



**BUSSELTON WATER**



# Annual Water Quality Report

2023-2024





1 Fairbairn Road  
Busseton WA

PO Box 57  
Busseton WA 6280  
+61 (8) 9781 0500  
admin@bussetonwater.wa.au

 /busseton.water  @BussetonWater

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# MESSAGE FROM THE CHIEF EXECUTIVE OFFICER

I am pleased to present the 2023-24 Annual Water Quality Report on behalf of Busselton Water.



Our commitment to compliance with health related and non-health related water quality criteria in the Australian Drinking Water Guidelines (ADWG) has continued. Our strong relationships with customers, stakeholders, and regulators are guided by these guidelines, supported by our Memorandum of Understanding (MoU) with the Department of Health.

The water quality results of the report show outstanding performance for 2023-24, during a period of sustained high growth in demand and higher-than-average summer temperatures.

This report covers water quality results, compliance with ADWG, and the processes Busselton Water uses for collecting, treating, and distributing drinking water to our customers.

I extend a thank you to everyone who has contributed to these excellent results, particularly staff and representatives from the Department of Health and the many contracted companies that support the delivery of our services.



**David Hughes-Owen**  
Chief Executive Officer

2023-24 WATER QUALITY RESULTS AT A GLANCE	
<b>Incident management</b>	
Incidents reportable to the Department of Health	Nil
<b>Health related characteristics</b>	
	<b>Compliance</b>
<i>Escherichia coli</i>	100%
<i>Naegleria</i>	100%
Chemical	100%
Pesticides	100%
Radiological	100%
Chlorine Disinfection	100%
<b>Non-health characteristics</b>	
	<b>Compliance</b>
Aesthetic characteristics (excluding chlorine) <sup>1</sup>	99.9%

<sup>1</sup> Busselton Water achieved full compliance with Australian Drinking Water Guidelines except for:  
(a) the 0.6 mg/L aesthetic guideline value for chlorine concentration. This aesthetic guideline value is exceeded on some occasions to ensure the microbiological safety of our water supply; and  
(b) two Total Dissolved Solids samples in the distribution network that exceeded the ADWG Aesthetic upper guideline of 600 milligrams per litre. These were short term exceedances and not of health related significance.

# OUR COMMITMENT

We are committed to achieving 100 per cent compliance, with health-related and non-health related water quality criteria in the ADWG<sup>2</sup>.

To enable us to achieve this, we will:

- systematically monitor and report water quality performance;
- be prepared for incidents including regular testing of our response plans;
- fulfil all the requirements of our Operating Licence and MoU<sup>3</sup> with the Department of Health; and review and implement the Drinking Water Quality Management Plan.

## Drinking Water Quality Policy

Busselton Water is committed to providing our current and future customers with high quality, safe drinking water consistent with the ADWG.

In pursuit of our commitments, we will:

- endorse and embrace the ADWG including protection of catchments and sources;
- fulfil all the requirements of our Operating Licence and MoU with the Department of Health;
- maintain and implement a Drinking Water Quality Management System consistent with the 12 elements of the ADWG Framework;
- systematically monitor and report water quality performance;
- prepare for incidents and regularly test our response plans;
- ensure our own water extraction is sustainable; and
- champion protection of source catchments in collaboration with

relevant government agencies and regulators.

## Drinking Water Quality Management Framework

Busselton Water bases its Drinking Water Quality Management System on the ADWG Framework for Management of Drinking Water Quality, endorsed by the National Health and Medical Research Council. The Framework provides benchmark water quality guidelines and values for designing a structured system for drinking water quality management. It aims to ensure a safe and reliable water supply. There are 12 elements within the ADWG Framework which are considered best practice. These elements are divided into four sections:

1. Commitment to drinking water quality management;
2. System analysis and management;
3. Supporting requirements;
4. Review.

Busselton Water regularly assesses its performance against these elements.

## Operating Licence

Our Operating Licence incorporates our MoU with the Department of Health<sup>4</sup>.

## Memorandum of Understanding

The MoU describes the Department of Health requirements for compliance with the microbiological, health, chemical and radiological criteria. Busselton Water provides the Department of Health with a quarterly water quality report, outlining how our organisation has performed against agreed requirements specified in the MoU. Busselton Water is a member of Western Australia's Advisory Committee for the Purity of Water<sup>5</sup>.

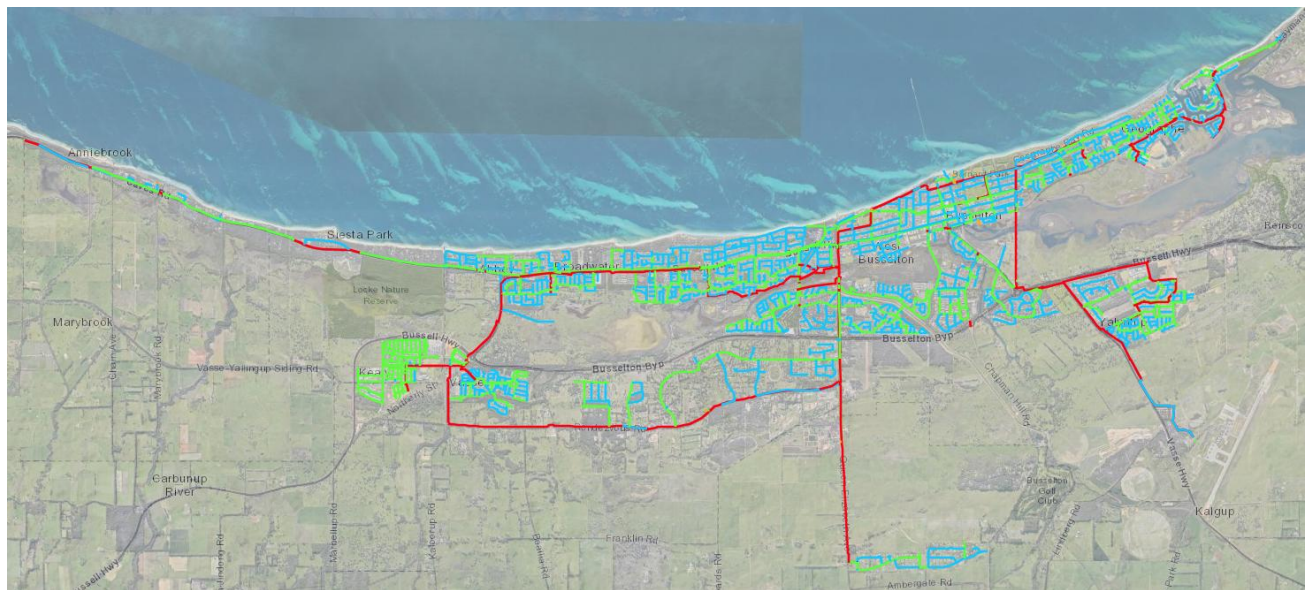
<sup>2</sup> The "Australian Drinking Water Guidelines" published by the National Health and Medical Research Council, Australia's peak health research body, provides an authoritative reference on what defines safe, good quality drinking water; how it can be achieved; and how it can be assured. It is available for download from <https://nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines>.

<sup>3</sup> A copy of the Memorandum of Understanding with the Department of Health is available on the Busselton Water website at: <https://dyf0dddatui34.cloudfront.net/wp-content/uploads/2020/01/MOU-between-Department-of-Health-and-Busselton-Water-2019.pdf>

<sup>4</sup> <https://www.erawa.com.au/cproot/21967/2/Water-Services-Licence-3-Version-10-02-June-2021---Busselton-Water-Corporation.pdf>

<sup>5</sup> More information on the Advisory Committee for the Purity of Water can be found at [http://ww2.health.wa.gov.au/Articles/A\\_E/Advisory-Committee-for-the-Purity-of-Water](http://ww2.health.wa.gov.au/Articles/A_E/Advisory-Committee-for-the-Purity-of-Water)

# OUR GEOGRAPHIC COVERAGE



## Current Extent of Operation

Established in 1906, Busselton Water is a local water corporation. We share a 118 year history and culture with the local community. We provide potable water services to more than 30,000 people within the City of Busselton (doubling to more than 60,000 in peak holiday periods). The Water Corporation purchases bulk treated water from Busselton Water to augment supply to Dunsborough.

