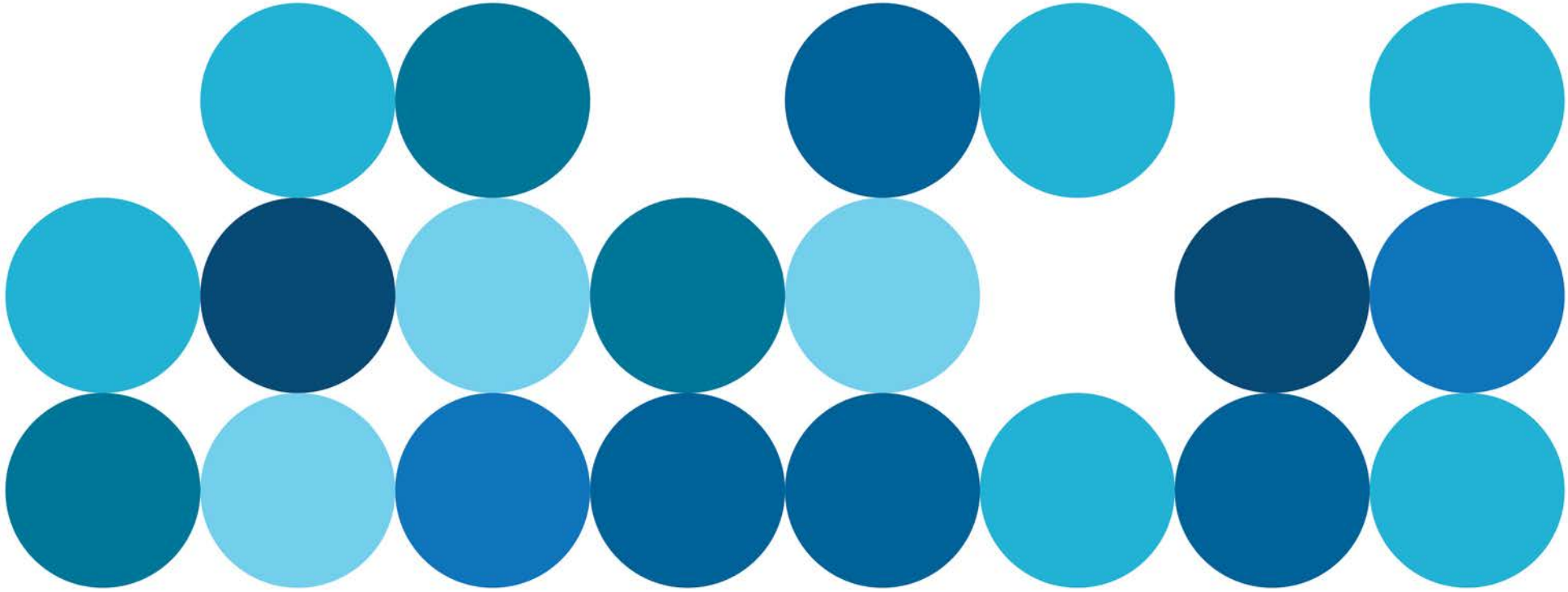
Drinking Water Quality

Annual Report 2017-18



WATER CORPORATION

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About this report

Water Corporation's 2017-18 Drinking Water Quality Annual Report is a review of our performance for the financial year ending 30 June 2018.

This report is designed to provide our customers and the Western Australian public with information on the quality of their drinking water.

Publication of this report allows us to meet the requirements of the *Australian Drinking Water Guidelines*, our Water Services Licence with the Economic Regulation Authority, our Memorandum of Understanding with the Department of Health and the National Performance Reporting requirements under the National Water Initiative.

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  - Hydrography Linear Hierarchy
- Landgate
  - Road Centrelines
  - Town sites
- Geoscience Australia
  - Australian Coastline

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Acronyms

Acronym	Description
2-MIB	2-methylisoborneol
ADWG	Australian Drinking Water Guidelines
AWRP	Advanced Water Recycling Plant
BRA	Barrier Risk Assessment
CPI	Customer Performance Index
DoH	Department of Health
DWER	Department of Water and Environmental Regulation
DWQ	Drinking Water Quality
EDR	Electrodialysis Reversal
GAR	Goldfields and Agricultural Region
GAWS / GAWSS	Goldfields and Agricultural Water Supply / Goldfields and Agricultural Water Supply Scheme
GSR	Great Southern Region
GSTWS / GSTWSS	Great Southern Towns Water Supply / Great Southern Towns Water Supply Scheme
GWR / GWRS	Groundwater Replenishment / Groundwater Replenishment Scheme
IWSS	Integrated Water Supply Scheme
LGSTWS / LGSTWSS	Lower Great Southern Towns Water Supply / Lower Great Southern Towns Water Supply Scheme
MIEX	Magnetic Ion Exchange
MoU	Memorandum of Understanding
NHMRC	National Health and Medical Research Council

Acronym	Description
NTU	Nephelometric Turbidity Units
NWR	North West Region
PDWSA	Public Drinking Water Source Area
RO	Reverse Osmosis
SCADA	Supervisory Control and Data Acquisition
SWR	South West Region
T&O	Taste and Odour
TCU	True Colour Units
TDS	Total Dissolved Solids
THM	Trihalomethanes
UF	Ultra-filtration
UV	Ultra-violet
WQMS	Water Quality Management System
WSP	Water Safety Plan
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

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Summary

Ensuring supply of safe drinking water is our highest priority. In 2017-18, we achieved compliance with the health related requirements and met all health targets for drinking water quality set by the Department of Health (DoH). Figures 1 and 2 provide a summary of the water production and drinking water assets for 2017-18.

Health related performance

- 100 per cent compliance with microbiological guidelines
- 100 per cent compliance with health related chemical guidelines

Non-health (aesthetic) related performance

While we strive to meet guidelines for aesthetic characteristics, this can be challenging to achieve across the diverse water sources in Western Australia.

This is especially the case in some of our small country water schemes where there may be few sources of drinking water available, and where installation of treatment can be very costly (refer page23).

In 2017-18 our performance for all aesthetic analyses was 94 per cent (refer page 39). Although we meet all obligations under our Water Services Licence, we recognise there are always opportunities for improvement.

Customer performance index

For 2017-18, the feedback from our customers about their water quality was at a six year high – with the end of year average of 7.45 for providing an acceptable standard of water quality (up from 7.29 in 2016-17) and 7.53 for providing a consistent level of water quality (up from 7.40 in 2016-17).

This is our 16th Drinking Water Quality Annual Report and we trust it provides our customers with the information they require about their drinking water quality.

