2021-22

DRINKING WATER QUALITY REPORT

icon WATER

CONTENTS

SUMMARY

EXECUTIVE SUMMARY

At Icon Water our mission is 'to sustain and enhance quality of life', and a big part of this is the way we support and protect the community and the environment by providing safe, clean drinking water.

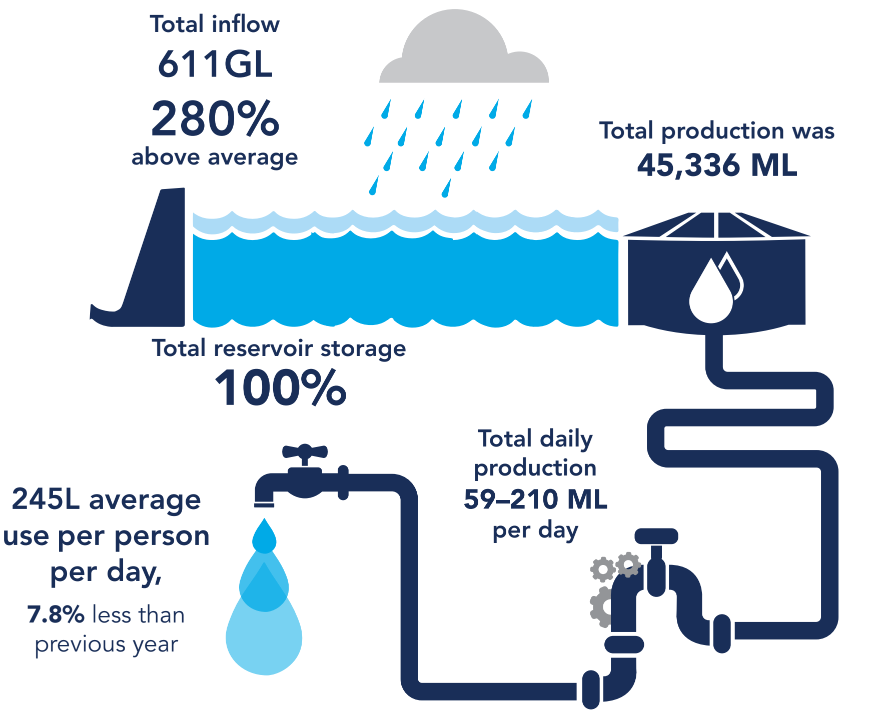
To do this, we apply a rigorous management framework that includes the catchments, our storage reservoirs, water treatment plants, service reservoirs and the reticulation system all the way to customers' properties. This includes a monitoring program that assesses water quality across the entire potable (drinking quality) water production sequence.

Through this framework, we ensure safe and clean water is delivered to Canberra, as well as the Queanbeyan-Palerang Regional Council.

At the end of June 2022, Canberra's four water storage reservoirs held 100 per cent of their total accessible capacity. High rainfall coupled with high storage from last year meant inflows far exceeded our storage capacity; inflows across all reservoirs totalled 611GL, which is 280 per cent above the yearly average of the last 15 years.

Throughout 2021–22 we produced between 59 and 210 megalitres (ML) per day of drinking water for our ACT and Queanbeyan-Palerang customers, to a total of 45GL throughout the year. This is 7.85 per cent less than the previous year.

Over the last twelve months we have shown the resilience of our organisation and of the quality management systems we use to control the production of high quality water. Exceptional diligence of our staff meant we were able to maintain full provision of service to our community throughout the COVID-19 pandemic. We also maintained external certification of the system which governs how we supply high quality water to our community and were compliant with the ACT Public Health (Drinking Water) Code of Practice 2007.



* Compared to 2020-21

Figure 1. Summary of total storage, production and consumption

WHO ARE OUR CUSTOMERS

In 2021-22 we supplied potable (drinking quality) water to 195,707 residential and commercial customers, and other site types within the ACT. A connection to a household is counted as one customer, even if the household has more than one water user, and other site types include public and non-commercial premises such as schools and community facilities. We also supplied bulk water to Queanbeyan-Palerang Regional Council (QPRC), which was distributed to the city of Queanbeyan, including the Googong Township.

The proportion of drinking water used by each customer type is shown in figure 2.

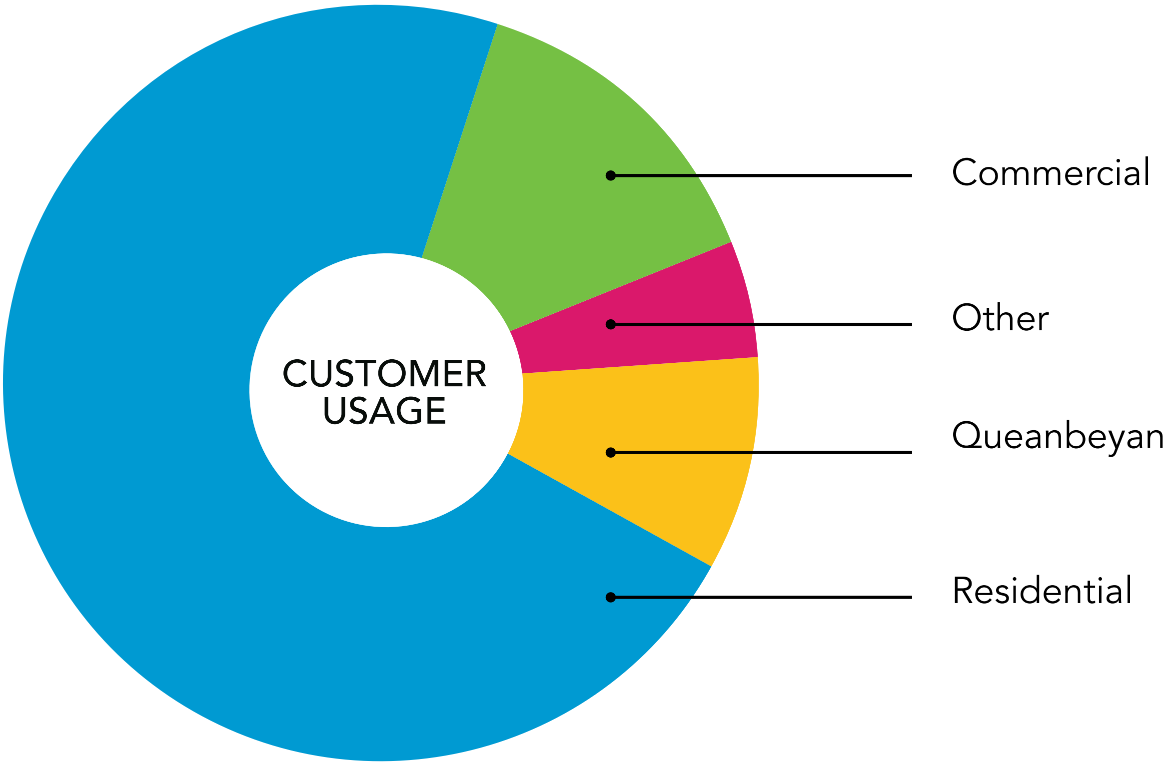


Figure 2. The proportion of drinking water utilised by customer type

In 2021–22 we supplied 45GL of drinking water to Canberra and Queanbeyan. This was 7.85 per cent lower than 2020–21, and also 18.11 per cent lower than 2019–20. This was expected, due to the higher-than-average rainfall pattern over the last few years.

Data from the 2021 Census lists Canberra's population at 454,499 and Queanbeyan and Googong at 48,254, representing an annual population growth of 0.4 per cent. This growth meant more customer connections to the water supply network.

1. Australian Bureau of Statistics. abs.gov.au

OUR SUPPLY SYSTEM

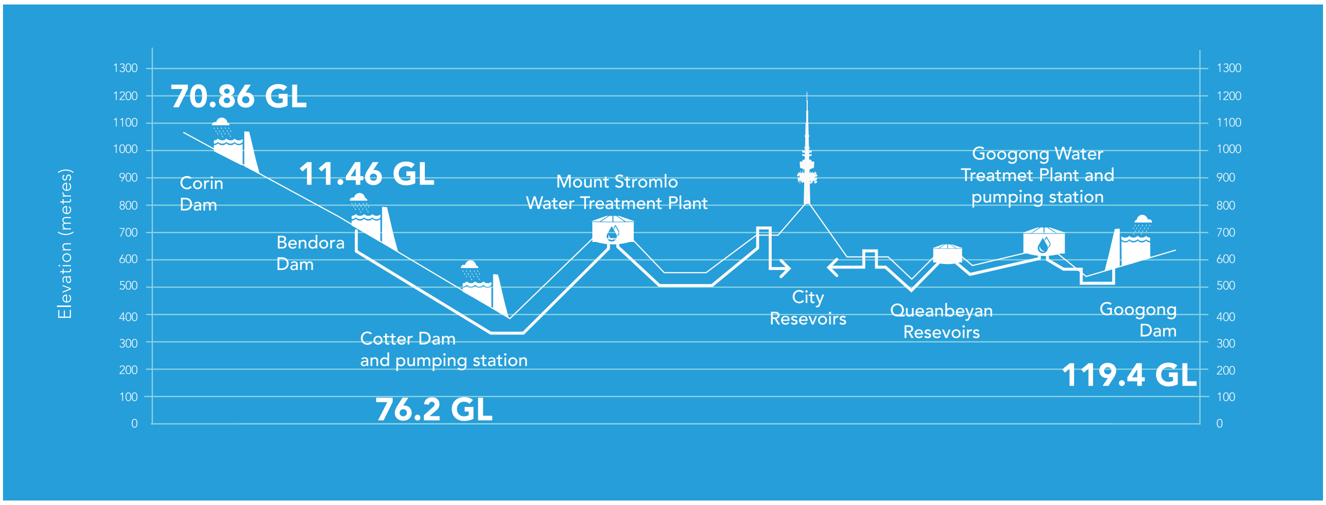


Figure 3. Total storage capacity (volume) of each reservoir

The process of providing water to our customers starts by withdrawing water from our dams.

Our dams (storage reservoirs) impound water from the Cotter and Queanbeyan rivers and we can also abstract from two locations on the Murrumbidgee River. This ability to abstract from three diverse catchments containing different rivers and tributaries strengthens Canberra's water security in times of drought or if major events like bushfires compromise the source water quality in one catchment. Refer to page page 16 for more information about our source water supply.

During 2021–22, the three Cotter River storage reservoirs (Corin, Bendora and Cotter) provided 88 per cent of the water we supplied to customers, of which the majority came from Bendora reservoir. Googong reservoir made up the balance of supply.

We treat the abstracted water to a standard that meets local and Australian health guidelines. We can treat water at either of our two water treatment plants at Googong and Mount Stromlo. During 2021–22 we produced a total of 45GL of treated drinking water – 40GL from Stromlo and 5GL from Googong WTP. Refer to page 25 for more information about our water treatment plants.

After treatment, the drinking water is fed into service reservoirs across the region, then into water mains which connect to local service lines and finally, to customers' properties. In 2021–22 the average water used was 245L per person per day. Refer to page 30 for more information about how water gets to you.

At all of these points we apply a rigorous management framework underpinned by an extensive water quality monitoring program using a combination of online monitoring and sampling undertaken by an external NATA-accredited laboratory (detailed on page 48). Information about the status of water quality at each point of the supply system comprises the foundation of this publication.

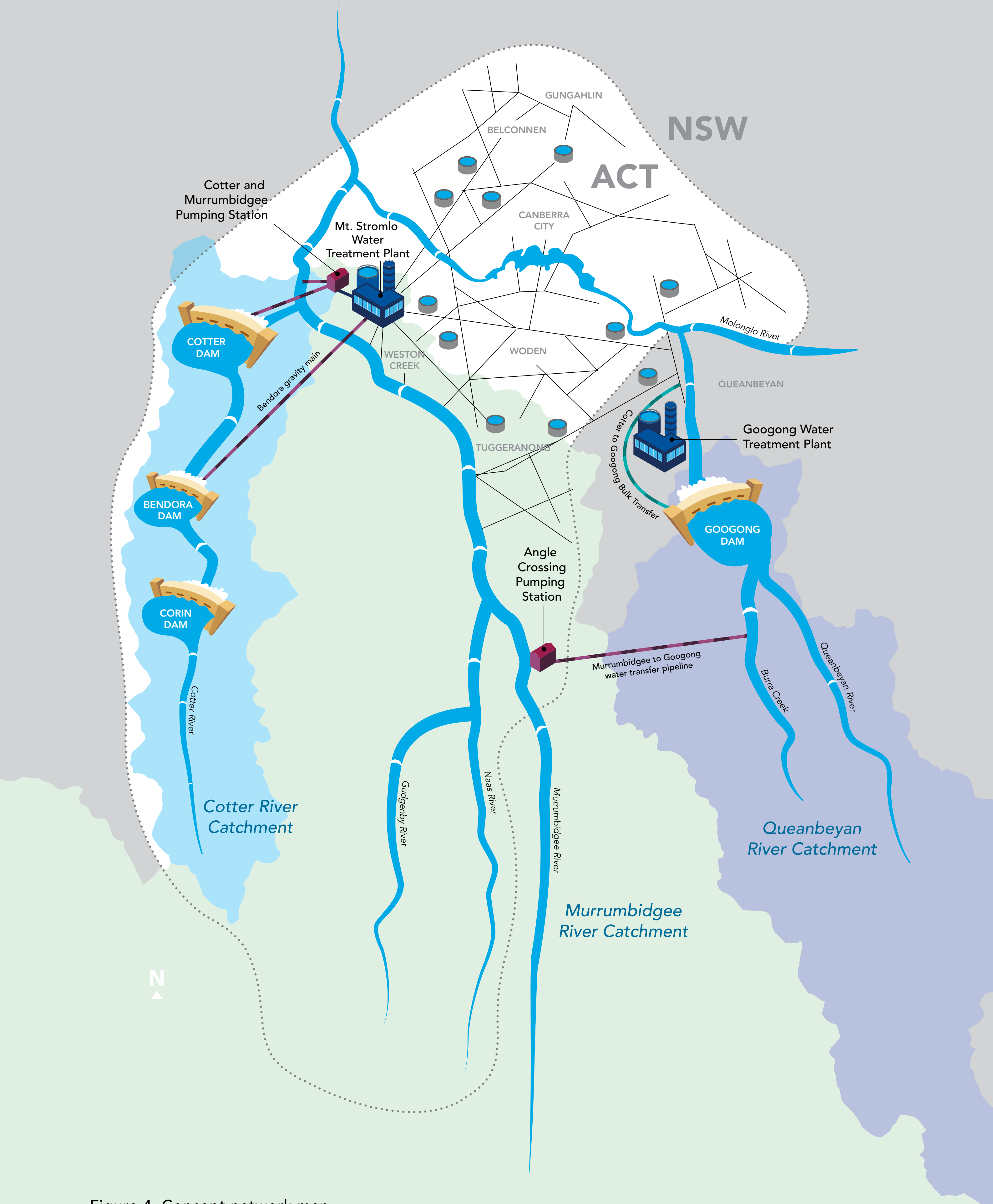


Figure 4. Concept network map

HOW WE MANAGE YOUR WATER SUPPLY


icon
WATER

Standards we apply to Canberra's drinking water

Licences

Icon Water holds the following licences which allow us to operate our drinking water distribution and supply service:

- Utility Services Licence, issued by the Independent Competition and Regulatory Commission (ICRC) under the *Utilities Act 2000*
- Drinking Water Utility Licence, issued by the ACT Health Directorate (ACT Health) under the *Public Health Act 1997.*

We apply quality standards in accordance with the requirements of the *Public Health (Drinking Water) Code of Practice (2007)* (the Code)[2], regulated by ACT Health. Copies of the Code are available from the ACT Health website at health.act.gov.au.

The Code sets out quality standards, operational, communication, reporting and response requirements for Icon Water and ACT Health to ensure the supply of safe drinking water. The Code also sets out specific events or incidents where Icon Water must notify ACT Health.

Under the operating licences and the Code, Icon Water is required to comply with the current National Health and Medical Research Council (NHMRC) Australian Drinking Water Guidelines 2011 (ADWG). The guidelines provide a basis for determining the minimum quality requirements of water in all parts of Australia and are regularly revised to ensure they represent the latest scientific evidence, with the most recent update in January 2022. The guidelines are available from the NHMRC website at nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines.

We apply an Integrated Management System to meet quality, environmental, regulatory and workplace health and safety requirements. We maintain annual certification and comply with the following Australian and international standards:

- ISO 9001:2015. Quality management systems
- ISO 14001:2015. Environmental management systems
- AS/NZS 4801:2001. Occupational health and safety management systems
- HACCP and Good Manufacturing Practice (GMP) – Codex Alimentarius Alinorm 2020/13A.

2. ACT Department of Health, Public Health (Drinking Water) Code of Practice 2007. legislation.act.gov.au/di/2007-62/

What is the ADWG management framework?

The ADWG, published by the NHMRC[3], determine the minimum health and aesthetic quality requirements of water supplied to consumers across Australia. In addition, the ADWG provide a framework to help utilities design a structured and systematic approach to preventative risk management of drinking water quality. The guidelines inform the holistic management of water supply systems from policy, education, customer engagement, system operation, continuous improvement, verification and assurance activities. In all, the guidelines establish management under 12 elements, 32 components and 76 actions.

Icon Water's drinking water monitoring program operates via an external NATA accredited laboratory that measures the physical, chemical and microbiological parameters of the water we supply to our customers. The results of the program inform how we manage water quality, and verify our compliance with the ADWG.

The ADWG include two types of criteria to measure and manage the performance of the water supply system. They are:

- a health guideline value, defined as the concentration or measure of a water quality characteristic that, based on present scientific knowledge, does not result in any significant risk to the health of the consumer over a lifetime of consumption
- an aesthetic guideline value, defined as the concentration or measure of a water quality characteristic that is associated with acceptability of water to the consumer, such as appearance, taste and odour.

What is Icon Water's HACCP system certification?

The HACCP (Hazard Analysis and Critical Control Point) system was designed to address risks to food production, and has been widely adapted by the water industry to suit potable water supply processes.

In addition to internal audits, certification of our HACCP program is conducted via external auditors. These audit processes strengthen our continuous evaluation and improvement responses across all the barriers in our supply system. In 2021–22 we maintained third-party certification of our HACCP-based risk management system.

3. NHMRC (2011), Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council, Natural Resource Management Ministerial Council, Commonwealth of Australia, Canberra. nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines

Multiple barrier approach

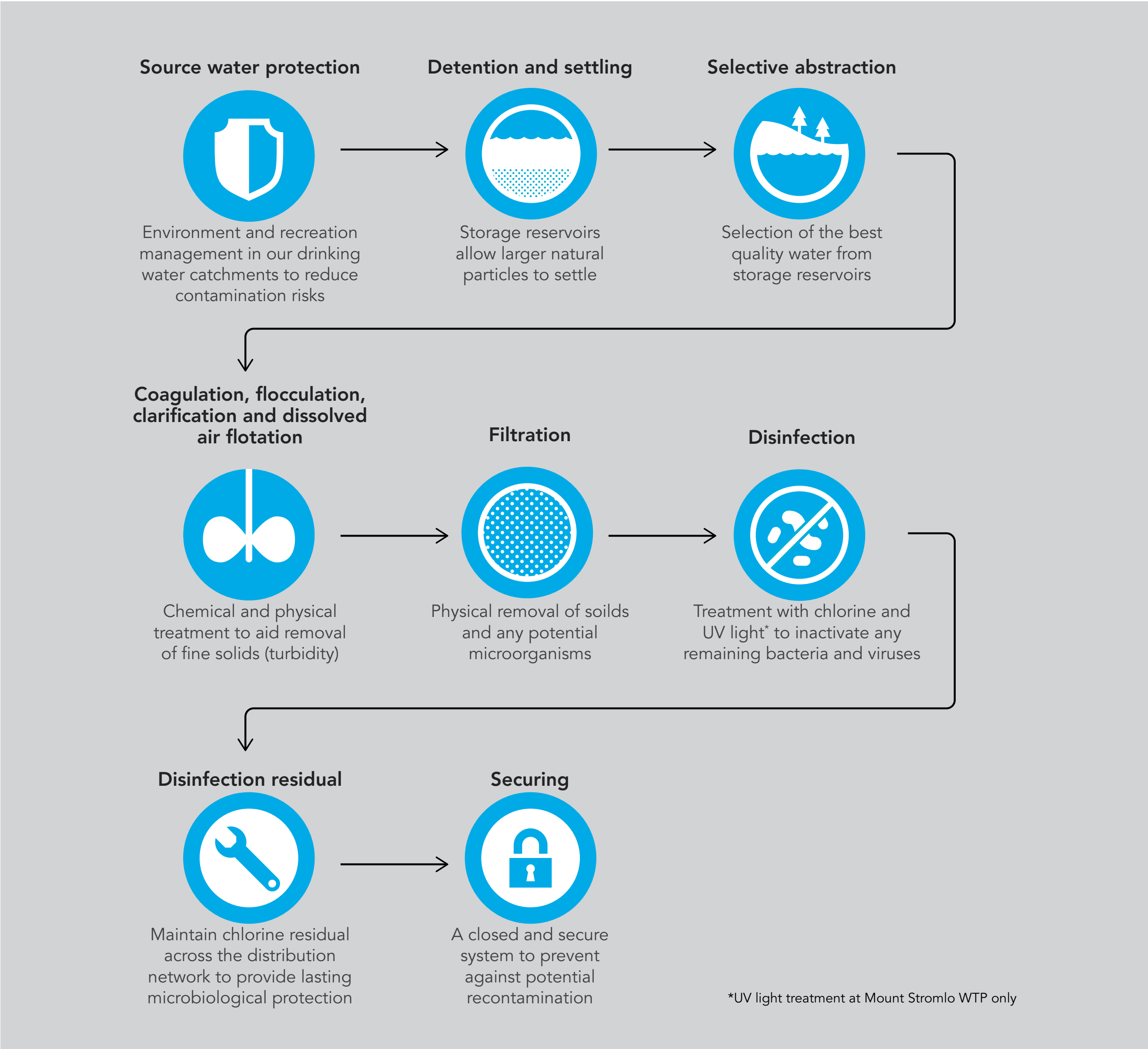


Figure 5. Drinking water supply barriers

Providing safe drinking water to customers is our priority.