We currently provide drinking water within a serviced area of 81,200 hectares, centred around Busselton as shown above. Red, green and blue lines depict water distribution pipes of various sizes, with red being the largest mains pipes and blue being the smallest.

## Our Licence Area

A map of our Licenced Operating Area for Potable Water Supply Services can be viewed on the Economic Regulation Authority website<sup>6</sup>.

<sup>6</sup> <https://www.erawa.com.au/cproot/12840/2/Operating%20area%20map%20-%20WL3%20-%20Busselton%20Water.PDF>

# SYSTEM ANALYSIS AND MANAGEMENT

## Our Water Source

Busselton Water sources most of its raw water from the deep, confined, Yarragadee aquifer which extends from about 275 metres to over 800 metres depth. There is some draw from the base of the shallower Leederville aquifer which extends from about 10 to 275 metres in depth.

Busselton Water extracts this raw water under groundwater licences (GWLs) 110850 and 110851, issued by the Department of Water and Environmental Regulation (DWER). There are eight production bores pumping the raw water to treatment plants for aeration, filtration and disinfection before the treated water is stored in tanks and reticulated to customers.

## Source protection

Busselton Water, in conjunction with DWER, developed the Busselton Water Reserves Drinking Water Source Protection Plan (Report WRP 139)<sup>7</sup> released by the Department of Water, predecessor of DWER, in August 2013. The Plan defines the boundaries of Busselton Water's Water Reserve and assigns a Priority 1 to these reserves. Ongoing monitoring ensures appropriate actions can be taken to mitigate any risks of contamination.

This identifies that due to the confined nature of this drinking water source, there is very little risk of contamination from overlying land uses. The purpose of proclaiming the water reserves was to ensure the bore locations are under legislative protection.

Busselton Water is also bound by DWER's Groundwater Licence Operating Strategy (GLOS), which is updated annually and stipulates annual extraction entitlement limits, licence conditions and compliance requirements. The annual review has specialist input by Busselton Water's consultant hydrogeologists (Rockwater Pty Ltd) who also establish the implementation of the borefield construction and maintenance plan, monitoring and reporting requirements to ensure future operational strategies are sustainable in the long term. Extraction of water in accordance with the operating strategy is shown as follows:



ANNUAL GROUNDWATER ABSTRACTED	
Financial Year	Extraction (gigalitres)
2013-2014	5.05
2014-2015	5.18
2015-2016	5.38
2016-2017	5.15
2017-2018	5.35
2018-2019	5.41
2019-2020	5.60
2020-2021	5.50
2021-2022	6.01
2022-2023	6.06
2023-2024	7.21

<sup>7</sup> [Busselton Water Reserve Drinking Water Source Protection Review](#)

## SYSTEM ANALYSIS AND MANAGEMENT

### Understanding water quality

Turbidity	Turbidity is the cloudy appearance of water caused by the presence of suspended matter.	The Australian Drinking Water Guidelines specify an aesthetic guideline of 5 Nephelometric Turbidity Units (NTU). If disinfection is required, a turbidity of less than 1 NTU is desirable at the point of disinfection.
Colour	Colour in water originates mainly from natural drainage through soil and vegetation in a catchment.	The Australian Drinking Water Guidelines value for colour is based on the colour that is noticeable in a glass. This is generally accepted as 15 Hazen Units (HU).
Iron	Iron occurs naturally in water as a result of contact with soil or rock in the catchment. Iron in the water does not present a health hazard.	The Australian Drinking Water Guidelines recommend that based on aesthetic consideration, the concentration of Iron should not exceed 0.3 milligrams per litre (mg/L).
Manganese	Manganese in water can come from contact with soil or rock in the catchment. Manganese is not considered a health concern unless the concentration exceeds 0.5 mg/L.	The Australian Drinking Water Guidelines recommend that based on aesthetic considerations, the levels of Manganese should not exceed 0.1 mg/L.
Total Dissolved Solids	Total dissolved solids (TDS) consist of inorganic (natural) salts and small amounts of organic matter dissolved in water. Total dissolved solids comprise sodium, potassium, calcium, magnesium, chloride, sulphate, bicarbonate, carbonate, silicon, organic matter, fluoride, iron, manganese, nitrate and phosphate.	Treated water quality containing TDS levels of below 600 mg/L is classified as good.
Microbial Pathogens	<p>The most common and widespread health risk associated with drinking water is contamination by microorganisms. Organisms associated with the gut of humans and mammals cause the usual waterborne diseases. Tests are undertaken for <i>Escherichia coli</i> (<i>E. coli</i>) as an indicator of microbial contamination.</p> <p>Thermophilic <i>Naegleria</i> refers to a group of amoebae which includes <i>Naegleria fowleri</i>, the organism that causes the waterborne disease primary amoebic meningoencephalitis. <i>Naegleria fowleri</i> is an environmental pathogen which naturally lives in fresh warm water.</p>	<p>The Australian Drinking Water Guidelines state that thermotolerant coliforms / <i>E.coli</i> should not be present in a minimum 100 mL sample of drinking water.</p> <p>The Department of Health WA has notification protocols in place regarding <i>Naegleria</i>. Busselton Water is required to immediately notify the Department of Health if <i>Naegleria</i> is detected in any microbiological sample.</p>
Radiological	There are natural levels of radiation within the environment, and groundwater sources such as that sourced from the Yarragadee aquifer can have higher background levels than that of surface water systems.	<p>Testing is undertaken for gross alpha and gross beta radioactivity, where screening levels can be determined.</p> <p>The Australian Drinking Water Guidelines recommend a screening level of 0.5 Becquerel per Litre (Bq/L).</p>
pH	pH is a measure of how acidic / basic water is. The range goes from 0 - 14, with 7 being neutral. pH is the measure of free hydrogen ion concentrations in the water.	The suggested aesthetic pH target from the Australian Drinking Water Guidelines is 6.5 to 8.5.

## SYSTEM ANALYSIS AND MANAGEMENT

### Water Treatment

Busselton Water uses a three-step process to treat raw water from the deep groundwater aquifers to provide customers with safe drinking water.

Chlorine is approved for use in the treatment of drinking water supplies and Busselton Water sources chlorine gas from an ISO 9001 accredited manufacturer.

#### Pre-oxidation and aeration

Raw water is dosed with a small amount of chlorine, which is a strong oxidizing agent. Water is then aerated through spray nozzles.

These two processes oxidise naturally occurring iron and manganese, turning them from their soluble form into small solids.



#### Filtration

The pre-chlorinated and aerated water is then filtered through sand filters to remove the iron and manganese solids, turbidity and any other filterable impurities. Filtered water is then collected in a clear-water well.



#### Disinfection

A further dose of chlorine is added to water pumped from the clear-water well to storage tanks. This chlorine maintains the disinfection level required to preserve microbiological safety of the water stored in tanks and subsequently pumped into the distribution network.



