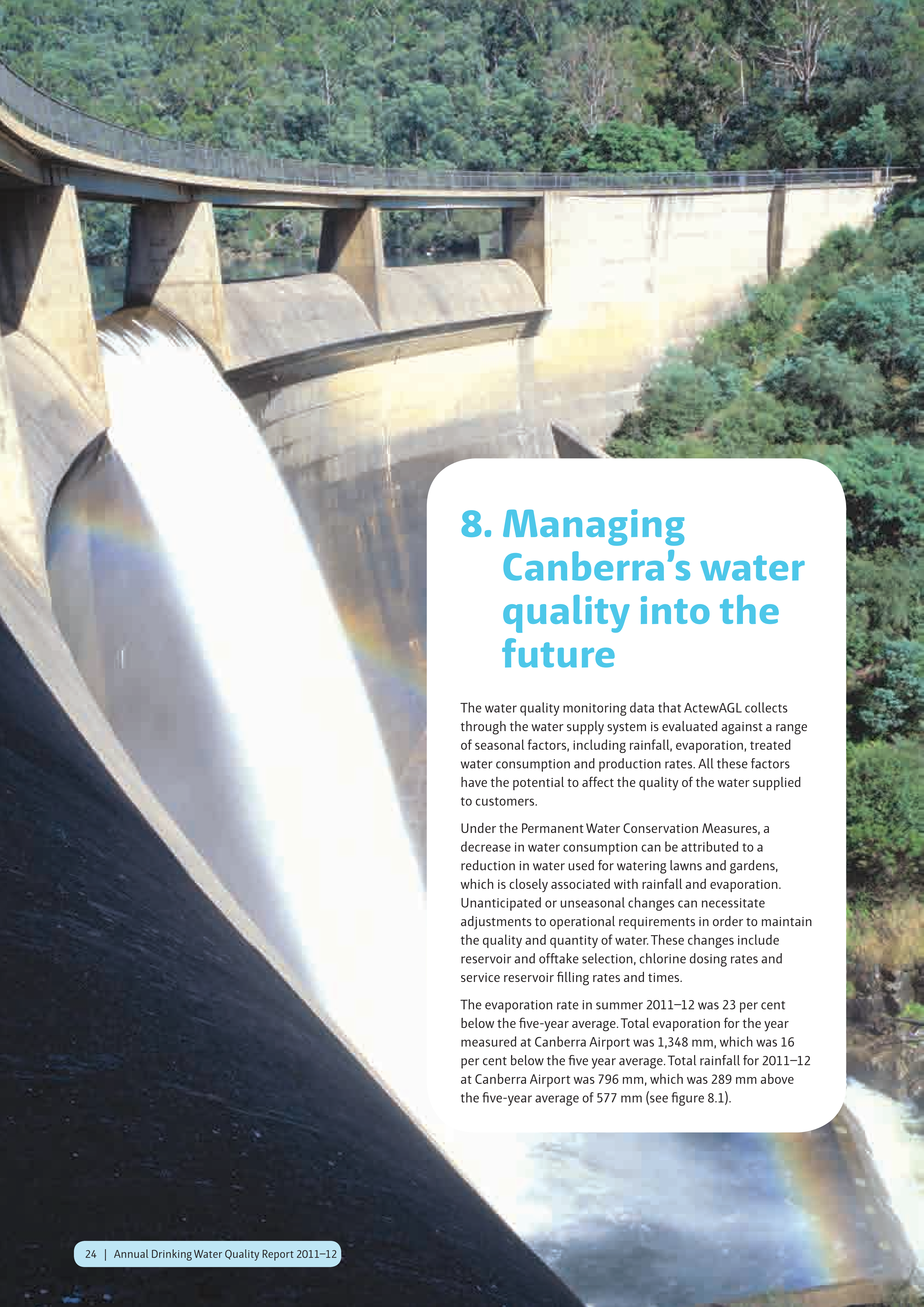
ActewAGL supplies water to 153,916 households in the ACT. Occasionally customers experience problems with the quality of their water supply and contact ActewAGL for advice. Each enquiry or complaint received by ActewAGL is investigated to determine the likely cause and, if required, corrective actions are taken. Enquiries and complaints are recorded along with the actions taken to rectify any problem.

Often issues related to water quality are short-term and may be associated with water main bursts or maintenance work being carried out on the water supply network. Valve operations required for maintenance work may reverse the direction of flow of water, causing shearing of pipe surfaces, which may result in discoloured water. Where customers are likely to be affected from maintenance activities, ActewAGL will endeavour to notify customers.

Customers are urged to contact ActewAGL if they have any questions relating to water quality. During 2011–12 a total of 131 water quality complaints were recorded across several categories as shown in the table below. This represents a decrease in the number of water quality problems registered during 2011–12.

Water quality issues

Issue	Frequency	Comments
Discoloured water	77	Discoloured water is most often associated with maintenance work or equipment failure in the system. ActewAGL's initial response is to flush the mains.
Staining	9	Deposits dislodged from domestic plumbing or from the water main can cause staining of washing or bathroom fittings. ActewAGL's initial response is to flush the mains.
White or cloudy	1	This usually presents as cloudy water resulting from air bubbles generated by flushing of the mains, hot water units or aerators on taps. If this does not clear over a short period of time the customer is invited to contact ActewAGL for further advice.
Colour other	7	Other colour issues which cannot be categorised above.
Taste	15	Taste is an aesthetic characteristic of water and varies from one customer to the next. These problems are usually short term and customers are advised to contact ActewAGL for further advice.
Customer believed water to be unsafe	6	Customer may raise concern that the water is unsafe to drink. In most cases water is tested by an independent laboratory to ensure compliance with the Australian Drinking Water Guidelines.
Blue or green water	4	Blue or green water is often associated with the corrosion of copper pipes. Miscellaneous taste enquiries are investigated individually. This also includes bitter and metallic tastes experienced by customers. These problems are usually short-term but may require further investigation.
Chlorine taste or odour	5	Chlorination is necessary for the disinfection of the water supply. Usually these enquiries relate to a change (increase or decrease) in the level of chlorine that a customer is receiving. These problems are usually aesthetic and short-term.
Odour	3	Miscellaneous odour enquires are investigated individually. These problems are usually short term.
Other	4	Issues not otherwise categorised.
TOTAL	131	



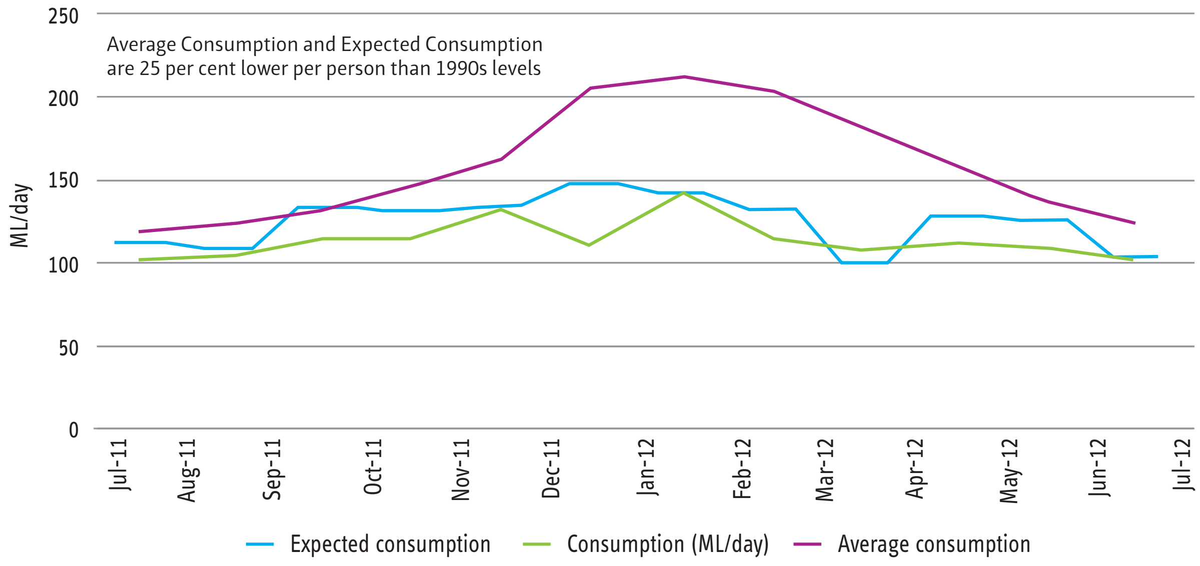
8. Managing Canberra's water quality into the future

The water quality monitoring data that ActewAGL collects through the water supply system is evaluated against a range of seasonal factors, including rainfall, evaporation, treated water consumption and production rates. All these factors have the potential to affect the quality of the water supplied to customers.

Under the Permanent Water Conservation Measures, a decrease in water consumption can be attributed to a reduction in water used for watering lawns and gardens, which is closely associated with rainfall and evaporation. Unanticipated or unseasonal changes can necessitate adjustments to operational requirements in order to maintain the quality and quantity of water. These changes include reservoir and offtake selection, chlorine dosing rates and service reservoir filling rates and times.

The evaporation rate in summer 2011–12 was 23 per cent below the five-year average. Total evaporation for the year measured at Canberra Airport was 1,348 mm, which was 16 per cent below the five year average. Total rainfall for 2011–12 at Canberra Airport was 796 mm, which was 289 mm above the five-year average of 577 mm (see figure 8.1).

8.1 Weekly water consumption for Canberra and Queanbeyan



Water quality management and improvement projects

ActewAGL is committed to the continuous improvement of water quality management practices. A number of projects are being undertaken by ActewAGL and ACTEW, covering the water supply system from the catchment to the customer's tap.

Projects from 2011–12 and those planned for 2012–13 include the following.

- **Australian Drinking Water Guidelines implementation strategy.** A revised edition of the Australian Drinking Water Guidelines was released in October 2011. This version replaces the 2004 version. ActewAGL is currently operating under the 2004 guidelines (as per the Drinking Water Utility Licence). A strategy is currently being developed to assess the implications of the new ADWG and to identify the actions required for implementation.
- **'Aquality' gap analysis and assessment.** Under the ADWG's preventative risk management approach and Framework for Management of Drinking Water Quality, and the Drinking Water Code Of Practice (2007) requirement to "take all reasonable steps to meet the requirements" of the Framework, ActewAGL is utilising the continuous improvement/gap analysis tool dubbed 'Aquality' developed by the Water Services Association of Australia (WSAA). This tool will assist with identifying gaps in the implementation of the Framework and facilitate improved water quality risk management practices.
It is anticipated that the internal audit component of the assessment will be complete by late 2012.
- **Catchment condition study.** As part of the SWPP a suite of catchment condition studies are undertaken within each catchment to monitor hazards and land use change, from which to determine the condition of the ACT drinking water catchments. Land use, water quality, erosion and land management practices were all assessed in addition to hazard identification. Information gathered from these studies is used to increase ActewAGL's understanding of the baseline condition of the catchments and target actions to mitigate hazards which may contribute to water quality decline.
- **Pathogen risk management.** A sanitary survey of all catchments commenced in 2012 to help understand the hazard distribution and potential risk of pathogen contamination to source waters. Actions to mitigate hazards for 2011–12 were focused on the Murrumbidgee River. In 2012–13 actions will be focused on the Burra Creek catchment above and below the Murrumbidgee to Googong discharge.
- **Grants and incentive program.** Funding has been made available via the SWPP to engage stakeholders to implement actions to reduce the risks of contamination to the ACT drinking water catchments. Funding is targeted to improve catchment conditions, improve water quality, promote or demonstrate best practice land management and to prevent or mitigate contamination to waterways within the drinking water catchments. The grants and incentive program is ongoing throughout the life of the SWPP and is subject to the limits of the allocated funding cap.
- **Schools education program.** Continuing on from last year, this program includes the preparation of targeted educational material for ACT schools, delivery of an in-class education program (within the ACT schools curriculum) and class excursions. Funding for an educators' role teaching primary, secondary and college students has been extended until 2013. In 2011–12, the grant has been refocused to build skills, knowledge, resources and capacity for the teaching profession to build source water protection into education sessions.