We achieve this by applying a 'multiple-barrier approach' through a framework that integrates the principles of the ADWG and the internationally recognised HACCP methodology. Both systems use a preventative risk management approach to ensure the risks to water quality are effectively controlled across the whole supply system.

Our barrier approach starts by applying controls in the source water catchments and continues through each step of the plant treatment process, all the way to the point at which the water flows through to a customer's connection. Our barrier control measures include activities that can protect water quality directly (e.g. physical barriers to a water asset) and indirectly (e.g. promotion of safe activities around a water catchment). A control may remove a hazard from the supply (e.g. treatment), or include measures that monitor and facilitate early intervention (e.g. sampling and analysis). We work to ensure we aren't relying upon any single tool or measure to protect public health, and that we continuously assess the performance of protection barriers for non-conformance and areas of improvement.

Our barrier measures are designed to eliminate or minimise real or potential risks to drinking water. To implement this we set higher targets for product quality than required to meet the ADWG standards (refer to page 10 for more information about the standards that apply to Canberra's drinking water).

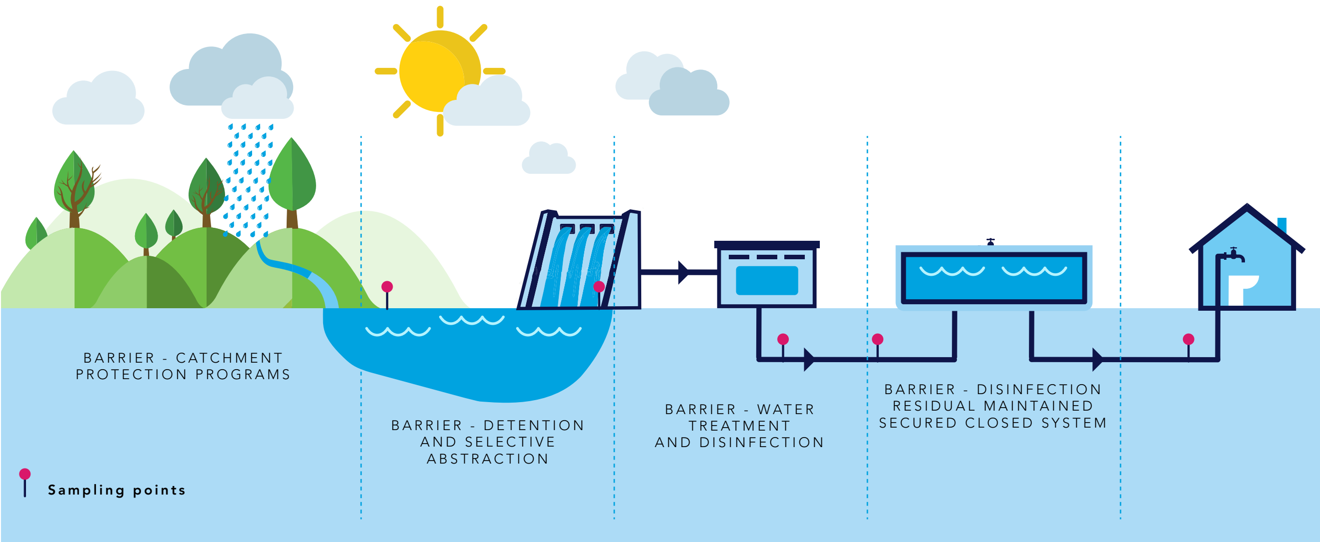


Figure 6. Our water protection barriers

Our multi-barrier approach includes:

- a source water protection program (see page 18 for more detail)
- selective abstraction of source water for treatment (see pages 27-29 to learn more)
- multiple water treatment processes monitored by real-time online analysers, verified with on and offsite testing (see pages 24-29 to learn about our water treatment plants)
- an enclosed distribution system with strictly limited access for maintenance and inspection purposes (See pages 33-36 to learn about the distribution network)
- maintaining residual disinfectant to provide lasting protection in the network
- a routine 'catchment-to-customer' verification sampling program conducted by an independent, National Association of Testing Authorities (NATA)-accredited laboratory (Refer to page 48 to see the results of laboratory analysis).

WHERE YOUR WATER COMES FROM

SOURCE WATER SUPPLY

The catchments feeding our storage reservoirs

In the Canberra region our source water catchments are able to store a total of 277.8GL of available water. The Cotter River holds three storage reservoirs (dams) – Corin (70.8GL), Bendora (11.4GL) and Cotter (76.2GL). Fed by the Queanbeyan River and tributaries we also hold storage in the Googong reservoir of 119.4GL. The final accessible catchment is the Murrumbidgee River, where we have no storage but can abstract directly from the flowing river.

The majority of the Cotter River catchment lies within the Namadgi National Park. This largely protects Corin and Bendora reservoirs from human-generated pollutants (for example faecal matter and pesticides) usually associated with agricultural, residential and recreational activities. The Lower Cotter Catchment, the watershed of the Cotter reservoir, is undergoing large-scale restoration following a history of commercial forestry and severe land degradation.

The Queanbeyan River catchment, located to the southeast of Canberra, contains a mix of developed and impacted land, including nature reserves, farm grazing and rural residential properties. NSW state agencies and local government councils regulate land-use planning and manage activities in this catchment. ACT Parks and Conservation Service manage the immediate area around the Googong reservoir and regulate approved recreational access to the water body and foreshore. The Googong reservoir on the Queanbeyan River is the largest of our four water supply reservoirs and represents 43 per cent of Canberra's storage capacity.

The Murrumbidgee River has no storage reservoir for our supply, water can be transferred from the Murrumbidgee River for storage in the Googong reservoir. The Murrumbidgee River catchment contains a wide variety of agricultural land uses, as well as the towns of Cooma, Numeralla, Bredbo and the Canberra district of Tuggeranong. No water was transferred from the Murrumbidgee River into the Googong reservoir during 2021–22.

A bushfire in early 2020 damaged portions of the Corin and Bendora catchments, and was followed by flood events in the following years. Although the immediate severe impact to water quality has since improved, there is still a long road to recovery in the catchment, and we expect the water quality in these storage reservoirs may continue to vary. The steep slopes within severely impacted areas have remained relatively stable post-fire and have continued to develop good ground coverage of vegetation re-growth which is helping to stabilise the soils and mitigate erosion.

Corin storage reservoir at full supply

Cotter Dam spilling

Googong Dam spilling

Bendora Dam spilling

Figure 7. Our source water

Catchment protection activities

Icon Water operates a Source Water Protection Strategy (the Strategy) which supports protection of drinking water supply from development and land-use pressures.

The strategy uses a three-tiered approach to:

- Maintain an awareness of the condition of the catchments by collating data, information, and analysis.
- Identify and assess catchment risks to inform our multiple barrier approach for safe drinking water.
- Build partnerships with stakeholders and land managers so any activities with potential to affect water quality are planned for and managed.

In 2021–22 we continued to work with relevant land management agencies and regional catchment groups to identify and mitigate potential contamination hazards within the catchments. Keeping the water clear at its source is the first layer of protection (barrier) we apply.

To protect the quality of our source water, we undertook the following key activities in 2021–22:

- Influencing catchment policy and legal protections and enhancements.
- We ran community engagement and education activities and campaigns.
- We supported catchment land managers with on-ground works and monitoring of ecological conditions.

Policy and legal protections

Icon Water has no legislative power in the management of land within the water supply catchments. Instead, our key objective is to work closely with the NSW and ACT regulators and policy makers which govern the water supply catchments.

In 2021–22, we liaised with regulators about the potential risks to water quality, and appropriate controls, for proposed development and commercial applications within the supply catchments. We also contributed to inter-agency groups and inter-jurisdictional regional catchment groups, including the ACT and Region Catchment Management Group and Upper Murrumbidgee Catchment Network.

On-ground works and monitoring

In the catchments, on-ground works can be an effective way of controlling localised hazards and risks to source water quality. These opportunities usually include partnerships with other projects or organisations.

Within the Lower Cotter Catchment, the ACT Government is implementing ongoing erosion control programs, focussing on slope length reduction and extensive revegetation on the upper slopes of the Pierces Creek catchment.

A series of sandbags, used to slow flowing water which reduces erosion of the creek bed and prevents soil washing downstream.

The Orroral Valley fire in January and February 2020 severely impacted 1,951 hectares of Corin catchment and 137 hectares of Bendora catchment. This event was followed by high intensity rainfall events which exacerbated soil erosion into the source water. Over the period, the ACT Government completed five catchment remediation projects via a Commonwealth-funded program to address the impacts of fire and flood-induced erosion and sedimentation. These works included remediating gullies, controlling eroding streambanks and enhancing vegetation along riverbanks.

In 2021, we produced a three-yearly Catchment Sanitary Survey (the Survey) and reported to ACT Health as required by Clause 14 of the Public Health (Drinking Water) Code of Practice 2007 (ACT). The Survey is an in-depth review of our drinking water catchments between January 2019 and November 2021, to determine the nature and extent of contaminant pathways with the potential to affect water quality. The survey did not identify any new or emerging risks to the water quality. Our risk management and hazard response plans have considered the known catchment-based risks from previous sanitary surveys.

Source water barriers

Our multi-barrier approach to managing water quality starts with control measures to protect the quality of our source water. These barriers support the downstream treatment barriers to manage all hazards that have a potential to affect public health. In addition to the activities to protect our water supply catchments from microbial pathogens, chemical contaminants and excess nutrients, we use passive and active controls within the storage reservoir and dam structure. The controls include:

- a long detention time in storage reservoirs which allows particles to settle and some natural microbiological disinfection to occur.
- sampling upstream of our abstraction sites to anticipate potential impacts at the treatment plants.
- online monitoring of source water.
- avoiding transferring poor quality source water between catchments and source water storage reservoirs.
- selective abstraction of water from the appropriate depth at our dam intake towers to deliver the best available quality to our water treatment plants.
- deploying booms and erosion controls in response to major events (such as bushfire or emergency incidents).
- stratification control in the reservoirs.

Detention and selective abstraction control

Water storage reservoirs are a fundamental part of the quality and security of our drinking water supply system. They store water for use during low rainfall periods and help to stabilise water quality through detention and settling of contaminants. This is particularly important after large rain events when inflows can transport high concentrations of sediment and organic material into the reservoir.

We monitor the quality of the water in our catchments via online analysers at our source water sites, and we maintain a routine verification program via a NATA-accredited laboratory, which conducts sampling at the pump stations and dam intake towers where we abstract water to send to our water treatment plants. This sampling also extends to upstream sites so we can respond quickly to source water quality changes and optimise our treatment processes (see 'source water monitoring' for more detail).

When we abstract from the Murrumbidgee River, we can transfer the water directly to Stromlo WTP for treatment, or to Googong Reservoir to provide long-term water security. Alternately, when we abstract water from our dam intake towers, we can vary the depth we draw from, which means we always send the best available water to Googong or Stromlo WTPs.

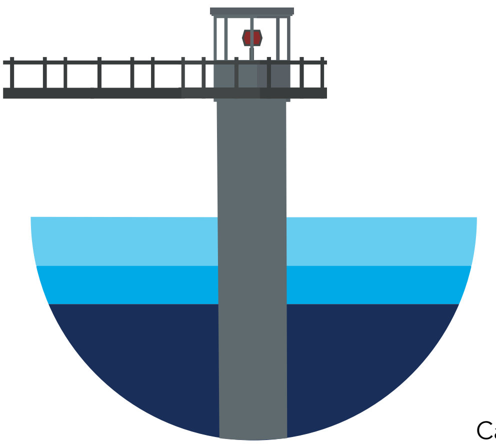


Figure 8. Selective abstraction

Stratification control measures

Thermal stratification occurs as a result of seasonal weather conditions and is where a water column is divided into distinct layers due to changes in temperature, oxygen and density. When these layers develop within a water body, they each form their own individual water quality zones with different properties that have implications for control of water treatment barriers. We operate mechanical mixers in the Cotter and Googong reservoirs to keep water circulating and reduce thermal stratification.

By actively managing stratification and minimising the formation of these layers, we can increase the amount of oxygen within a reservoir, and thus reduce dissolved metal and nutrient concentrations in the abstraction zone. Mixing also promotes environments less favourable for cyanobacteria (blue-green algae) growth. This makes more water available for selective abstraction for effective and efficient treatment.

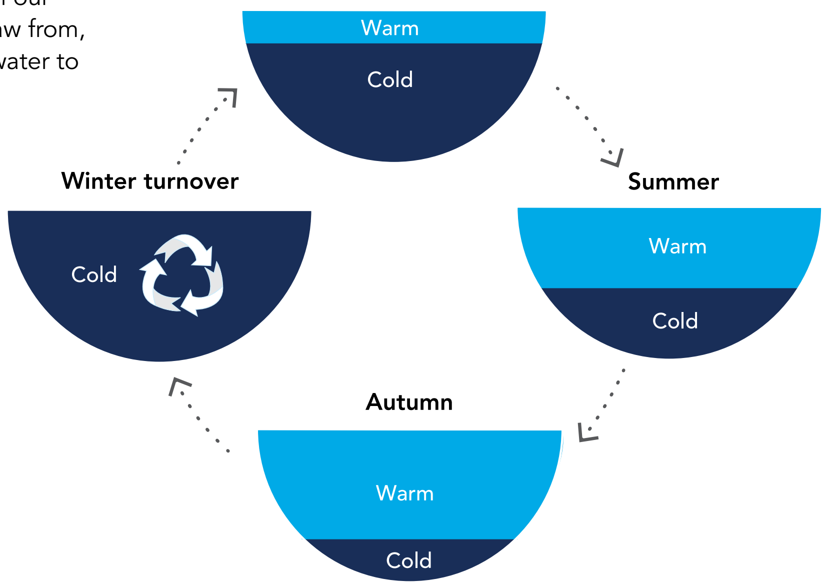


Figure 9. Water stratification process

Overview of source water conditions in 2021–22

2021–22 was a cool year with frequent wet weather and heavy inflows into the storage reservoirs. As such, we have seen increased microbiological pathogens in all our catchments, and have been required to respond at times when sediment was temporarily elevated in the source water reservoirs.

We were challenged by the ongoing impact on water quality at Googong reservoir, when in 2020, after years of sustained drought, heavy rains led to the rapid filling of the dam. The result was large amounts of runoff from the landscape flowing into the reservoir, leading to elevated levels of dissolved metals and natural organic matter within the source water.

The effects are still felt and have impacted our ability to select the highest quality water for treatment. It also challenged our treatment and network operations in terms of maintaining protective chlorine disinfection residuals within our network. This meant that some customers temporarily received safe, but higher-than usual chlorine residuals at their connection point in 2022 in order to provide a minimum level of protection to those located at an extremity of our network.

We undertake extensive sampling and analysis to monitor water quality in the source water storage reservoirs and the Murrumbidgee River. Our program is adaptively managed to ensure it adequately assesses the quality of source waters and identifies emerging issues that could impact on the effectiveness of treatment and the safety, or aesthetic quality of the drinking water supply, including those identified through Catchment Sanitary Surveys.

The NHMRC specify criteria in the ADWG for a wide range of measurable water quality characteristics that can be found in water and may affect its safety or aesthetic quality. They fall into several categories. Within these categories the key parameters we routinely monitor in the raw water sources are detailed in Table 1.

Table 1: Parameters routinely monitored in raw water sources

Microbiological	• *Cryptosporidium* and *Giardia* • *Escherichia coli (E. coli)* • Total coliforms • Enterococci • Phytoplankton (e.g. Algae cyanobacteria (blue-green algae) and associated pigments (chlorophyll-*aa*))
Physical	• Turbidity • Conductivity • Dissolved oxygen • pH • Temperature • UV absorbance • True colour
Chemical	• Alkalinity • Nutrients (e.g. nitrogen and phosphorous) • Synthetic organic compounds (including herbicides, pesticides, fungicides, insecticides and industrial chemicals such as PFAS) • Total and dissolved metals e.g. Iron and manganese • Total and dissolved organic carbon • Taste and odour compounds associated with cyanobacteria (Geosmin and MIB)
Radiological	• Radionuclides

The following summaries help our customers to understand more about the key source water quality components that we monitor to maintain and assess the performance of our source water barriers:

Cyanobacteria (blue-green algae)

Cyanobacteria are true bacteria, but are often referred to as 'blue-green algae' because they resemble green algae in appearance, habitat and photosynthetic abilities. Cyanobacteria occur naturally in water bodies, but when the water is warm, calm and nutrient-rich the conditions are highly favourable and they can grow in excessive numbers, called 'blooms'.

As well as environmental conditions such as drought and bushfire, the agricultural activities and other development prevalent in the Googong and Murrumbidgee catchments can increase the nutrient levels in the waterways, making these raw water sources more susceptible to algal blooms (Refer to page 16 for more information about our catchments). Our storage reservoirs (predominantly Googong) occasionally experience blue-green algae blooms.

The blooms experienced in our catchments are typically of the *Dolichospermum* and *Microcystis* genera, which can at times produce toxins harmful to humans and animals. Blooms can also produce natural compounds, that while harmless, can affect the aesthetic quality of drinking water by imparting earthy, musty tastes and odours. These compounds are called Geosmin and MIB (2-Methylisoborneol) and some people can detect these compounds at very low concentrations, as low as less than 10 parts-per-trillion (10 ng/L).

We carry out regular monitoring of cyanobacteria, generally most often in warmer months when blooms are more likely. Our cyanobacteria response plan, once activated, can direct an increase in monitoring within the reservoir and at the associated WTP, and additional operational actions including further treatment to protect the drinking water from harmful cyanobacteria and cyanotoxins, and to reduce aesthetic impacts. Under the Code, ACT Health is consulted if elevated levels of cyanobacteria are detected (details of the notifications provided to ACT Health are provided in page 39 of this report).

Concentrations of cyanobacteria in all of our catchments, including Googong reservoir, were lower in 2021–22 compared to the previous year. This was due to cooler temperatures during La Niña climate conditions, which provided less favourable conditions for algal growth. In 2021–22, there was one notifiable cyanobacteria detection in the Queanbeyan catchment (within Googong reservoir) and no notifiable cyanobacteria detections within the Cotter or Murrumbidgee catchments.

Microorganisms

Cryptosporidium and *Giardia* are microorganisms (parasitic protozoan) that can cause gastroenteritis. There is a background level of infection of *Cryptosporidium* and *Giardia* in the general community, and the organisms are usually spread through contact with pets, farm animals or people who are already infected. Infected people show either no symptoms or may experience diarrhoea, vomiting and fever. Healthy people usually recover fully.

If found in the source water supply these organisms indicate faecal contamination of the waterway (from either human or animal sources). Testing methods for *Cryptosporidium* and *Giardia* are complex and it is difficult to confirm whether they are infectious to humans. We undertake routine monitoring for *Cryptosporidium* and *Giardia* in the storage reservoirs and the Murrumbidgee River, as well as at our WTPs. Other faecal indictors like Enterococci and *E.coli* (which can have both environmental and human/animal source pathways) are also sampled.

Monitoring for microorganisms is important to confirm our barrier performance and verify the safety of the water provided to our customers.

Due to the lower levels of catchment protection and brief detention time, the Murrumbidgee River typically contains more *Cryptosporidium* and *Giardia* than our storage reservoirs. The risk increases across all catchments during rainfall events with additional runoff carrying faecal contaminants into the waterways. Therefore, in addition to routine testing, additional monitoring may be conducted if abstracting after high flow events or abstracting from the Murrumbidgee River.

During 2021–22, monitoring confirmed one detection of a protozoan organism in Googong reservoir and one in Cotter reservoir. In addition, protozoan detections occurred once in the raw water entering Googong WTP, and three times in the raw water entering Stromlo WTP.

There were no detections for these microorganisms in the treated water leaving either treatment plant, and treatment barriers were confirmed to be operating as intended (see Health notifications page 41 for more detail).

Synthetic compound monitoring

Synthetic compounds include items such as pesticides, herbicides, fungicides, insecticides and industrial chemicals such as Per- and Poly-fluoroalkyl substances (PFAS). Specific monitoring is undertaken in all drinking water catchment sources for these groups of parameters using a risk-based approach.

Maintaining relationships with land managers and the community in proximity to the drinking water supply is vital to protect the source water from these types of contaminants.

During 2021–22, there were no detections of synthetic compounds above ADWG health values in any of the four storage reservoirs or the Murrumbidgee River.

HOW YOUR WATER IS TREATED

WATER TREATMENT PLANTS

Icon Water operates two water treatment plants (WTPs), one located on Mount Stromlo (ACT) and the second adjacent to Googong Dam (NSW).

We abstract raw water from our storage reservoirs and treat it at one of our WTPs before we send it to the community.

The Stromlo WTP has operated since 1967 and can treat water from the Cotter catchment and the Murrumbidgee River. Stromlo WTP can treat 250 ML of water per day and is the preferred WTP as water can be supplied by gravity from Bendora reservoir, which is more sustainable and economical. The surrounding land use of the Cotter River provides reasonable protection to the water quality flowing into the dams.