We welcome any comments and feedback by phone on 13 13 85 or by email at **report@watercorporation.com.au**

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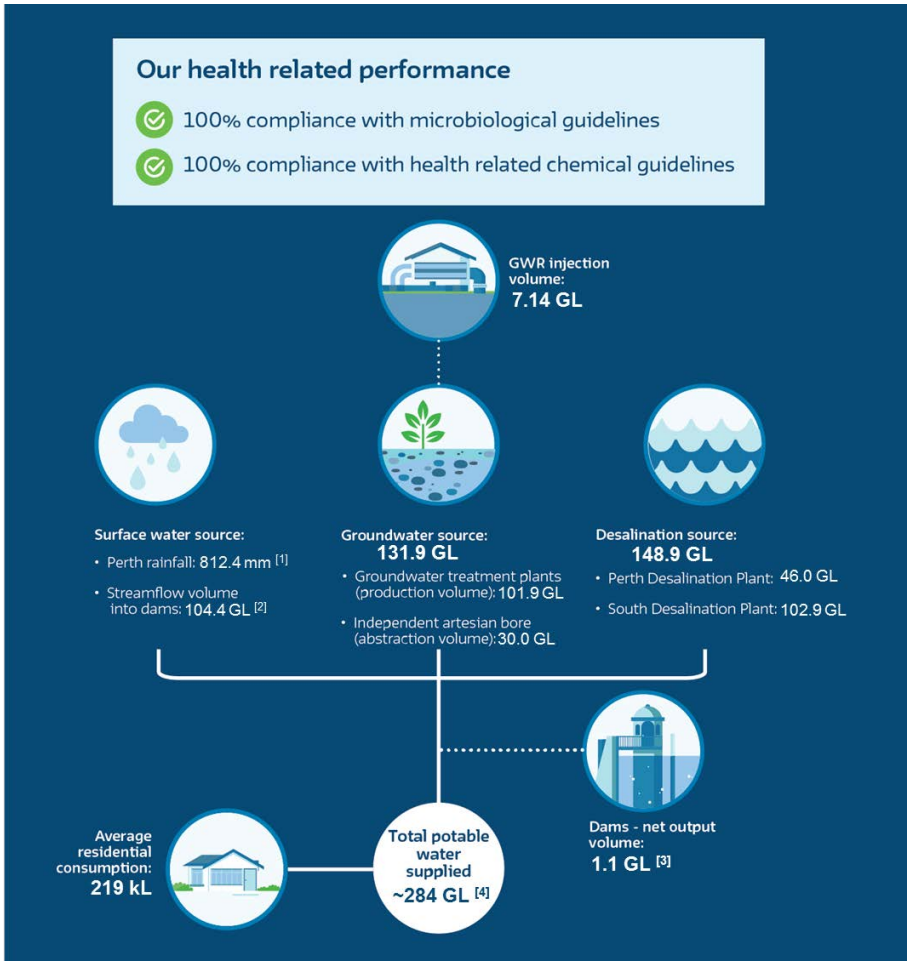

Figure 1. Drinking water summary – metropolitan water production and Perth average annual residential water use during the 2017-18 period (values reported as at 30 June 2018, unless otherwise specified)

Note:

[1] Rainfall volume sourced from Bureau of Meteorology for Perth Metro, WA (Station: 009225); reported from 01 July 2017 – 30 June 2018.

[2] Streamflow volume reported is calculated based on a “water year” (i.e. 01 May 2017 – 30 April 2018).

[3] Total Metropolitan Surface Water Dams Output was 85.6 GL, whilst a transfer volume of 84.5 GL was transferred into these dams. Therefore, the net output volume, i.e. the actual volume of water supplied from the dams to the integrated water supply scheme (IWSS) was 1.1 GL for 2017-18.

[4] Total potable water supplied reported for the Perth metropolitan region represent water supply from the IWSS, i.e. approximately 284 GL; whilst a total volume of 312 GL was produced by the IWSS, and an overall drinking water volume of 363 GL was supplied state-wide to customers (as reported in the Corporation’s 2018 Annual Report

The unit ‘GL’ = gigalitres; which is equivalent to ‘billion litres’.

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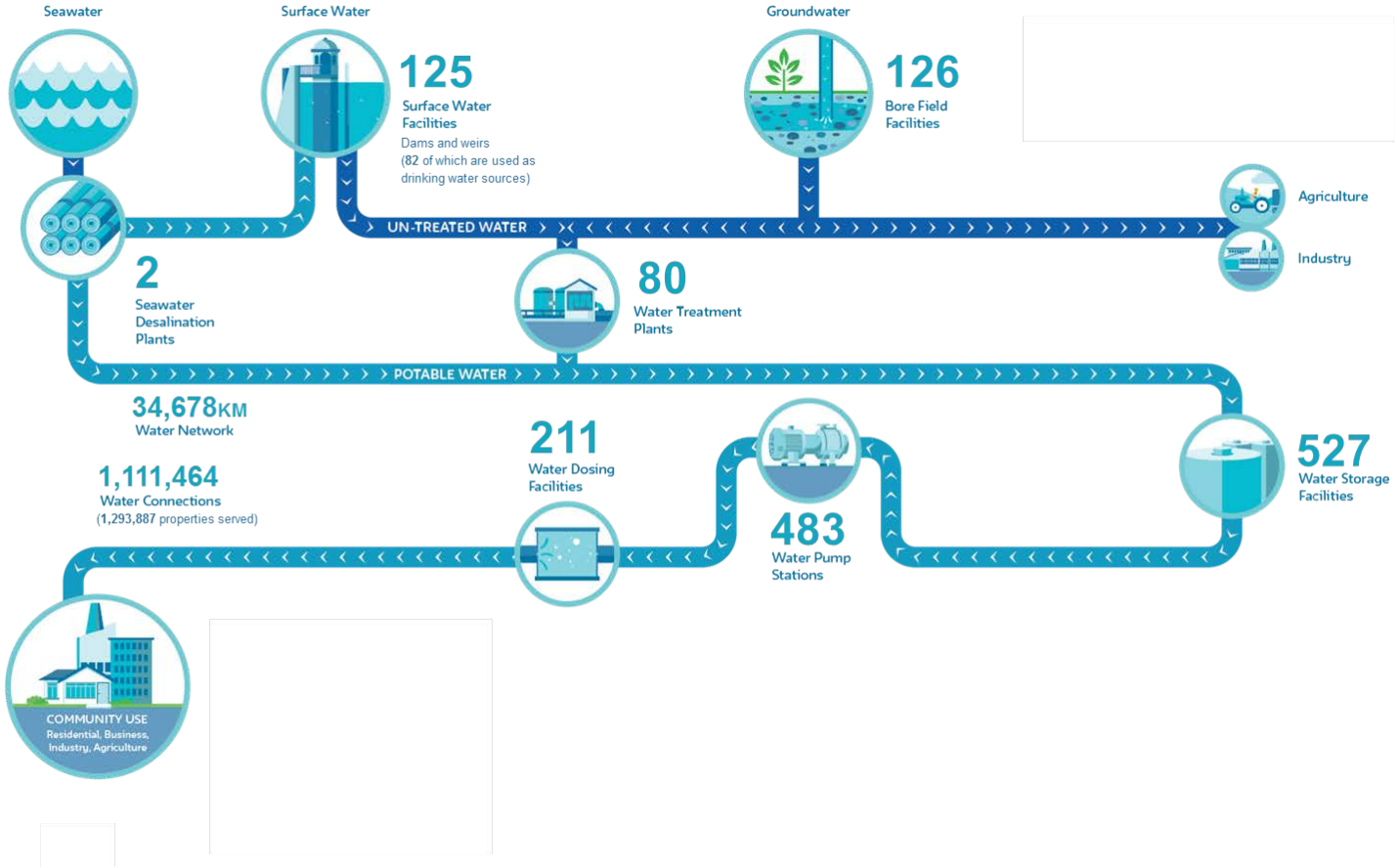