- **Online reservoir monitoring system.** This system will allow for real time water quality data to be collected from the Cotter and Googong reservoirs. The treatment of water relies heavily on water quality conditions. Conditions can change rapidly due to a number of factors and these changes may be missed by the grab sampling program. Raw water is monitored as it enters the WTP; however, this gives operators little time to respond to change. Having online monitoring at the offtake tower allows operations to respond to changing water quality prior to entry to the water treatment plant.
- **Mount Stromlo WTP enhanced coagulation control.** A feed forward coagulation control has been installed at the Mount Stromlo WTP to improve the ability for the plant to handle varying water quality. The old approach involved operators manually adjusting coagulant doses, when water quality changes were detected at the inlet channel or filters. The feed forward method uses the analyser to predict a suitable coagulant dose rate matching changing water quality. This eliminates reactive dose changes if water quality downstream deteriorates.
- **Mount Stromlo WTP filter to waste.** The Mount Stromlo WTP was designed to treat low turbidity water from Bendora reservoir and the low potential for handling higher turbidity water was not considered to warrant a filter to waste facility. The WTP is now treating differing water quality from the Cotter Dam and Murrumbidgee River. Currently the plant is running to strict turbidity limits. The filter to waste facility allows for disposal of turbid water, rather than the current option of blending the water back into the filtered water stream. The filter to waste method is current industry 'good practice' for higher turbidity waters.
- **Googong WTP fluoride dosing system upgrade.** The upgrade of the fluoride dosing system at the Googong WTP will improve the safety and reliability of the system and bring it up to the condition required in the *NSW Code of Practice for the Fluoridation of Public Water Supplies*. The project will also bring the system into line with the current work safety standards, in particular, manual handling and dust control.

Photo by Col Ellis

9. Cooperation between ACT Health and ActewAGL

In February 2007 the revised *Public Health (Drinking Water) Code of Practice 2007* (DWCoP) was issued by ACT Health. This document replaces the *Drinking Water Quality Code of Practice (2000)* and takes into account updates to the ADWG.

DWCoP sets out operational, communication, reporting and response requirements for both organisations to ensure that optimal drinking water quality is supplied to Canberra and Queanbeyan.

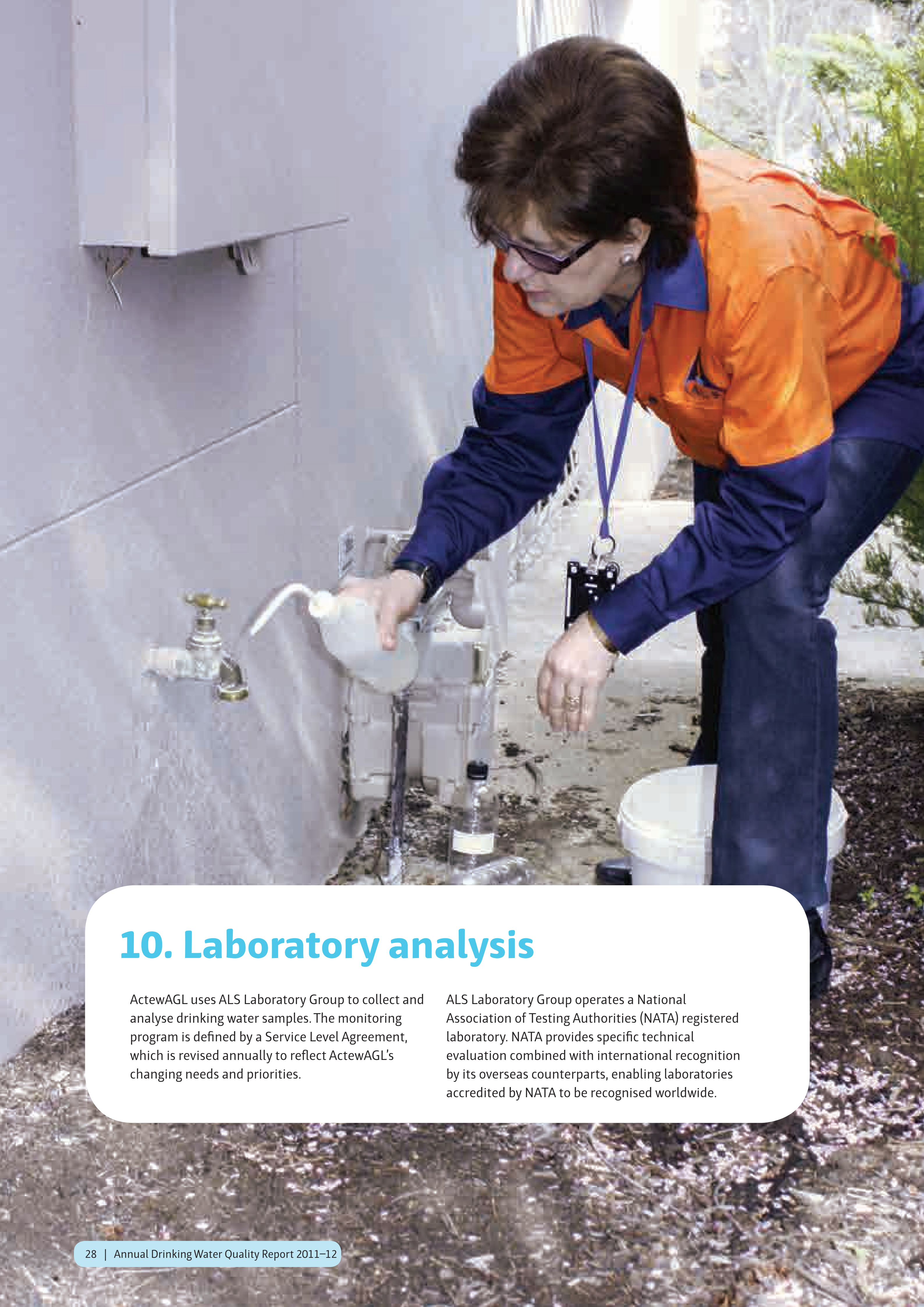
Copies of DWCoP are available from the ACT Health website at www.health.act.gov.au

Water quality notifications to ACT Health

During the year three notifications to ACT Health were issued. These notifiable incidents are captured in the table below.

Summary of the notifications and the action taken by ActewAGL.

Criteria	Date	Source	Incident
Cyanobacteria: levels exceed 2,000 cells/mL	10/01/12	Googong reservoir	Concentrations of the blue-green algae *Anabaena* had been gradually increasing prior to this detection. Googong WTP was not operating at the time of detection. Sampling frequency was increased to weekly.
Inorganic and organic chemicals with a health guideline value	13/01/12	Customer tap	Hydrocarbons (Benzene, Toluene, m&p-Xylene and o-Xylene) were detected in a kitchen tap sample following a customer complaint. Service reservoirs feeding the property and neighbouring properties were all tested to ensure the contamination was not wide spread. Further investigation revealed contaminated soil surrounding the service line to the property. The service line to the property was replaced.
	02/03/12	Customer tap	Lead was detected in a customer tap sample collected as part of the routine reticulated water monitoring program. The sample also contained higher than average turbidity (although under the ADWG health guideline). Flushing of the mains was carried out and retest returned results under ADWG health values.



10. Laboratory analysis

ActewAGL uses ALS Laboratory Group to collect and analyse drinking water samples. The monitoring program is defined by a Service Level Agreement, which is revised annually to reflect ActewAGL's changing needs and priorities.

ALS Laboratory Group operates a National Association of Testing Authorities (NATA) registered laboratory. NATA provides specific technical evaluation combined with international recognition by its overseas counterparts, enabling laboratories accredited by NATA to be recognised worldwide.

As part of its NATA registration, ALS Laboratory Group participates in regular audits and proficiency testing whereby results for identical samples are compared with other NATA-registered laboratories. The most recent NATA audits carried out in the chemistry area in December 2010 and in the biological area in September 2011 identified no accreditation non-compliance. All results for NATA proficiency testing in the past 12 months were within the acceptable statistical range.

The Canberra distribution network is divided into four water quality zones based on population, hydraulic characteristics and geography. These zones are used in ActewAGL's operations to assess the quality of drinking water supplied to the customer's taps. All data for combined zones is shown in table 10.1, along with the following.

- **Water quality zone 1** – summary data North Canberra and Gungahlin (table 10.2)
- **Water quality zone 2** – summary data Belconnen (table 10.3)
- **Water quality zone 3** – summary data South Canberra, Woden and Weston Creek (table 10.4)
- **Water quality zone 4** – summary data Tuggeranong (table 10.5)

10.1 Summary data for all ActewAGL water quality zones

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
1.2.4-Trichlorobenzene	US EPA 8270/8260	µg/L	30	<20	117	<20	<20	<20	<20
1.2-Dichlorobenzene	US EPA 8270/8260	µg/L	1500	<20	117	<20	<20	<20	<20
1.3-Dichlorobenzene	US EPA 8270/8260	µg/L	20*	<20	117	<20	<20	<20	<20
1.4-Dichlorobenzene	US EPA 8270/8260	µg/L	40	<20	117	<20	<20	<20	<20
2.3.4.6-Tetrachlorophenol	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
2.4.5-Trichlorophenol	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
2.4.6-Trichlorophenol	US EPA 8270/8260	µg/L	20	<20	117	<20	<20	<20	<20
2.4-Dichlorophenol	US EPA 8270/8260	µg/L	200	<10	117	<10	<10	<10	<10
2.4-Dimethylphenol	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
2.4-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
2.6-Dichlorophenol	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
2.6-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
2-Chloronaphthalene	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
2-Chlorophenol	US EPA 8270/8260	µg/L	300	<10	117	<10	<10	<10	<10
2-Methylnaphthalene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
2-Methylphenol	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
2-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
2-Nitrophenol	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
3.4-Methylphenol	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
3-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
4.4.-DDD	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
4.4.-DDE	US EPA 8270/8260	µg/L	20	<20	117	<20	<20	<20	<20
4.4.-DDT	US EPA 8270/8260	µg/L	20	<20	117	<20	<20	<20	<20
4-Bromophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
4-Chloro-3-methylphenol	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
4-Chloroaniline	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
4-Chlorophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
4-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
a-BHC	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Acenaphthene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Acenaphthene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Acenaphthene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Acenaphthylene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Acenaphthylene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Aldrin	US EPA 8270/8260	µg/L	0.3	<20	117	<20	<20	<20	<20
Alkalininty (Carb)	APHA 2320 A/B	mg/L	-	<0.1	237	<0.1	8.5	0.27	<0.1
Alkalinity (Bicarb)	APHA 2320 A/B	mg/L	-	<0.1	237	27.3	47.3	35.84	40.80
Alkalinity (Hydrox)	APHA 2320 A/B	mg/L	-	<0.1	237	<0.1	<0.1	<0.1	<0.1
Alkalinity (Total)	APHA 2320 A/B	mg/L	-	<1	237	27	47	36.04	41.00
Aluminium (Acid soluble)	US EPA 200.8	µg/L	200*	<5	117	<5	170	43.12	90.40
Aluminium (Total)	US EPA 200.7	mg/L	-	<0.02	117	<0.02	0.17	0.05	0.09
Aluminium (Total)	US EPA 200.8	µg/L	-	<9	117	17	170	48.03	100.40
Aniline	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Anthracene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Anthracene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Anthracene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Antimony (Total)	US EPA 200.8	µg/L	3	<3	117	<3	<3	<3	<3
Arsenic (Total)	US EPA 200.8	µg/L	7	<1	117	<1	<1	<1	<1
Asbestos	Polarised Light Microscopy	Presence/ Absence	-	N/A	118	Absent	Present	Absent #	Absent #
Azobenzene	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Barium (Total)	US EPA 200.8	µg/L	700	<0.5	117	2.3	9.3	4.27	7.82
b-BHC	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Benz(a)anthracene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Benz(a)anthracene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Benzo(a)anthracene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	US EPA 8270/8260	µg/L	0.01	<10	117	<10	<10	<10	<10
Benzo(a)pyrene	US EPA 8270	µg/L	0.01	<0.5	31	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	USEPA 3510/8270	µg/L	0.01	<0.5	90	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	USEPA 3510/8270	µg/L	-	<1	90	<0.5	<1	<1	<1
Benzo(b)fluoranthene	US EPA 8270	µg/L	-	<1	31	<1	<1	<1	<1
Benzo(b.k)fluoranthene	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Benzo(g.h.i)perylene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Benzo(g.h.i)perylene	US EPA 8270	µg/L	-	<0.5	31	<0.5	0.6	<0.5	<0.5
Benzo(g.h.i)perylene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Benzo(k) fluoranthene	USEPA 3510/8270	µg/L	-	<1	90	<0.5	<1	<1	<1
Benzo(k)fluoranthene	US EPA 8270	µg/L	-	<1	31	<1.0	<1	<1	<1
Benzyl alcohol	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Beryllium (Total)	US EPA 200.8	µg/L	-	<0.1	117	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Bis(2-chloroethyl)ether	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Bis(2-chloroisopropyl)ether	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Bis(2-ethylhexyl) phthalate	US EPA 8270/8260	µg/L	10	<20	117	<20	<20	<20	<20
Bromoacetic acid	HS/GC/MS	µg/L		<5	154	<5	<5	<5	<5
Bromochloroacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	83	<0.005	<0.005	<0.005	<0.005
Bromochloroacetic acid	HS/GC/MS	µg/L	-	<1	154	<1	3	<1	2.00