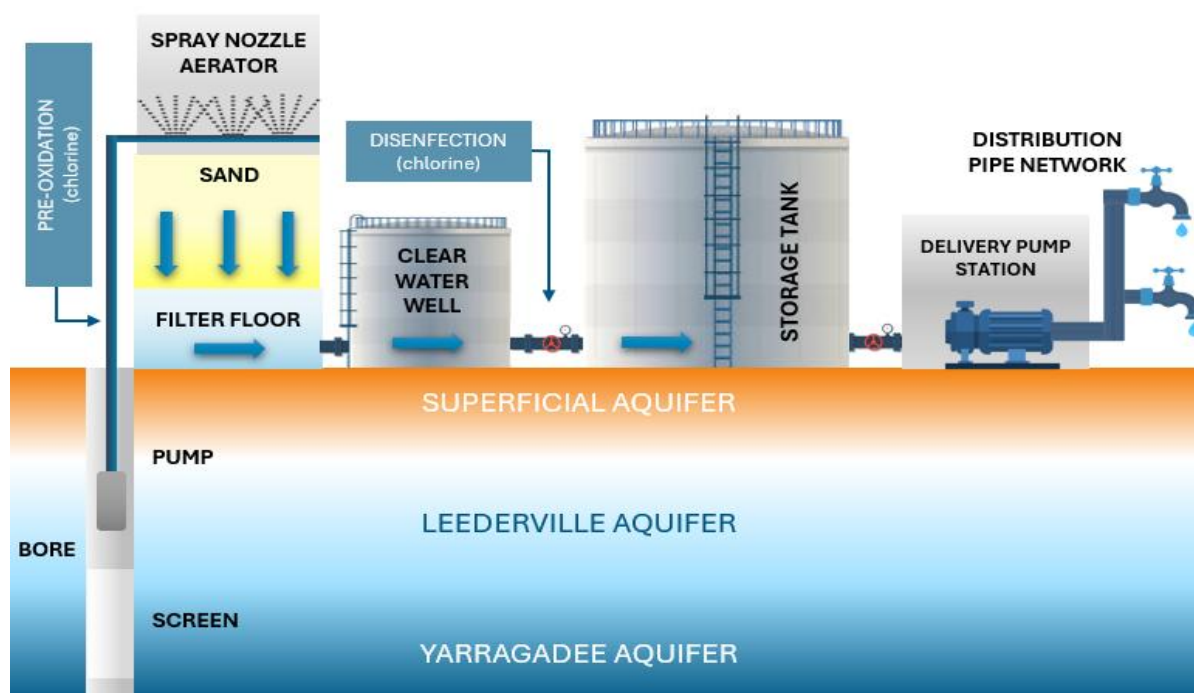
## SYSTEM ANALYSIS AND MANAGEMENT

### Our Water Treatment Plants

Busselton Water operates three water treatment plants (Plant 1, Plant 2 and Plant 3).

Chlorine disinfection occurs at each treatment plant to keep the concentration of chlorine in the distribution network at or above 0.4 milligrams per litre to ensure adequate protection against Thermophilic *Naegleria* and other microbiological threats. There is also a chlorine disinfection plant located in the distribution network on the trunk main to the Busselton Airport.

Note: Busselton Water has naturally-occurring fluoride in its raw water and does not add fluoride to its drinking water.



### Distribution Network

Busselton Water’s distribution network delivers drinking water to customers within the City of Busselton and transfers bulk water to neighbouring Dunsborough. The network operates as one large, interconnected system.

Materials (pipes, fittings etc) used in the reticulation network have been approved either under Australian Standard AS/NZS 4020 (Testing of Products for Use in Contact with Drinking Water) or as scheduled in the MoU with the Department of Health.

Strict protocols established by Busselton Water in conjunction with the Department of Health and the Department of Mines, Industry Regulation and Safety assure the:

- safety and integrity of water distributed to customers;
- safe handling of chlorine at the water treatment plants; and
- safety of chemicals used and materials in contact with drinking water.

DISTRIBUTION NETWORK COMPONENTS	
Estimated population	Approx. 30,000
Total number of connections	15,108
Total length of pipes (km)	351.5
Number of storage tanks	5
Chlorine residual target	0.4 to 0.6 mg/L
Number of water quality localities	1



### Multi-barrier Approach

Preventing contamination and minimising potential hazards is an essential part of providing our customers with safe drinking water. The ADWG require the implementation of a multi-barrier approach as the most effective way of ensuring the safety of drinking water.

Busselton Water's barriers include:

- protection of groundwater;
- treatment;
- chlorine disinfection; and
- backflow prevention.

Busselton Water maintains, operates and monitors these multiple barriers, ensuring they are robust, and that high-quality drinking water is delivered to our customers.

### Incident Responses

While every effort is made to prevent water quality incidents from occurring, there will inevitably be times when our systems fail due to equipment malfunction, human error, extreme weather conditions or unforeseen events.

Busselton Water has incident response plans to manage such events with the minimum possible impact on water quality.

In the event of a water quality incident, Busselton Water activates its Water Quality Incident Response Plan. This comprehensive plan is applied to manage water quality incidents and is consistent.

### Business Continuity

In March 2024, a Water Quality mock event was held with Department of Health participation. The mock event tested Busselton Water's Business Continuity and Emergency Response Plans for delivery of safe water and effective continuity of supply against a scenario involving a potential chlorine gas failure at one of Busselton Water's Water Treatment Plants. A number of minor improvements to Busselton Water's processes were identified as a result of the mock event and additionally, the feasibility of installing hard barriers or vegetation green belts around chlorine gas storage facilities and the potential for replacing chlorine gas with hypochlorite solution for chlorine dosing will be investigated.

### Water Quality Monitoring and Testing

Busselton Water has a comprehensive water quality monitoring program which has been reviewed and endorsed by the Department of Health. Key parameters monitored by Busselton Water are:

- microbiological – including Thermophilic *Naegleria* and *Escherichia coli*;
- chemical health – including:
  - a large range of parameters with health-related guideline values defined by the ADWG; and
  - pesticides which are monitored and tested on an annual basis to monitor the risk of groundwater contamination by pesticides and agricultural chemicals used in proximity to our bores or in the aquifer recharge area;
- chemical non-health (aesthetic) – including a large range of parameters with non-health guideline values defined by the ADWG; and
- radiological health – monitored and tested every two years.
- PFAS/PFOS sampling regime, commencing in 2023-24, of its raw and treated water.

### Development, Training and Innovation

Busselton Water utilises training in accordance with the National Water Industry Training package. Water quality operational staff progress towards Certificate III in Water Industry Operations.

Busselton Water adopts a best practice 70/20/10 development approach. This approach allocates more time to experiential learning and delivers better employee development and business outcomes.

It consists of 70 per cent experiential learning, 20 per cent mentorship of employee learning (including development planning), and 10 per cent approved class-based training. Personnel regularly attend relevant training courses and / or conferences.

Busselton Water continued to derive benefit from innovative detection of backflow from residential customers' properties using radio frequency water meters.



## SYSTEM ANALYSIS AND MANAGEMENT

### Our Customers

We strive to deliver excellence in customer service and continue to improve our existing levels of customer satisfaction. Busselton Water operates within a customer centricity mode where the customer remains at the centre of our work environment. Our goal is to leave our customers feeling satisfied and confident that we genuinely care about addressing their concerns after every interaction. As a result of this way of thinking and operating, water quality complaints remain at a very low level.

Busselton Water received 14 water quality complaints during 2023-24, with eight relating to taste and odour and six relating to discoloured water. This equates to 0.927 complaints per 1,000 properties.

All customer complaints were investigated through personal contact with the customer. All complaints were resolved through either flushing the pipe network in the immediate vicinity of the customer's property and, where appropriate, improving the customer's understanding of how drinking water quality is managed.



## REVIEW

Busselton Water monitors water quality in accordance with the requirements of the ADWG and Department of Health and ensures that all its dosing, measurement and sampling equipment, and the instrumentation that is used to monitor and control its drinking water quality, is calibrated pursuant to the *National Measurement Act 1960* (Cth).

Busselton Water understands the importance of holistic catchment to tap risk management processes that focus on the capabilities and resilience of the entire system, not just reactive measures of quality at the point of supply. The Senior Executive regularly review the approach to drinking water quality management, develop action plans, and commit the resources necessary to improve operational processes and overall drinking water quality performance.