The Googong WTP has operated since 1979 and can treat water from the Queanbeyan River catchment and indirectly from the Murrumbidgee River (via the Murrumbidgee to Googong Transfer Pipeline). The two water treatment plants can be operated independently or in conjunction with each other to meet the community's water supply demand.

Our Googong WTP operated between March and May 2022, producing 5,036 ML (11 per cent of annual total production), with Stromlo WTP operating for the remainder of the period, producing 40,300 ML (89 per cent of total annual production, see figure 9).

The two plants did not run concurrently over the year. Customers used less water overall because higher-than-average rainfall reduced the amount of garden watering. The amount we produce varies to meet customer demand throughout the year and seasons. Production over the period ranged between 59.1 ML and 210.2 ML per day, a reduction of 15.3 per cent of the summer peak water demand of the previous year.

Summary of our treatment process

There are various treatment steps within each plant. Due to their age and source water quality the plants have differences in the way they operate and the treatment barriers in place.

Stromlo WTP can operate in two process modes – direct filtration or dissolved air flotation and filtration. Dissolved air flotation is an optional treatment step that gives us extra capabilities when raw water is of poorer quality. It also has an additional barrier, utilising UV to disinfect microbiological organisms remaining after filtration. Figure 11 shows the treatment barriers for Stromlo WTP.

Googong WTP has an optional treatment step utilising powder activated carbon (PAC), which may be used to remove some of the taste and odour compounds prevailing in the Queanbeyan River catchment. This plant does not have UV disinfection.

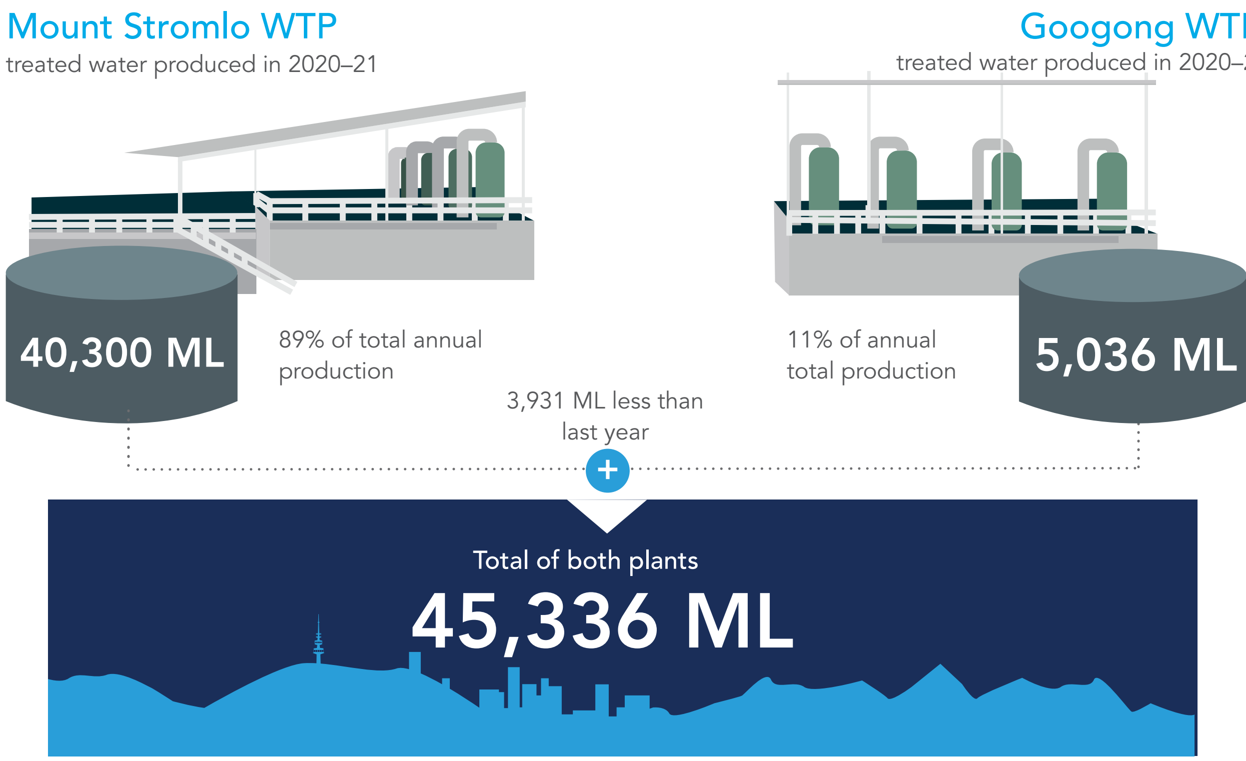
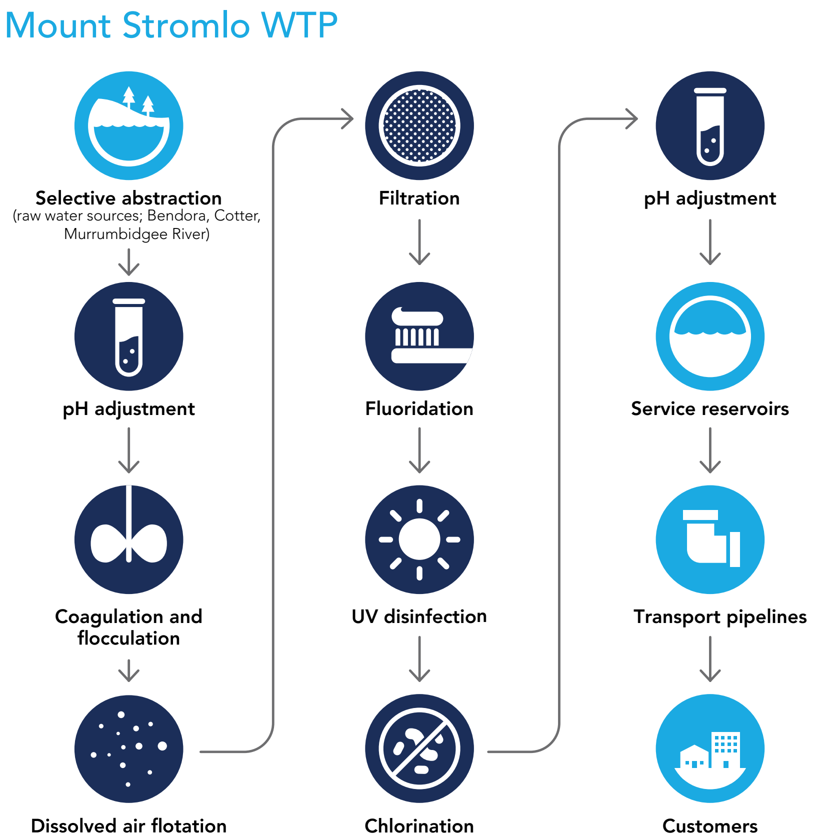


Figure 10. Water treatment plant drinking water production volumes

The treatment process is shown in Figure 11 and involves:

- selective abstraction (raw water sources: Bendora, Cotter, Murrumbidgee River)
- optional potassium permanganate for oxidation and removal of metals and organics
- pre-treatment for pH adjustment and stabilisation with lime and carbon dioxide
- coagulation by polyaluminium chloride and/or aluminium sulphate
- flocculation aided by polyelectrolyte
- optional dissolved air flotation
- filtration
- fluoridation by sodium fluorosilicate
- disinfection by ultraviolet (UV) light
- disinfection by chlorination
- pH adjustment and stabilisation with lime
- distribution to the network



- selective abstraction (raw water source: Googong
- optional potassium permanganate for oxidation and removal of metals and organics
- optional powdered activated carbon for cyanobacteria and taste and odour compound removal
- optional pre-treatment for pH adjustment with lime
- coagulation by aluminium sulphate
- flocculation aided by polyelectrolyte
- dissolved air flotation and filtration; or clarification and filtration, depending on operational mode
- fluoridation by sodium fluorosilicate
- disinfection by chlorination
- pH adjustment and stabilisation with lime
- distribution to the network

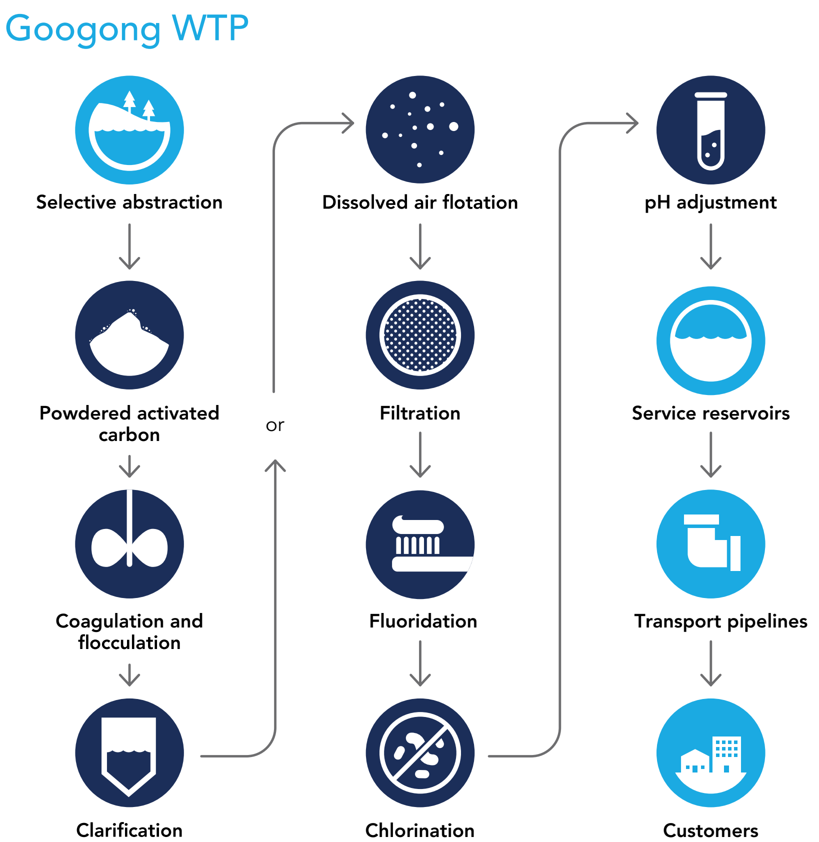


Figure 11: |Water treatment steps of water supplied from WTPs to customers' taps

MONITORING AND MAINTAINING OUR TREATMENT OPERATIONS

It's critical that we extensively monitor to control operations at our WTPs to ensure each treatment barrier is functioning optimally.

Under our HACCP-based water quality management system, five critical control points are applied in the drinking water supply system. Four of these exist within the WTPs highlighting the importance of the water treatment operations in the delivery of safe drinking water.

Both WTPs contain analysers to continuously monitor key water quality parameters, so we can rapidly respond to changes in the raw or processed water quality. Our dedicated treatment operators run and monitor plant processes, to ensure the supply is not compromised by any single point of failure.

Electrical, instrumentation and automation teams calibrate and maintain these control systems, along with the maintenance team, who support this with a scheduled service and repair program. Together, these teams ensure control systems are performing effectively and are producing high quality water within our specifications.

In addition to continuous operational monitoring performed by operators onsite, our external NATA-accredited laboratory verifies our treatment barrier performance by analysing for a range of parameters.

The parameters routinely monitored at the water treatment plants are detailed in Table 2.

Table 2: Parameters routinely monitored at the water treatment plants.

Microbiological	• *Cryptosporidium* and *Giardia* • *Escherichia coli (E. coli)* • Total coliforms • Heterotrophic plate counts
Physical	• Turbidity • Temperature • True colour • Conductivity • pH • UV absorbance • Total dissolved solids
Chemical	• Chlorine • Fluoride • Alkalinity • Total and dissolved metals • Total and dissolved organic carbon • Hardness • Synthetic organic compounds (including herbicides, pesticides, fungicides, insecticides and industrial chemicals) • Trihalomethanes • Haloacetic acids

The following summaries are provided to assist our customers to understand more about the key parameters continuously monitored at the water treatment plants to manage our critical treatment steps: filtration, fluoride management, UV disinfection and chlorination.

Controlling physical water quality parameters

Turbidity

Turbidity is a measurement of the light-scattering property of water caused by suspended particulates. These include suspended colloidal particles, clay and silt. Water treatment plants are designed to convert dissolved components into a solid form that can be coagulated and flocculated with other particles and any pathogens present in the raw water. Aggregates (flocculant) are formed and removed from the raw water via filtration. The filters at our water treatment plants are a water safety barrier and are considered a critical control point where performance is paramount. We use turbidity as a key indicator of filter performance.

The ADWG recommends a filtered water target of 0.2 nephelometric turbidity units (NTU). During 2021–22 the turbidity leaving the treatment barrier, the filters at Stromlo WTP, was below 0.06 NTU for 99 per cent of the time. At Googong WTP turbidity was below 0.21 NTU for 99 per cent of the time.

pH

While not considered a direct barrier to the safety of supplied drinking water, the pH of the water plays an important role in maximising the effectiveness of other treatment controls. We adjust pH at the beginning of the treatment process and again before leaving the WTP using lime. We control the pH of raw water entering our plant to optimise the coagulation and flocculation treatment steps which remove solid particles.

Adjusting the pH of treated water before it leaves the WTPs ensures effective disinfection potential while drinking water travels through our distribution pipelines. Consistent with the ADWG the pH range we target for drinking water when it arrives at the customer supply point is between 6.5 and 8.5. The average pH of the final treated water at Stromlo was 7.33 and for Googong WTP was 7.30 during 2021–22.

Controlling microbiological water quality parameters

We have two barriers for the control of microbial contaminants in the raw water. Our primary barrier is filtration to remove microbiological organisms attached to solid particles. This is followed by a disinfection treatment step to deactivate or kill any remaining organisms. The two disinfection treatment options we have are chlorine and UV. UV has an immediate but no residual effect for disinfection and is only available at the Stromlo WTP, whereas chlorine is used at both plants to provide a residual effect in water travelling to customers' connections.

Chlorine

Chlorine is widely used in treatment plants throughout the world. We add chlorine gas to Canberra's water at a concentration sufficient to provide a chlorine residual for lasting protection against contamination in the distribution system. Critical controls are in place to ensure the level of chlorine in the water is safe to drink and performing as an effective barrier.

The ADWG has a health limit of 5mg/L of free chlorine. During 2021–22 the free chlorine concentration in the drinking water leaving Stromlo WTP was maintained at an average of 1.39 mg/L. Due to its different raw water characteristics and longer transit time within the distribution system, Googong WTP generally operates with final treated water of a higher free chlorine concentration (average of 2.60 mg/L in 2021–22).

As all drinking water processed by our WTPs is disinfected using chlorine, customers who choose to adjust the water to a different standard (brewers, aquarium owners etc.) should be mindful that chloramine is not used within Canberra's drinking water system.

Ultraviolet light

UV disinfection is used at the Stromlo WTP to further reduce the risk of pathogens entering the drinking water supply. UV lamps provide a 'UV dose' to the water to irradiate and inactivate microorganisms by damaging the nucleic acids that form their DNA.

The quality of filtered water passing through the UV reactor can influence the effectiveness of the dose to penetrate the water. We monitor the quality of water entering the reactor via online sensors. The power of each UV lamp is optimised to ensure the required dose is maintained based on flow rate. ACT Health set the benchmarks for the irradiance dose.

The treatment step continued to meet the ACT Health performance objectives, and in 2021–22, 99.96 per cent of the treated water received a dose greater than the target value.

Additional treatment, addition of Fluoride

The Drinking Water Utility Licence, issued by ACT Health, requires fluoride to be added to the ACT's drinking water system at a concentration between 0.6 and 1.1 mg/L.

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, 2017[4]). To achieve compliance with our licence, we add sodium fluorosilicate to the drinking water at our WTPs.

Fluoride is monitored as a critical control point to ensure the concentration in the water is safe to drink and meets the requirements of our licence.

In 2021–22 fluoride concentrations in the treated water at Stromlo and Googong WTPs averaged 0.74 mg/L and 0.72 mg/L respectively.

4. NHMRC, 2017. Public Statement; Water Fluoridation and Human Health in Australia. National Health and Medical Research Council, Commonwealth of Australia, Canberra. nhmrc.gov.au/about-us/publications/2017-public-statement-water-fluoridation-and-human-health

HOW WATER GETS TO YOUR HOUSE

DELIVERING WATER TO YOUR DOOR – PIPES, PUMPS AND TANKS

Icon Water distributes water throughout Canberra using an extensive network of pipelines and service reservoirs. We also supply bulk water to Queanbeyan-Palerang Regional Council, which distributes the water to Queanbeyan city including the Googong Township.

We operate and maintain 51 service reservoir sites, 25 pump stations and approximately 3,438 km of water pipelines. This infrastructure is maintained and closely monitored and includes a number of physical and chemical control measures to protect against potential contamination.

Some of the prevention barriers include:

- The water distribution system is a closed network from the WTPs to customers' points of supply which prevents external contaminants entering the treated water.
- Water mains are operated under positive pressure to prevent contaminants infiltrating pipes.
- Backflow prevention devices are installed at customer supply points to protect against contaminants.
- A disinfection residual, free chlorine concentration, is maintained within the water distribution system to protect against microbiological growth or establishment during its journey from the WTP to our customers' points of connection.

Service reservoirs

Potable (drinking quality) water from our water treatment plants is fed into service reservoirs (tanks) that are spread out across the city. These reservoirs provide temporary storage to manage the variation in Canberra's demand for water across 24 hours, as well as emergency storage for firefighting. Tanks also provide water pressure when customers turn on the tap. From these tanks, water mains carry the drinking water to each customer's connection.

We have 51 reservoirs currently in service to supply potable water in the distribution network. They range in age from 107 to one year old. Reflective of the era in which they were built our reservoirs comprise five categories of construction types and material composition. Our reservoirs stored up to a maximum of 627.4 ML of potable water at any given time in 2021–22. We increased our network storage by 0.9ML in July 2021 with the commissioning of the One Tree Reservoir North Tank, located in the suburb of Taylor.

All Canberra service reservoirs are secure structures to protect the integrity of the distribution system and prevent contamination. We inspect them regularly to assess the security of the sites and their external condition. Reservoir cleaning is routinely undertaken with each reservoir being cleaned, on average, once every five years. When this happens, we empty the reservoir, inspect its condition, clean it, and perform maintenance as required. Before returning the tank to the supply system we disinfect the reservoir and test the water quality in the freshly filled tank.

Supply to customers' points of connection

Our distribution network consists of around 3,438 km of water mains (pipes). On average, new urban development adds 40 km of new distribution pipework each year. New suburbs under development such as Taylor in the city's north and Whitlam in the Molonglo district are examples of extensions to the water supply network.

The network varies by materials, construction methodology and age, and we have factored these variables into our predictive modelling to determine which parts of the network to schedule for inspection, maintenance or replacement. We have a rolling replacement program for pipes which are approaching their end of life or susceptible to failure (bursts).

One group identified for replacement are the cast iron unlined water mains, which remain in place from our city's early establishment and are likely to contain deposits of rust. Replacing these unlined water mains reduces water quality variability because turbidity and staining can occur when the rust is disturbed during high demand such as when a pipe breaks or when a large amount of water is used such as for fire suppression.

Another suite of scheduled pipe replacements are water mains installed between 1965 and 1978. This group of mains account for 73 per cent of structural failures in the distribution network.

MONITORING THE DISTRIBUTION SYSTEM

As part of our commitment to high water quality, we undertake a comprehensive routine drinking water quality monitoring program based on criteria set by the ADWG to verify water quality throughout the distribution system.

We monitor water quality routinely at each reservoir (tank) to verify that the water quality complies with the ADWG and to optimise system operations.

The quality of water travelling through the pipe work is monitored at approximately 400 locations across the city. To ensure a statistical representation of the water received by customers, a selection of customers participate in a voluntary program where their garden tap water is sampled sporadically throughout the year. During 2021–22 an average of 100 customer garden taps were monitored each month from the 400 locations around Canberra.

The monitoring includes a variety of physical, microbial and chemical parameters. We compare the results to criteria set by the NHMRC within the ADWG. The key parameters routinely monitored are summarised in page 35-36.

Disinfection in the distribution system

Chlorine is added to water in the final stages of treatment at Mount Stromlo and Googong WTPs. This process is detailed on page 31. Sometimes customers in one location can taste a different amount of chlorine than another location. This is because chlorine dissipates as the water travels through the distribution network and in different temperature conditions. When making decisions about the chlorine concentration leaving our water treatment plants, we factor in transit times and seasonal temperature to minimise aesthetic impacts for our customers. However, given water transit times can vary depending on how much water the community is using and seasonal factors, sometimes we need to increase the concentration at our plant or boost the concentration in an area of our network. We always prioritise protection of public health for the entire network over aesthetic considerations relating to chlorine.

Chlorine is monitored frequently so we can optimise and act on any results that indicate a depletion of disinfection residual. When chlorine levels drop we can boost those disinfection levels at service reservoirs using sodium hypochlorite.

The ADWG has set an aesthetic guideline for chlorine of 0.6 mg/L and a health guideline of 5 mg/L. In 2021–22, the average free chlorine concentration was 0.83 mg/L across the customer tap sampling program and the highest was 2.14 mg/L. See pages 47-80 (Laboratory Analysis section) for more information.

The distribution of chlorine results for customer taps across all the network is shown in Figure 12.