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Bromodichloroacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	83	<0.005	0.006	<0.005	0.01
Bromodichloroacetic acid	HS/GC/MS	µg/L	-	<1	154	<1	3	<1	2.00
Butyl benzyl phthalate	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Cadmium (Total)	US EPA 200.8	µg/L	2	<0.05	117	<0.05	<0.05	<0.05	<0.05
Calcium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	117	11	25	15.55	23.00
Carbazole	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	250*	<0.1	46	2.6	8.1	4.23	7.98
Chlorine residual (Combined)	APHA 4500-CL G	mg/L	5	<0.01	978	<0.01	0.41	0.06	0.16
Chlorine residual (Free)	APHA 4500-CL G	mg/L	5	<0.01	978	0.02	1.58	0.75	1.18
Chlorine residual (Total)	APHA 4500-CL G	mg/L	5	<0.01	978	0.04	1.64	0.81	1.22
Chlorpyifos	US EPA 8270/8260	µg/L	10	<20	117	<20	<20	<20	<20
Chromium (Total)	US EPA 200.8	µg/L	50	<2	117	<2	<2	<2	<2
Chrysene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Chrysene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Chrysene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Cobalt (Total)	US EPA 200.8	µg/L	-	<0.2	117	<0.2	0.3	<0.2	<0.2
Conductivity (uS/cm)	APHA 2510 B	uS/cm	-	<2	117	83	190	109.93	190.00
Copper (Total)	US EPA 200.8	µg/L	2000	<1	358	<1	220	23.76	75.15
Copper (Total)	US EPA 200.8	µg/L	2000	<1	117	2	210	20.61	69.20
d-BHC	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Diazinon	US EPA 8270/8260	µg/L	3	<20	117	<20	<20	<20	<20
Dibenz(a.h)anthracene	US EPA 8270/8260	µg/L	-	<10	117	<10	<20	<10	<10
Dibenz(a.h)anthracene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Dibenzo(a.h)anthracene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Dibenzofuran	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Dibromoacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	83	<0.005	<0.005	<0.005	<0.005
Dibromoacetic acid	HS/GC/MS	µg/L	-	<1	154	<1	2	<1	<1
Dibromochloroacetic acid	HS/GC/MS	µg/L	-	<10	154	<10	<10	<10	<10
Dichloracetic acid	USEPA SW-846 Method 8260 B	mg/L	0.1	<0.005	83	0.006	0.047	0.02	0.04
Dichloroacetic acid	HS/GC/MS	µg/L	100	<1	154	4	40	16.94	25.00
Dichlorobenzidine	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Dieldrin	US EPA 8270/8260	µg/L	0.3	<20	117	<20	<20	<20	<20
Diethyl phthalate	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Dimethoate	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Dimethyl phthalate	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Di-n-butyl phthalate	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Di-n-octyl phthalate	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
E.coli	APHA 9223 B	MPN/100mL	<1	<1	978	<1	<1	<1	<1
Endosulfan sulphate	US EPA 8270/8260	µg/L	30	<20	117	<20	<20	<20	<20
Endosulphan 1	US EPA 8270/8260	µg/L	30	<20	117	<20	<20	<20	<20
Endosulphan 11	US EPA 8270/8260	µg/L	30	<20	117	<20	<20	<20	<20
Endrin	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Endrin aldehyde	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Ethion	US EPA 8270/8260	µg/L	3	<20	117	<20	<20	<20	<20
Fenitrothion	US EPA 8270/8260	µg/L	10	<20	117	<20	<20	<20	<20

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Fluoranthene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Fluoranthene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Fluoranthene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Fluorene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Fluorene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Fluorene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Fluoride	APHA 4500-F C	mg/L	1.5	<0.05	117	0.53	0.93	0.82	0.89
g-BHC (Lindane)	US EPA 8270/8260	µg/L	20	<20	117	<20	<20	<20	<20
Hardness Tot	APHA 2340 B	mg/L	200*	<0.1	117	32	77	44.44	73.00
Heptachlor	US EPA 8270/8260	µg/L	0.3	<20	117	<20	<20	<20	<20
Heptachlorepoxide	US EPA 8270/8260	µg/L	0.3	<20	117	<20	<20	<20	<20
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	978	<1	1700	8.68	18.15
Hexachloro-1.3-butadiene	US EPA 8270/8260	µg/L	0.7	<20	117	<20	<20	<20	<20
Hexachlorobenzene	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Hexachlorocyclopentadiene	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Hexachloroethane	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Indeno(1.2.3-cd)pyrene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Indeno(1.2.3-cd)pyrene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Indino(1.2.3-cd)pyrene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Iodide	ASTM D19	mg/L	0.1	<0.05	46	<0.05	<0.05	<0.05	<0.05
Iron (Total)	US EPA 200.7	mg/L	0.3*	<0.02	237	<0.02	0.22	<0.02	0.03
Isophorone	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Lead (Total)	US EPA 200.8	µg/L	100	<0.2	120	<0.2	14	0.42	1.00
Lead (Total)	US EPA 200.8	µg/L	10	<0.2	117	<0.2	1.9	0.22	0.52
Magnesium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	117	0.73	4.2	1.37	3.90
Malathion	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Manganese (Total)	US EPA 200.7	mg/L	0.5	<0.001	475	<0.001	0.12	0.00	0.01
Manganese (Total)	US EPA 200.8	µg/L	500	<0.5	117	<0.5	32	2.76	8.52
Molybdemium (Total)	US EPA 200.8	µg/L	50	<1	117	<1	<1	<1	<1
Monobromoacetic acid	USEPA SW-846 Method 8260B	mg/L	-	<0.005	83	<0.005	<0.005	<0.005	<0.005
Monochloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.15	<0.005	83	<0.005	<0.005	<0.005	<0.005
Monochloroacetic acid	HS/GC/MS	µg/L	150	<1	154	<1	8	1.52	3.00
Naphthalene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Naphthalene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Naphthalene	USEPA 3510/8270	µg/L	-	<0.5	90	<0.5	<1	<1	<1
Nickel (Total)	US EPA 200.8	µg/L	20	<1	117	<1	3	<1	1.00
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	46	<0.1	0.3	<0.1	0.20
Nitrobenzene	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
N-Nitrosodimethylamine	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
N-Nitrosodi-n-propylamine	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
N-Nitrosodiphenylamine	US EPA 8270/8260	µg/L	-	<20	117	<20	<20	<20	<20
Pentachlorophenol	US EPA 8270/8260	µg/L	10	<20	117	<20	<20	<20	<20
pH (pH units)	APHA 4500-H B	pH Units	6.5-8.5*	<0.1	978	7	9.6	7.72	8.30
Phenanthrene	US EPA 8270/8260	µg/L	-	<10	117	<10	<10	<10	<10
Phenanthrene	US EPA 8270	µg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95^{th} Percentile
Phenanthrene	USEPA 3510/8270	μg/L	-	<0.5	90	<0.5	<1	<1	<1
Phenol	US EPA 8270/8260	μg/L	-	<10	117	<10	<10	<10	<10
Poly aromatic hydrocarbons (Total)	USEPA 3510/8270	μg/L	-	<0.5	90	<0.5	<0.5	<0.5	<0.5
Pottasium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	46	0.4	2.4	0.77	2.20
Pyrene	US EPA 8270/8260	μg/L	-	<10	117	<10	<10	<10	<10
Pyrene	US EPA 8270	μg/L	-	<0.5	31	<0.5	<0.5	<0.5	<0.5
Pyrene	USEPA 3510/8270	μg/L	-	<0.5	90	<0.5	<1	<1	<1
Selenium (Total)	US EPA 200.8	μg/L	10	<2	117	<2	<2	<2	<2
Silver (Total)	US EPA 200.8	μg/L	100	<1	117	<1	<1	<1	<1
Sodium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	46	2.4	6.9	3.47	6.50
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	500	<0.4	46	3.2	38	10.22	35.00
Temperature	APHA 2550 B	°C	-	<0.1	475	7.5	26	15.89	22.00
Total coliforms	APHA 9223 B	MPN/100mL	-	<1	978	<1	3	<1	<1
Total dissolved solids	APHA 2540 C	mg/L	500*	<20	116	26	120	71.09	120.00
Tribromoacetic acid	HS/GC/MS	μg/L		<10	154	<10	13	<10	<10
Trichloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.1	<0.005	83	0.01	0.061	0.03	0.06
Trichloroacetic acid	HS/GC/MS	μg/L	100	<1	154	11	42	23.73	33.00
Trihalomethanes (CHBr2Cl)	HP 228-135	μg/L	250	<1	237	<1	<1	<1	<1
Trihalomethanes (CHBr3)	HP 228-135	μg/L	250	<1	237	<1	<1	<1	<1
Trihalomethanes (CHBrCl2)	HP 228-135	μg/L	250	<1	237	<1	11	2.68	8.84
Trihalomethanes (CHCl3)	HP 228-135	μg/L	250	<1	237	12	96	35.14	61.20
Trihalomethanes (Total)	HP 228-135	μg/L	250	<1	237	13	110	37.78	71.00
True colour	Lachat QuikChem method, color in waters 10-308-00-1-A	Pt-Co	15*	<1	475	<1	5	<1	2.00
Turbidity	APHA 2130 B	NTU	5*	<0.1	475	0.11	4.2	0.34	0.70
Zinc (Total)	US EPA 200.8	μg/L	3000*	<5	117	<5	290	7.26	13.20

*aesthetic guideline

one sample returned positive. Resample was negative.

Notes:

APHA	American Public Health Association. 2005. Standard Methods for the Examination of Water and Wastewater, 21st Edition. APHA.
IC	Ion Chromatography
GC	Gas Chromatography
ICP-AES	Inductively Coupled Plasma/Atomic Emission Spectrometry
ICP-MS	Inductively Coupled Plasma/Mass Spectrometry
ISE	Ion Selective Electrode
MPN	Most Probable Number
USEPA	United States Environment Protection Authority

The 95^{th} percentile is a statistical calculation based on 'normal' distribution. In the context of this report, estimates the value for which 95 per cent of all the water that passes through the distribution system in this 12 month period falls below.