Figure 2. State-wide drinking water assets and generalised layout – as at 30 June 2018

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Our commitment to you

We are committed to providing our customers with safe, high-quality drinking water that consistently meets the requirements of the *Australian Drinking Water Guidelines* (*ADWG*), our customers and other regulatory provisions.

To achieve this, in partnership with stakeholders and relevant agencies, we will:

- Manage water quality from a 'source to service' approach and promote confidence in the safe supply of drinking water.
- Incorporate the needs and expectations of our consumers and stakeholders, regulators and employees into our planning.
- Strongly advocate source protection and primacy of drinking water quality over other land uses.
- Use a risk-based approach to identify and manage potential threats and ensure appropriate barriers to water quality.
- Comply with the health-related criteria of the *ADWG** and work to progressively improve compliance with aesthetic criteria.
- Use appropriate contingency planning and maintain incident response capability.
- Routinely monitor our systems and use effective reporting mechanisms to provide relevant and timely information on our performance.
- Participate in research and development activities to ensure we continually improve our understanding of drinking water quality issues and performance.
- Contribute to setting industry regulations and guidelines, and other standards relevant to public health and the water cycle.
- Continually improve our practices by assessing performance against corporate commitments and stakeholder expectations.

We will implement and maintain a drinking water quality management system consistent with the *ADWG* to effectively manage the risks to drinking water quality. All Water Corporation employees and alliance partners involved in the supply of drinking water are responsible for understanding their role in implementing and continuously improving the drinking water quality management system.

*We have a Memorandum of Understanding with the Department of Health that grants exemptions to the infant health guideline for 10 towns in the Mid-West and Goldfields and Agricultural regions. We are progressively working to improve the water quality in these towns (refer to *Case Study – Improving Water Quality in the Murchison* on page 31).

For further information please refer to our Drinking Water Quality Policy and Drinking Water Source Protection Policy.

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Introduction

We provide drinking water to Perth, Mandurah and more than 220 regional towns and communities throughout Western Australia.

This year we delivered 363 billion litres of drinking water to more than 1.29 million properties through 34,678 kilometres of water mains. This water was sourced from 82 dams and weirs, 144 licensed borefields, two major desalination plants (the Perth Seawater Desalination Plant and Southern Seawater Desalination Plant) and eight regional water treatment plants that use desalination technology.

Under our Water Services Licence, we comply with a Memorandum of Understanding (MoU) with the DoH. We act in accordance with the microbiological, health related chemical and radiological parameters as specified by the National Health and Medical Research Council (NHMRC) in the *Australian Drinking Water Guidelines 2011* (*ADWG*).

Our health performance (chemical, microbiological, and radiological) has again resulted in 100 per cent of metropolitan and country localities meeting the high standards set by the DoH.

Our extensive and sophisticated drinking water quality monitoring program confirms the safety of the water we provide to our customers. Microbiological, chemical and radiological analyses are carried out by independent laboratories.

Figure 3. Valves inside Ravenswood Pumping Station

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Where does your water come from?

Perth metropolitan region

Our largest scheme, the Integrated Water Supply Scheme (IWSS) delivered more than 284 billion litres of water to more than two million people in Perth, Mandurah, parts of the Goldfields and Agricultural, South West and Great Southern Regions. Customers receive a mix of groundwater, surface water and desalinated seawater. The percentage of each depends on seasonal factors.

Surface water comes from eight dams in the Darling Range: South and North Dandalup, Serpentine, Wungong, Churchman Brook, Canning, Victoria and Mundaring Weir. Water is also supplied from Stirling and Samson dams in the South West.

Groundwater is drawn from the Yarragadee, Leederville and Mirrabooka aquifers, and is treated at six groundwater treatment plants. Most of our 180 bores are located in Perth's northern suburbs. There are also 13 independent artesian bores which pump water directly into service reservoirs. In 2017-18, drinking water production for the IWSS was delivered on target and within overall water allocation and licence parameters. Total groundwater abstracted was 131.9 billion litres.