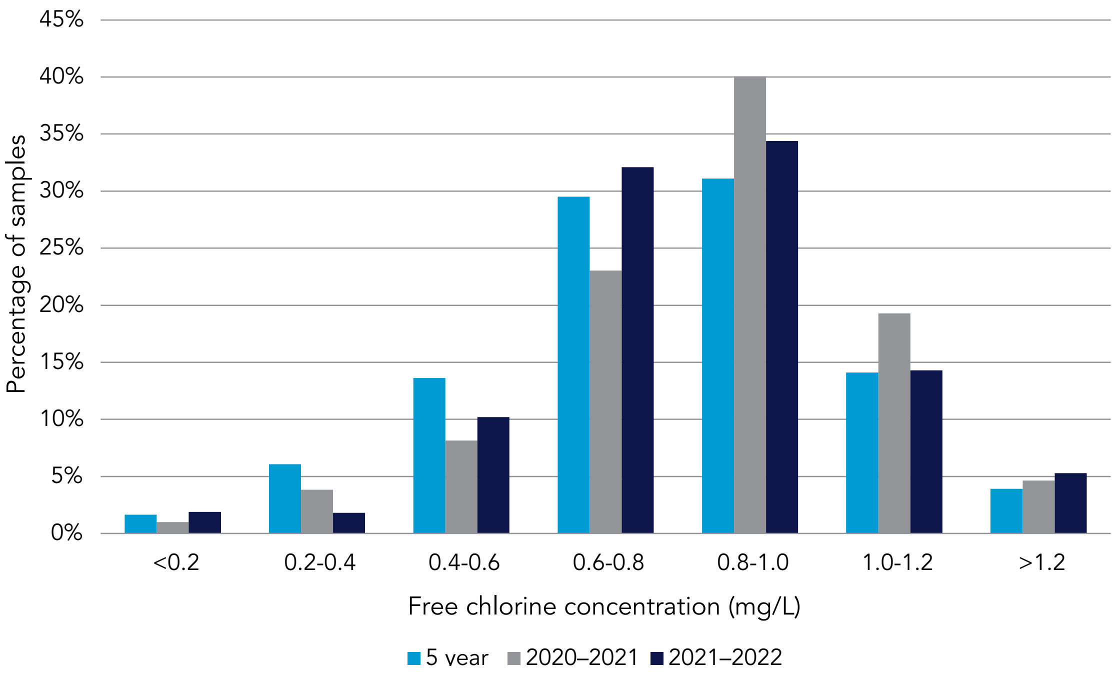


Figure 12. The distribution of chlorine concentration in monthly network monitoring samples

Microbial monitoring

The WTPs are designed to deactivate and remove microbial contaminants before distribution to customers, but as the water moves through the water distribution system there remains a small potential for re-contamination.

Therefore, we conduct verification monitoring of *E. coli* (faecal indicator) at customers' connections to ensure their water is free from harmful microbiological contamination.

The ADWG suggests that *E. coli* should not be detected in a minimum 100 mL sample of drinking water.

Monitoring physical parameters

Turbidity is a physical parameter that is a measurement of the suspended and dissolved particulates in water. Turbidity can increase as water passes through the distribution system, usually because of resuspension of natural minerals that have settled over a long period of time. Elevated turbidity levels may be temporary, associated with a water main burst or when sudden demand is placed on the network.

The ADWG does not outline a health guideline, however the aesthetic value is five nephelometric turbidity units (NTU) – a level that is just noticeable in a glass of water. During 2021–22 the average turbidity at participating customers' taps was 1.1 NTU. A summary of the results are in pages 47-80 (Laboratory Analysis section).

Colour is mainly present in the raw water due to natural organic compounds, from small hydrophilic acids, proteins and amino acids to humic and fulvic acids. These compounds originate from organic matter in the catchment. The majority of natural organic matter is removed by coagulation in the water treatment plants.

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. During 2021–22 the average true colour measured at participating customers' taps was <1 Pt-Co. A summary of the results are in pages 47-80 (Laboratory Analysis section).

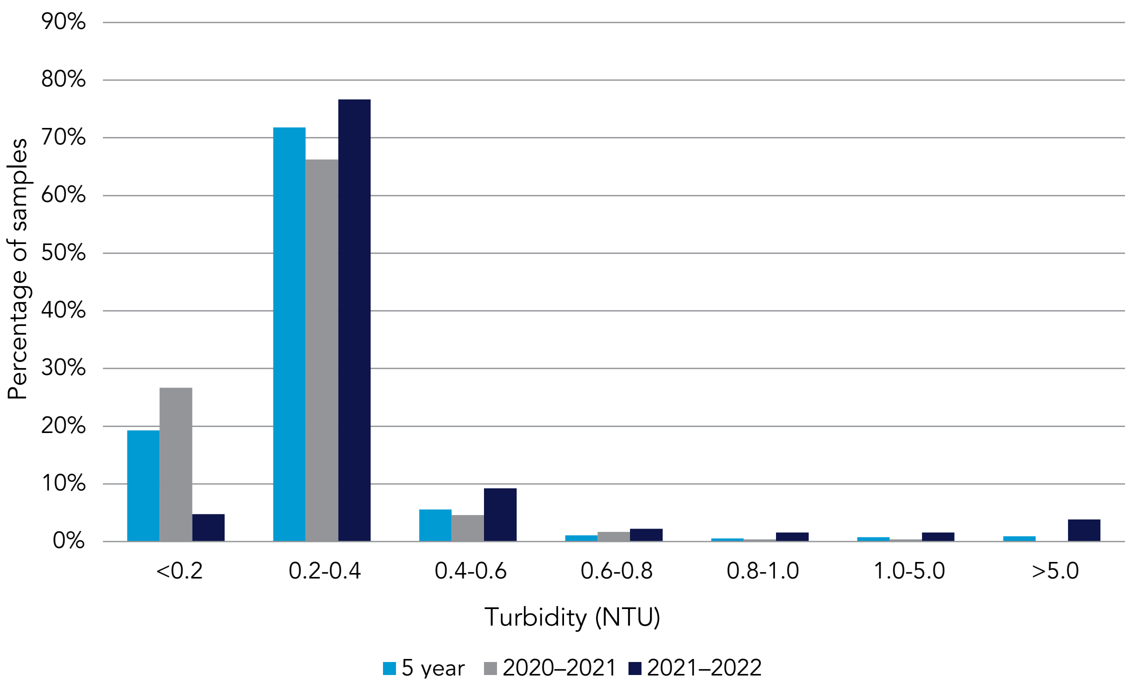


Figure 13. The distribution of turbidity values across monthly network monitoring samples

Metals

Iron

Iron in the soil of the catchment dissolves into raw water (within our dams) but can also arise in the distribution system from the corrosion of iron or steel pipes, including components of a plumbing system. Iron can contribute to the formation of mineral deposits on the inside of pipes, which may detach during high flows and appear as temporary discolouration. It can also affect the taste of the water. We undertake a planned program of works to replace sections of corroded pipe, which helps lower metal concentrations.

The ADWG does not outline a health value, however the aesthetic guideline value for iron is 0.3 mg/L, which is based on the taste threshold in water. In 2021–22 the average concentration of iron measured at participating customers' taps was 0.04 mg/L. A summary of the results are in pages 47-80 (Laboratory Analysis section).

Manganese

Manganese is commonly present in water sources in low concentrations, and is detected in higher concentration when under anoxic conditions, like at the bottom of deep reservoirs. Like iron, manganese can also contribute to the formation of deposits on the inside of pipes, which may temporarily discolour water when flows are disturbed.

The ADWG provide both a health and an aesthetic value for manganese. The health guideline value is 0.5 mg/L. Levels above the ADWG aesthetic guideline level of 0.1 mg/L can cause an undesirable taste and stain clothes during washing. During 2021–22 the average concentration of manganese measured at participating customers' taps was 0.008 mg/L. A summary of the results are in pages 47-80 (Laboratory Analysis section).

Copper

Copper is found naturally in raw water, generally in low concentrations. Water from customers' taps may contain higher levels of copper if the water has been in contact with copper plumbing and fixtures such as hot water systems. Copper levels increase when water stagnates in the plumbing system for long periods, for example if residents are away on holiday. Water with a high level of copper often has a blue-green appearance.

The ADWG health guideline value for copper is 2 mg/L. The ADWG aesthetic guideline value for copper is 1 mg/L which can contribute to staining on plumbing fixtures such as taps. During 2021–22 the average concentration of copper measured at participating customers' taps was 0.017 mg/L. A summary of the results are in pages 47-80 (Laboratory Analysis section).

Lead

Lead is found in the catchments as a naturally occurring metal, and household plumbing systems are another source. Lead is used to manufacture a range of plumbing products such as brass fittings. Lead can dissolve into drinking water if it has been sitting in contact with these brass fittings for a long time.

The Australian Government Department of Health recommends flushing cold water taps used for drinking and cooking for about 30 seconds first thing in the morning and for at least two to three minutes after periods of absence. This draws fresh water from the network into the tap and reduces potential exposure to lead and other metals such as copper and nickel that may have stagnated within household pipes.

The ADWG sets a health limit for lead of 0.01 mg/L. During 2021–22 the average concentration of lead measured at participating customers' taps was 0.0004 mg/L. A summary of the results are in pages 47-80 (Laboratory Analysis section).

Other compounds

We monitor various other substances in the distribution system including a range of semi-volatile organic compounds (SVOCs) and disinfection by-products in line with the ADWG. Plasticisers and hydrocarbons are common sources of SVOCs. Plasticisers are used in a broad range of products including some pipework, while hydrocarbons can be used as an indicator of contamination permeating the wall of some pipe materials and fittings.

Disinfection by-products are chemicals with health values in the ADWG. Under suitable conditions these chemicals can form as a result of the water treatment process. We monitor for these compounds at the WTP and across the distribution network.

All routine monitoring results are presented in the Laboratory analysis section.

HOW WE ENGAGE WITH OUR CUSTOMERS

Community engagement and education

In 2021–22 we undertook a range of land manager engagement and community education activities to influence land use and recreation and to build community knowledge of our regional water supply.

Due to ongoing COVID-19 restrictions, our face-to-face education and engagement events and guided tours were put on hold again to ensure the safety of our staff and the community. Instead, this year we successfully delivered our education program to more than 2,275 participants in other formats. We used our digital studio to deliver 35 live webinar sessions to educators and students throughout Canberra and Queanbeyan, where students learned about the ACT urban water cycle and Icon Water's water and wastewater services.

We also worked with the ACT Government, Actsmart Schools Program and H20K Healthy Waterways to deliver two online webinars to 17 teachers and over 1,500 students. We delivered nine presentations to Master Plumbers ACT and Canberra Institute of Technology Industry Forums in 2021–22. These sessions highlight industry partnerships and support Icon Water's water network awareness training requirements for first year plumbing students.

We continued our focus on developing relevant and informative digital materials to further build our online water and wastewater literacy program. These resources include a growing series of downloadable factsheets and engaging activities to support learning for primary (K-2, 3-6) and secondary (7-10) students. Over 54,000 unique visitors explored the Icon Water education section of our website this year.

We continued to deliver our Googong Dam and Foreshores Community Engagement Strategy, where we emphasise the important role developers, local community groups, schools and ACT Parks and Conservation Service play in the protection of source water.

We continued our direct engagement with Queanbeyan-Palerang Regional Council to develop regulation and policy to protect the quality of water entering the Googong reservoir.

We also provided financial support that allowed Waterwatch programs to continue in the Cooma-Monaro upper Murrumbidgee catchment.

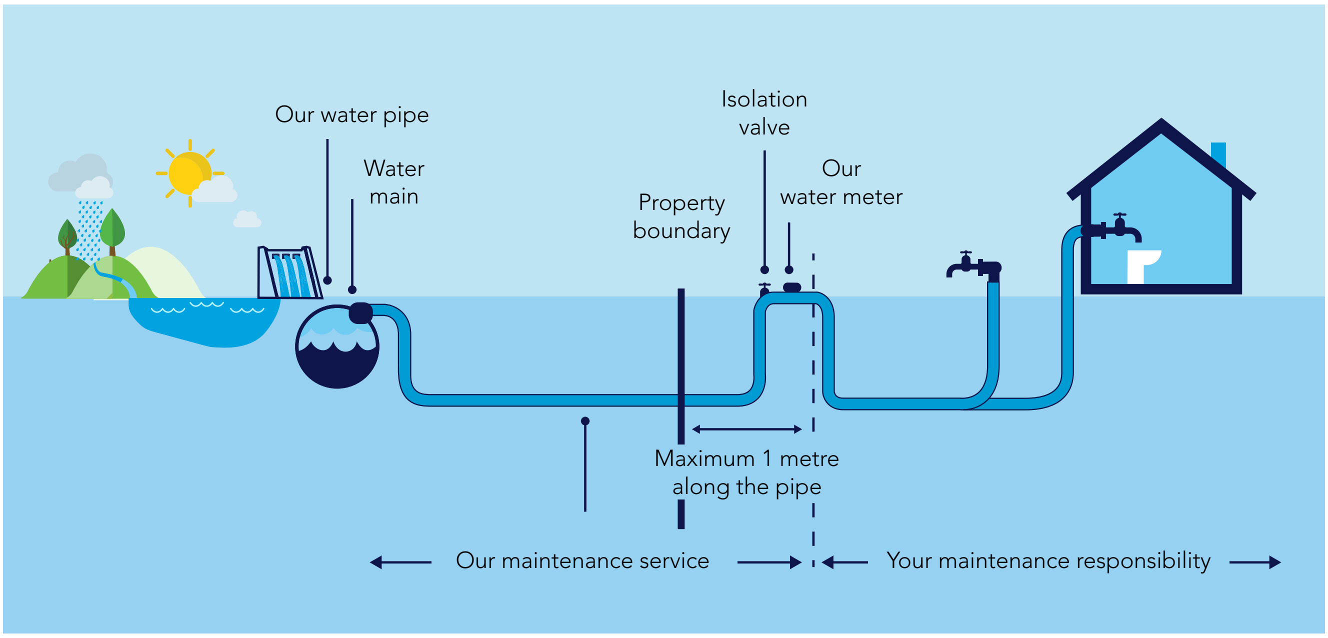


Figure 14. Canberra's water journey

Common water quality enquiries

At Icon Water we manage approximately 195,000 connections to the water network in the ACT. A survey of 300 residential households and 200 businesses indicated that 96 per cent of our customers are satisfied with our services. Our drinking water continued to be highly regarded with 98 per cent of our customers satisfied with the quality.

Occasionally customers experience problems with the quality of their water supply and contact us for advice. Concerns expressed by the community may be investigated to determine the likely cause and, if required, corrective actions are taken. During 2021–22 we received over 60,000 customer calls (including faults and emergencies, account and general enquiries). Of those calls, 33 were water quality complaints, a 23 per cent reduction compared with 2020–21.

Often changes related to water quality are short-term and may be associated with:

- seasonal changes to quality
- a switch between water treatment plants (each source water catchment has a different natural quality signature – for instance organic content changes in each catchment)
- water main bursts, network renewal or expansion, maintenance work or a change in usage patterns within the water supply system.

In particular, sudden changes in network demand caused by hot weather, use of a fire hydrant, or network valve operations required for maintenance work, have the potential to reverse the direction of flow of water. This causes a shearing force on internal pipe surfaces and disturbs the natural mineral sediment that is settled at the bottom of pipes, which may result in discoloured water for a short time. Where customers are likely to be affected by planned maintenance activities, we make every effort to notify them in advance.

It is also common for customers to notice a change to the appearance or the aesthetic quality of their water due to something associated with their own internal pipework or the way they are storing water (See Figure 16). The easiest way to determine if something might be originating in our network or within a customer's home is to check the water at the front garden tap, or talk with neighbours.

Of the 33 enquiries in 2021–22, two were confirmed through investigation to be attributed to the Icon Water network and supply. A summary of the types of water quality complaints received are detailed in Figures 15 and 16. The light blue portion of the graph represents the number of enquiries which were attributed to the customer's private plumbing issues or remained within ADWG limits. The navy portion represents the number of complaints where Icon Water's supply was determined to be the underlying cause.

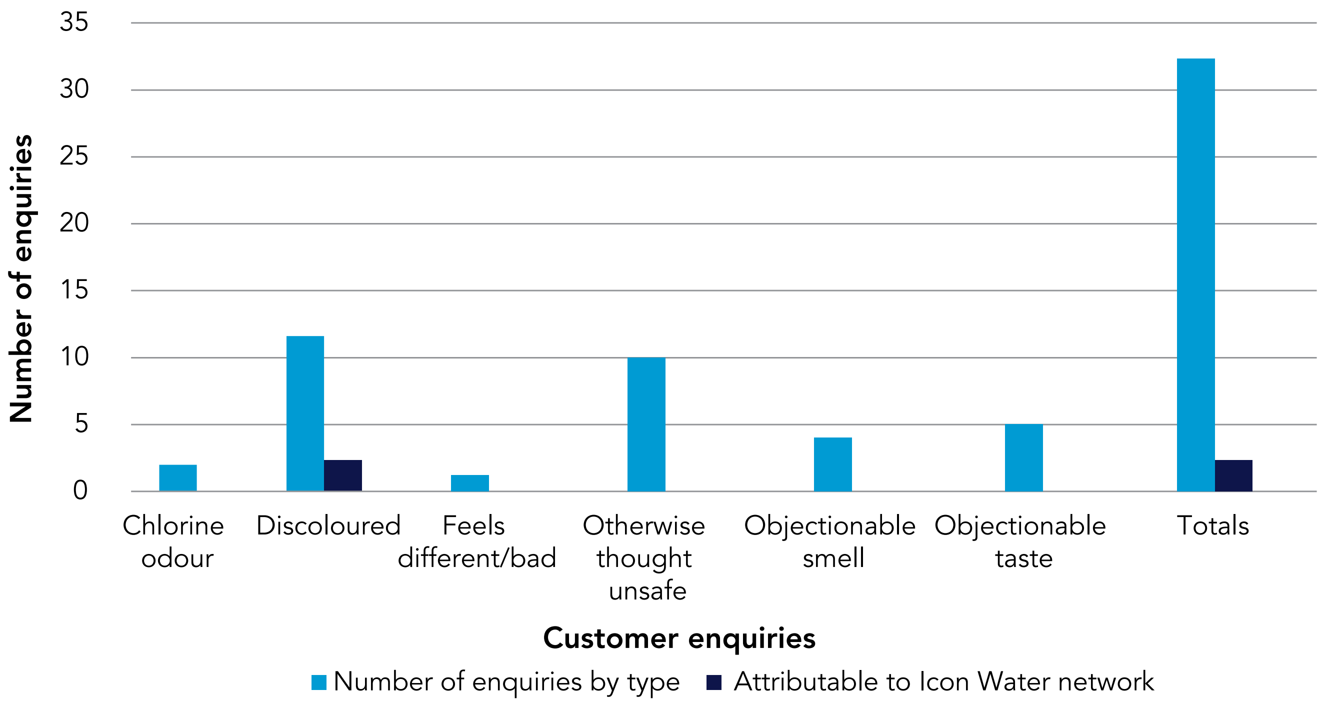


Figure 15. Total number of customer enquiries about water quality

Discoloured

Discoloured water is often associated with planned and reactive maintenance work or a change in network usage patterns, but may also be associated with internal plumbing (particularly within deteriorated pipework and hot water services).

Usually clears within a short time, after flushing or upon inspection of internal pipework.

White/cloudy

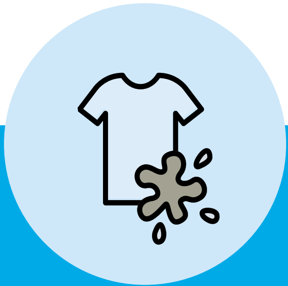
Usually presents as cloudy water resulting from air bubbles generated by flushing of the mains, hot water units or aerators on taps.

Air is harmless, and will clear from the glass (from the bottom-upwards) if left to sit.

Blue/green

Blue or green water can often be associated with the corrosion of copper pipes.

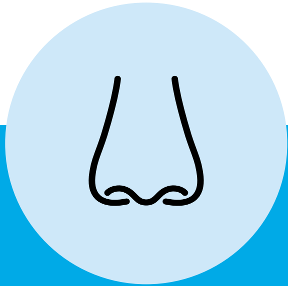
Usually addressed through changes to internal plumbing.



Staining

Deposits dislodged from domestic plumbing or from the water main can cause staining of washing.

Usually temporary or cleared through investigation of internal fittings/pipework.

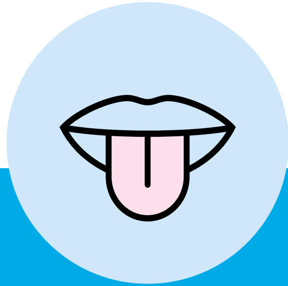


Chlorine odour

Usually these enquiries relate to a change (increase) in the level of chlorine perceived by a customer.

These problems are aesthetic, usually short-term and can be reduced by:

- leaving water to stand on a bench or in a fridge for a short time, which will allow the chlorine to dissipate
- adding freshly squeezed citrus e.g. lemon juice to the water; this contains ascorbic acid which can neutralise chlorine



Disagreeable taste

Disagreeable tastes including musty, earthy, bitter and metallic tastes. Like odour, taste can vary and is subjective.

Can sometimes be resolved by flushing water in the network, often addressed by investigating internal plumbing issues.

Other

Issues not otherwise categorised.

Figure 16. A summary of common enquiries received

NOTIFICATIONS TO ACT HEALTH

Icon Water complies with the *Public Health (Drinking Water) Code of Practice (2007)* (the Code) issued by ACT Health (as referenced in Section 2 of this report).

The Code sets out operational, communication, reporting and response requirements for Icon Water and ACT Health to ensure the supply of safe drinking water. The Code also sets out specific water quality events or incidents that Icon Water must notify to ACT Health.