10.2 Summary data for water quality zone 1 – North Canberra and Gungahlin

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
1.2.4-Trichlorobenzene	US EPA 8270/8260	µg/L	30	<20	24	<20	<20	<20	<20
1.2-Dichlorobenzene	US EPA 8270/8260	µg/L	1500	<20	24	<20	<20	<20	<20
1.3-Dichlorobenzene	US EPA 8270/8260	µg/L	20*	<20	24	<20	<20	<20	<20
1.4-Dichlorobenzene	US EPA 8270/8260	µg/L	40	<20	24	<20	<20	<20	<20
2.3.4.6-Tetrachlorophenol	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
2.4.5-Trichlorophenol	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
2.4.6-Trichlorophenol	US EPA 8270/8260	µg/L	20	<20	24	<20	<20	<20	<20
2.4-Dichlorophenol	US EPA 8270/8260	µg/L	200	<10	24	<10	<10	<10	<10
2.4-Dimethylphenol	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
2.4-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
2.6-Dichlorophenol	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
2.6-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
2-Chloronaphthalene	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
2-Chlorophenol	US EPA 8270/8260	µg/L	300	<10	24	<10	<10	<10	<10
2-Methylnaphthalene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
2-Methylphenol	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
2-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
2-Nitrophenol	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
3.4-Methylphenol	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
3-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
4.4.-DDD	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
4.4.-DDE	US EPA 8270/8260	µg/L	20	<20	24	<20	<20	<20	<20
4.4.-DDT	US EPA 8270/8260	µg/L	20	<20	24	<20	<20	<20	<20
4-Bromophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
4-Chloro-3-methylphenol	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
4-Chloroaniline	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
4-Chlorophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
4-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
a-BHC	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Acenaphthene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Acenaphthene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Acenaphthene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Acenaphthylene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Acenaphthylene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Aldrin	US EPA 8270/8260	µg/L	0.3	<20	24	<20	<20	<20	<20
Alkalininty (Carb)	APHA 2320 A/B	mg/L	-	<0.1	60	<0.1	<0.1	<0.1	<0.1
Alkalinity (Bicarb)	APHA 2320 A/B	mg/L	-	<0.1	60	27.3	42.4	35.21	38.22
Alkalinity (Hydrox)	APHA 2320 A/B	mg/L	-	<0.1	60	<0.1	<0.1	<0.1	<0.1
Alkalinity (Total)	APHA 2320 A/B	mg/L	-	<1	60	27	42	35.22	38.05
Aluminium (Acid soluble)	US EPA 200.8	µg/L	200*	<5	24	16	85	41.21	63.70
Aluminium (Total)	US EPA 200.8	µg/L	-	<9	24	21	98	46.54	70.95
Aluminium (Total)	US EPA 200.7	mg/L	-	<0.02	24	<0.02	0.09	0.05	0.08
Aniline	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Anthracene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Anthracene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Anthracene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Antimony (Total)	US EPA 200.8	µg/L	3	<3	24	<3	<3	<3	<3
Arsenic (Total)	US EPA 200.8	µg/L	7	<1	24	<1	<1	<1	<1
Asbestos	Polarised Light Microscopy	Presence/ Absence	-	N/A	24	Absent	Absent	N/A	N/A
Azobenzene	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Barium (Total)	US EPA 200.8	µg/L	700	<0.5	24	2.3	8.5	4.42	8.10
b-BHC	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Benz(a)anthracene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Benz(a)anthracene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Benzo(a)anthracene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	US EPA 8270/8260	µg/L	0.01	<10	24	<10	<10	<10	<10
Benzo(a)pyrene	US EPA 8270	µg/L	0.01	<0.5	6	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	USEPA 3510/8270	µg/L	0.01	<0.5	18	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	USEPA 3510/8270	µg/L	-	<1	18	<1	<1	<1	<1
Benzo(b)fluoranthene	US EPA 8270	µg/L	-	<1	6	<1	<1	<1	<1
Benzo(b.k)fluoranthene	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Benzo(g.h.i)perylene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Benzo(g.h.i)perylene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Benzo(k) fluoranthene	USEPA 3510/8270	µg/L	-	<1	18	<1	<1	<1	<1
Benzo(k)fluoranthene	US EPA 8270	µg/L	-	<1	6	<1.0	<1	<1	<1
Benzyl alcohol	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Beryllium (Total)	US EPA 200.8	µg/L	-	<0.1	24	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Bis(2-chloroethyl)ether	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Bis(2-chloroisopropyl)ether	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Bis(2-ethylhexyl) phthalate	US EPA 8270/8260	µg/L	10	<20	24	<20	<20	<20	<20
Bromoacetic acid	HS/GC/MS	µg/L		<5	38	<5	<5	<5	<5
Bromochloroacetic acid	USEPA SW-846 Method 8260B	mg/L	-	<0.005	22	<0.005	<0.005	<0.005	<0.005
Bromochloroacetic acid	USEPA SW-846 Method 8260 B	µg/L	-	<1	38	<1	3	<1	2.00
Bromodichloroacetic acid	USEPA SW-846 Method 8260B	mg/L	-	<0.005	22	<0.005	0.006	<0.005	0.01
Bromodichloroacetic acid	USEPA SW-846 Method 8260 B	µg/L	-	<1	38	<1	2	<1	2.00
Butyl benzyl phthalate	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Cadmium (Total)	US EPA 200.8	µg/L	2	<0.05	24	<0.05	<0.05	<0.05	<0.05
Calcium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	24	12	23	15.38	22.70
Carbazole	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	250*	<0.1	12	2.7	8	4.36	7.67
Chlorine residual (Combined)	APHA 4500-CL G	mg/L	5	<0.01	244	0.01	0.34	0.06	0.16
Chlorine residual (Free)	APHA 4500-CL G	mg/L	5	<0.01	244	0.05	1.33	0.78	1.19
Chlorine residual (Total)	APHA 4500-CL G	mg/L	5	<0.01	244	0.1	1.4	0.84	1.22
Chlorpyifos	US EPA 8270/8260	µg/L	10	<20	24	<20	<20	<20	<20
Chromium (Total)	US EPA 200.8	µg/L	50	<2	24	<2	<2	<2	<2
Chrysene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Chrysene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Chrysene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Cobalt (Total)	US EPA 200.8	µg/L	-	<0.2	24	<0.2	<0.2	<0.2	<0.2
Conductivity (uS/cm)	APHA 2510 B	uS/cm	-	<2	24	85	190	109.75	188.50
Copper (Total)	US EPA 200.8	µg/L	2000	<1	96	2	160	21.27	54.25
Copper (Total)	US EPA 200.8	µg/L	2000	<1	24	2	120	21.17	69.05
d-BHC	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Diazinon	US EPA 8270/8260	µg/L	3	<20	24	<20	<20	<20	<20
Dibenz(a.h)anthracene	US EPA 8270/8260	µg/L	-	<10	24	<10	<20	<10	<10
Dibenz(a.h)anthracene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Dibenzo(a.h)anthracene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Dibenzofuran	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Dibromoacetic acid	USEPA SW-846 Method 8260B	mg/L	-	<0.005	22	<0.005	<0.005	<0.005	<0.005
Dibromoacetic acid	USEPA SW-846 Method 8260 B	µg/L	-	<1	38	<1	1	<1	<1
Dibromochloroacetic acid	HS/GC/MS	µg/L	-	<10	38	<10	<10	<10	<10
Dichloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.1	<0.005	22	0.008	0.047	0.02	0.04
Dichloroacetic acid	USEPA SW-846 Method 8260 B	µg/L	100	<1	38	5	27	17.63	25.15
Dichlorobenzidine	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Dieldrin	US EPA 8270/8260	µg/L	0.3	<20	24	<20	<20	<20	<20
Diethyl phthalate	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Dimethoate	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Dimethyl phthalate	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Di-n-butyl phthalate	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Di-n-octyl phthalate	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
E.coli	APHA 9223 B	MPN/100mL	<1	<1	244	<1	<1	<1	<1
Endosulfan sulphate	US EPA 8270/8260	µg/L	30	<20	24	<20	<20	<20	<20
Endosulphan 1	US EPA 8270/8260	µg/L	30	<20	24	<20	<20	<20	<20
Endosulphan 11	US EPA 8270/8260	µg/L	30	<20	24	<20	<20	<20	<20
Endrin	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Endrin aldehyde	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Endrin aldehyde	US EPA 8270/8260	µg/L	3	<20	24	<20	<20	<20	<20
Fenitrothion	US EPA 8270/8260	µg/L	10	<20	24	<20	<20	<20	<20
Fluoranthene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Fluoranthene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Fluoranthene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Fluorene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Fluorene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Fluorene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Fluoride	APHA 4500-F C	mg/L	1.5	<0.05	24	0.69	0.88	0.82	0.87
g-BHC (Lindane)	US EPA 8270/8260	µg/L	20	<20	24	<20	<20	<20	<20
Hardness Tot	APHA 2340 B	mg/L	200*	<0.1	24	34	75	44.33	72.95
Heptachlor	US EPA 8270/8260	µg/L	0.3	<20	24	<20	<20	<20	<20
Heptachlorepoxide	US EPA 8270/8260	µg/L	0.3	<20	24	<20	<20	<20	<20
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	244	<1	1200	13.29	18.00
Heterotrophic plate count	US EPA 8270/8260	µg/L	0.7	<20	24	<20	<20	<20	<20
Hexachlorobenzene	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Hexachlorocyclopentadiene	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Hexachloroethane	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Indeno(1.2.3-cd)pyrene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Indeno(1.2.3-cd)pyrene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Indino(1.2.3-cd)pyrene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Iodide	ASTM D19	mg/L	0.1	<0.05	12	<0.05	<0.05	<0.05	<0.05
Iron (Total)	US EPA 200.7	mg/L	0.3*	<0.02	60	<0.02	0.22	<0.02	0.05
Isophorone	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Lead (Total)	US EPA 200.8	µg/L	100	<0.2	36	<0.2	1	0.30	0.73
Lead (Total)	US EPA 200.8	µg/L	10	<0.2	24	<0.2	1.1	0.28	0.85
Magnesium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	24	0.76	4.2	1.42	4.07
Malathion	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Manganese (Total)	US EPA 200.8	µg/L	500	<0.5	24	<0.5	32	4.18	11.51
Manganese (Total)	US EPA 200.7	mg/L	0.5	<0.001	120	0.001	0.03	0.00	0.01
Molybdemium (Total)	US EPA 200.8	µg/L	50	<1	24	<1	<1	<1	<1
Monobromoacetic acid	USEPA SW-846 Method 8260B	mg/L	-	<0.005	22	<0.005	<0.005	<0.005	<0.005
Monochloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.15	<0.005	22	<0.005	<0.005	<0.005	<0.005
Monochloroacetic acid	HS/GC/MS	µg/L	150	<1	38	<1	3	1.53	2.15
Naphthalene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Naphthalene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Naphthalene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Nickel (Total)	US EPA 200.8	µg/L	20	<1	24	<1	1	<1	1.00
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	12	<0.1	0.3	<0.1	0.25
Nitrobenzene	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
N-Nitrosodimethylamine	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
N-Nitrosodi-n-propylamine	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
N-Nitrosodiphenylamine	US EPA 8270/8260	µg/L	-	<20	24	<20	<20	<20	<20
Pentachlorophenol	US EPA 8270/8260	µg/L	10	<20	24	<20	<20	<20	<20
pH (pH units)	APHA 4500-H B	pH Units	6.5-8.5*	<0.1	244	7.2	8.5	7.62	8.00
Phenanthrene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Phenanthrene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Phenanthrene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Phenol	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Poly aromatic hydrocarbons (Total)	USEPA 3510/8270	µg/L	-	<0.5	18	<0.5	<0.5	<0.5	<0.5
Pottasium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	12	0.4	2.2	0.81	2.20
Pyrene	US EPA 8270/8260	µg/L	-	<10	24	<10	<10	<10	<10
Pyrene	US EPA 8270	µg/L	-	<0.5	6	<0.5	<0.5	<0.5	<0.5
Pyrene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Selenium (Total)	US EPA 200.8	µg/L	10	<2	24	<2	<2	<2	<2
Silver (Total)	US EPA 200.8	µg/L	100	<1	24	<1	<1	<1	<1
Sodium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	12	2.4	6.5	3.53	6.45
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	500	<0.4	12	3.9	37	10.62	32.60
Temperature	APHA 2550 B	°C	-	<0.1	120	8.2	26	15.55	22.00
Total coliforms	APHA 9223 B	MPN/100mL	-	<1	244	<1	<1	<1	<1
Total dissolved solids	APHA 2540 C	mg/L	500*	<20	24	35	120	70.13	120.00