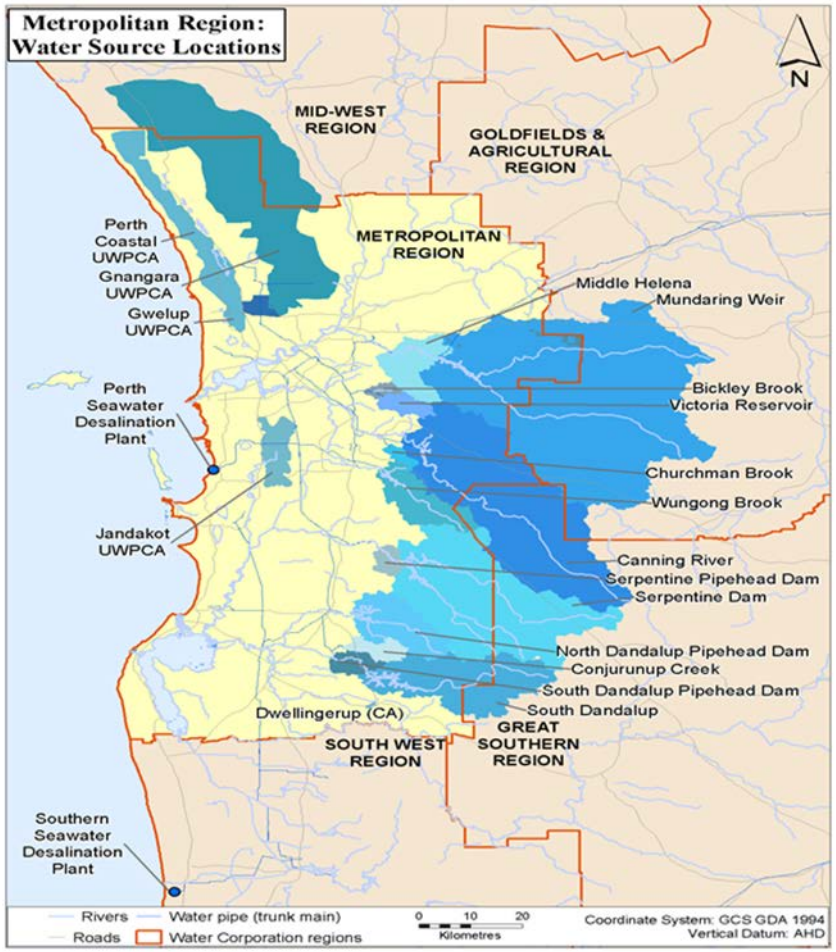

Figure 4. Overview map of the Perth Metropolitan Region

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Climate independent sources

More than half of the water supplied to the IWSS was manufactured through seawater desalination. The Perth Seawater Desalination Plant in Kwinana delivered 46.0 billion litres of water into the IWSS in 2017-18. The desalinated water enters the IWSS through Thomsons Reservoir where it is blended with Jandakot groundwater and surface water. A portion can be stored in Canning Dam and Wungong Dam during periods of low demand in the winter. The Southern Seawater Desalination Plant near Binningup produced 102.9 billion litres of water for the IWSS in 2017-18. For further information, refer to the Desalination section in *Diversifying our sources* (page 19).

In late 2017, the newest water source for the IWSS - the Groundwater Replenishment Scheme in Craigie - began recharging to aquifers. Groundwater replenishment (GWR) is the process by which secondary treated wastewater undergoes advanced treatment to produce recycled water. The recycled water is recharged to an aquifer for later use as a drinking water source.

Stage 1 has the capacity to recharge up to 14 billion litres of water into groundwater supplies each year. Construction of stage 2 is well underway and is expected to be completed in late 2019. This project will double the scheme's capacity to recharge up to 28 billion litres of water each year, providing a climate independent water source to boost much needed drinking water supplies.

Refer to the GWR section in *Diversifying our sources* (page 19) for further information.

Figure 5. Advanced Water Recycling Plant

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South West Region

Towns in the South West Region are supplied with water from a number of surface and groundwater sources that are largely independent.

Margaret River is supplied by groundwater and surface water via Ten Mile Brook Dam.

Boyanup, Dalyellup, Dardanup, Donnybrook, Dunsborough, Capel, Peppermint Grove Beach, Preston Beach and Augusta are supplied by locally treated groundwater.

Bridgetown, Nannup, Hester, Boyup Brook, Greenbushes, Balingup and Manjimup are connected to the Warren Blackwood Regional Water Supply Scheme. Millstream and Manjimup dams and a Yarragadee Bore near Nannup are the main water sources for this scheme, with Tanjannerup Dam supplying most of Nannup's water requirements.

Kirup and Mullalyup are supplied from surface water or groundwater from Donnybrook (depending upon the current storage at Kirup Dam).

Quinninup and Northcliffe are supplied with carted water from either Manjimup or Pemberton.

Pemberton is supplied by surface water from Big Brook Dam via Lefroy Brook Dam.

Australind, Clifton Park, Eaton, Pelican Point, Millbridge, Treendale, Kingston, Brunswick Junction, Roelands and Burekup are supplied with groundwater, via water treatment plants in Australind, Eaton and Picton.

Harris Dam supplies Collie, Allanson and Darkan in the South West Region as well as around 38 towns in the Great Southern Region via the Great Southern Towns Water Supply Scheme (GSTWSS).During 2017-18, a new pump station and pipeline was completed to transfer water from Stirling Dam to Harris water treatment plant, so IWSS water can now be used to supply the GSTWS when required.

Harvey, Waroona, Hamel, Binningup, Myalup and Yarloop are supplied from the IWSS.

Figure 6. Overview map of the South West Region

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Goldfields and Agricultural Region

The Goldfields and Agricultural Water Supply (GAWS) scheme consists of 9,624 kilometres of water mains that service more than 100,000 people. Water is sourced from Mundaring Weir near Perth and undergoes treatment at Mundaring Water Treatment Plant, before it is supplied to the majority of towns in the Goldfields and Agricultural Region. Mundaring Weir is supplemented with desalinated seawater and groundwater.

The towns of Laverton, Leonora and Wiluna are supplied from local groundwater sources. Water is carted to Menzies from Kalgoorlie, as a short-term solution, as we determine the long term solution for this town.

We have an ongoing program of work to upgrade tanks and reservoirs in the Goldfields and Agricultural Region to improve water quality, which will continue over the coming years. Construction was completed in 2018 on two new 37.5 million litre tanks in Cunderdin. A new 4 million litre tank will also be built in Norseman and is due to be completed in mid-2019.

Chloramination is used in the GAWS to maintain a disinfectant residual across the network. (Refer to *How is your water treated? – Disinfection* section on page 24). Additional disinfection facilities have largely been installed throughout the distribution system. Both of these initiatives will improve disinfection management within the GAWS.