During 2021–22, 14 notifications to ACT Health were issued; all but one were identified from the results of our routine monitoring program. One was in response to internal testing completed by a plumber and then notified to Icon Water. Of the 14 notifications:

- three were in the source water reservoirs, and did not exceed the ADWG. They required a watching brief only.
- four notifications were in treatment plants.
- seven were in the distribution network.

The details of each of these are below in table 3:

Table 3: notifications to ACT Health under the Drinking Water Code of Practice

Water in the storage reservoirs	
22/10/2021	***Cryptosporidium* – Cotter Reservoir** *Cryptosporidium* was detected in Cotter Reservoir. The reservoir was not in use at the time and was not detected in the next monitoring occasion.
08/12/2021	***Cryptosporidium* – Googong Reservoir** *Cryptosporidium* was detected at Googong Reservoir. The reservoir was not in use at the time and was not detected in the next monitoring occasion.
04/03/2022	**Cyanobacteria – Googong Reservoir** A bloom of blue green algae was recorded at notifiable levels within Googong Reservoir. The reservoir was not in use at the time and the bloom had dissipated by April 2022.
Water in the treatment plants	
15/09/2021 and 08/06/2022	***Giardia* – Mt Stromlo Water Treatment Plant** One positive detection of *Giardia* occurred on two occasions in the raw water entering Mt Stromlo Water Treatment Plant (SWTP). All treatment barriers were operating at the time of detection and *Giardia* was not detected in the final treated water.
17/12/2021	***Cryptosporidium* – Mt Stromlo Water Treatment Plant** *Cryptosporidium* was detected in the raw water entering Mt Stromlo Water Treatment Plant. All treatment barriers were operating at the time of detection. *Cryptosporidium* was not detected in the final treated water.
20/05/2022	***Cryptosporidium* – Googong Water Treatment Plant** *Cryptosporidium* was detected in the raw water entering Googong Water Treatment Plant. All treatment barriers were operating at the time of detection and *Cryptosporidium* was not detected in the final treated water.

Water in the distribution system	
05/07/2022	**Lead – Forrest** A private plumber collected a sample from a customer tap during some residential plumbing activities that had lead concentrations exceeding a health limit and notified us of the result. We completed an investigation that indicated lead concentrations were elevated and above what is typical within our network, however not exceeding the health guidelines. Despite not exceeding health guidelines, we replaced the water meter at the customer tap and completed follow-up testing which reflected lead concentrations returned to those typical of the Canberra network.
06/08/2021	***E.Coli* – Stromlo district** An *E.Coli* detection of 1 MPN/100ml was observed at a site as part of our routine monitoring program. Sampling from an additional five locations within the vicinity of this sample point had no detections of *E.Coli*. Follow-up testing of the same sample found no further coliforms, indicating a likely false positive detection. It was concluded that the original detection did not reflect genuine contamination of the drinking water supply.
04/03/2022	**Lead – Stromlo district** An elevated level of lead above the ADWG health value was detected from a sample from the routine monitoring program at a commercial property. Sampling from an additional three locations within the vicinity of this sample point did not have elevated lead levels. From various checks it was determined that the lack of water use during the COVID-19 period had allowed the metal to leach from local plumbing. Although the cause was local plumbing, the issue was resolved through liaising with the customer to complete flushing water through the service pipes.
06/08/2021	**Manganese and lead – Griffith** An elevated level of manganese and lead above the ADWG health value was detected from a sample taken at a distribution monitoring point. Further investigation found that this coincided with a burst main within the vicinity. Follow up testing of the sample point returned low detections of these metals, within the health guideline limit. The elevated manganese levels were determined to be a short-term exposure associated with the burst main.
23/03/2022	**Enterococci – West Belconnen** Following a response to a burst water main, we identified the potential for contamination during the repair. We arranged for sampling of contaminant indicators at nearby hydrants and Enterococci was detected at some of these hydrants, indicating some contaminant ingress. We rapidly arranged flushing of the mains in the area, increased the chlorine in the network, and liaised closely with ACT Health who monitored the investigation. Sampling of the area continued for 15 days, which confirmed the water in the network was compliant with the ADWG and there were no adverse health outcomes associated with the event.

22/04/2022	**Lead – Deakin** An elevated level of lead above the ADWG health value was detected from a sample taken at a distribution monitoring point. Icon Water flushed water from the main to rectify any potential issues and follow-up sampling was completed. Elevated lead concentrations were not detected in any follow-up samples. Upon further investigation it was observed that the house associated with the customer tap was vacant and the water meter had been switched off, indicating that the monitoring point was not representative of the Canberra network.
25/05/2022	**Trichloroacetic acid (THA) – Macgregor** One result of an elevated level exceeding the ADWG health threshold of THA was detected. Throughout May 2022 Googong Water Treatment Plant was in use, sourcing water from Googong Reservoir. At this time maintaining an adequate disinfection residual to provide lasting protection to the entire network was challenging due to source water quality. As a result, chlorine was required to be added at a safe, but higher concentration than normal. This resulted in the increased formation of disinfection by-products. THA is a chemical associated with disinfection by-products. Recognising the potential risk of generating disinfection by-products, Icon Water increased monitoring within the network. The positive sample of THA was collected within days of changing WTP and processing water from a different catchment with a lower potential to generate disinfection byproducts.

MANAGING WATER QUALITY INTO THE FUTURE

Looking ahead

Part of ensuring we are operating in the most efficient way involves keeping abreast of the latest developments and technologies. We do this by contributing funds, providing in-kind support, collaborating on a range of research and development projects, and partnering with other 'can do' business partners.

We are a member of several water industry bodies and participate in network groups and joint collaborative research projects. This enables us to learn from a rich body of expertise across Australia and internationally, and benefit from shared knowledge, expertise, partnerships and funding.

We work in partnership with universities and industry through the Water Services Association of Australia[5] (WSAA) and Water Research Australia (WaterRA). These relationships provide access to research organisations such as Cooperative Research Centres (CRC), the Water Environment Research Foundation (WERF), the Smart Water Fund and the Australian Research Council. We contribute to industry associations such as the Research Managers Network, WaterRA forums and W-Lab (a platform for showcasing the latest advances, innovations and international water utility technologies).

In 2021–22, we continued our involvement in the Perpetual Endowment Fund – a collaboration between the Australian National University (ANU), Icon Water and ActewAGL that has been running since 2008 to support PhD scholarships and research projects. In 2021–22, a research project was awarded under the endowment to improve understanding and incorporation of runoff non-recovery in source water models for improved water security.

This year we shared our knowledge and expertise through conference presentations, industry papers and publications including:

- at OzWater on how we use adaptive planning to enhance our preparedness for future droughts and maintain water security
- to WaterRA on managing water security through floods and fire following our experience from 2019 to 2021.

Managing assets to meet current and future needs

To prepare for climate change-driven impacts to source water quality and drinking water treatment, in 2020 we developed a Climate Change Adaptation Plan. Activities in the Plan include ensuring the water quality monitoring can adequately inform treatment capability to respond to impacts of climate change.

During the second year of implementation, approximately two thirds of actions have been completed including:

- delivery of a Drought Management Plan
- publication of the Actions for Clean Water Plan for Cotter
- an update of the water quality monitoring program and Source Water Strategy modelling assumptions, and revision of the Blue Green Algae Response Plan, allowing for projected climate variability
- consultation with the ACT Emergency Services Agency (ESA) for our water and wastewater assets to be included in their fire protection zones.

A summary of the plan can be found on our website by searching for Climate Change Adaptation Plan 2020.

We are committed to the continuous improvement of water quality management practices, and part of this will come from work to update our Water System Strategy.

The updated strategy (2022) will refine the long term direction, guide future investments and inform our decision making. The strategy will ensure plant and network assets continue to meet water quality requirements far into the future, with safety the overarching objective for our water system. Our asset management plans and future works program will be developed in line with the principles set out in this strategy.

We also produce an annual plan for Strategic Water Quality Improvement. This plan summarises the drinking water quality improvement activities proposed or underway that address identified strategic risks associated with drinking water supply. Most projects relate to maintenance, asset renewal, or continual improvement, many of which are longer term projects. Status updates on these projects along with any new projects are outlined in this plan. A selection of projects from the 2021–22 plan are detailed in the following sections.

The notable downward trend in raw water quality in the Googong reservoir means the ability of the Googong WTP to meet drinking water quality requirements may be at risk in the future. Investigations are underway to determine what process improvements will be needed to treat the predicted lower raw water quality. This is likely to include new process trains to help remove higher concentrations of contaminants from the water to ensure we can continue to comply with the ADWG requirements. This work is currently in an evaluation stage of our project life cycle with engineering options to be developed. Together with financial analysis, a business case proposing upgrade improvements is planned for the 2022–23 financial year.

[5] Water Services Association of Australia. wsaa.asn.au/

With 51 reservoirs of varying ages within our network, we run a routine program to assess and maintain their structural integrity; in particular, the roof integrity of reservoirs is an essential control to prevent contamination from entering the drinking water. During this reporting period renewal and maintenance works commenced for O'Connor Reservoir and were completed for Mugga Reservoir. The program has scheduled other reservoirs for works in the coming years.

In addition to roof replacements we are also looking at the replacement of the Lower Red Hill Reservoir, which has reached its end of life. The decommissioning of this reservoir will be an opportunity to investigate supply to the south Canberra zone with a view to leveraging works to optimise the network distribution of drinking water if possible.

One Tree Hill Reservoir

LABORATORY

LABORATORY ANALYSIS

Quality control and assurance

Icon Water contracts ALS Global to collect and analyse drinking water samples. The monitoring program is defined by a Service Level Agreement which is revised by Icon Water annually to reflect our changing need and priorities. ALS Global operates a NATA-registered laboratory. NATA provides specific technical evaluation combined with international recognition by its overseas counterparts, which allow for NATA-accredited laboratories to be recognised worldwide.

As part of its NATA registration, ALS Global participates in regular audits and proficiency testing whereby results for identical samples are compared with other NATA-registered laboratories. NATA audits were carried out in the chemistry area in October 2020 and in the biological area in April 2021. The facility complies with the criteria of NATA Policy Circular 1 – Corporate Accreditation.

How to read the result for water quality in your area

The Canberra distribution system is divided into four water quality supply zones based on population, hydraulic characteristics and geography. These zones also ensure the statistical representation of samples collected from the taps of participants in our voluntary water quality monitoring program.

A summary of the laboratory analysis completed for the customer tap water quality monitoring program is presented in the following tables. You can search by suburb and by the water quality parameter of interest. Parameters are grouped into categories to simplify navigating the tables. Each summary table includes the total number of samples analysed for each parameter, the range of those values being the minimum, maximum, mean and the 95th percentile. Also included are the ADWG health values for a ready comparison of our results demonstrating how we are meeting public health requirements.

- Table 4: Summary data for all water quality zones
- Table 5: Summary data for water quality zone 1 – North Canberra and Gungahlin
- Table 6: Summary data for water quality zone 2 – Belconnen
- Table 7: Summary data for water quality zone 3 – South Canberra, Woden and Weston Creek
- Table 8: Summary data for water quality zone 4 – Tuggeranong

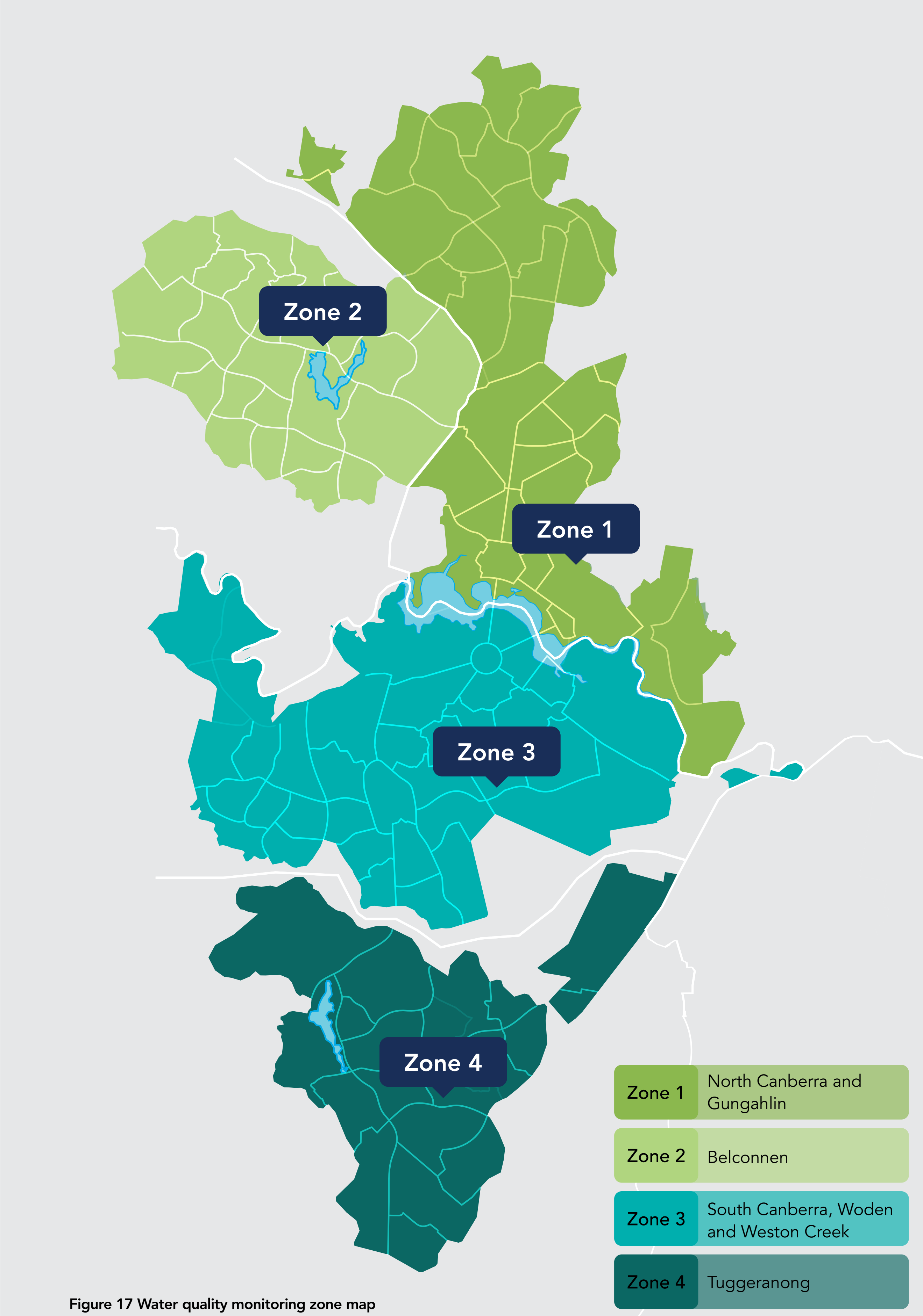


Figure 17 Water quality monitoring zone map

SUMMARY DATA

Table 4 Summary data for all water quality zones

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Microbiological									
E. coli	AS 4276.21	MPN/100mL	<1	<1	1265	<1	<1	<1	<1
Total coliforms	AS 4276.21	MPN/100mL	-	<1	1265	<1	9	<1	<1
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	1200	<1	>5900	23	12
Physical									
Conductivity	APHA 2510 B	µS/cm	-	<2	120	85	184	113	178
pH	APHA 4500-H B	pH units	-	<0.01	1205	6.51	8.73	7.70	8.17
Temperature	APHA 4500-H B	deg.C	-	<0.1	244	7.6	24.2	15.9	23.0
Total dissolved solids	APHA 2540 C	mg/L	-	<10	120	28	142	72	117
True colour	APHA 2120 B	Pt-Co	-	<1	241	<1	29	<1	1
Turbidity	APHA 2130 B	NTU	-	<0.1	313	0.1	113.0	1.1	2.0
Inorganic									
Alkalinity bicarb	APHA 2320 A/B	mg/L	-	<0.1	241	<0.1	71.6	46.0	55.9
Alkalinity carb	APHA 2320 A/B	mg/L	-	<0.1	241	<0.1	4.6	0.1	<0.1
Alkalinity hydrox	APHA 2320 A/B	mg/L	-	<0.1	241	<0.1	<0.1	<0.1	<0.1
Alkalinity total	APHA 2320 A/B	mg/L	-	<1	241	33	72	46	56
Aluminium acid soluble	USEPA 200.8	µg/L	-	<5	120	28	893	50	66
Asbestos	AS4964-2000	Present/ Absent	-	Absent	48	Absent	Absent	Absent	Absent
Calcium dissolved	USEPA 200.7	mg/L	-	<0.05	120	10.4	21.8	15.0	19.6
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.1	48	4.0	8.5	5.4	8.2
Chlorine combined	APHA 4500 -CL G	mg/L	-	<0.03	1265	<0.03	0.38	0.06	0.16
Chlorine free	APHA 4500 -CL G	mg/L	-	<0.03	1265	<0.03	2.14	0.83	1.21
Chlorine total	APHA 4500 -CL G	mg/L	5	<0.03	1265	<0.03	2.20	0.89	1.29
Cyanide	APHA 4500_CN	mg/L	0.08	<0.004	48	<0.004	<0.004	<0.004	<0.004
Fluoride	APHA 21st Ed. 2005, Part 4110 B	mg/L	1.5	<0.05	121	0.58	0.83	0.71	0.80
Hardness total	APHA 2340 B	mg/L	-	<1	120	31	66	43	62
Iodide	VIC-CM078	mg/L	0.5	<0.01	48	<0.01	<0.01	<0.01	<0.01
Magnesium dissolved	USEPA 200.7	mg/L	-	<0.05	120	0.76	3.72	1.26	3.26
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	48	<0.1	0.5	0.3	0.3
Potassium dissolved	USEPA 200.7	mg/L	-	<0.1	48	0.5	1.6	0.7	1.5
Sodium dissolved	USEPA 200.7	mg/L	-	<0.1	48	2.5	6.9	3.3	6.7
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.4	48	3.1	26.6	6.1	25.0
Total metals									
Aluminium total	USEPA 200.8	µg/L	-	<9	120	22	1140	65	117
Antimony total	USEPA 200.8	µg/L	3	<3	120	<3	<3	<3	<3
Arsenic total	USEPA 200.8	µg/L	10	<1	120	<1	<1	<1	<1
Barium total	USEPA 200.8	µg/L	2000	<0.5	120	3.0	22.9	4.7	8.2
Beryllium total	USEPA 200.8	µg/L	60	<0.1	120	<0.1	<0.1	<0.1	<0.1
Boron total	USEPA 200.7	mg/L	4	<0.01	48	<0.01	0.01	<0.01	0.01
Cadmium total	USEPA 200.8	µg/L	2	<0.05	120	<0.05	0.09	<0.05	<0.05
Chromium total	USEPA 200.8	µg/L	-	<2	120	<2	3	<2	<2
Cobalt total	USEPA 200.8	µg/L	-	<0.2	120	<0.2	1.0	<0.2	<0.2
Copper total	USEPA 200.8	µg/L	2000	<1	241	<1	482	17	45
Iron total	USEPA 200.7	mg/L	-	<0.01	244	<0.01	2.49	0.04	0.05

Table 4 Summary data for all water quality zones

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Lead total	USEPA 200.8	µg/L	10	<0.2	241	<0.2	12.7[1]	0.4	1.1
Manganese total	USEPA 200.7	mg/L	0.5	<0.001	241	<0.001	0.51[2]	0.008	0.015
Mercury total	USEPA 200.8	µg/L	1	<0.1	119	<0.1	<0.1	<0.1	<0.1
Molybdenium total	USEPA 200.8	µg/L	50	<1	120	<1	2	<1	<1
Nickel total	USEPA 200.8	µg/L	20	<1	120	<1	2	<1	<1
Selenium total	USEPA 200.8	µg/L	10	<1	120	<1	<1	<1	<1
Silver total	USEPA 200.8	µg/L	100	<1	120	<1	<1	<1	<1
Zinc total	USEPA 200.8	µg/L	-	<5	120	<5	57	5	15
Haloacetic acids									
Bromoacetic acid	ALS: Headspace GCMS	µg/L	-	<5	224	<5	10	<5	<5
Bromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	224	<1	6	2	5
Bromodichloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	224	<1	16	5	12
Dibromoacetic acid	ALS: Headspace GCMS	µg/L	-	<1	224	<1	<1	<1	<1
Dibromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<10	224	<10	10	<10	<10
Dichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	224	<1	83	27	66
Monochloroacetic acid	ALS: Headspace GCMS	µg/L	150	<1	224	<1	8	2	6
Tribromoacetic acid	ALS: Headspace GCMS	µg/L	-	<10	224	<10	10	<10	<10
Trichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	224	<1	106[3]	49	93
Sum of Haloacetic acid	ALS: Headspace GCMS	µg/L	-	<1	224	<1	213	84	180
Trihalomethanes									
Bromoform	VIC-CM047	mg/L	-	<0.001	224	<0.001	0.001	<0.001	<0.001
Chloroform	VIC-CM047	mg/L	-	<0.001	224	<0.001	0.180	0.067	0.139
Dibromochloromethane	VIC-CM047	mg/L	-	<0.001	224	<0.001	<0.001	<0.001	<0.001
Dichlorobromomethane	VIC-CM047	mg/L	-	<0.001	224	0.001	0.015	0.006	0.012
Trihalomethanes total	VIC-CM047	mg/L	0.25	<0.001	224	0.001	0.200	0.073	0.149
Semi volatile organic compounds (SVOC)									
Anilines and benzidines									
2-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
3-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
3,3`-Dichlorobenzidine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
4-Chloroaniline	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
4-Nitroaniline	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Aniline	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Carbazole	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Dibenzofuran	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Chlorinated hydrocarbons									
1,2-Dichlorobenzene	US EPA 3510/8270	µg/L	1500	<2	120	<2	<2	<2	<2
1,2,4-Trichlorobenzene	US EPA 3510/8270	µg/L	30	<2	120	<2	<2	<2	<2

1 Exceedance of health value reported to ACT Health. One lead detection was investigated and found to be not indicative of water quality within the reticulation and one detection was found to be short term exposure associated with a burst main within the reticulation. See page 40 for further information.
2 Exceedance of health value reported to ACT Health. The manganese detection was investigated and found to be short term exposure associated with a burst main within the reticulation. See page 40 for further information.
3 Exceedance of health value reported to ACT Health. The detection was investigated and found to be associated with disinfection by-products. See page 41 for further information.