### Microbiological Health and Disinfection Results

Busselton Water collected 364 samples from its reticulation system for formal assessment during the reporting period and 100 per cent of these samples were compliant, with no detections of either *Escherichia coli* or Thermophilic *Naegleria*. A further 2,064 samples were taken to assess chlorine levels (1,672 in the distribution network and 392 in the storage tanks).

### Chemical Health Results

There are many chemical parameters that have health-related guideline values in the ADWG. Busselton Water achieved 100 per cent compliance with all these requirements. The report in the next section gives more detail on the individual parameters.

Perfluoroalkyl and Polyfluoroalkyl substances (PFAS) are a family of manufactured chemicals which do not occur naturally in the environment.

PFAS has been identified in the environment at several known and suspected contaminated sites in Western Australia including one in Busselton. No PFAS was detected in Busselton Water's source water when the site was identified and liaison continues with the City of Busselton, the Department of Health and the Department of Water and Environmental Regulation regarding ongoing monitoring and testing.

### Radiological Health Results

Groundwater radiological testing is conducted in accordance with parameters and frequencies based on the ADWG and in consultation with the Department of Health. This testing is only required every two years. Gross alpha and gross beta were tested in April 2024 and results from these samples were 100 per cent compliant.

### Visibility of Water Quality Information

Quarterly and annual water quality reports are posted on the Busselton Water website and Executive reports are provided to the Board.

Staff are continually updated and involved in water quality management and relevant data is made readily available. As a simple example, the "Ten Commandments for Safe Drinking Water" (Hrudey & Hrudey 2014)<sup>8</sup> is on display at the operational depot as a reminder to staff.



<sup>8</sup> Hrudey S E, Hrudey E J, *Ten Commandments For Safe Drinking Water* Canadian Water Network 2020, and American Water and Wastewater Association, 2014

## REVIEW

### Non-health (Aesthetic) Results

Except for chlorine as described below, Busselton Water achieved 99.9 per cent compliance with non-health (Aesthetic) parameters. Two Total Dissolved Solids sample results were slightly outside the ADWG upper aesthetic limit of 600 milligrams per litre and this operational fluctuation is of minor concern with no adverse customer impact.

Busselton Water uses chlorine to provide a disinfectant residual in the water distribution network. Disinfection is designed to kill pathogenic microorganisms, thereby preventing waterborne diseases. Chlorination is the most commonly-used process for disinfection and has been endorsed by the National Health and Medical Research Council for use as a drinking water treatment chemical.

The ADWG state that “In some supplies it may be necessary to exceed the aesthetic guideline in order to maintain an effective disinfectant residual throughout the system.” Busselton Water closely manages chlorine dosing levels to maintain a minimum residual chlorine level of 0.4 milligrams per litre throughout the distribution network. During the year, Busselton Water collected 1,672 chlorine samples in the distribution network and 410 chlorine samples in the storage tanks. The minimum total chlorine level was 0.40 milligrams per litre at Spinnaker Boulevard, and the maximum was 0.91 milligrams per litre at Vernon Track.

There are many parameters with aesthetic guideline values in the ADWG. Results of individual parameters are outlined in the next section of this report.



# WATER QUALITY RESULTS

In the period 1 July 2023 to 30 June 2024, there were no water quality incidents reportable to the Department of Health.

Busselton Water collected 613 free chlorine samples during 2023-24 (364 in the distribution network and 249 in the storage tanks) for formal assessment of our water's chemical health characteristics. An additional 2,082 chlorine (free and total) samples were taken during 2023-24 to manage the disinfection performance achieved within the pipe network. The minimum, average and maximum levels of these additional operational samples were:

CHLORINE SAMPLES – 1 JULY 2023 TO 30 JUNE 2024			
TYPE	Minimum mg/L	Average mg/L	Maximum mg/L
Distributed Chlorine (Free)	0.40	0.56	0.88
Distributed Chlorine (Total)	0.40	0.60	0.91

MICROBIOLOGICAL SAMPLES – 1 JULY 2023 TO 30 JUNE 2024										
CHARACTERISTIC	UNIT	ADWG LIMIT	Number of Samples		Total No. of Samples (Treated + Distribution)	Maximum Value		Number of Non Compliance with ADWG Limit		Compliance % Distribution Water
			Treated Water (Non-Assessable)	Distribution Water (Assessable)		Treated Water (Non-Assessable)	Distribution Water (Assessable)	Treated Water (Non-Assessable)	Distribution Water (Assessable)	
<i>Escherichia coli</i>	CFU/100 mL	0	249	364	613	0	0	0	0	100%
Thermophilic <i>Naegleria</i>	org/250 mL	ND	249	364	613	ND	ND	0	0	100%
<i>Naegleria fowleri</i>	org/250 mL	ND	0	0	0	-	-	0	0	100%

**Note 1** CFU = colony forming units

**Note 2** Tests for *Naegleria Fowleri* only required if Thermophilic *Naegleria* is detected.

**Note 3** Sampling for *E. coli* in the distribution network commenced on 30 March 2010. There has not been an *E. coli* detection in the distribution network to date.

**Note 4** The last known Thermophilic *Naegleria* detection in the distribution network was at Vernon Track on 16 August 2011.

CHEMICAL HEALTH - 1 JULY 2023 TO 30 JUNE 2024											
CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples		Total No. of Samples (Raw + Distribution)	Maximum Value		Number of Non Compliance with ADWG Health Guideline		Compliance % Distribution Water
				Raw Water	Distribution Water		Raw Water	Distribution Water	Raw Water	Distribution Water	
Antimony	mg/L	0.003	0.001	NR	16	16	NR	ND	NR	0	100%
Arsenic	mg/L	0.01	0.001	NR	16	16	NR	ND	NR	0	100%
Barium	mg/L	2	0.01	NR	16	16	NR	0.41	NR	0	100%
Beryllium	mg/L	0.06	0.001	NR	16	16	NR	ND	NR	0	100%
Boron	mg/L	4	0.05	NR	16	16	NR	0.24	NR	0	100%
Bromate	mg/L	0.02	0.005	NR	7	7	NR	ND	NR	0	100%
Bromide	mg/L	No guideline	0.1	8	7	15	0.4	ND	No guideline	0	No guideline
Bromodichloromethane	mg/L	0.25*	0.005	NR	12	12	NR	ND	NR	0	100%
Bromoform	mg/L	0.25*	0.005	NR	12	12	NR	0.0034	NR	0	100%
Cadmium	mg/L	0.002	0.0005	NR	16	16	NR	ND	NR	0	100%
Chlorine (Total)	mg/L	5		NR	364	364	NR	0.91	NR	0	100%
Chloroform	mg/L	0.25*	0.0005	NR	12	12	NR	ND	NR	0	100%
Copper	mg/L	2	0.001	NR	16	16	NR	0.014	NR	0	100%
Dibromochloromethane	mg/L	0.25*	0.001	NR	12	12	NR	ND	NR	0	100%
Fluoride <i>(See Note 6 below)</i>	mg/L	1.5	0.1	78	84	162	1.0	0.6	0	0	100%
Lanthanum	mg/L	0.002	0.001	NR	7	7	NR	ND	NR	0	100%
Lead	mg/L	0.01	0.001	NR	16	16	NR	ND	NR	0	100%
Manganese (Soluble)	mg/L	0.5	0.01	105	84	189	0.093	ND	0	0	100%
Manganese (Total)	mg/L	0.5	0.01	105	84	189	0.1	ND	0	0	100%
Mercury	mg/L	0.001	0.0001		16	16	NR	ND	NR	0	100%
Molybdenum	mg/L	0.05	0.001		16	16	NR	0.003	NR	0	100%
Nickel	mg/L	0.02	0.001		16	16	NR	ND	NR	0	100%
Nitrate-NO3	mg/L	50	0.01	31	4	35	0.08	0.03	0	0	100%
Nitrite NO2	mg/L	3	0.01	31	4	35	0.03	ND	0	0	100%
Selenium	mg/L	0.01	0.001	NR	16	16	NR	0.002	NR	0	100%
Silver	mg/L	0.1	0.001	NR	16	16	NR	ND	NR	0	100%
Total Trihalomethanes *	mg/L	0.25*	0.001	NR	12	12	NR	0.0034	NR	0	100%
Uranium	mg/L	0.021	0.001	NR	16	16	NR	ND	NR	0	100%
<b>TOTAL</b>				<b>358</b>	<b>929</b>	<b>1287</b>			<b>0</b>	<b>0</b>	<b>100%</b>

**Note 1** mg/L = milligrams per litre

NTU = Nephelometric turbidity units

ND = Not Detected

NR = Not required to be sampled

**Note 2:** Raw water is blended and treated prior to supply to consumers. Raw water is not provided to consumers and raw water data presented is for operational purposes.