Figure 7. Goldfields Pipeline

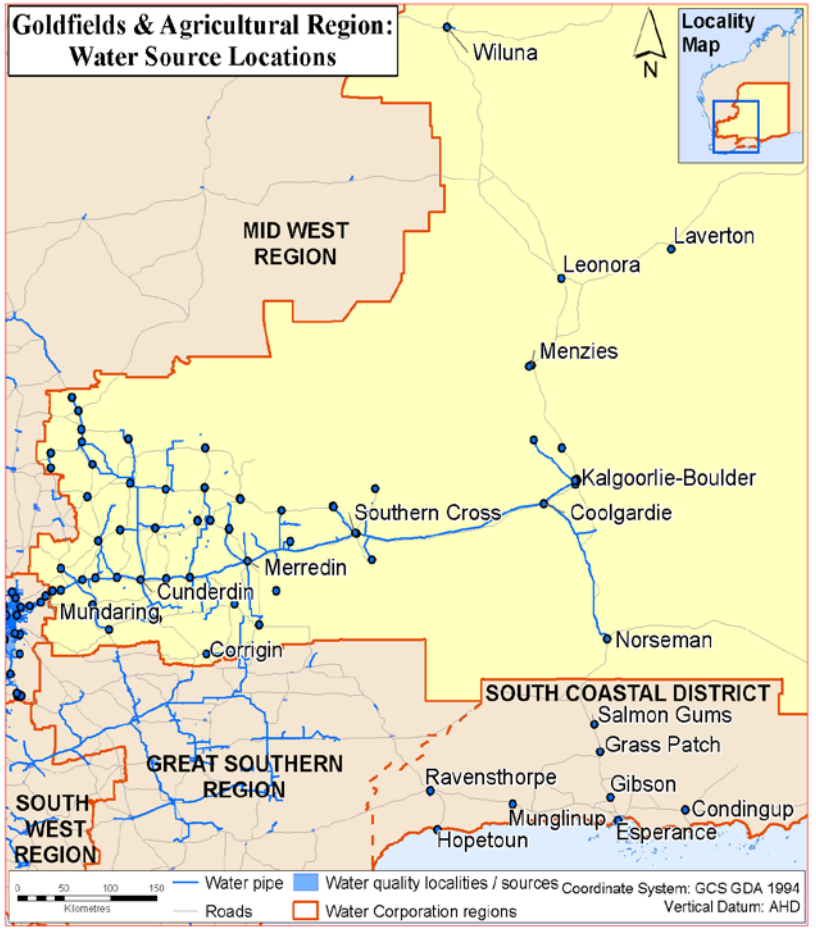

Figure 8. Overview map of the Goldfields and Agricultural Region

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Great Southern Region

In the Great Southern Region (GSR), we have two main water supply schemes - the Great Southern Towns Water Supply Scheme (GSTWSS) and the Lower Great Southern Towns Water Supply Scheme (LGSTWSS). Harris Dam, near Collie, is the main source for the GSTWSS. Groundwater from the South Coast borefields near Albany is the main source for the LGSTWSS, although some local sources can contribute to the supply if required.

Hopetoun, Bremer Bay, Esperance, Condingup and Gibson are all supplied from local groundwater sources. Ravensthorpe and Salmon Gums are supplied from local surface water sources. Grass Patch is supplied by carted water from Esperance or Salmon Gums.

We continue to invest in projects to improve water quality across the GSR, with upgrades completed in Bremer Bay and Yealering, and more work underway in Kondinin.

At Bremer Bay a new water supply bore was installed to help meet the peak summer demand when the region's tourist population more than triples and will increase the overall capacity of the town's water supply scheme by around 30 per cent. Construction of this $1.7 million bore began in April 2018 and was completed in mid-August 2018.

To improve water quality and reliability in Yealering, we invested $2.4 million to construct two new 60,000 litre water storage tanks, an upgraded water treatment plant and a booster pump station. Approximately 300 metres of water supply main was constructed to connect the new tanks to Yealering's existing town supply, with work completed in February 2018.

Work is also underway on a $14.4 million project to construct a new 2.5 million litre water tank, pump station, and 18.35 km of water main to improve water quality in Kondinin, Karlgarin and Hyden. This work is expected to be complete by late 2018.

Figure 9. Overview map of the Great Southern Region

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North West Region

The West Pilbara Water Supply Scheme supplies customers in Karratha, Dampier and the neighbouring towns of Roebourne, Wickham, Point Samson, Cape Lambert and the Burrup Peninsula. The scheme currently has three sources: Harding Dam, groundwater from the Millstream Aquifer, and the Bungaroo Valley groundwater source (developed by Rio Tinto Iron Ore).

The East Pilbara Water Supply Scheme supplies customers in Port Hedland, South Hedland, Wedgefield Industrial Area and the local port operations. The scheme is supplied with groundwater from the Yule and De Grey River borefields.

Newman is supplied with groundwater via BHP Billiton operated borefields.

In the Kimberley area, the towns of Kununurra and Broome are supplied by local groundwater sources. The remaining towns in the North West Region are supplied by local independent groundwater sources, with the exception of Wyndham which is supplied by Moochalabra Dam.

Figure 10. Moochalabra Dam

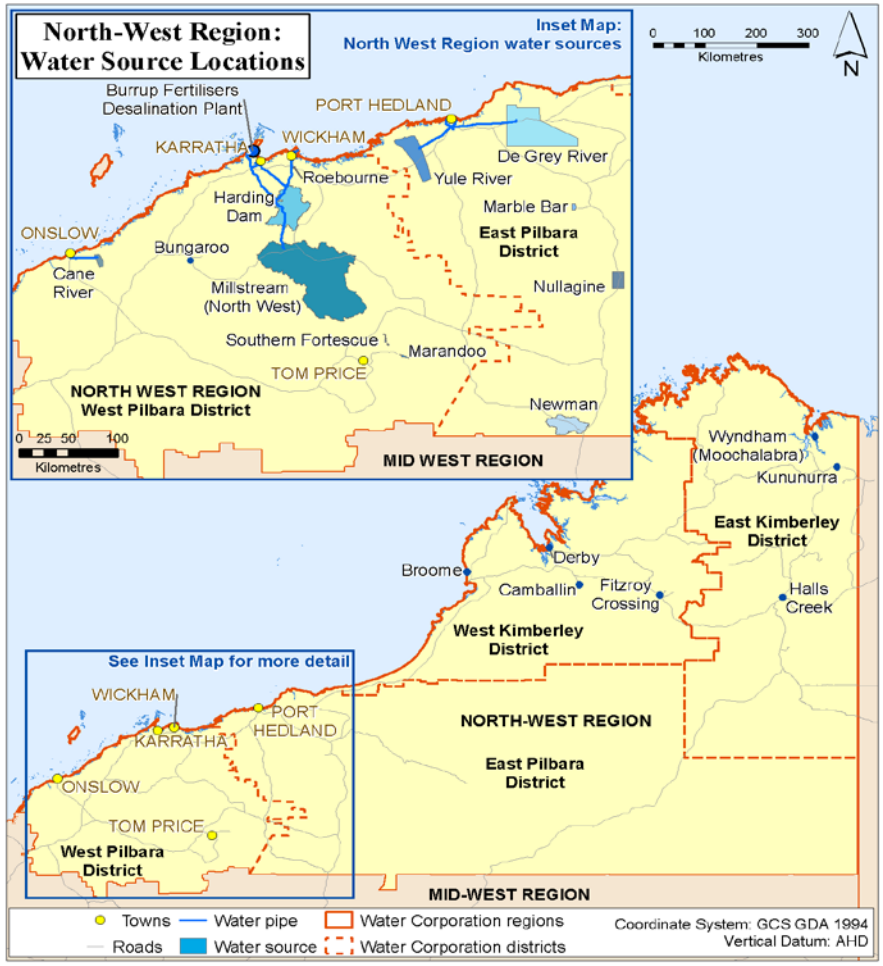

Figure 11. Overview map of the North West Region

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Mid-West Region

Drinking water throughout the Mid-West Region is supplied from local sources, with 42 independent groundwater borefields provide drinking water to 51 localities. In addition, the three communities of Coomberdale, Nabawa and Yuna receive water carted from nearby towns.