Table 4 Summary data for all water quality zones

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
1,3-Dichlorobenzene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
1,4-Dichlorobenzene	US EPA 3510/8270	µg/L	40	<2	120	<2	<2	<2	<2
Hexachlorobenzene	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
Hexachlorobutadiene	US EPA 3510/8270	µg/L	0.7	<2	120	<2	<2	<2	<2
Hexachlorocyclopentadiene	US EPA 3510/8270	µg/L	-	<10	120	<10	<10	<10	<10
Hexachloroethane	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Hexachloropropylene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Pentachlorobenzene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Haloethers									
4-Bromophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
4-Chlorophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Bis(2-chloroethoxy) methane	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Bis(2-chloroethyl) ether	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Nitroaromatics and ketones									
1-Naphthylamine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
1,3,5-Trinitrobenzene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
2-Picoline	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
2,4-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
2,6-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
4-Aminobiphenyl	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
4-Nitroquinoline-N-oxide	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
5-Nitro-o-toluidine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Acetophenone	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Azobenzene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Chlorobenzilate	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Dimethylaminoazobenzene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Isophorone	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Nitrobenzene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Pentachloronitrobenzene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Phenacetin	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Pronamide	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Nitrosamines									
Methapyrilene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
N-Nitrosodibutylamine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
N-Nitrosodiethylamine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
N-Nitrosodi-n-propylamine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
N-Nitrosodiphenyl & Diphenylamine	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
N-Nitrosomethylethylamine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
N-Nitrosomorpholine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
N-Nitrosopiperidine	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
N-Nitrosopyrrolidine	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
Organochlorine pesticides									
4,4'-DDD	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
4,4'-DDE	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
4,4'-DDT	US EPA 3510/8270	µg/L	9	<4	120	<4	<4	<4	<4

Table 4 Summary data for all water quality zones

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Aldrin	US EPA 3510/8270	µg/L	0.3	<2	120	<2	<2	<2	<2
alpha-BHC	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
alpha-Endosulfan	US EPA 3510/8270	µg/L	20	<2	120	<2	<2	<2	<2
beta-BHC	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
beta-Endosulfan	US EPA 3510/8270	µg/L	20	<2	120	<2	<2	<2	<2
delta-BHC	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Dieldrin	US EPA 3510/8270	µg/L	0.3	<2	120	<2	<2	<2	<2
Endrin	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Endosulfan sulfate	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
gamma-BHC	US EPA 3510/8270	µg/L	10	<2	120	<2	<2	<2	<2
Heptachlor	US EPA 3510/8270	µg/L	0.3	<2	120	<2	<2	<2	<2
Heptachlor epoxide	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Organophosphorous pesticides									
Chlorfenvinphos	US EPA 3510/8270	µg/L	2	<2	120	<2	<2	<2	<2
Chlorpyrifos	US EPA 3510/8270	µg/L	10	<2	120	<2	<2	<2	<2
Chlorpyrifos-methyl	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Diazinon	US EPA 3510/8270	µg/L	4	<2	120	<2	<2	<2	<2
Dichlorvos	US EPA 3510/8270	µg/L	5	<2	120	<2	<2	<2	<2
Dimethoate	US EPA 3510/8270	µg/L	7	<2	120	<2	<2	<2	<2
Ethion	US EPA 3510/8270	µg/L	4	<2	120	<2	<2	<2	<2
Fenthion	US EPA 3510/8270	µg/L	7	<2	120	<2	<2	<2	<2
Malathion	US EPA 3510/8270	µg/L	70	<2	120	<2	<2	<2	<2
Pirimiphos-ethyl	US EPA 3510/8270	µg/L	0.5	<2	120	<2	<2	<2	<2
Prothiofos	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Phenolic compounds									
2,3,4,6-Tetrachlorophenol	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
2,4-Dichlorophenol	US EPA 3510/8270	µg/L	200	<2	120	<2	<2	<2	<2
2,4-Dimethylphenol	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
2,4,5-Trichlorophenol	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
2,4,6-Trichlorophenol	US EPA 3510/8270	µg/L	20	<2	120	<2	<2	<2	<2
2,6-Dichlorophenol	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
2-Chlorophenol	US EPA 3510/8270	µg/L	300	<2	120	<2	<2	<2	<2
2-Methylphenol	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
2-Nitrophenol	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
3- & 4-Methylphenol	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
4-Chloro-3-Methylphenol	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Pentachlorophenol	US EPA 3510/8270	µg/L	10	<4	120	<4	<4	<4	<4
Phenol	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Phthalates									
Bis(2-ethylhexyl) phthalate	US EPA 3510/8270	µg/L	10	<10	120	<10	<10	<10	<10
Bis(2-ethylhexyl) phthalate	US EPA 8270D	µg/L	10	<10	121	<10	<10	<10	<10
Butyl benzyl phthalate	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Butyl benzyl phthalate	US EPA 8270D	µg/L	-	<2	121	<2	<2	<2	<2
Diethyl phthalate	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Diethyl phthalate	US EPA 8270D	µg/L	-	<2	121	<2	<2	<2	<2
Dimethyl phthalate	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2

Table 4 Summary data for all water quality zones

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Dimethyl phthalate	US EPA 8270D	µg/L	-	<2	121	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 8270D	µg/L	-	<2	121	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 8270D	µg/L	-	<2	121	<2	<2	<2	<2
Polycyclic aromatic hydrocarbons									
2-Chloronaphthalene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
2-Methylnaphthalene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
3-Methylcholanthrene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
7,12-Dimethylbenz(a) anthracene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Acenaphthylene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Acenaphthylene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Anthracene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Anthracene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<2	120	<2	<2	<2	<2
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<0.5	121	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Benzo(b) & Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<4	120	<4	<4	<4	<4
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Chrysene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Chrysene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Fluoranthene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Fluoranthene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Fluorene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Fluorene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
N-2-Fluorenyl Acetamide	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Phenanthrene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Phenanthrene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
Pyrene	US EPA 3510/8270	µg/L	-	<2	120	<2	<2	<2	<2
Pyrene	US EPA 3510/8270	µg/L	-	<1	121	<1	<1	<1	<1
PAHs (total)	US EPA 3510/8270	µg/L	-	<0.5	121	<0.5	<0.5	<0.5	<0.5

Table notes:

ADWG	(Health) Australian Drinking Water Guidelines – Health Guideline Value
CFU/mL	colony forming units per millilitre
deg. C	degrees Celsius
LOR	limit of reporting
µg/L	micrograms per litre
µS/cm	micro siemens per centimetre
mg/L	milligrams per litre
MPN/100ml	most probable number per 100 millilitres
NTU	nephelometric units
Pt-Co	platinum-cobalt units

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

Where the table lists two distinct data sets for the same analyte, the analyte has been measured in two different suites of screens conducted by the:

* Exceedance of health value reported to ACT Health. One lead detection was investigated and found to be not indicative of water quality within the reticulation and one detection was found to be short term exposure associated with a burst main within the reticulation.

** Exceedance of health value reported to ACT Health. The manganese detection was investigated and found to be short term exposure associated with a burst main within the reticulation.

*** Exceedance of health value reported to ACT Health. The detection was investigated and found to be associated with disinfection by-products.

Zone 1 North Canberra and Gungahlin

Table 5 Summary data for water quality zone 1: North Canberra and Gungahlin

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Microbiological									
E. coli	AS 4276.21	MPN/100mL	<1	<1	354	<1	<1	<1	<1
Total coliforms	AS 4276.21	MPN/100mL	-	<1	354	<1	5	<1	<1
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	353	<1	324	4	5
Physical									
Conductivity	APHA 2510 B	µS/cm	-	<2	36	85	180	113	176
pH	APHA 4500-H B	pH units	-	<0.01	354	6.51	8.32	7.61	7.94
Temperature	APHA 4500-H B	deg.C	-	<0.1	74	8.6	23.7	15.9	22.9
Total dissolved solids	APHA 2540 C	mg/L	-	<10	36	34	133	71	97
True colour	APHA 2120 B	Pt-Co	-	<1	73	<1	29	1	2
Turbidity	APHA 2130 B	NTU	-	<0.1	78	0.1	10.2	0.5	0.6
Inorganic									
Alkalinity bicarb	APHA 2320 A/B	mg/L	-	<0.1	73	33.0	71.6	46.7	56.3
Alkalinity carb	APHA 2320 A/B	mg/L	-	<0.1	73	<0.1	<0.1	<0.1	<0.1
Alkalinity hydrox	APHA 2320 A/B	mg/L	-	<0.1	73	<0.1	<0.1	<0.1	<0.1
Alkalinity total	APHA 2320 A/B	mg/L	-	<1	73	33	72	47	56
Aluminium acid soluble	USEPA 200.8	µg/L	-	<5	37	28	84	42	71
Asbestos	AS4964-2000	Present/ Absent	-	Absent	12	Absent	Absent	Absent	Absent
Calcium dissolved	USEPA 200.7	mg/L	-	<0.05	36	11.0	19.8	14.8	18.9
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.1	12	4.0	5.5	4.9	5.4
Chlorine combined	APHA 4500 -CL G	mg/L	-	<0.03	354	<0.03	0.23	0.05	0.12
Chlorine free	APHA 4500 -CL G	mg/L	-	<0.03	354	<0.03	1.48	0.85	1.18
Chlorine total	APHA 4500 -CL G	mg/L	5	<0.03	354	0.06	1.70	0.91	1.22
Cyanide	APHA 4500_CN	mg/L	0.08	<0.004	12	<0.004	<0.004	<0.004	<0.004
Fluoride	APHA 21st Ed. 2005, Part 4110 B	mg/L	1.5	<0.05	37	0.61	0.83	0.71	0.80
Hardness total	APHA 2340 B	mg/L	-	<1	36	31	63	42	54
Iodide	VIC-CM078	mg/L	0.5	<0.01	12	<0.01	<0.01	<0.01	<0.01
Magnesium dissolved	USEPA 200.7	mg/L	-	<0.05	36	0.80	3.48	1.17	2.05
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	12	0.2	0.3	0.3	0.3
Potassium dissolved	USEPA 200.7	mg/L	-	<0.1	12	0.5	0.7	0.6	0.7
Sodium dissolved	USEPA 200.7	mg/L	-	<0.1	12	2.8	3.7	3.0	3.5
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.4	12	3.1	6.0	4.1	5.9
Total metals									
Aluminium total	USEPA 200.8	µg/L	-	<9	36	28	121	46	88
Antimony total	USEPA 200.8	µg/L	3	<3	36	<3	<3	<3	<3
Arsenic total	USEPA 200.8	µg/L	10	<1	36	<1	<1	<1	<1
Barium total	USEPA 200.8	µg/L	2000	<0.5	36	3.2	8.4	4.4	6.8
Beryllium total	USEPA 200.8	µg/L	60	<0.1	36	<0.1	<0.1	<0.1	<0.1
Boron total	USEPA 200.7	mg/L	4	<0.01	12	<0.01	0.01	<0.01	0.01
Cadmium total	USEPA 200.8	µg/L	2	<0.05	36	<0.05	0.09	<0.05	<0.05
Chromium total	USEPA 200.8	µg/L	-	<2	36	<2	<2	<2	<2
Cobalt total	USEPA 200.8	µg/L	-	<0.2	36	<0.2	<0.2	<0.2	<0.2
Copper total	USEPA 200.8	µg/L	2000	<1	73	<1	97	14	42
Iron total	USEPA 200.7	mg/L	-	<0.01	74	<0.01	2.49	0.07	0.05

Zone 1 North Canberra and Gungahlin

Table 5 Summary data for water quality zone 1: North Canberra and Gungahlin

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Lead total	USEPA 200.8	µg/L	10	<0.2	73	<0.2	2.1	0.3	1.0
Manganese total	USEPA 200.7	mg/L	0.5	<0.001	73	<0.001	0.046	0.004	0.015
Mercury total	USEPA 200.8	µg/L	1	<0.1	35	<0.1	<0.1	<0.1	<0.1
Molybdenum total	USEPA 200.8	µg/L	50	<1	36	<1	2	<1	<1
Nickel total	USEPA 200.8	µg/L	20	<1	36	<1	2	<1	<1
Selenium total	USEPA 200.8	µg/L	10	<1	36	<1	<1	<1	<1
Silver total	USEPA 200.8	µg/L	100	<1	36	<1	<1	<1	<1
Zinc total	USEPA 200.8	µg/L	-	<5	36	<5	57	6	11
Haloacetic acids									
Bromoacetic acid	ALS: Headspace GCMS	µg/L	-	<5	58	<5	10	<5	<5
Bromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	58	<1	5	2	4
Bromodichloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	58	<1	16	5	11
Dibromoacetic acid	ALS: Headspace GCMS	µg/L	-	<1	58	<1	<1	<1	<1
Dibromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<10	58	<10	<10	<10	<10
Dichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	58	4	57	23	53
Monochloroacetic acid	ALS: Headspace GCMS	µg/L	150	<1	58	<1	6	2	5
Tribromoacetic acid	ALS: Headspace GCMS	µg/L	-	<10	58	<10	10	<10	<10
Trichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	58	5	97	45	91
Sum of Haloacetic acid	ALS: Headspace GCMS	µg/L	-	<1	58	9	163	76	155
Trihalomethanes									
Bromoform	VIC-CM047	mg/L	-	<0.001	58	<0.001	<0.001	<0.001	<0.001
Chloroform	VIC-CM047	mg/L	-	<0.001	58	0.017	0.180	0.067	0.150
Dibromochloromethane	VIC-CM047	mg/L	-	<0.001	58	<0.001	<0.001	<0.001	<0.001
Dichlorobromomethane	VIC-CM047	mg/L	-	<0.001	58	0.001	0.015	0.006	0.013
Trihalomethanes total	VIC-CM047	mg/L	0.25	<0.001	58	0.001	0.200	0.072	0.160
Semi volatile organic compounds (SVOC)									
Anilines and benzidines									
2-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
3-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
3,3`-Dichlorobenzidine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4-Chloroaniline	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4-Nitroaniline	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Aniline	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Carbazole	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dibenzofuran	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Chlorinated hydrocarbons									
1,2-Dichlorobenzene	US EPA 3510/8270	µg/L	1500	<2	36	<2	<2	<2	<2
1,2,4-Trichlorobenzene	US EPA 3510/8270	µg/L	30	<2	36	<2	<2	<2	<2
1,3-Dichlorobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
1,4-Dichlorobenzene	US EPA 3510/8270	µg/L	40	<2	36	<2	<2	<2	<2
Hexachlorobenzene	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
Hexachlorobutadiene	US EPA 3510/8270	µg/L	0.7	<2	36	<2	<2	<2	<2

* Exceedance of health value reported to ACT Health. The detection was investigated and found to be associated with disinfection by-products. See page 40 for further information.

Zone 1 North Canberra and Gungahlin

Table 5 Summary data for water quality zone 1: North Canberra and Gungahlin

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Hexachlorocyclopentadiene	US EPA 3510/8270	µg/L	-	<10	36	<10	<10	<10	<10
Hexachloroethane	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Hexachloropropylene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pentachlorobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Haloethers									
4-Bromophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4-Chlorophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Bis(2-chloroethoxy) methane	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Bis(2-chloroethyl) ether	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Nitroaromatics and ketones									
1-Naphthylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
1,3,5-Trinitrobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2-Picoline	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2,4-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
2,6-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
4-Aminobiphenyl	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4-Nitroquinoline-N-oxide	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
5-Nitro-o-toluidine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Acetophenone	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Azobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Chlorobenzilate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dimethylaminoazobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Isophorone	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Nitrobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pentachloronitrobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Phenacetin	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pronamide	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Nitrosamines									
Methapyrilene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosodibutylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosodiethylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosodi-n-propylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosodiphenyl & Diphenylamine	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
N-Nitrosomethylethylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosomorpholine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosopiperidine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosopyrrolidine	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
Organochlorine pesticides									
4,4'-DDD	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4,4'-DDE	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4,4'-DDT	US EPA 3510/8270	µg/L	9	<4	36	<4	<4	<4	<4
Aldrin	US EPA 3510/8270	µg/L	0.3	<2	36	<2	<2	<2	<2
alpha-BHC	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
alpha-Endosulfan	US EPA 3510/8270	µg/L	20	<2	36	<2	<2	<2	<2
beta-BHC	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2

Zone 1 North Canberra and Gungahlin

Table 5 Summary data for water quality zone 1: North Canberra and Gungahlin

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
beta-Endosulfan	US EPA 3510/8270	µg/L	20	<2	36	<2	<2	<2	<2
delta-BHC	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dieldrin	US EPA 3510/8270	µg/L	0.3	<2	36	<2	<2	<2	<2
Endrin	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Endosulfan sulfate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
gamma-BHC	US EPA 3510/8270	µg/L	10	<2	36	<2	<2	<2	<2
Heptachlor	US EPA 3510/8270	µg/L	0.3	<2	36	<2	<2	<2	<2
Heptachlor epoxide	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Organophosphorous pesticides									
Chlorfenvinphos	US EPA 3510/8270	µg/L	2	<2	36	<2	<2	<2	<2
Chlorpyrifos	US EPA 3510/8270	µg/L	10	<2	36	<2	<2	<2	<2
Chlorpyrifos-methyl	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Diazinon	US EPA 3510/8270	µg/L	4	<2	36	<2	<2	<2	<2
Dichlorvos	US EPA 3510/8270	µg/L	5	<2	36	<2	<2	<2	<2
Dimethoate	US EPA 3510/8270	µg/L	7	<2	36	<2	<2	<2	<2
Ethion	US EPA 3510/8270	µg/L	4	<2	36	<2	<2	<2	<2
Fenthion	US EPA 3510/8270	µg/L	7	<2	36	<2	<2	<2	<2
Malathion	US EPA 3510/8270	µg/L	70	<2	36	<2	<2	<2	<2
Pirimiphos-ethyl	US EPA 3510/8270	µg/L	0.5	<2	36	<2	<2	<2	<2
Prothiofos	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Phenolic compounds									
2,3,4,6-Tetrachlorophenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2,4-Dichlorophenol	US EPA 3510/8270	µg/L	200	<2	36	<2	<2	<2	<2
2,4-Dimethylphenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2,4,5-Trichlorophenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2,4,6-Trichlorophenol	US EPA 3510/8270	µg/L	20	<2	36	<2	<2	<2	<2
2,6-Dichlorophenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2-Chlorophenol	US EPA 3510/8270	µg/L	300	<2	36	<2	<2	<2	<2
2-Methylphenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2-Nitrophenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
3- & 4-Methylphenol	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
4-Chloro-3-Methylphenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pentachlorophenol	US EPA 3510/8270	µg/L	10	<4	36	<4	<4	<4	<4
Phenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Phthalates									
Bis(2-ethylhexyl) phthalate	US EPA 3510/8270	µg/L	10	<10	36	<10	<10	<10	<10
Bis(2-ethylhexyl) phthalate	US EPA 8270D	µg/L	10	<10	37	<10	<10	<10	<10
Butyl benzyl phthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Butyl benzyl phthalate	US EPA 8270D	µg/L	-	<2	37	<2	<2	<2	<2
Diethyl phthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Diethyl phthalate	US EPA 8270D	µg/L	-	<2	37	<2	<2	<2	<2
Dimethyl phthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dimethyl phthalate	US EPA 8270D	µg/L	-	<2	37	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 8270D	µg/L	-	<2	37	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 8270D	µg/L	-	<2	37	<2	<2	<2	<2

Zone 1 North Canberra and Gungahlin

Table 5 Summary data for water quality zone 1: North Canberra and Gungahlin

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Polycyclic aromatic hydrocarbons									
2-Chloronaphthalene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2-Methylnaphthalene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
3-Methylcholanthrene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
7,12-Dimethylbenz(a) anthracene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Acenaphthylene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Acenaphthylene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Anthracene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Anthracene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<2	36	<2	<2	<2	<2
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<0.5	37	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Benzo(b) & Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Chrysene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Chrysene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Fluoranthene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Fluoranthene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Fluorene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Fluorene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
N-2-Fluorenyl Acetamide	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Phenanthrene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Phenanthrene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
Pyrene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pyrene	US EPA 3510/8270	µg/L	-	<1	37	<1	<1	<1	<1
PAHs (total)	US EPA 3510/8270	µg/L	-	<0.5	37	<0.5	<0.5	<0.5	<0.5

Table notes:

ADWG	(Health) Australian Drinking Water Guidelines – Health Guideline Value
CFU/mL	colony forming units per millilitre
deg. C	degrees Celsius
LOR	limit of reporting
µg/L	micrograms per litre
µS/cm	micro siemens per centimetre
mg/L	milligrams per litre
MPN/100ml	most probable number per 100 millilitres
NTU	nephelometric units
Pt-Co	platinum-cobalt units

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

Where the table lists two distinct data sets for the same analyte, the analyte has been measured in two different suites of screens conducted by the laboratory: semi volatile organic compounds screen and phthalates screen.