**Note 3** Chlorine Total is a Busselton Water in-house test. All others are NATA accredited test results. The operating target for residual chlorine in the reticulation system is 0.4 – 0.6 mg/L. Total chlorine levels will be higher than residual levels.

**Note 4** The average Chlorine Total level in the distribution network for the reporting period was 0.60 mg/L.

**Note 5** The maximum Chlorine Total level of 0.91 mg/L in the distribution network for the reporting period was recorded at the Vernon Track sample point on 9 May 2024. No adverse customer or operational impacts resulted. The aesthetic guideline value of 0.6 mg/L is exceeded on some occasions to ensure the microbiological safety of our water supply.

**Note 6** Busselton Water does not add fluoride to the water. The naturally occurring fluoride levels vary from bore to bore. The maximum value shown is not indicative of the level throughout the Busselton water supply. Fluoride levels in the drinking water vary with location and time and can be between 0.1 and 1.0 mg/L. The average fluoride level in the distribution network for the reporting period was 0.4 mg/L.

**Note 7** \* The concentration of trihalomethanes, either individually or in total, in drinking water should not exceed 0.25 mg/L.

**PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES (PFAS) - 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples		Total No. of Samples (Raw + Distribution)	Maximum Value		Number of Non Compliance with ADWG Health Guideline		Compliance % Distribution Water
				Raw Water	Distribution Water		Raw Water	Distribution Water	Raw Water	Distribution Water	
<b>Perfluoroalkyl sulfonamido substances - Trace</b>											
Perfluorooctane sulfonamide (FOSA)N11	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
N-methylperfluoro-1-octane sulfonamide (N- MeFOSA)N11	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
N-ethylperfluoro-1-octane sulfonamide (N- EtFOSA)N11	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N- MeFOSE)N11	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N- EtFOSE)N11	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
N-ethyl-perfluorooctanesulfonamidoacetic acid (N- EtFOSAA)N11	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
N-methyl-perfluorooctanesulfonamidoacetic acid (N- MeFOSAA)N11	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
<b>Perfluoroalkyl carboxylic acids (PFCAs) – Trace</b>											
Perfluorobutanoic acid (PFBA)N11	ug/L	No Guideline	0.005	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluoropentanoic acid (PFPeA)N11	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorohexanoic acid (PFHxA)N11	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluoroheptanoic acid (PFHpA)N11	ug/L	No Guideline	0.005	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorooctanoic acid (PFOA)N11	ug/L	0.56	0.001	24	30	54	ND	ND	0	0	100%
Perfluorononanoic acid (PFNA)N11	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorodecanoic acid (PFDA)N11	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorotridecanoic acid (PFTTrDA)N15	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
Perfluoroundecanoic acid (PFUnDA)N11	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorododecanoic acid (PFDoDA)N11	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorotetradecanoic acid (PFTeDA)N11	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Trace</b>											
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)N11	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)N11	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)N11	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)N11	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
8											
<b>Perfluoroalkyl sulfonic acids (PFSA)- Trace</b>											
Perfluorobutanesulfonic acid (PFBS)N11	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorononanesulfonic acid (PFNS)*N15	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluoropropanesulfonic acid (PFPrS)*N15	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluoropentanesulfonic acid (PFPeS)N15	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorohexanesulfonic acid (PFHxS)N11	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluoroheptanesulfonic acid (PFHpS)N15	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline

**PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES (PFAS) - 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples		Total No. of Samples (Raw + Distribution)	Maximum Value		Number of Non Compliance with ADWG Health Guideline		Compliance % Distribution Water
				Raw Water	Distribution Water		Raw Water	Distribution Water	Raw Water	Distribution Water	
Perfluorooctanesulfonic acid (PFOS)N11	ug/L	No Guideline	0.001	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Perfluorodecanesulfonic acid (PFDS)N15	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
<b>PFASs Summations</b>											
Sum (PFHxS + PFOS)*	ug/L	0.07	0.001	24	30	54	ND	ND	0	0	100%
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
Sum of PFASs (n=30)*	ug/L	No Guideline	0.005	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
Sum of US EPA PFAS (PFOS + PFOA)*	ug/L	No Guideline	0.001	16	20	36	ND	ND	No Guideline	No Guideline	No Guideline
Sum of WA DWER PFAS (n=10)*	ug/L	No Guideline	0.005	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
Sum of WA DWER PFAS (n=10)*	ug/L	No Guideline	0.005	24	30	54	ND	ND	No Guideline	No Guideline	No Guideline
<b>TOTAL</b>				<b>696</b>	<b>870</b>	<b>1566</b>			<b>0</b>	<b>0</b>	<b>100%</b>

**Note 1:** mg/L = milligrams per litre  
 ND = Not Detected

No Guideline = No ADWG guideline. Compliance is not required or shown for these analytes.

**Note 2:** Raw water is blended and treated prior to supply to consumers. Raw water is not provided to consumers and raw water data presented is for operational purposes.

**CHEMICAL HEALTH – PESTICIDES AND HERBICIDES – 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples	Maximum Value	Number of Non-compliance with ADWG Health Guideline	Compliance %
<b>Acid Herbicides</b>							
Dicamba	µg/L	100	0.1	5	ND	0	100%
MCPA	µg/L	40	0.1	5	ND	0	100%
2,4-D	µg/L	200	0.1	5	ND	0	100%
2,4,5-T	µg/L	100	0.1	5	ND	0	100%
2,4,6-T	µg/L	20	0.1	5	ND	0	100%
Picloram	µg/L	300	0.2	5	ND	0	100%
Fluazifop	µg/L	No Guideline	0.4	5	ND	No Guideline	No Guideline
Clopyralid	µg/L	2000	0.4	5	ND	0	100%
Metsulfuron Methyl	µg/L	40	0.5	5	ND	0	100%
Triclopyr	µg/L	20	0.1	5	ND	0	100%
<b>Base Neutral Pesticides</b>							
Diuron	µg/L	20	0.5	5	ND	0	100%
Prometryn	µg/L	No Guideline	0.1	5	ND	No Guideline	No Guideline
Molinate	µg/L	4	0.1	5	ND	0	100%
Terbutryn	µg/L	400	0.1	5	ND	0	100%
Fenitrothion	µg/L	7	0.1	5	ND	0	100%
Fluometuron	µg/L	70	0.1	5	ND	0	100%
Chlorpyrifos	ug/L	10	0.1	5	ND	0	100%
Trifluralin	µg/L	90	0.1	5	ND	0	100%
Dimethoate	ug/L	7	0.1	5	ND	0	100%
Endosulfan I	µg/L	20	0.1	5	ND	0	100%
Fenamiphos	µg/L	0.5	0.1	5	ND	0	100%
Simazine	µg/L	20	0.1	5	ND	0	100%
Atrazine	µg/L	20	0.1	5	ND	0	100%
Endosulfan II	µg/L	20	0.1	5	ND	0	100%
Endosulfan Sulfate	µg/L	No Guideline	0.1	5	ND	No Guideline	No Guideline
Propazine	µg/L	50	0.1	5	ND	0	100%
Diclofop Methyl	µg/L	5	0.1	5	ND	0	100%
Amitraz	µg/L	9	0.1	5	ND	0	100%
Tebuconazole	µg/L	No Guideline	0.4	5	ND	No Guideline	No Guideline
Metolachlor	µg/L	300	0.2	5	ND	0	100%
Hexazinone	µg/L	400	0.4	5	ND	0	100%
Myclobutanil	µg/L	No Guideline	0.4	5	ND	No Guideline	No Guideline
Azinphos Methyl	ug/L	30	1	5	ND	0	100%
Propiconazole	µg/L	100	0.4	5	ND	0	100%
<b>Pesticides</b>							
Aldicarb	µg/L	4	1	5	ND	0	100%
Aldicarb Sulfone	µg/L	4	1	5	ND	0	100%