The largest borefield is Allanooka, which supplies Geraldton and the surrounding towns of Dongara, Northampton, Mullewa, Walkaway, Greenough and Narngulu.

Water for Carnarvon is sourced from bores located along the Gascoyne River, which provides water for both the town and irrigated horticulture. Bores, located along the western side of the Cape Range Peninsula, are the sole supply for the town of Exmouth. This aquifer also supports an ancient subterranean aquatic fauna known as stygofauna.

The Coastal Midlands schemes are mostly small independent groundwater sources where we operate a number of water treatment plants to manage the natural characteristics in the groundwater; these include specialised water treatment plants at Gascoyne Junction, Denham, Coral Bay and Yalgoo.

Figure 12. Yalgoo - Electrodialysis Reversal Plant

The plan to build specialised water treatment plants using electrodialysis reversal in Cue, Meekatharra (refer to *Case study – Improving water quality in the Murchison*, page 31), Sandstone and Mt Magnet to improve water quality is progressing with the plant's expected to be completed by mid to late 2020.

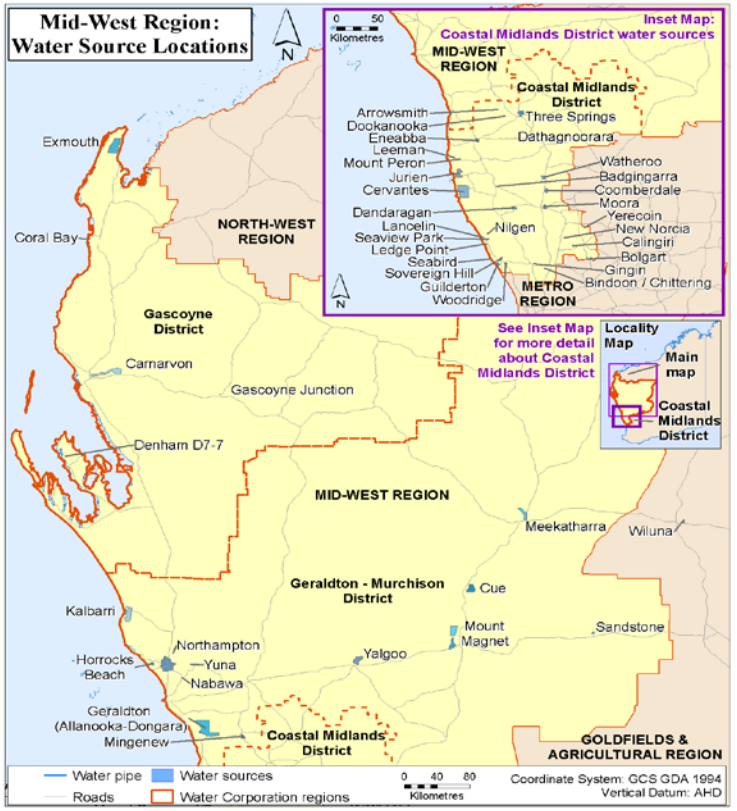

Figure 13. Overview map of the Mid-West Region

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Diversifying our sources

With climate change, reduced runoff and expanding city, we have planned ahead to secure water supplies in response to climate change, producing long-term plans under the *Water Forever* title. These plans are based on a three-pronged approach to develop new water sources, reduce water use and increase water recycling. We continue to progress towards targets set in *Water Forever* – including investment in climate independent water sources such as seawater desalination and groundwater replenishment.

Desalination

Desalination, using reverse osmosis (RO), is a membrane based treatment that was the process chosen for both the Perth Seawater Desalination Plant, which has been operational since November 2006, and the Southern Seawater Desalination Plant, that began supply in September 2011.

During 2017-18, these two desalination plants reached a major milestone – producing 1 trillion litres of drinking water from the Indian Ocean.

Desalination was the largest source of water for the IWSS in 2017-18 – supplying 48 per cent of water. Figure 14 shows a typical desalination process.

Figure 14. Typical desalination treatment process

Perth Seawater Desalination Plant

The Perth Seawater Desalination Plant, located in Kwinana, started operating in November 2006 and produces up to 45 billion litres of fresh drinking water a year (around 18 per cent of Perth's water supply).

The plant has won numerous national and international awards including the International Desalination Association's International Desalination Plant of the Year in 2007.

Southern Seawater Desalination Plant

The Southern Seawater Desalination Plant, located in Binningup in the South West, started producing water in 2011. It produces up to 100 billion litres of fresh drinking water a year (about 33 per cent of Perth's total water needs).

Groundwater replenishment

What is groundwater replenishment?

Groundwater replenishment is the process by which secondary treated wastewater undergoes advanced treatment to produce recycled water. The recycled water is recharged to the Leederville or Yarragadee aquifers for later use as a drinking water source. Once abstracted, the mixed groundwater will be further treated before being supplied into the Integrated Water Supply Scheme. Figure 15 shows how groundwater replenishment fits in to Perth's water cycle.

The Groundwater Replenishment Scheme in Craigie is the first of its kind in Australia. Similar schemes have been used successfully in other parts of the world, such as Orange County California, USA, since the 1970s. Water recycling schemes are also used to supplement drinking water supplies in Singapore and in Windhoek, Namibia.

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Benefits of groundwater replenishment

- Does not rely on rainfall
- Sustainable water source
- Has the potential to recycle large volumes of water
- Enables equivalent volumes of groundwater to be abstracted from the aquifer while reducing impacts to the environment or other water users.