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Tribromoacetic acid	HS/GC/MS	µg/L		<10	38	<10	<10	<10	<10
Trichloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.1	<0.005	22	0.012	0.061	0.03	0.05
Trichloroacetic acid	HS/GC/MS	µg/L	100	<1	38	16	42	24.55	33.60
Trihalomethanes (CHBr2Cl)	HP 228-135	µg/L	250	<1	60	<1	<1	<1	<1
Trihalomethanes (CHBr3)	HP 228-135	µg/L	250	<1	60	<1	<1	<1	<1
Trihalomethanes (CHBrCl2)	HP 228-135	µg/L	250	<1	60	<1	10	2.81	8.11
Trihalomethanes (CHCl3)	HP 228-135	µg/L	250	<1	60	15	96	35.17	57.10
Trihalomethanes (Total)	HP 228-135	µg/L	250	<1	60	16	110	37.95	64.15
True colour	Lachat QuikChem method, color in waters 10-308-00-1-A	Pt-Co	15*	<1	120	<1	4	<1	2.00
Turbidity	APHA 2130 B	NTU	5*	<0.1	120	0.12	0.97	0.34	0.69
Zinc (Total)	US EPA 200.8	µg/L	3000*	<5	24	<5	14	5.40	12.00

10.3 Summary data for water quality zone 2 – Belconnen

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
1.2.4-Trichlorobenzene	US EPA 8270/8260	µg/L	30	<20	34	<20	<20	<20	<20
1.2-Dichlorobenzene	US EPA 8270/8260	µg/L	1500	<20	34	<20	<20	<20	<20
1.3-Dichlorobenzene	US EPA 8270/8260	µg/L	20*	<20	34	<20	<20	<20	<20
1.4-Dichlorobenzene	US EPA 8270/8260	µg/L	40	<20	34	<20	<20	<20	<20
2.3.4.6-Tetrachlorophenol	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
2.4.5-Trichlorophenol	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
2.4.6-Trichlorophenol	US EPA 8270/8260	µg/L	20	<20	34	<20	<20	<20	<20
2.4-Dichlorophenol	US EPA 8270/8260	µg/L	200	<10	34	<10	<10	<10	<10
2.4-Dimethylphenol	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
2.4-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
2.6-Dichlorophenol	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
2.6-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
2-Chloronaphthalene	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
2-Chlorophenol	US EPA 8270/8260	µg/L	300	<10	34	<10	<10	<10	<10
2-Methylnaphthalene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
2-Methylphenol	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
2-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
2-Nitrophenol	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
3.4-Methylphenol	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
3-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
4.4.-DDD	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
4.4.-DDE	US EPA 8270/8260	µg/L	20	<20	34	<20	<20	<20	<20
4.4.-DDT	US EPA 8270/8260	µg/L	20	<20	34	<20	<20	<20	<20
4-Bromophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
4-Chloro-3-methylphenol	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
4-Chloroaniline	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
4-Chlorophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
4-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
a-BHC	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Acenaphthene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Acenaphthene	US EPA 8270	µg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Acenaphthene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Acenaphthylene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Acenaphthylene	US EPA 8270	µg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Aldrin	US EPA 8270/8260	µg/L	0.3	<20	34	<20	<20	<20	<20
Alkalininty (Carb)	APHA 2320 A/B	mg/L	-	<0.1	58	<0.1	6.9	0.17	<0.1
Alkalinity (Bicarb)	APHA 2320 A/B	mg/L	-	<0.1	58	32.2	47.3	36.57	42.33
Alkalinity (Hydrox)	APHA 2320 A/B	mg/L	-	<0.1	58	<0.1	<0.1	<0.1	<0.1
Alkalinity (Total)	APHA 2320 A/B	mg/L	-	<1	58	32	47	36.72	42.00
Aluminium (Acid soluble)	US EPA 200.8	µg/L	200*	<5	34	14	170	41.32	69.90
Aluminium (Total)	US EPA 200.8	µg/L	-	<9	34	22	170	47.09	82.80
Aluminium (Total)	US EPA 200.7	mg/L	-	<0.02	34	0.02	0.17	0.05	0.08
Aniline	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Anthracene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Anthracene	US EPA 8270	µg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Anthracene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Antimony (Total)	US EPA 200.8	µg/L	3	<3	34	<3	<3	<3	<3
Arsenic (Total)	US EPA 200.8	µg/L	7	<1	34	<1	<1	<1	<1
Asbestos	Polarised Light Microscopy	Presence/ Absence	-	N/A	34	Absent	Absent	N/A	N/A
Azobenzene	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Barium (Total)	US EPA 200.8	µg/L	700	<0.5	34	2.5	9.3	4.41	7.60
b-BHC	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Benz(a)anthracene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Benz(a)anthracene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Benzo(a)anthracene	US EPA 8270	µg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	US EPA 8270/8260	µg/L	0.01	<10	34	<10	<10	<10	<10
Benzo(a)pyrene	US EPA 8270	µg/L	0.01	<0.5	11	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	USEPA 3510/8270	µg/L	0.01	<0.5	27	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	USEPA 3510/8270	µg/L	-	<1	27	<1	<1	<1	<1
Benzo(b)fluoranthene	US EPA 8270	µg/L	-	<1	11	<1	<1	<1	<1
Benzo(b.k)fluoranthene	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Benzo(g.h.i)perylene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Benzo(g.h.i)perylene	US EPA 8270	µg/L	-	<0.5	11	<0.5	0.6	<0.5	<0.5
Benzo(g.h.i)perylene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Benzo(k) fluoranthene	USEPA 3510/8270	µg/L	-	<1	27	<1	<1	<1	<1
Benzo(k)fluoranthene	US EPA 8270	µg/L	-	<1	11	<1.0	<1	<1	<1
Benzyl alcohol	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Beryllium (Total)	US EPA 200.8	µg/L	-	<0.1	34	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Bis(2-chloroethyl)ether	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Bis(2-chloroisopropyl)ether	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Bis(2-ethylhexyl) phthalate	US EPA 8270/8260	µg/L	10	<20	34	<20	<20	<20	<20
Bromoacetic acid	HS/GC/MS	µg/L		<5	39	<5	<5	<5	<5
Bromochloroacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	19	<0.005	<0.005	<0.005	<0.005
Bromochloroacetic acid	HS/GC/MS	µg/L	-	<1	39	<1	2	<1	2.00
Bromodichloroacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	19	<0.005	0.006	<0.005	<0.005
Bromodichloroacetic acid	HS/GC/MS	µg/L	-	<1	39	<1	3	<1	2.00
Butyl benzyl phthalate	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Cadmium (Total)	US EPA 200.8	µg/L	2	<0.05	34	<0.05	<0.05	<0.05	<0.05
Calcium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	34	12	23	15.74	22.00
Carbazole	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	250*	<0.1	11	2.9	8.1	4.24	7.80
Chlorine residual (Combined)	APHA 4500-CL G	mg/L	5	<0.01	247	0.01	0.26	0.06	0.14
Chlorine residual (Free)	APHA 4500-CL G	mg/L	5	<0.01	247	0.03	1.33	0.72	1.14
Chlorine residual (Total)	APHA 4500-CL G	mg/L	5	<0.01	247	0.05	1.46	0.78	1.22
Chlorpyifos	US EPA 8270/8260	µg/L	10	<20	34	<20	<20	<20	<20
Chromium (Total)	US EPA 200.8	µg/L	50	<2	34	<2	<2	<2	<2
Chrysene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Chrysene	US EPA 8270	µg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Chrysene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Cobalt (Total)	US EPA 200.8	µg/L	-	<0.2	34	<0.2	0.3	<0.02	<0.02
Conductivity (uS/cm)	APHA 2510 B	uS/cm	-	<2	34	86	190	110.44	180.00
Copper (Total)	US EPA 200.8	µg/L	2000	<1	83	2	83	17.67	67.60
Copper (Total)	US EPA 200.8	µg/L	2000	<1	34	2	44	17.26	43.35
d-BHC	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Diazinon	US EPA 8270/8260	µg/L	3	<20	34	<20	<20	<20	<20
Dibenz(a.h)anthracene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Dibenz(a.h)anthracene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Dibenzo(a.h)anthracene	US EPA 8270	µg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Dibenzofuran	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Dibromoacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	19	<0.005	<0.005	<0.005	<0.005
Dibromoacetic acid	HS/GC/MS	µg/L	-	<1	39	<1	1	<1	<1
Dibromochloroacetic acid	HS/GC/MS	µg/L	-	<10	39	<10	<10	<10	<10
Dichloracetic acid	USEPA SW-846 Method 8260 B	mg/L	0.1	<0.005	19	0.006	0.041	0.02	0.04
Dichloroacetic acid	HS/GC/MS	µg/L	100	<1	39	4	25	15.77	23.10
Dichlorobenzidine	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Dieldrin	US EPA 8270/8260	µg/L	0.3	<20	34	<20	<20	<20	<20
Diethyl phthalate	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Dimethoate	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Dimethyl phthalate	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Di-n-butyl phthalate	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Di-n-octyl phthalate	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
E.coli	APHA 9223 B	MPN/100mL	<1	<1	247	<1	<1	<1	<1
Endosulfan sulphate	US EPA 8270/8260	µg/L	30	<20	34	<20	<20	<20	<20
Endosulphan 1	US EPA 8270/8260	µg/L	30	<20	34	<20	<20	<20	<20
Endosulphan 11	US EPA 8270/8260	µg/L	30	<20	34	<20	<20	<20	<20
Endrin	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Endrin aldehyde	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Ethion	US EPA 8270/8260	µg/L	3	<20	34	<20	<20	<20	<20
Fenitrothion	US EPA 8270/8260	µg/L	10	<20	34	<20	<20	<20	<20
Fluoranthene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Fluoranthene	US EPA 8270	µg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Fluoranthene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Fluorene	US EPA 8270/8260	µg/L	-	<10	34	<10	<10	<10	<10
Fluorene	US EPA 8270	µg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Fluorene	USEPA 3510/8270	µg/L	-	<0.5	27	<1	<1	<1	<1
Fluoride	APHA 4500-F C	mg/L	1.5	<0.05	34	0.53	0.93	0.83	0.91
g-BHC (Lindane)	US EPA 8270/8260	µg/L	20	<20	34	<20	<20	<20	<20
Hardness Tot	APHA 2340 B	mg/L	200*	<0.1	34	32	73	44.62	68.70
Heptachlor	US EPA 8270/8260	µg/L	0.3	<20	34	<20	<20	<20	<20
Heptachlorepoxide	US EPA 8270/8260	µg/L	0.3	<20	34	<20	<20	<20	<20
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	247	<1	340	4.47	13.00
Hexachloro-1.3-butadiene	US EPA 8270/8260	µg/L	0.7	<20	34	<20	<20	<20	<20
Hexachlorobenzene	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20
Hexachlorocyclopentadiene	US EPA 8270/8260	µg/L	-	<20	34	<20	<20	<20	<20