**CHEMICAL HEALTH – PESTICIDES AND HERBICIDES – 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples	Maximum Value	Number of Non-compliance with ADWG Health Guideline	Compliance %
Aldicarb Sulfoxide	µg/L	4	1	5	ND	0	100%
Aminocarb	µg/L	No Guideline	1	5	ND	No Guideline	No Guideline
Bromacil	µg/L	400	2	5	ND	0	100%
Carbaryl	µg/L	30	4	5	ND	0	100%
Carbendazim	µg/L	90	1	5	ND	0	100%
Carbofuran	µg/L	10	1	5	ND	0	100%
Diuron	µg/L	20	0.5	5	ND	0	100%
EPTC	µg/L	300	5	5	ND	0	100%
Fenamiphos	µg/L	0.5	0.1	5	ND	0	100%
Fenuron/Fenuron TCA	µg/L	No Guideline	2	5	ND	No Guideline	No Guideline
Fluometuron	µg/L	70	1	5	ND	0	100%
Linuron	µg/L	No Guideline	5	5	ND	No Guideline	No Guideline
Methiocarb	µg/L	7	4	5	ND	0	100%
Methomyl	µg/L	20	2	5	ND	0	100%
Mexacarbate	µg/L	No Guideline	1	5	ND	No Guideline	No Guideline
Monuron/Monuron TCA	µg/L	No Guideline	2	5	ND	No Guideline	No Guideline
Oxamyl	µg/L	7	2	5	ND	0	100%
Propachlor	µg/L	70	1	5	ND	0	100%
Propham	µg/L	No Guideline	5	5	ND	No Guideline	No Guideline
Propoxur	µg/L	No Guideline	1	5	ND	No Guideline	No Guideline
Siduron	µg/L	No Guideline	1	5	ND	No Guideline	No Guideline
<b>Organochlorine Pesticides</b>							
Aldrin	µg/L	0.3	0.001	5	ND	0	100%
alpha-BHC (HCH)	µg/L	No Guideline	0.001	5	ND	No Guideline	No Guideline
beta-BHC (HCH)	µg/L	No Guideline	0.001	5	ND	No Guideline	No Guideline
delta-BHC (HCH)	µg/L	No Guideline	0.001	5	ND	No Guideline	No Guideline
Bifenthrin	µg/L	No Guideline	0.05	5	ND	No Guideline	No Guideline
Bromophos Ethyl	µg/L	10	0.005	5	ND	0	100%
Chlordane	µg/L	2	0.002	5	ND	0	100%
Chlorothalonil	µg/L	50	0.01	5	ND	0	100%
Chlorpyrifos	µg/L	10	0.005	5	ND	0	100%
Diazinon	ug/L	4	0.01	5	ND	0	100%
Dieldrin	µg/L	0.3	0.001	5	ND	0	100%
Endosulfan I	µg/L	20	0.001	5	ND	0	100%
Endosulfan II	µg/L	20	0.001	5	ND	0	100%
Endosulfan Sulfate	µg/L	20	0.001	5	ND	0	100%
Endrin	µg/L	No Guideline	0.01	5	ND	No Guideline	No Guideline
Ethion	ug/L	4	0.01	5	ND	0	100%
Fenitrothion	µg/L	7	0.01	5	ND	0	100%

**CHEMICAL HEALTH – PESTICIDES AND HERBICIDES – 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples	Maximum Value	Number of Non-compliance with ADWG Health Guideline	Compliance %
Fipronil	µg/L	0.7	0.02	5	ND	0	100%
Hexachlorobenzene (HCB)	µg/L	No Guideline	0.001	5	ND	No Guideline	No Guideline
Heptachlor Epoxide	µg/L	No Guideline	0.001	5	ND	No Guideline	No Guideline
Heptachlor	µg/L	0.3	0.001	5	ND	0	100%
Lindane	µg/L	10	0.001	5	ND	0	100%
Malathion	µg/L	70	0.01	5	ND	0	100%
Methoxychlor	µg/L	30	0.02	5	ND	0	100%
o,p-DDT	µg/L	9	0.001	5	ND	0	100%
Oxychlorane	µg/L	No Guideline	0.001	5	ND	No Guideline	No Guideline
p,p-DDD	µg/L	No Guideline	0.001	5	ND	No Guideline	No Guideline
p,p-DDE	µg/L	No Guideline	0.001	5	ND	No Guideline	No Guideline
p,p-DDT	µg/L	9	0.001	5	ND	0	100%
Parathion Ethyl	µg/L	20	0.02	5	ND	0	100%
Parathion Methyl	µg/L	1	0.02	5	ND	0	100%
Trifluralin	µg/L	90	0.01	5	ND	0	100%
Vinclozolin	µg/L	No Guideline	0.02	5	ND	0	No Guideline
<b>TOTAL</b>				<b>450</b>		<b>0</b>	<b>100%</b>

**Note 1:** mg/L milligrams per litre  
µg/L micrograms per litre  
ND Not Detected  
No Guideline No ADWG guideline. Compliance is not required or shown for these analytes.

**CHEMICAL HEALTH – VOLATILE ORGANIC COMPOUNDS – 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples	Maximum Value	Number of Non-compliance with ADWG Health Guideline	Compliance %
<b>Storage Tanks</b>							
<b>Haloacetic Acids</b>							
Chloroacetic acid	ug/L	150	2	5	ND	0	100%
Bromoacetic acid	ug/L	No Guideline	2	5	ND	No Guideline	No Guideline
Dichloroacetic acid	ug/L	100	2	5	ND	0	100%
Trichloroacetic acid	ug/L	100	2	5	ND	0	100%
Bromochloroacetic acid	ug/L	No Guideline	2	5	ND	No Guideline	No Guideline
Bromodichloroacetic acid	ug/L	No Guideline	2	5	ND	No Guideline	No Guideline
Dibromoacetic acid	ug/L	No Guideline	2	5	ND	No Guideline	No Guideline
Dibromochloroacetic acid	ug/L	No Guideline	5	5	2.1	No Guideline	No Guideline
Tribromoacetic acid	ug/L	No Guideline	5	5	ND	No Guideline	No Guideline
<b>Plasticisers</b>							
Dimethyl phthalate	ug/L	No Guideline	1	5	ND	No Guideline	No Guideline
Diethyl phthalate	ug/L	No Guideline	1	5	ND	No Guideline	No Guideline
Dibutyl phthalate	ug/L	No Guideline	1	5	ND	No Guideline	No Guideline
Benzyl butyl phthalate	ug/L	No Guideline	1	5	ND	No Guideline	No Guideline
Di(2-ethylhexyl) adipate	ug/L	10	1	5	ND	0	100%
Di(2-ethylhexyl) phthalate	ug/L	10	1	5	ND	0	100%
Di-n-Octyl phthalate	ug/L	No Guideline	1	5	ND	No Guideline	No Guideline
<b>Volatile Organic Carbons</b>							
Benzene	µg/L	1	0.5	5	ND	0	100%
Carbon tetrachloride	µg/L	3	0.5	5	ND	0	100%
Chlorobenzene	µg/L	300	0.5	5	ND	0	100%
DCM	µg/L	No Guideline	5	5	ND	No Guideline	No Guideline
Ethylbenzene	µg/L	300	0.5	5	ND	0	100%
Hexachlorobutadiene	µg/L	0.7	0.5	5	ND	0	100%
Methyl tert Butyl Ether	µg/L	No Guideline	0.5	5	ND	No Guideline	No Guideline
Styrene	µg/L	4	0.5	5	ND	0	100%
Perchloroethene (PCE)	µg/L	No Guideline	0.5	5	ND	No Guideline	No Guideline
Toluene	µg/L	800	0.5	5	ND	0	100%
Trichloroethylene (TCE)	µg/L	No Guideline	0.5	5	ND	No Guideline	No Guideline
Vinyl Chloride	µg/L	0.3	0.2	5	ND	0	100%
Xylenes (Total)	µg/L	600	3	5	ND	0	100%
1,1-Dichloroethane	µg/L	No Guideline	0.5	5	ND	No Guideline	No Guideline
1,2-Dichloroethane	µg/L	3	0.5	5	ND	0	100%
1,1-Dichloroethene	µg/L	30	0.5	5	ND	0	100%
cis- 1,3-dichlorobenzene	µg/L	60	0.5	5	ND	0	100%
trans-1,2-Dichloroethene	µg/L	60	2	5	ND	0	100%