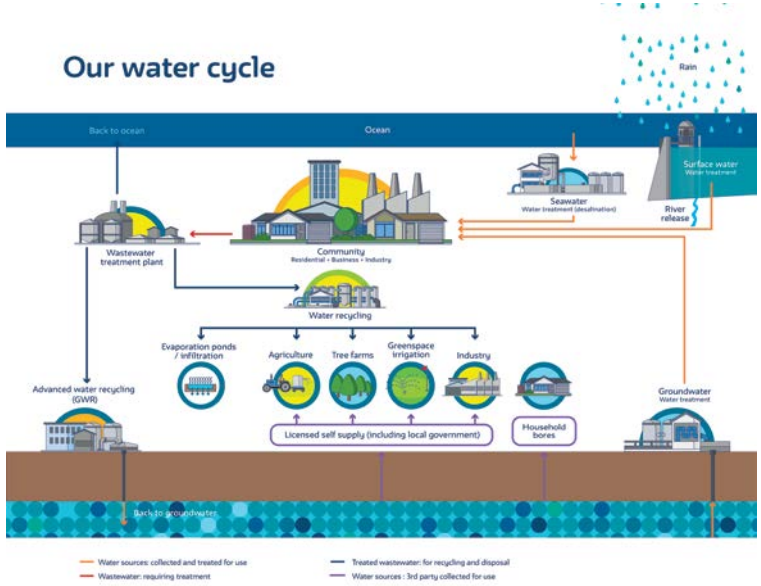

Figure 15. Groundwater replenishment in the water cycle

Water treatment for groundwater replenishment

Wastewater undergoes treatment at Beenyup Wastewater Treatment Plant (WWTP) before entering the Advanced Water Recycling Plant (AWRP). This treatment facilitates the removal of most chemicals and microorganisms such as nutrients, detergents, heavy metals and bacteria.

Treatment at the AWRP (as shown in Figure 16) further reduces the levels of chemicals and microorganisms so that it meets, and in many cases exceeds, drinking water standards. Throughout the treatment process, the water is monitored to ensure strict water quality guidelines are met.

The water is then recharged into an aquifer where it mixes with the existing groundwater. Further treatment then occurs when it is abstracted for drinking water use.

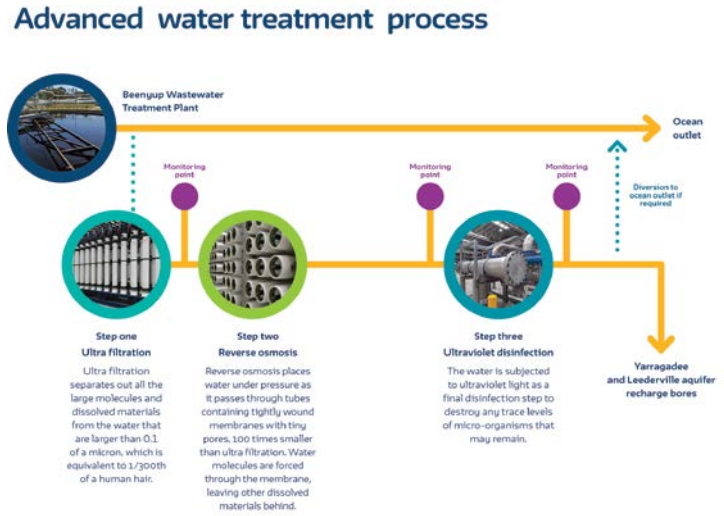

Figure 16. Advanced water treatment process

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Water quality monitoring

We have systems, processes and regulations to ensure groundwater replenishment does not put public health or the environment at risk. These include:

- Water quality checkpoints (also known as critical control points) to ensure each stage of the plant works at an optimum level.
- If the water is not treated to a safe level when it reaches a checkpoint, the treatment process shuts down and water is diverted to the ocean outfall.
- The Department of Health (DoH) set very strict water quality guidelines that the recycled water must meet at the point of recharge and in the aquifers.
- Independent, accredited laboratories test water quality samples to ensure they meet guidelines.
- Groundwater monitoring provides long-term evaluation of water and aquifer quality, as well as providing immediate notification to any changes to the groundwater environment.
- Independent third party review of performance.

Groundwater replenishment scheme update

Stage 1 of the scheme has the capacity to recharge up to 14 billion litres of water each year. Recharge from Stage 1 began in late 2017, with 7.14 billion litres recharged during 2017-18.

Work is progressing well on the Stage 2 expansion of the scheme (Figure 18), which will double its capacity to be able to recharge up to 28 billion litres of water each year. That is enough water to supply around 100,000 Perth homes.

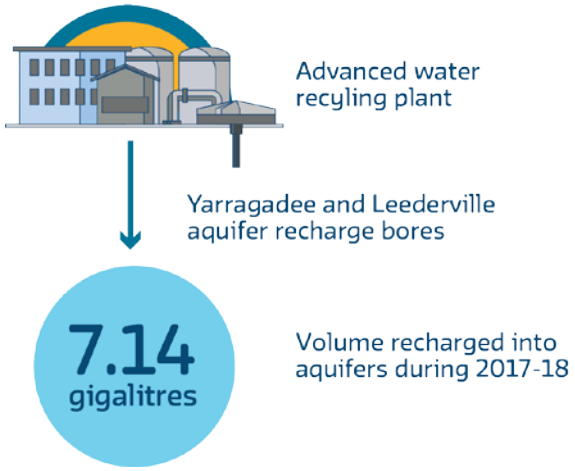

Figure 17. Groundwater Replenishment Scheme – volume recharged into the Leederville and Yarragadee aquifers during 2017-18

The project consists of a second, independently AWRP, and a 13 kilometre recharge pipeline to two recharge sites in Neerbup and Wanneroo.

Stage 2 of the Groundwater Replenishment Scheme is expected to begin recharging to aquifers in late 2019.

Further information can be found on the Water Corporation website.

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Figure 18. Stage 2 of the Groundwater Replenishment Scheme, June 2018

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How is your water treated?

Water treatment

The specific water quality of each source dictates the type of treatment required. Where water comes from large water bodies or some groundwater supplied by fully protected catchment areas, very little treatment is required – often just disinfection (as per Figure 19). In other cases, more intensive treatment processes may be required to ensure the drinking water delivered to every house is safe and aesthetically pleasing.

Figure 19. Example of a basic water treatment process

Groundwater, which is pumped from underground aquifers, can be treated to remove dissolved gases, iron, manganese, colour and turbidity (as per Figure 20). In Perth, groundwater treatment plants at Jandakot, Wanneroo, Lexia, Mirrabooka and Gwelup oxidise the water (via aeration and/or chlorination) to increase the amount of dissolved oxygen and remove both carbon dioxide and hydrogen sulphide, as well as to precipitate iron and manganese. A coagulant (alum) is also added which increases the settling of fine particles caused by iron and natural organic matter. Clarified water then passes through sand filters to remove any remaining particles. Similar processes occur in many country water schemes. At Neerabup Groundwater Treatment Plant, we use a crystallisation technology to reduce hardness (soften the water) and manage total dissolved solids levels.