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Hexachloroethane	US EPA 8270/8260	μg/L	-	<20	34	<20	<20	<20	<20
Indeno(1.2.3-cd)pyrene	US EPA 8270/8260	μg/L	-	<10	34	<10	<10	<10	<10
Indeno(1.2.3-cd)pyrene	USEPA 3510/8270	μg/L	-	<0.5	27	<1	<1	<1	<1
Indino(1.2.3-cd)pyrene	US EPA 8270	μg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Iodide	ASTM D19	mg/L	0.1	<0.05	11	<0.05	<0.05	<0.05	<0.05
Iron (Total)	US EPA 200.7	mg/L	0.3*	<0.02	58	<0.02	0.1	<0.02	0.02
Isophorone	US EPA 8270/8260	μg/L	-	<20	34	<20	<20	<20	<20
Lead (Total)	US EPA 200.8	μg/L	100	<0.2	24	<0.2	0.5	0.20	0.40
Lead (Total)	US EPA 200.8	μg/L	10	<0.2	34	<0.2	1	0.22	0.50
Magnesium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	34	0.77	3.9	1.32	3.37
Malathion	US EPA 8270/8260	μg/L	-	<20	34	<20	<20	<20	<20
Manganese (Total)	US EPA 200.8	μg/L	500	<0.5	34	<0.5	8.8	2.37	6.24
Manganese (Total)	US EPA 200.7	mg/L	0.5	<0.001	117	0.001	0.12	0.00	0.01
Molybdemium (Total)	US EPA 200.8	μg/L	50	<1	34	<1	<1	<1	<1
Monobromoacetic acid	USEPA SW-846 Method 8260B	mg/L	-	<0.005	19	<0.005	<0.005	<0.005	<0.005
Monochloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.15	<0.005	19	<0.005	<0.005	<0.005	<0.005
Monochloroacetic acid	HS/GC/MS	μg/L	150	<1	39	<1	8	1.53	3.00
Naphthalene	US EPA 8270/8260	μg/L	-	<10	34	<10	<10	<10	<10
Naphthalene	US EPA 8270	μg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Naphthalene	USEPA 3510/8270	μg/L	-	<0.5	27	<1	<1	<1	<1
Nickel (Total)	US EPA 200.8	μg/L	20	<1	34	<1	1	<1	1.00
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	11	<0.1	0.2	<0.1	0.20
Nitrobenzene	US EPA 8270/8260	μg/L	-	<20	34	<20	<20	<20	<20
N-Nitrosodimethylamine	US EPA 8270/8260	μg/L	-	<20	34	<20	<20	<20	<20
N-Nitrosodi-n-propylamine	US EPA 8270/8260	μg/L	-	<20	34	<20	<20	<20	<20
N-Nitrosodiphenylamine	US EPA 8270/8260	μg/L	-	<20	34	<20	<20	<20	<20
Pentachlorophenol	US EPA 8270/8260	μg/L	10	<20	34	<20	<20	<20	<20
pH (pH units)	APHA 4500-H B	pH Units	6.5-8.5*	<0.1	247	7.1	9	7.76	8.30
Phenanthrene	US EPA 8270/8260	μg/L	-	<10	34	<10	<10	<10	<10
Phenanthrene	US EPA 8270	μg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Phenanthrene	USEPA 3510/8270	μg/L	-	<0.5	27	<1	<1	<1	<1
Phenol	US EPA 8270/8260	μg/L	-	<10	34	<10	<10	<10	<10
Poly aromatic hydrocarbons (Total)	USEPA 3510/8270	μg/L	-	<0.5	27	<0.5	<0.5	<0.5	<0.5
Pottasium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	11	0.4	2.2	0.78	1.95
Pyrene	US EPA 8270/8260	μg/L	-	<10	34	<10	<10	<10	<10
Pyrene	US EPA 8270	μg/L	-	<0.5	11	<0.5	<0.5	<0.5	<0.5
Pyrene	USEPA 3510/8270	μg/L	-	<0.5	27	<1	<1	<1	<1
Selenium (Total)	US EPA 200.8	μg/L	10	<2	34	<2	<2	<2	<2
Silver (Total)	US EPA 200.8	μg/L	100	<1	34	<1	<1	<1	<1
Sodium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	11	2.4	6.9	3.44	6.30
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	500	<0.4	11	3.2	38	10.88	36.00
Temperature	APHA 2550 B	°C	-	<0.1	117	8	24.5	16.08	21.60
Total coliforms	APHA 9223 B	MPN/100mL	-	<1	247	<1	1	<1	<1

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Total dissolved solids	APHA 2540 C	mg/L	500*	<20	33	26	120	71.21	120.00
Tribromoacetic acid	HS/GC/MS	µg/L		<10	39	<10	13	<10	<10
Trichloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.1	<0.005	19	0.011	0.06	0.03	0.05
Trichloroacetic acid	HS/GC/MS	µg/L	100	<1	39	13	33	22.87	32.10
Trihalomethanes (CHBr2Cl)	HP 228-135	µg/L	250	<1	58	<1	<1	<1	<1
Trihalomethanes (CHBr3)	HP 228-135	µg/L	250	<1	58	<1	<1	<1	<1
Trihalomethanes (CHBrCl2)	HP 228-135	µg/L	250	<1	58	<1	9	2.62	8.46
Trihalomethanes (CHCl3)	HP 228-135	µg/L	250	<1	58	12	64	34.22	58.30
Trihalomethanes (Total)	HP 228-135	µg/L	250	<1	58	13	73	36.79	66.15
True colour	Lachat QuikChem method, color in waters 10-308-00-1-A	Pt-Co	15*	<1	117	<1	2	<1	2.00
Turbidity	APHA 2130 B	NTU	5*	<0.1	117	0.12	1.7	0.31	0.59
Zinc (Total)	US EPA 200.8	µg/L	3000*	<5	34	<5	290	12.13	10.40

10.4 Summary data for water quality zone 3 – South Canberra, Woden and Weston Creek

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
1.2.4-Trichlorobenzene	US EPA 8270/8260	µg/L	30	<20	36	<20	<20	<20	<20
1.2-Dichlorobenzene	US EPA 8270/8260	µg/L	1500	<20	36	<20	<20	<20	<20
1.3-Dichlorobenzene	US EPA 8270/8260	µg/L	20*	<20	36	<20	<20	<20	<20
1.4-Dichlorobenzene	US EPA 8270/8260	µg/L	40	<20	36	<20	<20	<20	<20
2.3.4.6-Tetrachlorophenol	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
2.4.5-Trichlorophenol	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
2.4.6-Trichlorophenol	US EPA 8270/8260	µg/L	20	<20	36	<20	<20	<20	<20
2.4-Dichlorophenol	US EPA 8270/8260	µg/L	200	<10	36	<10	<10	<10	<10
2.4-Dimethylphenol	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
2.4-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
2.6-Dichlorophenol	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
2.6-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
2-Chloronaphthalene	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
2-Chlorophenol	US EPA 8270/8260	µg/L	300	<10	36	<10	<10	<10	<10
2-Methylnaphthalene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
2-Methylphenol	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
2-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
2-Nitrophenol	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
3.4-Methylphenol	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
3-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
4.4.-DDD	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
4.4.-DDE	US EPA 8270/8260	µg/L	20	<20	36	<20	<20	<20	<20
4.4.-DDT	US EPA 8270/8260	µg/L	20	<20	36	<20	<20	<20	<20
4-Bromophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
4-Chloro-3-methylphenol	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
4-Chloroaniline	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
4-Chlorophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
4-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
a-BHC	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Acenaphthene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Acenaphthene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Acenaphthene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Acenaphthylene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Acenaphthylene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Aldrin	US EPA 8270/8260	µg/L	0.3	<20	36	<20	<20	<20	<20
Alkalininty (Carb)	APHA 2320 A/B	mg/L	-	<0.1	60	<0.1	<0.1	<0.1	<0.1
Alkalinity (Bicarb)	APHA 2320 A/B	mg/L	-	<0.1	60	31.8	45.6	35.15	38.95
Alkalinity (Hydrox)	APHA 2320 A/B	mg/L	-	<0.1	60	<0.1	<0.1	<0.1	<0.1
Alkalinity (Total)	APHA 2320 A/B	mg/L	-	<1	60	32	46	35.13	39.05
Aluminium (Acid soluble)	US EPA 200.8	µg/L	200*	<5	36	<5	130	46.54	107.50
Aluminium (Total)	US EPA 200.8	µg/L	-	<9	36	17	160	51.14	117.50
Aluminium (Total)	US EPA 200.7	mg/L	-	<0.02	36	0.03	0.16	0.05	0.12
Aniline	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Anthracene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Anthracene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Anthracene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Antimony (Total)	US EPA 200.8	µg/L	3	<3	36	<3	<3	<3	<3
Arsenic (Total)	US EPA 200.8	µg/L	7	<1	36	<1	<1	<1	<1
Asbestos	Polarised Light Microscopy	Presence/ Absence	-	N/A	36	Absent	Absent	N/A	N/A
Azobenzene	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Barium (Total)	US EPA 200.8	µg/L	700	<0.5	36	2.6	7.8	4.025	7.58
b-BHC	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Benz(a)anthracene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Benz(a)anthracene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Benzo(a)anthracene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	US EPA 8270/8260	µg/L	0.01	<10	36	<10	<10	<10	<10
Benzo(a)pyrene	US EPA 8270	µg/L	0.01	<0.5	9	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	USEPA 3510/8270	µg/L	0.01	<0.5	27	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	USEPA 3510/8270	µg/L	-	<1	27	<0.5	<1	<1	<1
Benzo(b)fluoranthene	US EPA 8270	µg/L	-	<1	9	<1	<1	<1	<1
Benzo(b.k)fluoranthene	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Benzo(g.h.i)perylene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Benzo(g.h.i)perylene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Benzo(k) fluoranthene	USEPA 3510/8270	µg/L	-	<1	27	<0.5	<1	<1	<1
Benzo(k)fluoranthene	US EPA 8270	µg/L	-	<1	9	<1.0	<1	<1	<1
Benzyl alcohol	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Beryllium (Total)	US EPA 200.8	µg/L	-	<0.1	36	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Bis(2-chloroethyl)ether	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Bis(2-chloroisopropyl)ether	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Bis(2-ethylhexyl) phthalate	US EPA 8270/8260	µg/L	10	<20	36	<20	<20	<20	<20
Bromoacetic acid	HS/GC/MS	µg/L		<5	38	<5	<5	<5	<5
Bromochloroacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	22	<0.005	<0.005	<0.005	<0.005
Bromochloroacetic acid	HS/GC/MS	µg/L	-	<1	38	<1	2	<1	2.00
Bromodichloroacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	22	<0.005	0.006	<0.005	0.01
Bromodichloroacetic acid	HS/GC/MS	µg/L	-	<1	38	<1	2	<1	2.00
Butyl benzyl phthalate	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Cadmium (Total)	US EPA 200.8	µg/L	2	<0.05	36	<0.05	<0.05	<0.05	<0.05
Calcium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	36	11	23	15.03	23.00
Carbazole	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	250*	<0.1	12	2.6	7.9	4.11	7.68
Chlorine residual (Combined)	APHA 4500-CL G	mg/L	5	<0.01	244	<0.01	0.35	0.07	0.16
Chlorine residual (Free)	APHA 4500-CL G	mg/L	5	<0.01	244	0.02	1.47	0.76	1.18
Chlorine residual (Total)	APHA 4500-CL G	mg/L	5	<0.01	244	0.04	1.64	0.83	1.24
Chlorpyifos	US EPA 8270/8260	µg/L	10	<20	36	<20	<20	<20	<20
Chromium (Total)	US EPA 200.8	µg/L	50	<2	36	<2	<2	<2	<2