**CHEMICAL HEALTH – VOLATILE ORGANIC COMPOUNDS – 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples	Maximum Value	Number of Non-compliance with ADWG Health Guideline	Compliance %
<b>Storage Tanks</b>							
1,1,1-Trichloroethane	µg/L	No Guideline	0.5	5	ND	No Guideline	No Guideline
1,1,1,2-Tetrachloroethane	µg/L	No Guideline	0.5	5	ND	No Guideline	No Guideline
1,1,2,2-Tetrachloroethane	µg/L	No Guideline	0.5	5	ND	No Guideline	No Guideline
1,2-Dichlorobenzene	µg/L	1500	0.5	5	ND	0	100%
1,3-Dichlorobenzene	µg/L	No Guideline	0.5	5	ND	No Guideline	No Guideline
1,4-Dichlorobenzene	µg/L	40	0.5	5	ND	0	100%
1,2,3-Trichlorobenzene	µg/L	30	0.5	5	ND	0	100%
1,2,4-Trichlorobenzene	µg/L	30	0.5	5	ND	0	100%
1,3,5-Trichlorobenzene	µg/L	30	0.5	5	ND	0	100%
<b>TOTAL</b>				<b>215</b>		<b>0</b>	<b>100%</b>

**Note 1:**     µg/L                    micrograms per litre  
                   ND                        Not Detected  
                   No Guideline            No ADWG guideline. Compliance is not required or shown for these analytes.

**CHEMICAL HEALTH – 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples	Maximum Value	Number of Non-compliance with ADWG Health Guideline	Compliance %
<b>Storage Tanks</b>							
<b>Synthetic Pyrethroids</b>							
Alphamethrin	µg/L	No Guideline	0.05	5	ND	No Guideline	No Guideline
Cyfluthrin	µg/L	50	0.05	5	ND	0	100%
Cyhalothrin	µg/L	No Guideline	0.05	5	ND	No Guideline	No Guideline
Cypermethrin	µg/L	200	0.05	5	ND	0	100%
Deltamethrin	µg/L	40	1	5	ND	0	100%
Fenvalerate	µg/L	60	0.05	5	ND	0	100%
Permethrin	µg/L	200	0.05	5	ND	0	100%
<b>Paraquat, Diquat, Amitrole</b>							
Paraquat	µg/L	20	1	5	ND	0	100%
Diquat	µg/L	7	1	5	ND	0	100%
Amitrole	µg/L	0.9	0.9	5	ND	0	100%
<b>Organotins</b>							
Tributyltin	ngSn/L	No Guideline	2	5	ND	0	100%
Monobutyltin	ngSn/L	No Guideline	5	5	ND	No Guideline	No Guideline
Dibutyltin	ngSn/L	No Guideline	5	5	ND	No Guideline	No Guideline
<b>Miscellaneous Organics</b>							
Acrylamide	µg/L	0.2	0.1	5	ND	0	100%
Dalapon	µg/L	No Guideline	2	5	ND	No Guideline	No Guideline
Ethylenediaminetetraacetic acid (EDTA)	µg/L	250	20	5	ND	0	100%
Glyphosate	mg/L	No Guideline	0.1	5	ND	No Guideline	No Guideline
AminoMethylPhosphonic Acid (AMPA)	mg/L	No Guideline	0.1	5	ND	No Guideline	No Guideline
Nitrilotriacetic acid (NTA)	µg/L	200	20	5	ND	0	100%
<b>Metals</b>							
Silver - Dissolved	µg/L	100	0.01	5	ND	0	100%
Tin - Dissolved	µg/L	No Guideline	0.01	5	ND	No Guideline	No Guideline
Iodide	µg/L	500	0.01	5	ND	0	100%
<b>TOTAL</b>				<b>110</b>		<b>0</b>	<b>100%</b>

**Note 1:** µg/L            micrograms per litre  
ngSn/L            nanograms per litre  
ND                 Not Detected  
No Guideline     No ADWG guideline. Compliance is not required or shown for these analytes/

CHEMICAL HEALTH - 1 JULY 2023 TO 30 JUNE 2024

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples	Maximum Value	Number of Non-compliance with ADWG Health Guideline	Compliance %
<b>Distribution Network</b>							
<b>Haloacetic Acids</b>							
Chloroacetic acid	ug/L	150	2	1	ND	0	100%
Bromoacetic acid	ug/L	No Guideline	2	1	ND	No Guideline	No Guideline
Dichloroacetic acid	ug/L	100	2	1	ND	0	100%
Trichloroacetic acid	ug/L	100	2	1	ND	0	100%
Bromochloroacetic acid	ug/L	No Guideline	2	1	ND	No Guideline	No Guideline
Bromodichloroacetic acid	ug/L	No Guideline	2	1	ND	No Guideline	No Guideline
Dibromoacetic acid	ug/L	No Guideline	2	1	ND	No Guideline	No Guideline
Dibromochloroacetic acid	ug/L	No Guideline	5	1	ND	No Guideline	No Guideline
Tribromoacetic acid	ug/L	No Guideline	5	1	ND	No Guideline	No Guideline
<b>Nitrosamines</b>							
N-Nitrosodimethylamine	ng/L	100	5	1	ND	0	100%
N-Nitrosomethylethylamine	ng/L	100	5	1	ND	0	100%
N-Nitrosodiethylamine	ng/L	100	5	1	ND	0	100%
N-Nitrosodipropylamine	ng/L	100	5	1	ND	0	100%
N-Nitrosopyrrolidine	ng/L	100	20	1	ND	0	100%
N-Nitrosopiperidine	ng/L	100	5	1	ND	0	100%
N-Nitrosodibutylamine	ng/L	100	5	1	ND	0	100%
<b>Miscellaneous Organics</b>							
Chloral Hydrate	ug/L	100	2	1	ND	0	100%
<b>Low Level Polycyclic Aromatic Hydrocarbons</b>							
Naphthalene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
2-Methylnaphthalene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Acenaphthylene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Acenaphthene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Fluorene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Phenanthrene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Anthracene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Fluoranthene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Pyrene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Benz(a)anthracene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Chrysene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Benzo(b)fluoranthene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Benzo(k)fluoranthene	ug/L	No Guideline	0.01	1	ND	No Guideline	No Guideline
Benzo(a)pyrene	ug/L	0.01	0.01	1	ND	0	100%
Indeno(1.2.3-c.d)pyrene	ug/L	No Guideline	0.02	1	ND	No Guideline	No Guideline