Zone 2 Belconnen

Table 6 Summary data for water quality zone 2: Belconnen

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Microbiological									
E. coli	AS 4276.21	MPN/100mL	<1	<1	387	<1	<1	<1	<1
Total coliforms	AS 4276.21	MPN/100mL	-	<1	387	<1	9	<1	<1
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	324	<1	259	4	12
Physical									
Conductivity	APHA 2510 B	µS/cm	-	<2	36	92	184	114	179
pH	APHA 4500-H B	pH units	-	<0.01	328	6.57	8.51	7.73	8.12
Temperature	APHA 4500-H B	deg.C	-	<0.1	72	9.1	24.2	16.0	22.9
Total dissolved solids	APHA 2540 C	mg/L	-	<10	36	28	142	73	120
True colour	APHA 2120 B	Pt-Co	-	<1	72	<1	1	<1	1
Turbidity	APHA 2130 B	NTU	-	<0.1	135	0.1	113.0	2.0	6.0
Inorganic									
Alkalinity bicarb	APHA 2320 A/B	mg/L	-	<0.1	72	35.9	62.5	46.5	55.7
Alkalinity carb	APHA 2320 A/B	mg/L	-	<0.1	72	<0.1	<0.1	<0.1	<0.1
Alkalinity hydrox	APHA 2320 A/B	mg/L	-	<0.1	72	<0.1	<0.1	<0.1	<0.1
Alkalinity total	APHA 2320 A/B	mg/L	-	<1	72	36	62	46	55
Aluminium acid soluble	USEPA 200.8	µg/L	-	<5	36	28	112	43	58
Asbestos	AS4964-2000	Present/ Absent	-	Absent	12	Absent	Absent	Absent	Absent
Calcium dissolved	USEPA 200.7	mg/L	-	<0.05	36	11.8	21.7	15.3	20.2
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.1	12	4.2	8.5	5.8	8.3
Chlorine combined	APHA 4500 -CL G	mg/L	-	<0.03	387	<0.03	0.38	0.06	0.17
Chlorine free	APHA 4500 -CL G	mg/L	-	<0.03	387	<0.03	2.14	0.86	1.30
Chlorine total	APHA 4500 -CL G	mg/L	5	<0.03	387	0.14	2.20	0.92	1.38
Cyanide	APHA 4500_CN	mg/L	0.08	<0.004	12	<0.004	<0.004	<0.004	<0.004
Fluoride	APHA 21st Ed. 2005, Part 4110 B	mg/L	1.5	<0.05	36	0.63	0.80	0.71	0.80
Hardness total	APHA 2340 B	mg/L	-	<1	36	34	66	44	64
Iodide	VIC-CM078	mg/L	0.5	<0.01	12	<0.01	<0.01	<0.01	<0.01
Magnesium dissolved	USEPA 200.7	mg/L	-	<0.05	36	0.88	3.48	1.31	3.10
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	12	<0.1	0.5	0.3	0.4
Potassium dissolved	USEPA 200.7	mg/L	-	<0.1	12	0.5	1.6	0.8	1.5
Sodium dissolved	USEPA 200.7	mg/L	-	<0.1	12	2.5	6.8	3.7	6.8
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.4	12	3.1	25.9	8.0	25.2
Total Metals									
Aluminium total	USEPA 200.8	µg/L	-	<9	36	22	116	46	34
Antimony total	USEPA 200.8	µg/L	3	<3	36	<3	<3	<3	<3
Arsenic total	USEPA 200.8	µg/L	10	<1	36	<1	<1	<1	<1
Barium total	USEPA 200.8	µg/L	2000	<0.5	36	3.1	8.1	4.5	7.5
Beryllium total	USEPA 200.8	µg/L	60	<0.1	36	<0.1	<0.1	<0.1	<0.1
Boron total	USEPA 200.7	mg/L	4	<0.01	12	<0.01	0.01	<0.01	0.01
Cadmium total	USEPA 200.8	µg/L	2	<0.05	36	<0.05	<0.05	<0.05	<0.05
Chromium total	USEPA 200.8	µg/L	-	<2	36	<2	3	<2	<2

Zone 2 Belconnen

Table 6 Summary data for water quality zone 2: Belconnen

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Cobalt total	USEPA 200.8	µg/L	-	<0.2	36	<0.2	<0.2	<0.2	<0.2
Copper total	USEPA 200.8	µg/L	2000	<1	72	1	188	20	71
Iron total	USEPA 200.7	mg/L	-	<0.01	72	<0.01	0.05	0.01	0.02
Lead total	USEPA 200.8	µg/L	10	<0.2	72	<0.2	1.7	0.3	1.1
Manganese total	USEPA 200.7	mg/L	0.5	<0.001	72	<0.001	0.043	0.005	0.014
Mercury total	USEPA 200.8	µg/L	1	<0.1	34	<0.1	<0.1	<0.1	<0.1
Molybdenium total	USEPA 200.8	µg/L	50	<1	36	<1	<1	<1	<1
Nickel total	USEPA 200.8	µg/L	20	<1	36	<1	<1	<1	<1
Selenium total	USEPA 200.8	µg/L	10	<1	36	<1	<1	<1	<1
Silver total	USEPA 200.8	µg/L	100	<1	36	<1	<1	<1	<1
Zinc total	USEPA 200.8	µg/L	-	<5	36	<5	20	<5	14
Haloacetic Acids									
Bromoacetic acid	ALS: Headspace GCMS	µg/L	-	<5	74	<5	5	<5	<5
Bromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	74	<1	6	2	5
Bromodichloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	74	<1	15	6	14
Dibromoacetic acid	ALS: Headspace GCMS	µg/L	-	<1	74	<1	<1	<1	<1
Dibromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<10	74	<10	10	<10	10
Dichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	74	<1	83	33	71
Monochloroacetic acid	ALS: Headspace GCMS	µg/L	150	<1	74	<1	8	3	6
Tribromoacetic acid	ALS: Headspace GCMS	µg/L	-	<10	74	<10	10	<10	<10
Trichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	74	<1	106*	55	96
Sum of Haloacetic acid	ALS: Headspace GCMS	µg/L	-	<1	74	<1	213	99	184
Trihalomethanes									
Bromoform	VIC-CM047	mg/L	-	<0.001	72	<0.001	<0.001	<0.001	<0.001
Chloroform	VIC-CM047	mg/L	-	<0.001	72	0.018	0.170	0.073	0.135
Dibromochloromethane	VIC-CM047	mg/L	-	<0.001	72	<0.001	<0.001	<0.001	<0.001
Dichlorobromomethane	VIC-CM047	mg/L	-	<0.001	72	0.001	0.013	0.006	0.012
Trihalomethanes total	VIC-CM047	mg/L	0.25	<0.001	72	0.019	0.180	0.078	0.145
Semi Volatile Organic Compounds (SVOC)									
Anilines and Benzidines									
2-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
3-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
3,3`-Dichlorobenzidine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4-Chloroaniline	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4-Nitroaniline	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Aniline	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Carbazole	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dibenzofuran	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Chlorinated Hydrocarbons									
1,2-Dichlorobenzene	US EPA 3510/8270	µg/L	1500	<2	36	<2	<2	<2	<2
1,2,4-Trichlorobenzene	US EPA 3510/8270	µg/L	30	<2	36	<2	<2	<2	<2

Zone 2 Belconnen

Table 6 Summary data for water quality zone 2: Belconnen

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
1,3-Dichlorobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
1,4-Dichlorobenzene	US EPA 3510/8270	µg/L	40	<2	36	<2	<2	<2	<2
Hexachlorobenzene	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
Hexachlorobutadiene	US EPA 3510/8270	µg/L	0.7	<2	36	<2	<2	<2	<2
Hexachlorocyclopentadiene	US EPA 3510/8270	µg/L	-	<10	36	<10	<10	<10	<10
Hexachloroethane	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Hexachloropropylene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pentachlorobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Haloethers									
4-Bromophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4-Chlorophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Bis(2-chloroethoxy) methane	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Bis(2-chloroethyl) ether	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Nitroaromatics and Ketones									
1-Naphthylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
1,3,5-Trinitrobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2-Picoline	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2,4-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
2,6-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
4-Aminobiphenyl	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4-Nitroquinoline-N-oxide	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
5-Nitro-o-toluidine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Acetophenone	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Azobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Chlorobenzilate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dimethylaminoazobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Isophorone	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Nitrobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pentachloronitrobenzene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Phenacetin	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pronamide	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Nitrosamines									
Methapyrilene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosodibutylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosodiethylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosodi-n-propylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosodiphenyl & Diphenylamine	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
N-Nitrosomethylethylamine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosomorpholine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosopiperidine	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
N-Nitrosopyrrolidine	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
Organochlorine Pesticides									
4,4'-DDD	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
4,4'-DDE	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2

Zone 2 Belconnen

Table 6 Summary data for water quality zone 2: Belconnen

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
4,4'-DDT	US EPA 3510/8270	µg/L	9	<4	36	<4	<4	<4	<4
Aldrin	US EPA 3510/8270	µg/L	0.3	<2	36	<2	<2	<2	<2
alpha-BHC	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
alpha-Endosulfan	US EPA 3510/8270	µg/L	20	<2	36	<2	<2	<2	<2
beta-BHC	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
beta-Endosulfan	US EPA 3510/8270	µg/L	20	<2	36	<2	<2	<2	<2
delta-BHC	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dieldrin	US EPA 3510/8270	µg/L	0.3	<2	36	<2	<2	<2	<2
Endrin	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Endosulfan sulfate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
gamma-BHC	US EPA 3510/8270	µg/L	10	<2	36	<2	<2	<2	<2
Heptachlor	US EPA 3510/8270	µg/L	0.3	<2	36	<2	<2	<2	<2
Heptachlor epoxide	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Organophosphorous Pesticides									
Chlorfenvinphos	US EPA 3510/8270	µg/L	2	<2	36	<2	<2	<2	<2
Chlorpyrifos	US EPA 3510/8270	µg/L	10	<2	36	<2	<2	<2	<2
Chlorpyrifos-methyl	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Diazinon	US EPA 3510/8270	µg/L	4	<2	36	<2	<2	<2	<2
Dichlorvos	US EPA 3510/8270	µg/L	5	<2	36	<2	<2	<2	<2
Dimethoate	US EPA 3510/8270	µg/L	7	<2	36	<2	<2	<2	<2
Ethion	US EPA 3510/8270	µg/L	4	<2	36	<2	<2	<2	<2
Fenthion	US EPA 3510/8270	µg/L	7	<2	36	<2	<2	<2	<2
Malathion	US EPA 3510/8270	µg/L	70	<2	36	<2	<2	<2	<2
Pirimiphos-ethyl	US EPA 3510/8270	µg/L	0.5	<2	36	<2	<2	<2	<2
Prothiofos	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Phenolic Compounds									
2,3,4,6-Tetrachlorophenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2,4-Dichlorophenol	US EPA 3510/8270	µg/L	200	<2	36	<2	<2	<2	<2
2,4-Dimethylphenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2,4,5-Trichlorophenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2,4,6-Trichlorophenol	US EPA 3510/8270	µg/L	20	<2	36	<2	<2	<2	<2
2,6-Dichlorophenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2-Chlorophenol	US EPA 3510/8270	µg/L	300	<2	36	<2	<2	<2	<2
2-Methylphenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2-Nitrophenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
3- & 4-Methylphenol	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
4-Chloro-3-Methylphenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pentachlorophenol	US EPA 3510/8270	µg/L	10	<4	36	<4	<4	<4	<4
Phenol	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Phthalates									
Bis(2-ethylhexyl) phthalate	US EPA 3510/8270	µg/L	10	<10	36	<10	<10	<10	<10
Bis(2-ethylhexyl) phthalate	US EPA 8270D	µg/L	10	<10	36	<10	<10	<10	<10
Butyl benzyl phthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Butyl benzyl phthalate	US EPA 8270D	µg/L	-	<2	36	<2	<2	<2	<2
Diethyl phthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2

Zone 2 Belconnen

Table 6 Summary data for water quality zone 2: Belconnen

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Diethyl phthalate	US EPA 8270D	µg/L	-	<2	36	<2	<2	<2	<2
Dimethyl phthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dimethyl phthalate	US EPA 8270D	µg/L	-	<2	36	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 8270D	µg/L	-	<2	36	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 8270D	µg/L	-	<2	36	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons									
2-Chloronaphthalene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
2-Methylnaphthalene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
3-Methylcholanthrene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
7,12-Dimethylbenz(a) anthracene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Acenaphthylene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Acenaphthylene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Anthracene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Anthracene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<2	36	<2	<2	<2	<2
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<0.5	36	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Benzo(b) & Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<4	36	<4	<4	<4	<4
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Chrysene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Chrysene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Fluoranthene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Fluoranthene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Fluorene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Fluorene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
N-2-Fluorenyl Acetamide	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Phenanthrene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Phenanthrene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
Pyrene	US EPA 3510/8270	µg/L	-	<2	36	<2	<2	<2	<2
Pyrene	US EPA 3510/8270	µg/L	-	<1	36	<1	<1	<1	<1
PAHs (total)	US EPA 3510/8270	µg/L	-	<0.5	36	<0.5	<0.5	<0.5	<0.5

Table notes:

ADWG	(Health) Australian Drinking Water Guidelines – Health Guideline Value
CFU/mL	colony forming units per millilitre
deg. C	degrees Celsius
LOR	limit of reporting
µg/L	micrograms per litre
µS/cm	micro siemens per centimetre
mg/L	milligrams per litre
MPN/100ml	most probable number per 100 millilitres
NTU	nephelometric units
Pt-Co	platinum-cobalt units

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

Where the table lists two distinct data sets for the same analyte, the analyte has been measured in two different suites of screens conducted by the laboratory: semi volatile organic compounds screen and phthalates screen.

Zone 3 South Canberra, Woden and Weston Creek

Table 7 Summary data for water quality zone 3: South Canberra, Woden and Weston Creek

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Microbiological									
E. coli	AS 4276.21	MPN/100mL	<1	<1	263	<1	<1	<1	<1
Total coliforms	AS 4276.21	MPN/100mL	-	<1	263	<1	6	<1	<1
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	263	<1	>5900	64	11
Physical									
Conductivity	APHA 2510 B	µS/cm	-	<2	24	87	179	112	176
pH	APHA 4500-H B	pH units	-	<0.01	263	6.84	8.23	7.63	7.96
Temperature	APHA 4500-H B	deg.C	-	<0.1	49	8.9	23.9	15.8	21.3
Total dissolved solids	APHA 2540 C	mg/L	-	<10	24	46	124	74	117
True colour	APHA 2120 B	Pt-Co	-	<1	48	<1	3	<1	2
Turbidity	APHA 2130 B	NTU	-	<0.1	51	0.1	8.6	0.7	1.9
Inorganic									
Alkalinity bicarb	APHA 2320 A/B	mg/L	-	<0.1	48	<0.1	57.0	44.7	55.4
Alkalinity carb	APHA 2320 A/B	mg/L	-	<0.1	48	<0.1	<0.1	<0.1	<0.1
Alkalinity hydrox	APHA 2320 A/B	mg/L	-	<0.1	48	<0.1	<0.1	<0.1	<0.1
Alkalinity total	APHA 2320 A/B	mg/L	-	<1	48	34	57	45	55
Aluminium acid soluble	USEPA 200.8	µg/L	-	<5	27	29	893	76	78
Asbestos	AS4964-2000	Present/ Absent	-	Absent	12	Absent	Absent	Absent	Absent
Calcium dissolved	USEPA 200.7	mg/L	-	<0.05	24	10.4	21.8	15.0	18.6
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.1	12	4.4	8.2	5.4	6.8
Chlorine combined	APHA 4500 -CL G	mg/L	-	<0.03	263	<0.03	0.24	0.06	0.18
Chlorine free	APHA 4500 -CL G	mg/L	-	<0.03	263	<0.03	1.90	0.83	1.18
Chlorine total	APHA 4500 -CL G	mg/L	5	<0.03	263	<0.03	2.05	0.89	1.23
Cyanide	APHA 4500_CN	mg/L	0.08	<0.004	12	<0.004	<0.004	<0.004	<0.004
Fluoride	APHA 21st Ed. 2005, Part 4110 B	mg/L	1.5	<0.05	24	0.58	0.80	0.71	0.79
Hardness total	APHA 2340 B	mg/L	-	<1	24	31	65	43	62
Iodide	VIC-CM078	mg/L	0.5	<0.01	12	<0.01	<0.01	<0.01	<0.01
Magnesium dissolved	USEPA 200.7	mg/L	-	<0.05	24	0.91	3.72	1.33	3.32
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	12	0.2	0.3	0.3	0.3
Potassium dissolved	USEPA 200.7	mg/L	-	<0.1	12	0.5	1.5	0.7	1.1
Sodium dissolved	USEPA 200.7	mg/L	-	<0.1	12	2.7	6.9	3.3	4.9
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.4	12	3.1	26.6	6.3	15.7
Total Metals									
Aluminium total	USEPA 200.8	µg/L	-	<9	24	27	1140	131	518
Antimony total	USEPA 200.8	µg/L	3	<3	24	<3	<3	<3	<3
Arsenic total	USEPA 200.8	µg/L	10	<1	24	<1	<1	<1	<1
Barium total	USEPA 200.8	µg/L	2000	<0.5	24	3.3	22.9	5.6	9.3
Beryllium total	USEPA 200.8	µg/L	60	<0.1	24	<0.1	<0.1	<0.1	<0.1
Boron total	USEPA 200.7	mg/L	4	<0.01	12	0.01	0.01	0.01	0.01
Cadmium total	USEPA 200.8	µg/L	2	<0.05	24	<0.05	0.09	<0.05	<0.05
Chromium total	USEPA 200.8	µg/L	-	<2	24	<2	<2	<2	<2
Cobalt total	USEPA 200.8	µg/L	-	<0.2	24	<0.2	1.0	<0.2	0.4
Copper total	USEPA 200.8	µg/L	2000	<1	48	3	482	23	36

Zone 3 South Canberra, Woden and Weston Creek

Table 7 Summary data for water quality zone 3: South Canberra, Woden and Weston Creek

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Iron total	USEPA 200.7	mg/L	-	<0.01	50	<0.01	1.10	0.07	0.50
Lead total	USEPA 200.8	µg/L	10	<0.2	48	<0.2	12.7[1]	0.9	1.7
Manganese total	USEPA 200.7	mg/L	0.5	<0.001	48	0.001	0.51[2]	0.024	0.111
Mercury total	USEPA 200.8	µg/L	1	<0.1	27	<0.1	<0.1	<0.1	<0.1
Molybdenium total	USEPA 200.8	µg/L	50	<1	24	<1	<1	<1	<1
Nickel total	USEPA 200.8	µg/L	20	<1	24	<1	2	<1	2
Selenium total	USEPA 200.8	µg/L	10	<1	24	<1	<1	<1	<1
Silver total	USEPA 200.8	µg/L	100	<1	24	<1	<1	<1	<1
Zinc total	USEPA 200.8	µg/L	-	<5	24	<5	34	7	27
Haloacetic Acids									
Bromoacetic acid	ALS: Headspace GCMS	µg/L	-	<5	50	<5	5	<5	<5
Bromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	50	<1	5	2	4
Bromodichloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	50	<1	12	5	11
Dibromoacetic acid	ALS: Headspace GCMS	µg/L	-	<1	50	<1	<1	<1	<1
Dibromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<10	50	<10	<10	<10	<10
Dichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	50	5	61	25	54
Monochloroacetic acid	ALS: Headspace GCMS	µg/L	150	<1	50	<1	5	2	5
Tribromoacetic acid	ALS: Headspace GCMS	µg/L	-	<10	50	<10	10	<10	<10
Trichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	50	3	89	44	85
Sum of Haloacetic acid	ALS: Headspace GCMS	µg/L	-	<1	50	12	162	78	152
Trihalomethanes									
Bromoform	VIC-CM047	mg/L	-	<0.001	50	<0.001	0.001	<0.001	<0.001
Chloroform	VIC-CM047	mg/L	-	<0.001	50	<0.001	0.130	0.063	0.120
Dibromochloromethane	VIC-CM047	mg/L	-	<0.001	50	<0.001	<0.001	<0.001	<0.001
Dichlorobromomethane	VIC-CM047	mg/L	-	<0.001	50	0.001	0.015	0.006	0.011
Trihalomethanes total	VIC-CM047	mg/L	0.25	<0.001	50	0.016	0.140	0.069	0.130
Semi Volatile Organic Compounds (SVOC)									
Anilines and Benzidines									
2-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
3-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
3,3`-Dichlorobenzidine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4-Chloroaniline	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4-Nitroaniline	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Aniline	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Carbazole	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dibenzofuran	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Chlorinated Hydrocarbons									
1,2-Dichlorobenzene	US EPA 3510/8270	µg/L	1500	<2	24	<2	<2	<2	<2

1 Exceedance of health value reported to ACT Health. One lead detection was investigated and found to be not indicative of water quality within the reticulation and one detection was found to be short term exposure associated with a burst main within the reticulation. See page 40 for further information.

2 Exceedance of health value reported to ACT Health. The manganese detection was investigated and found to be short term exposure associated with a burst main within the reticulation. See page 40 for further information.