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Chrysene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Chrysene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Chrysene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Cobalt (Total)	US EPA 200.8	µg/L	-	<0.2	36	<0.2	<0.2	<0.2	<0.2
Conductivity (uS/cm)	APHA 2510 B	uS/cm	-	<2	36	83	190	107.44	182.50
Copper (Total)	US EPA 200.8	µg/L	2000	<1	84	3	220	34.02	132.50
Copper (Total)	US EPA 200.8	µg/L	2000	<1	36	3	210	26.56	70.75
d-BHC	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Diazinon	US EPA 8270/8260	µg/L	3	<20	36	<20	<20	<20	<20
Dibenz(a.h)anthracene	US EPA 8270/8260	µg/L	-	<10	36	<10	<20	<10	<10
Dibenz(a.h)anthracene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Dibenzo(a.h)anthracene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Dibenzofuran	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Dibromoacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	22	<0.005	<0.005	<0.005	<0.005
Dibromoacetic acid	HS/GC/MS	µg/L	-	<1	38	<1	2	<1	<1
Dibromochloroacetic acid	HS/GC/MS	µg/L	-	<10	38	<10	<10	<10	<10
Dichloracetic acid	USEPA SW-846 Method 8260 B	mg/L	0.1	<0.005	22	0.006	0.041	0.02	0.04
Dichloroacetic acid	HS/GC/MS	µg/L	100	<1	38	5	40	17.11	24.45
Dichlorobenzidine	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Dieldrin	US EPA 8270/8260	µg/L	0.3	<20	36	<20	<20	<20	<20
Diethyl phthalate	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Dimethoate	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Dimethyl phthalate	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Di-n-butyl phthalate	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Di-n-octyl phthalate	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
E.coli	APHA 9223 B	MPN/100mL	<1	<1	244	<1	<1	<1	<1
Endosulfan sulphate	US EPA 8270/8260	µg/L	30	<20	36	<20	<20	<20	<20
Endosulphan 1	US EPA 8270/8260	µg/L	30	<20	36	<20	<20	<20	<20
Endosulphan 11	US EPA 8270/8260	µg/L	30	<20	36	<20	<20	<20	<20
Endrin	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Endrin aldehyde	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Ethion	US EPA 8270/8260	µg/L	3	<20	36	<20	<20	<20	<20
Fenitrothion	US EPA 8270/8260	µg/L	10	<20	36	<20	<20	<20	<20
Fluoranthene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Fluoranthene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Fluoranthene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Fluorene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Fluorene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Fluorene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Fluoride	APHA 4500-F C	mg/L	1.5	<0.05	36	0.6	0.9	0.82	0.89
g-BHC (Lindane)	US EPA 8270/8260	µg/L	20	<20	36	<20	<20	<20	<20
Hardness Tot	APHA 2340 B	mg/L	200*	<0.1	36	32	74	43.5	73.00
Heptachlor	US EPA 8270/8260	µg/L	0.3	<20	36	<20	<20	<20	<20
Heptachlorepoxide	US EPA 8270/8260	µg/L	0.3	<20	36	<20	<20	<20	<20
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	244	<1	1700	12.94	29.70
Hexachloro-1.3-butadiene	US EPA 8270/8260	µg/L	0.7	<20	36	<20	<20	<20	<20

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Hexachlorobenzene	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Hexachlorocyclopentadiene	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Hexachloroethane	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Indeno(1.2.3-cd)pyrene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Indeno(1.2.3-cd)pyrene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Indino(1.2.3-cd)pyrene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Iodide	ASTM D19	mg/L	0.1	<0.05	12	<0.05	<0.05	<0.05	<0.05
Iron (Total)	US EPA 200.7	mg/L	0.3*	<0.02	60	<0.02	0.19	<0.02	0.06
Isophorone	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Lead (Total)	US EPA 200.8	µg/L	100	<0.2	24	<0.2	3.2	0.60	1.90
Lead (Total)	US EPA 200.8	µg/L	10	<0.2	36	<0.2	1.9	0.24	0.60
Magnesium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	36	0.75	4	1.39	3.90
Malathion	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Manganese (Total)	US EPA 200.8	µg/L	500	<0.5	36	<0.5	18	2.85	8.53
Manganese (Total)	US EPA 200.7	mg/L	0.5	<0.001	120	<0.001	0.058	0.00	0.01
Molybdemium (Total)	US EPA 200.8	µg/L	50	<1	36	<1	<1	<1	<1
Monobromoacetic acid	USEPA SW-846 Method 8260B	mg/L	-	<0.005	22	<0.005	<0.005	<0.005	<0.005
Monochloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.15	<0.005	22	<0.005	<0.005	<0.005	<0.005
Monochloroacetic acid	HS/GC/MS	µg/L	150	<1	38	<1	5	1.38	3.00
Naphthalene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Naphthalene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Naphthalene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Nickel (Total)	US EPA 200.8	µg/L	20	<1	36	<1	1	<1	1.00
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	12	<0.1	0.2	<0.1	0.20
Nitrobenzene	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
N-Nitrosodimethylamine	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
N-Nitrosodi-n-propylamine	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
N-Nitrosodiphenylamine	US EPA 8270/8260	µg/L	-	<20	36	<20	<20	<20	<20
Pentachlorophenol	US EPA 8270/8260	µg/L	10	<20	36	<20	<20	<20	<20
pH (pH units)	APHA 4500-H B	pH Units	6.5-8.5*	<0.1	244	7	9.6	7.64	7.99
Phenanthrene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Phenanthrene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Phenanthrene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Phenol	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Poly aromatic hydrocarbons (Total)	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<0.5	<0.5	<0.5
Pottasium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	12	0.4	2	0.71	1.95
Pyrene	US EPA 8270/8260	µg/L	-	<10	36	<10	<10	<10	<10
Pyrene	US EPA 8270	µg/L	-	<0.5	9	<0.5	<0.5	<0.5	<0.5
Pyrene	USEPA 3510/8270	µg/L	-	<0.5	27	<0.5	<1	<1	<1
Selenium (Total)	US EPA 200.8	µg/L	10	<2	36	<2	<2	<2	<2
Silver (Total)	US EPA 200.8	µg/L	100	<1	36	<1	<1	<1	<1
Sodium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	12	2.4	6.5	3.36	6.28
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	500	<0.4	12	3.8	35	9.56	31.70

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Temperature	APHA 2550 B	°C	-	<0.1	120	9	23	15.82	21.50
Total coliforms	APHA 9223 B	MPN/100mL	-	<1	244	<1	2	<1	<1
Total dissolved solids	APHA 2540 C	mg/L	500*	<20	36	33	120	70.92	120.00
Tribromoacetic acid	HS/GC/MS	µg/L		<10	38	<10	<10	<10	<10
Trichloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.1	<0.005	22	0.01	0.059	0.03	0.05
Trichloroacetic acid	HS/GC/MS	µg/L	100	<1	38	11	35	23.08	33.15
Trihalomethanes (CHBr2Cl)	HP 228-135	µg/L	250	<1	60	<1	<1	<1	<1
Trihalomethanes (CHBr3)	HP 228-135	µg/L	250	<1	60	<1	<1	<1	<1
Trihalomethanes (CHBrCl2)	HP 228-135	µg/L	250	<1	60	<1	11	2.55	9.02
Trihalomethanes (CHCl3)	HP 228-135	µg/L	250	<1	60	13	87	33.92	62.40
Trihalomethanes (Total)	HP 228-135	µg/L	250	<1	60	13	91	36.37	71.50
True colour	Lachat QuikChem method, color in waters 10-308-00-1-A	Pt-Co	15*	<1	120	<1	5	<1	2.00
Turbidity	APHA 2130 B	NTU	5*	<0.1	120	0.11	3.3	0.37	0.78
Zinc (Total)	US EPA 200.8	µg/L	3000*	<5	36	<5	61	5.56	11.50