CHEMICAL HEALTH - 1 JULY 2023 TO 30 JUNE 2024

CHARACTERISTIC	UNIT	ADWG Health Guideline	Lab Limit of Reporting (LOR)	Number of Samples	Maximum Value	Number of Non-compliance with ADWG Health Guideline	Compliance %
<b>Distribution Network</b>							
Dibenz(a,h)anthracene	ug/L	No Guideline	0.02	1	ND	No Guideline	No Guideline
Benzo(ghi)perylene	ug/L	No Guideline	0.02	1	ND	No Guideline	No Guideline
<b>Metals</b>							
Antimony	mg/L	0.003	0.001	1	ND	0	100%
Cadmium	mg/L	0.002	0.0001	1	ND	0	100%
Chromium (VI)	mg/L	0.05	0.002	1	ND	0	100%
Copper	mg/L	2	0.001	1	0.009	0	100%
Lead	mg/L	0.01	0.001	1	ND	0	100%
Nickel	mg/L	0.02	0.001	1	ND	0	100%
Zinc	mg/L	3	0.005	1	ND	0	100%
<b>Miscellaneous Inorganics</b>							
Hydrogen Sulfide	mg/L	No Guideline	0.05	1	ND	No Guideline	No Guideline
Cyanide - Total	mg/L	0.08	0.005	1	ND	0	100%
<b>TOTAL</b>				<b>43</b>		<b>0</b>	<b>100%</b>

**Note 1:** mg/L milligrams per litre  
 µg/L micrograms per litre  
 µS/cm microSiemens per centimetre  
 mS/cm milliSiemens per centimetre  
 ngSn/L nanograms per litre  
 ND Not Detected  
 No Guideline No ADWG guideline. Compliance is not required or shown for these analytes.

PHYSICAL AND CHEMICAL AESTHETIC - 1 JULY 2023 TO 30 JUNE 2024

CHARACTERISTIC	UNIT	ADWG Aesthetic Guideline	Lab Limit of Reporting (LOR)	Number of Samples		Total No. of Samples (Raw + Distribution)	Maximum Value		Number of Non Compliance with ADWG Aesthetic Guideline		Compliance % Distribution Water
				Raw Water	Distribution Water		Raw Water	Distribution Water	Raw Water	Distribution Water	
Alkalinity (Bicarbonate)	mg CaCO3/L	No Guideline	5	31	16	47	210	240	No Guideline	No Guideline	No Guideline
Alkalinity (Carbonate)	mg CaCO3/L	No Guideline	5	31	16	47	ND	ND	No Guideline	No Guideline	No Guideline
Alkalinity (Hydroxide)	mg CaCO3/L	No Guideline	5	31	16	47	ND	ND	No Guideline	No Guideline	No Guideline
Alkalinity (Total)	mg CaCO3/L	No Guideline	5	31	16	47	210	240	No Guideline	No Guideline	No Guideline
Aluminium (Soluble)	mg/L	0.2	0.1	31	16	47	ND	ND	0	0	100%
Aluminium (Total)	mg/L	0.2	0.1	31	16	47	ND	ND	0	0	100%
Ammonia-N	mg/L	0.5	0.02	NR	16	16	NR	0.33	NR	0	100%
Calcium	mg/L	200	0.1	NR	16	16	NR	29	NR	0	100%
Chloride	mg/L	250	5	31	4	35	160	87	0	0	100%
Colour True	HU	15	5	105	84	189	52	0.01	8	0	100%
Electrical Conductivity	µS/cm	No Guideline	10	105	84	189	970	640	No Guideline	No Guideline	No Guideline
Filterable Reactive Phosphorus	mg/L	No Guideline	0.01	31	4	35	0.12	0.04	No Guideline	No Guideline	No Guideline
Hardness	mg CaCO3/L	200	5	31	16	0	150	150	8	0	100%
Iron (Soluble)	mg/L	0.3	0.01	105	84	47	8.7	0.02	57	0	100%
Iron (Total)	mg/L	0.3	0.01	105	84	189	11	0.11	77	0	100%
Magnesium (Filtered)	mg/L	No Guideline	0.1	NR	29	189	NR	15	NR	No Guideline	No Guideline
Magnesium (Total)	mg/L	No Guideline	0.1	NR	33	29	NR	18	NR	No Guideline	No Guideline
pH	pH	6.5-8.5		85	343	33	8.0	8.5	0	0	100%
Silica	mg/L	80	0.1	31	4	428	18	16	0	0	100%
Sodium	mg/L	180	0.1	31	4	35	140	68	0	0	100%
Sulfate	mg/L	250	1	31	4	35	22	13	0	0	100%
Total Dissolved Solids	mg/L	600	5	105	84	35	980	640	8	2 <b>Note 5</b>	99.7%
Turbidity	NTU	5		93	64	189	3.39	0.35	0	0	100%
Zinc	mg/L	3	0.01	NR	16	457	NR	0.061	NR	0	100%
<b>TOTAL</b>				<b>1,075</b>	<b>1,369</b>	<b>2,444</b>	-	-	-	<b>2</b>	<b>99.9%</b>

**Note 1:** HU Hazen Units  
 NTU Nephelometric Turbidity Units  
 mg/L milligrams per litre  
 mg CaCO3/L milligrams per litre as calcium carbonate  
 uS/cm microSiemens per centimetre  
 ND Not Detected  
 No Guideline No ADWG guideline. Compliance is not required or shown for these analytes.  
 NR Not required to be sampled

**Note 2:** Raw water is blended and treated prior to supply to consumers. Raw water is not provided to consumers and raw water data presented is for operational purposes.

**Note 3:** pH and Turbidity are Busselton Water in-house tests. All others are accredited test results.

**Note 4:** Busselton Water’s water supply is sourced from bores constructed in the Leederville and Yarragadee aquifers. The raw groundwater has turbidity, colour and total iron concentrations. Treatment process using aeration, oxidation and filtration readily removes turbidity, colour and total iron before distribution into the reticulation network.

**Note 5:** Two Total Dissolved Solids samples in the distribution network in the reporting period exceeded the ADWG Aesthetic Guideline of 600 milligrams per litre. Based on taste, <600 mg/L is regarded as good quality drinking water, and 600 mg/L to 900 mg/L is regarded as fair quality. The two samples that were above 600 mg/L were both taken on 16 January 2024 (640 mg/L at the Vernon Track sampling point and 630 mg/L at the Orlando Boulevard sampling point). These short term exceedances were not of health-related significance. Subsequent NATA samples taken at these locations have all returned results below 600 mg/L. These exceedances were reported to the Department of Health in Busselton Water’s Water Quality Report for the January to March 2024 reporting period.

**RADIOLOGICAL SAMPLES – 1 JULY 2023 TO 30 JUNE 2024**

CHARACTERISTIC	UNIT	ADWG Screening Value	Raw Water (Bores)				Treated Water (Storage Tanks)			
			Non-Compliance (Health)	No. of Samples	% Compliance (Health)	Maximum Detected Bq/L	Non-Compliance (Health)	No. of Samples	% Compliance (Health)	Maximum Detected Bq/L
Gross Alpha	Bq/L	0.5	0	8	100%	0.213	0	5	100%	0.178 ± 0.053
Gross Beta	Bq/L	0.5	0	8	100%	0.183	0	5	100%	0.134 ± 0.046

**Note 1** Bq/L = Becquerel per Litre



**BUSSELTON WATER**

1 Fairbairn Road  
Busselton WA

PO Box 57  
Busselton WA 6280  
+61 (8) 9781 0500  
admin@busseltonwater.wa.au

 /busselton.water  @BusseltonWater