Zone 3 South Canberra, Woden and Weston Creek

Table 7 Summary data for water quality zone 3: South Canberra, Woden and Weston Creek

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
1,2,4-Trichlorobenzene	US EPA 3510/8270	µg/L	30	<2	24	<2	<2	<2	<2
1,3-Dichlorobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
1,4-Dichlorobenzene	US EPA 3510/8270	µg/L	40	<2	24	<2	<2	<2	<2
Hexachlorobenzene	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
Hexachlorobutadiene	US EPA 3510/8270	µg/L	0.7	<2	24	<2	<2	<2	<2
Hexachlorocyclopentadiene	US EPA 3510/8270	µg/L	-	<10	24	<10	<10	<10	<10
Hexachloroethane	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Hexachloropropylene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pentachlorobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Haloethers									
4-Bromophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4-Chlorophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Bis(2-chloroethoxy) methane	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Bis(2-chloroethyl) ether	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Nitroaromatics and Ketones									
1-Naphthylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
1,3,5-Trinitrobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2-Picoline	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2,4-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
2,6-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
4-Aminobiphenyl	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4-Nitroquinoline-N-oxide	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
5-Nitro-o-toluidine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Acetophenone	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Azobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Chlorobenzilate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dimethylaminoazobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Isophorone	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Nitrobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pentachloronitrobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Phenacetin	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pronamide	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Nitrosamines									
Methapyrilene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosodibutylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosodiethylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosodi-n-propylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosodiphenyl & Diphenylamine	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
N-Nitrosomethylethylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosomorpholine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosopiperidine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosopyrrolidine	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
Organochlorine Pesticides									
4,4'-DDD	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2

Zone 3 South Canberra, Woden and Weston Creek

Table 7 Summary data for water quality zone 3: South Canberra, Woden and Weston Creek

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
4,4'-DDE	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4,4'-DDT	US EPA 3510/8270	µg/L	9	<4	24	<4	<4	<4	<4
Aldrin	US EPA 3510/8270	µg/L	0.3	<2	24	<2	<2	<2	<2
alpha-BHC	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
alpha-Endosulfan	US EPA 3510/8270	µg/L	20	<2	24	<2	<2	<2	<2
beta-BHC	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
beta-Endosulfan	US EPA 3510/8270	µg/L	20	<2	24	<2	<2	<2	<2
delta-BHC	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dieldrin	US EPA 3510/8270	µg/L	0.3	<2	24	<2	<2	<2	<2
Endrin	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Endosulfan sulfate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
gamma-BHC	US EPA 3510/8270	µg/L	10	<2	24	<2	<2	<2	<2
Heptachlor	US EPA 3510/8270	µg/L	0.3	<2	24	<2	<2	<2	<2
Heptachlor epoxide	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Organophosphorous Pesticides									
Chlorfenvinphos	US EPA 3510/8270	µg/L	2	<2	24	<2	<2	<2	<2
Chlorpyrifos	US EPA 3510/8270	µg/L	10	<2	24	<2	<2	<2	<2
Chlorpyrifos-methyl	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Diazinon	US EPA 3510/8270	µg/L	4	<2	24	<2	<2	<2	<2
Dichlorvos	US EPA 3510/8270	µg/L	5	<2	24	<2	<2	<2	<2
Dimethoate	US EPA 3510/8270	µg/L	7	<2	24	<2	<2	<2	<2
Ethion	US EPA 3510/8270	µg/L	4	<2	24	<2	<2	<2	<2
Fenthion	US EPA 3510/8270	µg/L	7	<2	24	<2	<2	<2	<2
Malathion	US EPA 3510/8270	µg/L	70	<2	24	<2	<2	<2	<2
Pirimiphos-ethyl	US EPA 3510/8270	µg/L	0.5	<2	24	<2	<2	<2	<2
Prothiofos	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Phenolic Compounds									
2,3,4,6-Tetrachlorophenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2,4-Dichlorophenol	US EPA 3510/8270	µg/L	200	<2	24	<2	<2	<2	<2
2,4-Dimethylphenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2,4,5-Trichlorophenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2,4,6-Trichlorophenol	US EPA 3510/8270	µg/L	20	<2	24	<2	<2	<2	<2
2,6-Dichlorophenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2-Chlorophenol	US EPA 3510/8270	µg/L	300	<2	24	<2	<2	<2	<2
2-Methylphenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2-Nitrophenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
3- & 4-Methylphenol	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
4-Chloro-3-Methylphenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pentachlorophenol	US EPA 3510/8270	µg/L	10	<4	24	<4	<4	<4	<4
Phenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Phthalates									
Bis(2-ethylhexyl) phthalate	US EPA 3510/8270	µg/L	10	<10	24	<10	<10	<10	<10
Bis(2-ethylhexyl) phthalate	US EPA 8270D	µg/L	10	<10	24	<10	<10	<10	<10
Butyl benzyl phthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Butyl benzyl phthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Diethyl phthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2

Zone 3 South Canberra, Woden and Weston Creek

Table 7 Summary data for water quality zone 3: South Canberra, Woden and Weston Creek

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Diethyl phthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Dimethyl phthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dimethyl phthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons									
2-Chloronaphthalene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2-Methylnaphthalene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
3-Methylcholanthrene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
7,12-Dimethylbenz(a) anthracene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Acenaphthylene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Acenaphthylene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Anthracene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Anthracene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<2	24	<2	<2	<2	<2
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<0.5	24	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Benzo(b) & Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Chrysene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Chrysene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Fluoranthene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Fluoranthene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Fluorene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Fluorene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
N-2-Fluorenyl Acetamide	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Phenanthrene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Phenanthrene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Pyrene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pyrene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
PAHs (total)	US EPA 3510/8270	µg/L	-	<0.5	24	<0.5	<0.5	<0.5	<0.5

Table notes:

ADWG	(Health) Australian Drinking Water Guidelines – Health Guideline Value
CFU/mL	colony forming units per millilitre
deg. C	degrees Celsius
LOR	limit of reporting
µg/L	micrograms per litre
µS/cm	micro siemens per centimetre
mg/L	milligrams per litre
MPN/100ml	most probable number per 100 millilitres
NTU	nephelometric units
Pt-Co	platinum-cobalt units

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

Where the table lists two distinct data sets for the same analyte, the analyte has been measured in two different suites of screens conducted by the laboratory: semi volatile organic compounds screen and phthalates screen.

Zone 4 Tuggeranong

Table 8 Summary data for water quality zone 4: Tuggeranong

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Microbiological									
E. coli	APHA 9223 B	MPN/100mL	<1	<1	266	<1	<1	<1	<1
Total coliforms	AS 4276.21	MPN/100mL	-	<1	261	<1	<1	<1	<1
Heterotrophic plate count	APHA 9215 B	CFU/mL	-	<1	261	<1	>5900	30	30
Physical									
Conductivity	APHA 2510 B	µS/cm	-	<2	24	86	180	110	173
pH	APHA 4500-H B	pH units	-	<0.01	260	6.64	8.73	7.84	8.54
Temperature	APHA 4500-H B	deg.C	-	<0.1	49	7.6	24.0	15.8	23.1
Total dissolved solids	APHA 2540 C	mg/L	-	<10	24	50	120	71	108
True colour	APHA 2120 B	Pt-Co	-	<1	48	<1	2	<1	1
Turbidity	APHA 2130 B	NTU	-	<0.1	51	0.1	0.9	0.3	0.7
Inorganic									
Alkalinity bicarb	APHA 2320 A/B	mg/L	-	<0.1	48	34.3	63.6	45.5	53.3
Alkalinity carb	APHA 2320 A/B	mg/L	-	<0.1	48	<0.1	4.6	0.4	2.5
Alkalinity hydrox	APHA 2320 A/B	mg/L	-	<0.1	48	<0.1	<0.1	<0.1	<0.1
Alkalinity total	APHA 2320 A/B	mg/L	-	<1	48	34	64	46	55
Aluminium acid soluble	USEPA 200.8	µg/L	-	<5	24	31	66	42	48
Asbestos	AS4964-2000	Present/ Absent	-	Absent	12	Absent	Absent	Absent	Absent
Calcium dissolved	USEPA 200.7	mg/L	-	<0.05	24	12.0	19.5	14.8	18.3
Chloride	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.1	12	4.0	8.2	5.3	6.8
Chlorine combined	APHA 4500 -CL G	mg/L	-	<0.03	261	<0.03	0.27	0.05	0.15
Chlorine free	APHA 4500 -CL G	mg/L	-	<0.03	261	0.03	2.00	0.76	1.14
Chlorine total	APHA 4500 -CL G	mg/L	5	<0.03	261	0.06	2.17	0.81	1.20
Cyanide	APHA 4500_CN	mg/L	0.08	<0.004	12	<0.004	<0.004	<0.004	<0.004
Fluoride	APHA 21st Ed. 2005, Part 4110 B	mg/L	1.5	<0.05	24	0.58	0.78	0.71	0.76
Hardness total	APHA 2340 B	mg/L	-	<1	24	33	60	42	57
Iodide	VIC-CM078	mg/L	0.5	<0.01	12	<0.01	<0.01	<0.01	<0.01
Magnesium dissolved	USEPA 200.7	mg/L	-	<0.05	24	0.76	3.26	1.22	2.61
Nitrate	APHA 21st Ed. 2005, Part 4110 B	mg/L	50	<0.1	12	0.2	0.3	0.3	0.3
Potassium dissolved	USEPA 200.7	mg/L	-	<0.1	12	0.5	1.4	0.7	1.1
Sodium dissolved	USEPA 200.7	mg/L	-	<0.1	12	2.8	6.6	3.3	4.8
Sulphate	APHA 21st Ed. 2005, Part 4110 B	mg/L	-	<0.4	12	3.3	25.2	5.7	14.8
Total Metals									
Aluminium total	USEPA 200.8	µg/L	-	<9	24	24	209	55	91
Antimony total	USEPA 200.8	µg/L	3	<3	24	<3	<3	<3	<3
Arsenic total	USEPA 200.8	µg/L	10	<1	24	<1	<1	<1	<1
Barium total	USEPA 200.8	µg/L	2000	<0.5	24	3.0	9.4	4.4	7.7
Beryllium total	USEPA 200.8	µg/L	60	<0.1	24	<0.1	<0.1	<0.1	<0.1
Boron total	USEPA 200.7	mg/L	4	<0.01	12	<0.01	0.01	<0.01	0.01
Cadmium total	USEPA 200.8	µg/L	2	<0.05	24	<0.05	<0.05	<0.05	<0.05
Chromium total	USEPA 200.8	µg/L	-	<2	24	<2	<2	<2	<2
Cobalt total	USEPA 200.8	µg/L	-	<0.2	24	<0.2	<0.2	<0.2	<0.2
Copper total	USEPA 200.8	µg/L	2000	<1	48	1	70	13	49

Zone 4 Tuggeranong

Table 8 Summary data for water quality zone 4: Tuggeranong

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Iron total	USEPA 200.7	mg/L	-	<0.01	48	<0.01	0.07	0.01	0.02
Lead total	USEPA 200.8	µg/L	10	<0.2	48	<0.2	0.6	<0.2	0.3
Manganese total	USEPA 200.7	mg/L	0.5	<0.001	48	<0.001	0.034	0.004	0.012
Mercury total	USEPA 200.8	µg/L	1	<0.1	23	<0.1	<0.1	<0.1	<0.1
Molybdenium total	USEPA 200.8	µg/L	50	<1	24	<1	<1	<1	<1
Nickel total	USEPA 200.8	µg/L	20	<1	24	<1	<1	<1	<1
Selenium total	USEPA 200.8	µg/L	10	<1	24	<1	<1	<1	<1
Silver total	USEPA 200.8	µg/L	100	<1	24	<1	<1	<1	<1
Zinc total	USEPA 200.8	µg/L	-	<5	24	<5	11	<5	8
Haloacetic Acids									
Bromoacetic acid	ALS: Headspace GCMS	µg/L	-	<5	42	<5	<5	<5	<5
Bromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	42	<1	5	2	4
Bromodichloroacetic acid	ALS: Headspace GCMS	µg/L	-	<1	42	<1	11	5	10
Dibromoacetic acid	ALS: Headspace GCMS	µg/L	-	<1	42	<1	<1	<1	<1
Dibromochloroacetic acid	ALS: Headspace GCMS	µg/L	-	<10	42	<10	<10	<10	<10
Dichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	42	<1	80	21	50
Monochloroacetic acid	ALS: Headspace GCMS	µg/L	150	<1	42	<1	6	2	5
Tribromoacetic acid	ALS: Headspace GCMS	µg/L	-	<10	42	<10	<10	<10	<10
Trichloroacetic acid	ALS: Headspace GCMS	µg/L	100	<1	42	<1	90	46	86
Sum of Haloacetic acid	ALS: Headspace GCMS	µg/L	-	<1	42	<1	176	75	149
Trihalomethanes									
Bromoform	VIC-CM047	mg/L	-	<0.001	42	<0.001	<0.001	<0.001	<0.001
Chloroform	VIC-CM047	mg/L	-	<0.001	42	0.017	0.150	0.066	0.130
Dibromochloromethane	VIC-CM047	mg/L	-	<0.001	42	<0.001	<0.001	<0.001	<0.001
Dichlorobromomethane	VIC-CM047	mg/L	-	<0.001	42	0.001	0.012	0.005	0.011
Trihalomethanes total	VIC-CM047	mg/L	0.25	<0.001	42	0.018	0.160	0.071	0.130
Semi Volatile Organic Compounds (SVOC)									
Anilines and Benzidines									
2-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
3-Nitroaniline	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
3,3`-Dichlorobenzidine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4-Chloroaniline	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4-Nitroaniline	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Aniline	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Carbazole	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dibenzofuran	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Chlorinated Hydrocarbons									
1,2-Dichlorobenzene	US EPA 3510/8270	µg/L	1500	<2	24	<2	<2	<2	<2
1,2,4-Trichlorobenzene	US EPA 3510/8270	µg/L	30	<2	24	<2	<2	<2	<2
1,3-Dichlorobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
1,4-Dichlorobenzene	US EPA 3510/8270	µg/L	40	<2	24	<2	<2	<2	<2
Hexachlorobenzene	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4

Zone 4 Tuggeranong

Table 8 Summary data for water quality zone 4: Tuggeranong

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Hexachlorobutadiene	US EPA 3510/8270	µg/L	0.7	<2	24	<2	<2	<2	<2
Hexachlorocyclopentadiene	US EPA 3510/8270	µg/L	-	<10	24	<10	<10	<10	<10
Hexachloroethane	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Hexachloropropylene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pentachlorobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Haloethers									
4-Bromophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4-Chlorophenyl phenyl ether	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Bis(2-chloroethoxy) methane	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Bis(2-chloroethyl) ether	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Nitroaromatics and Ketones									
1-Naphthylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
1,3,5-Trinitrobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2-Picoline	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2,4-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
2,6-Dinitrotoluene	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
4-Aminobiphenyl	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4-Nitroquinoline-N-oxide	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
5-Nitro-o-toluidine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Acetophenone	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Azobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Chlorobenzilate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dimethylaminoazobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Isophorone	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Nitrobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pentachloronitrobenzene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Phenacetin	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pronamide	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Nitrosamines									
Methapyrilene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosodibutylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosodiethylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosodi-n-propylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosodiphenyl & Diphenylamine	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
N-Nitrosomethylethylamine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosomorpholine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosopiperidine	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
N-Nitrosopyrrolidine	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
Organochlorine Pesticides									
4,4'-DDD	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4,4'-DDE	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
4,4'-DDT	US EPA 3510/8270	µg/L	9	<4	24	<4	<4	<4	<4
Aldrin	US EPA 3510/8270	µg/L	0.3	<2	24	<2	<2	<2	<2
alpha-BHC	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2

Zone 4 Tuggeranong

Table 8 Summary data for water quality zone 4: Tuggeranong

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
alpha-Endosulfan	US EPA 3510/8270	µg/L	20	<2	24	<2	<2	<2	<2
beta-BHC	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
beta-Endosulfan	US EPA 3510/8270	µg/L	20	<2	24	<2	<2	<2	<2
delta-BHC	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dieldrin	US EPA 3510/8270	µg/L	0.3	<2	24	<2	<2	<2	<2
Endrin	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Endosulfan sulfate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
gamma-BHC	US EPA 3510/8270	µg/L	10	<2	24	<2	<2	<2	<2
Heptachlor	US EPA 3510/8270	µg/L	0.3	<2	24	<2	<2	<2	<2
Heptachlor epoxide	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Organophosphorous Pesticides									
Chlorfenvinphos	US EPA 3510/8270	µg/L	2	<2	24	<2	<2	<2	<2
Chlorpyrifos	US EPA 3510/8270	µg/L	10	<2	24	<2	<2	<2	<2
Chlorpyrifos-methyl	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Diazinon	US EPA 3510/8270	µg/L	4	<2	24	<2	<2	<2	<2
Dichlorvos	US EPA 3510/8270	µg/L	5	<2	24	<2	<2	<2	<2
Dimethoate	US EPA 3510/8270	µg/L	7	<2	24	<2	<2	<2	<2
Ethion	US EPA 3510/8270	µg/L	4	<2	24	<2	<2	<2	<2
Fenthion	US EPA 3510/8270	µg/L	7	<2	24	<2	<2	<2	<2
Malathion	US EPA 3510/8270	µg/L	70	<2	24	<2	<2	<2	<2
Pirimiphos-ethyl	US EPA 3510/8270	µg/L	0.5	<2	24	<2	<2	<2	<2
Prothiofos	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Phenolic Compounds									
2,3,4,6-Tetrachlorophenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2,4-Dichlorophenol	US EPA 3510/8270	µg/L	200	<2	24	<2	<2	<2	<2
2,4-Dimethylphenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2,4,5-Trichlorophenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2,4,6-Trichlorophenol	US EPA 3510/8270	µg/L	20	<2	24	<2	<2	<2	<2
2,6-Dichlorophenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2-Chlorophenol	US EPA 3510/8270	µg/L	300	<2	24	<2	<2	<2	<2
2-Methylphenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2-Nitrophenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
3- & 4-Methylphenol	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
4-Chloro-3-Methylphenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pentachlorophenol	US EPA 3510/8270	µg/L	10	<4	24	<4	<4	<4	<4
Phenol	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Phthalates									
Bis(2-ethylhexyl) phthalate	US EPA 3510/8270	µg/L	10	<10	24	<10	<10	<10	<10
Bis(2-ethylhexyl) phthalate	US EPA 8270D	µg/L	10	<10	24	<10	<10	<10	<10
Butyl benzyl phthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Butyl benzyl phthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Diethyl phthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Diethyl phthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Dimethyl phthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dimethyl phthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2

Zone 4 Tuggeranong

Table 8 Summary data for water quality zone 4: Tuggeranong

Analyte	Method ID	Units	ADWG (Health)	Limit of Reporting	Number of Samples	Minimum	Maximum	Mean	95th Percentile
Di-n-butyl phthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Di-n-butyl phthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Di-n-octylphthalate	US EPA 8270D	µg/L	-	<2	24	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons									
2-Chloronaphthalene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
2-Methylnaphthalene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
3-Methylcholanthrene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
7,12-Dimethylbenz(a) anthracene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Acenaphthene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Acenaphthylene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Acenaphthylene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Anthracene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Anthracene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Benz(a)anthracene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<2	24	<2	<2	<2	<2
Benzo(a)pyrene	US EPA 3510/8270	µg/L	0.01	<0.5	24	<0.5	<0.5	<0.5	<0.5
Benzo(b) fluoranthene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Benzo(b) & Benzo(k) fluoranthene	US EPA 3510/8270	µg/L	-	<4	24	<4	<4	<4	<4
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Benzo(g,h,i)perylene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Chrysene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Chrysene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Dibenz(a,h)anthracene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Fluoranthene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Fluoranthene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Fluorene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Fluorene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Indeno(1,2,3-cd)pyrene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
N-2-Fluorenyl Acetamide	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Naphthalene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Phenanthrene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Phenanthrene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
Pyrene	US EPA 3510/8270	µg/L	-	<2	24	<2	<2	<2	<2
Pyrene	US EPA 3510/8270	µg/L	-	<1	24	<1	<1	<1	<1
PAHs (total)	US EPA 3510/8270	µg/L	-	<0.5	24	<0.5	<0.5	<0.5	<0.5

Table notes:

ADWG	(Health) Australian Drinking Water Guidelines – Health Guideline Value
CFU/mL	colony forming units per millilitre
deg. C	degrees Celsius
LOR	limit of reporting
µg/L	micrograms per litre
µS/cm	micro siemens per centimetre
mg/L	milligrams per litre
MPN/100ml	most probable number per 100 millilitres
NTU	nephelometric units
Pt-Co	platinum-cobalt units

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

Where the table lists two distinct data sets for the same analyte, the analyte has been measured in two different suites of screens conducted by the laboratory: semi volatile organic compounds screen and phthalates screen.

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ABBREVIATIONS

ACT	Australian Capital Territory
ACT Heath	ACT Health Directorate
ADWG	Australian Drinking Water Guidelines (2011)
ADWG (Health)	Australian Drinking Water Guidelines – health guideline value
AS/NZS	Australian Standards/New Zealand Standards
CFU	colony forming units
cm	centimetre
cm2	centimetre squared
deg. C	degrees Celsius
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
LOR	limit of reporting
mg	milligram
mJ	megajoule
ML	megalitre
mL	millilitre
mm	millimetre
mm3	millimetres cubed
MPN	most probable number
ng	nanogram
µg	micrograms
µS	microsiemens
NATA	National Association of Testing Authorities
NHMRC	National Health and Medical Research Council
NSW	New South Wales
NTU	nephelometric turbidity units
Pt-Co	platinum-cobalt units
SVOC	semi volatile organic compound
The Code	*Public Health (Drinking Water) Code of Practice (2007)*
The Strategy	Source Water Protection Strategy
THM	trihalomethane
UV	ultraviolet light
WSAA	Water Services Association of Australia
WTP	Water treatment plant

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