10.5 Summary data for water quality zone 4 – Tuggeranong

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
1.2.4-Trichlorobenzene	US EPA 8270/8260	µg/L	30	<20	23	<20	<20	<20	<20
1.2-Dichlorobenzene	US EPA 8270/8260	µg/L	1500	<20	23	<20	<20	<20	<20
1.3-Dichlorobenzene	US EPA 8270/8260	µg/L	20*	<20	23	<20	<20	<20	<20
1.4-Dichlorobenzene	US EPA 8270/8260	µg/L	40	<20	23	<20	<20	<20	<20
2.3.4.6-Tetrachlorophenol	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
2.4.5-Trichlorophenol	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
2.4.6-Trichlorophenol	US EPA 8270/8260	µg/L	20	<20	23	<20	<20	<20	<20
2.4-Dichlorophenol	US EPA 8270/8260	µg/L	200	<10	23	<10	<10	<10	<10
2.4-Dimethylphenol	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
2.4-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
2.6-Dichlorophenol	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
2.6-Dinitrotoluene	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
2-Chloronaphthalene	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
2-Chlorophenol	US EPA 8270/8260	µg/L	300	<10	23	<10	<10	<10	<10
2-Methylnaphthalene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
2-Methylphenol	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
2-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
2-Nitrophenol	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
3.4-Methylphenol	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
3-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
4.4.-DDD	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
4.4.-DDE	US EPA 8270/8260	µg/L	20	<20	23	<20	<20	<20	<20
4.4.-DDT	US EPA 8270/8260	µg/L	20	<20	23	<20	<20	<20	<20
4-Bromophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
4-Chloro-3-methylphenol	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
4-Chloroaniline	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
4-Chlorophenyl phenyl ether	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
4-Nitroaniline	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
a-BHC	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Acenaphthene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Acenaphthene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Acenaphthylene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Acenaphthylene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Aldrin	US EPA 8270/8260	µg/L	0.3	<20	23	<20	<20	<20	<20
Alkalininty (Carb)	APHA 2320 A/B	mg/L	-	<0.1	59	<0.1	8.5	0.80	7.57
Alkalinity (Bicarb)	APHA 2320 A/B	mg/L	-	<0.1	59	27.4	43.4	36.47	41.37
Alkalinity (Hydrox)	APHA 2320 A/B	mg/L	-	<0.1	59	<0.1	<0.1	<0.1	<0.1
Alkalinity (Total)	APHA 2320 A/B	mg/L	-	<1	59	27	43	37.12	42.00
Aluminium (Acid soluble)	US EPA 200.8	µg/L	200*	<5	23	15	99	42.39	77.40
Aluminium (Total)	US EPA 200.8	µg/L	-	<9	25	22	200	52.36	104.20
Aluminium (Total)	US EPA 200.7	mg/L	-	<0.02	23	0.03	0.1	0.05	0.08
Aniline	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Anthracene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Anthracene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Anthracene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Antimony (Total)	US EPA 200.8	µg/L	3	<3	25	<3	<3	<3	<3
Arsenic (Total)	US EPA 200.8	µg/L	7	<1	25	<1	<1	<1	<1
Asbestos	Polarised Light Microscopy	Presence/ Absence	-	N/A	24	Absent	Present	Absent	Absent
Azobenzene	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Barium (Total)	US EPA 200.8	µg/L	700	<0.5	25	2.8	8.4	4.252	7.98
b-BHC	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Benz(a)anthracene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Benz(a)anthracene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Benzo(a)anthracene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	US EPA 8270/8260	µg/L	0.01	<10	23	<10	<10	<10	<10
Benzo(a)pyrene	US EPA 8270	µg/L	0.01	<0.5	5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	USEPA 3510/8270	µg/L	0.01	<0.5	18	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	USEPA 3510/8270	µg/L	-	<1	18	<1	<1	<1	<1
Benzo(b)fluoranthene	US EPA 8270	µg/L	-	<1	5	<1	<1	<1	<1
Benzo(b.k)fluoranthene	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Benzo(g.h.i)perylene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Benzo(g.h.i)perylene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Benzo(k) fluoranthene	USEPA 3510/8270	µg/L	-	<1	18	<1	<1	<1	<1
Benzo(k)fluoranthene	US EPA 8270	µg/L	-	<1	5	<1.0	<1	<1	<1
Benzyl alcohol	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Beryllium (Total)	US EPA 200.8	µg/L	-	<0.1	25	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Bis(2-chloroethyl)ether	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Bis(2-chloroisopropyl)ether	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Bis(2-ethylhexyl) phthalate	US EPA 8270/8260	µg/L	10	<20	23	<20	<20	<20	<20
Bromoacetic acid	HS/GC/MS	µg/L		<5	39	<5	<5	<5	<5
Bromochloroacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	20	<0.005	<0.005	<0.005	<0.005
Bromochloroacetic acid	HS/GC/MS	µg/L	-	<1	39	<1	3	<1	2.00
Bromodichloroacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	20	<0.005	0.006	<0.005	0.01
Bromodichloroacetic acid	HS/GC/MS	µg/L	-	<1	39	<1	2	<1	1.00
Butyl benzyl phthalate	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Cadmium (Total)	US EPA 200.8	µg/L	2	<0.05	25	<0.05	<0.05	<0.05	<0.05
Calcium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	23	12	25	16.26	23.80
Carbazole	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	250*	<0.1	11	2.8	8	4.22	7.05
Chlorine residual (Combined)	APHA 4500-CL G	mg/L	5	<0.01	243	0.01	0.41	0.07	0.17
Chlorine residual (Free)	APHA 4500-CL G	mg/L	5	<0.01	243	0.11	1.58	0.72	1.17
Chlorine residual (Total)	APHA 4500-CL G	mg/L	5	<0.01	243	0.16	1.59	0.79	1.21
Chlorpyifos	US EPA 8270/8260	µg/L	10	<20	23	<20	<20	<20	<20
Chromium (Total)	US EPA 200.8	µg/L	50	<2	25	<2	<2	<2	<2
Chrysene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Chrysene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Chrysene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Cobalt (Total)	US EPA 200.8	µg/L	-	<0.2	25	<0.2	0.2	<0.2	<0.2
Conductivity (uS/cm)	APHA 2510 B	uS/cm	-	<2	23	86	190	113.26	190.00
Copper (Total)	US EPA 200.8	µg/L	2000	<1	95	<1	120	22.53	78.30
Copper (Total)	US EPA 200.8	µg/L	2000	<1	25	3	80	16.44	44.60
d-BHC	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Diazinon	US EPA 8270/8260	µg/L	3	<20	23	<20	<20	<20	<20
Dibenz(a.h)anthracene	US EPA 8270/8260	µg/L	-	<10	23	<10	<20	<10	<10
Dibenz(a.h)anthracene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Dibenzo(a.h)anthracene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Dibenzofuran	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Dibromoacetic acid	USEPA SW-846 Method 8260 B	mg/L	-	<0.005	20	<0.005	<0.005	<0.005	<0.005
Dibromoacetic acid	HS/GC/MS	µg/L	-	<1	39	<1	<1	<1	<1
Dibromochloroacetic acid	HS/GC/MS	µg/L	-	<10	39	<10	<10	<10	<10
Dichloracetic acid	USEPA SW-846 Method 8260 B	mg/L	0.1	<0.005	20	0.008	0.039	0.02	0.04
Dichloroacetic acid	HS/GC/MS	µg/L	100	<1	39	5	27	17.28	25.00
Dichlorobenzidine	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Dieldrin	US EPA 8270/8260	µg/L	0.3	<20	23	<20	<20	<20	<20
Diethyl phthalate	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Dimethoate	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Dimethyl phthalate	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Di-n-butyl phthalate	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Di-n-octyl phthalate	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
E.coli	APHA 9223 B	MPN/100mL	<1	<1	243	<1	<1	<1	<1
Endosulfan sulphate	US EPA 8270/8260	µg/L	30	<20	23	<20	<20	<20	<20
Endosulphan 1	US EPA 8270/8260	µg/L	30	<20	23	<20	<20	<20	<20
Endosulphan 11	US EPA 8270/8260	µg/L	30	<20	23	<20	<20	<20	<20
Endrin	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Endrin aldehyde	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Ethion	US EPA 8270/8260	µg/L	3	<20	23	<20	<20	<20	<20
Fenitrothion	US EPA 8270/8260	µg/L	10	<20	23	<20	<20	<20	<20
Fluoranthene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Fluoranthene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Fluorene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Fluorene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Fluorene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Fluoride	APHA 4500-F C	mg/L	1.5	<0.05	23	0.72	0.89	0.83	0.89
g-BHC (Lindane)	US EPA 8270/8260	µg/L	20	<20	23	<20	<20	<20	<20
Hardness Tot	APHA 2340 B	mg/L	200*	<0.1	23	33	77	45.74	75.10
Heptachlor	US EPA 8270/8260	µg/L	0.3	<20	23	<20	<20	<20	<20
Heptachlorepoxide	US EPA 8270/8260	µg/L	0.3	<20	23	<20	<20	<20	<20
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	243	<1	120	4.04	18.90
Hexachloro-1.3-butadiene	US EPA 8270/8260	µg/L	0.7	<20	23	<20	<20	<20	<20
Hexachlorobenzene	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Hexachlorocyclopentadiene	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Hexachloroethane	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Indeno(1.2.3-cd)pyrene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Indeno(1.2.3-cd)pyrene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Indino(1.2.3-cd)pyrene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Iodide	ASTM D19	mg/L	0.1	<0.05	11	<0.05	<0.05	<0.05	<0.05
Iron (Total)	US EPA 200.7	mg/L	0.3*	<0.02	59	0.01	0.15	0.01	0.01
Isophorone	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Lead (Total)	US EPA 200.8	µg/L	100	<0.2	36	<0.2	14	0.56	0.53
Lead (Total)	US EPA 200.8	µg/L	10	<0.2	25	<0.2	13	0.67	0.40
Magnesium (Dissolved)	US EPA 200.7	mg/L	-	<0.05	23	0.73	4	1.33	3.86
Malathion	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Manganese (Total)	US EPA 200.8	µg/L	500	<0.5	25	<0.5	70	4.41	4.36
Manganese (Total)	US EPA 200.7	mg/L	0.5	<0.001	118	0.001	0.083	0.00	0.01
Molybdemium (Total)	US EPA 200.8	µg/L	50	<1	25	<1	<1	<1	<1
Monobromoacetic acid	USEPA SW-846 Method 8260B	mg/L	-	<0.005	20	<0.005	<0.005	<0.005	<0.005
Monochloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.15	<0.005	20	<0.005	<0.005	<0.005	<0.005
Monochloroacetic acid	HS/GC/MS	µg/L	150	<1	39	<1	5	1.63	3.00
Naphthalene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Naphthalene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Naphthalene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Nickel (Total)	US EPA 200.8	µg/L	20	<1	25	<1	3	<1	2.00
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	11	<0.1	0.3	<0.1	0.25
Nitrobenzene	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
N-Nitrosodimethylamine	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
N-Nitrosodi-n-propylamine	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
N-Nitrosodiphenylamine	US EPA 8270/8260	µg/L	-	<20	23	<20	<20	<20	<20
Pentachlorophenol	US EPA 8270/8260	µg/L	10	<20	23	<20	<20	<20	<20
pH (pH units)	APHA 4500-H B	pH Units	6.5-8.5*	<0.1	243	7.2	8.9	7.84	8.50
Phenanthrene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Phenanthrene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Phenol	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Poly aromatic hydrocarbons (Total)	USEPA 3510/8270	µg/L	-	<0.5	18	<0.5	<0.5	<0.5	<0.5
Pottasium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	11	0.4	2.4	0.78	1.80
Pyrene	US EPA 8270/8260	µg/L	-	<10	23	<10	<10	<10	<10
Pyrene	US EPA 8270	µg/L	-	<0.5	5	<0.5	<0.5	<0.5	<0.5
Pyrene	USEPA 3510/8270	µg/L	-	<0.5	18	<1	<1	<1	<1
Selenium (Total)	US EPA 200.8	µg/L	10	<2	25	<2	<2	<2	<2
Silver (Total)	US EPA 200.8	µg/L	100	<1	25	<1	<1	<1	<1
Sodium (Dissolved)	US EPA 200.7	mg/L	-	<0.1	11	2.6	6.8	3.55	5.90
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	500	<0.4	11	3.5	35	9.83	28.50
Temperature	APHA 2550 B	°C	-	<0.1	118	7.5	23.5	16.10	22.50

Analyte	Method ID	Units	ADWG	Limit of Reporting	Number of samples	Minimum	Maximum	Mean	95th Percentile
Total coliforms	APHA 9223 B	MPN/100mL	-	<1	243	<1	3	<1	<1
Total dissolved solids	APHA 2540 C	mg/L	500*	<20	23	38	120	72.22	119.00
Tribromoacetic acid	HS/GC/MS	μg/L		<10	39	<10	<10	<10	<10
Trichloracetic acid	USEPA SW-846 Method 8260B	mg/L	0.1	<0.005	20	0.01	0.059	0.03	0.06
Trichloroacetic acid	HS/GC/MS	μg/L	100	<1	39	15	37	24.41	30.10
Trihalomethanes (CHBr2Cl)	HP 228-135	μg/L	250	<1	59	<1	<1	<1	<1
Trihalomethanes (CHBr3)	HP 228-135	μg/L	250	<1	59	<1	<1	<1	<1
Trihalomethanes (CHBrCl2)	HP 228-135	μg/L	250	<1	59	<1	11	2.73	9.28
Trihalomethanes (CHCl3)	HP 228-135	μg/L	250	<1	59	14	95	37.27	72.10
Trihalomethanes (Total)	HP 228-135	μg/L	250	<1	59	14	110	40.02	81.10
True colour	Lachat QuikChem method, color in waters 10-308-00-1-A	Pt-Co	15*	<1	118	<1	2	<1	2.00
Turbidity	APHA 2130 B	NTU	5*	<0.1	120	0.12	4.2	0.35	0.62
Zinc (Total)	US EPA 200.8	μg/L	3000*	<5	25	<5	19	5.02	18.20

11. References

ACT Department of Health and Community Care, *Drinking Water Code of Practice 2007*. Available at www.health.act.gov.au

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Australian Bureau of Statistics. Information available at www.abs.gov.au

Partnership for Safe Water Program. American Water Works Association. Information available at www.awwa.org/partner/partner1.htm and www.epa.gov/ogwdw000/psw/psw.html

United States Environmental Protection Authority www.epa.gov

12. Abbreviations

ACTEW	ACTEW Corporation Ltd
ActewAGL	ActewAGL Distribution Ltd
ACT	Australian Capital Territory
ADWG	*Australian Drinking Water Guidelines (2004)* also referred to as "the guidelines"
ACTPLA	ACT Planning and Land Authority
AS/NZS	Australian Standards/New Zealand Standards
CFU	colony forming units
DAFF	Dissolved air flotation and filtration
DWCoP	Drinking Water Code of Practice (2007)
E.coli	*Escherichia coli*
GL	gigalitre
HACCP	Hazard Analysis and Critical Control Point
ICRC	Independent Competition and Regulatory Commission
ISO	International Standards Organisation
km	kilometre
L	litre
M	metre
ML	megalitre
µg	micrograms
mg	milligram
mL	millilitre
mm	millimetre
MPN	most probable number
NATA	National Association of Testing Authorities
NHMRC	National Health and Medical Research Council
NTU	nephelometric turbidity units
NSW	New South Wales
%	per cent
PAC	Powdered Activated Carbon
PCS	Parks and Conservation Services
Pt-Co	platinum-cobalt units
SWPP	Source Water Protection program
TAMS	Territory and Municipal Services
THMs	trihalomethanes
UV	ultraviolet light
WSAA	Water Services Association of Australia
WTP	water treatment plant

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ActewAGL for you

ActewAGL Distribution ABN 76 670 568 688 a partnership of ACTEW Distribution Limited ABN 83 073 025 224 and Jemena Networks (ACT) Pty Ltd ABN 24 008 552 663. ActewAGL Distribution operates the water and wastewater assets of ACTEW Corporation Ltd ABN 86 069 381 960.