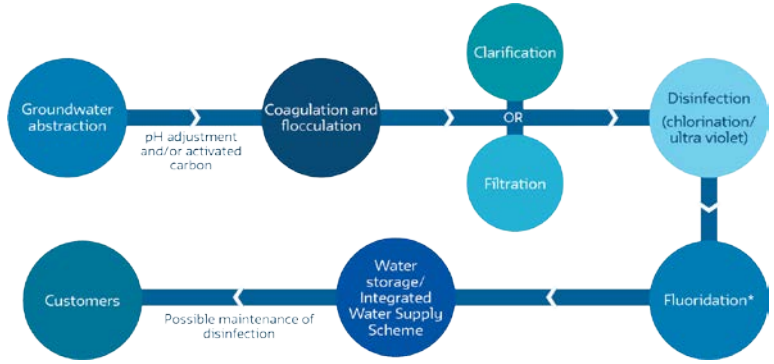

Figure 20. Example of a more complex treatment process

Naturally occurring organic substances add colour to the water, which can increase taste and odour and provide precursors for disinfection by-products. Since 2001, we have used a water treatment technology known as MIEX® (magnetic ion exchange) to prevent an intermittent “swampy” odour occurring in treated groundwater supplied to Perth’s northern suburbs. Unlike conventional processes, MIEX® resin more effectively removes dissolved organic carbon from drinking water, the source of potential odour and taste.

Ultra-filtration

Ultra-filtration (UF) treatment is a form of membrane filtration where source water is forced through a very small, semi-permeable membrane. It is designed to remove suspended solids, bacteria, viruses and other pathogens to produce water with very high purity.

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UF is being used to treat water at Wyndham, Harding Dam, Pemberton, Denmark, Hyden, Walpole, Gascoyne Junction, Salmon Gums, Frankland and Kirup.

Desalination and electrodialysis reversal

Seawater desalination is the removal of salt and impurities from seawater to produce fresh water. Our desalination plants use a reverse osmosis process. Seawater is pumped into the desalination plant from the ocean and passes through pre-treatment filtration to remove the majority of large and small particles.

The filtered seawater is then forced under pressure through special membranes whereby the osmosis process that normally occurs in nature is reversed. The pores in the membranes are so tiny that salt, bacteria, viruses and other impurities are separated from the seawater. In essence they act like microscopic strainers. About half of the water that enters the plant from the sea becomes fresh drinking water. The salt and other impurities removed from the seawater are then returned to the ocean via diffusers, to ensure it mixes quickly and prevent impacts the marine environment.

The desalinated water is then further treated to meet drinking water standards before it reaches our customers.

Desalination using RO has been used in Denham for many years to treat brackish (saline) groundwater. Similar technology exists at Leonora, Gascoyne Junction, Coral Bay, and Hopetoun to improve water quality. Other methods of desalination include electrodialysis reversal (EDR) which is in use at Wiluna and Yalgoo.

The EDR process removes salts in water by inducing ion movement using electrical currents. The groundwater that supplies Yalgoo is affected by salinity, hardness, nitrates and silica. As a result of this, the water had an undesirable taste for some people, was difficult to form soap lather with and left white crystalline deposits when evaporated. To help address these issues and cater for future growth in the town, we installed an EDR plant at Yalgoo's water treatment plant. This will allow 180,000 litres of water to be treated each day in Yalgoo.

Disinfection

All drinking water supply schemes are disinfected with chlorine or chloramine to protect against pathogenic bacteria and viruses. The chlorine dose is maintained within a narrow range to ensure adequate disinfection is achieved, with a minimal effect on the taste of our water.

Chloramination involves the use of chlorine and ammonia to produce a longer lasting disinfectant. Chloramination is used in the Goldfields and Agricultural Water Supply Scheme to maintain a disinfectant residual along the length of the extensive pipe network.

Ultraviolet (UV) light is used as an additional disinfectant in combination with chlorination at some towns where there are additional risks due to activities in the catchment. UV is used at a number of water treatment plants across the State, including Kirup Dam, Hester, Greenbushes, Salmon Gums and Cranbrook.

Fluoridation

In Western Australia, fluoridation of community water supplies is regulated by the Fluoridation of Public Water Supplies Act 1966 (the Act) which is administered by the Department of Health. The Fluoridation of Public Water Supplies Advisory Committee oversees fluoridation and makes recommendations to the Minister for Health who may issue or rescind directives as appropriate.

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Community water fluoridation is an important, cost-effective public health measure which plays a critical role in reducing dental decay and improving oral health.

Fluoridation of community water supplies is backed by authoritative health research agencies and government bodies in Australia and worldwide, including the World Health Organization; the Australian Dental Association; the Australian Medical Association; the National Health and Medical Research Council, and numerous others.

Water fluoridation was introduced in Western Australia in 1968. Currently, around 91 per cent of the WA population is provided with fluoridated drinking water, principally in the Perth metropolitan area and most regional centres, as well as a number of smaller communities supplied from the same source or treatment plant as regional centres.

Some regional centres in WA have naturally occurring levels of fluoride in the water supply.

The water fluoridation process involves adding fluoride in a controlled manner to the recommended optimum concentration. Fluoridated water supplies are monitored continuously via an online fluoride analyser at a dosing point, and sampled at least weekly to confirm acceptable fluoridation performance. Purity and quality control standards for chemicals added to drinking water are also strictly controlled by the Department of Health.

Fluoridation performance is reported quarterly to the Advisory Committee for Purity of Water. Tables 1 and 2 list the localities requiring fluoridation under the Act.

Table 1. Localities requiring fluoridation under Fluoridation of Public Water Supplies Act 1966 – Metropolitan region

Region / Scheme	Locality
Perth Integrated Water Supply Scheme	Armadale/Kelmscott
	Bold Park
	Buckland Hill
	Foothills
	Greenmount
	Greenmount/Darlington
	Hamilton Hill
	Harvey
	Hills Direct
	Lake Thompson
	Lexia
	Mandurah
	Melville
	Mirrabooka
	Mt. Eliza
	Mt. Hawthorn
	Mt. Yokine
	Mundaring
	Neerabup
	Pinjarra
	South Perth/Kewdale
	Tamworth Hill
	Wanneroo
	Waroona
	West Yokine
	Whitfords
Perth Metropolitan Region	Yanchep

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Table 2. Localities requiring fluoridation under Fluoridation of Public Water Supplies Act 1966 – Other regions

Region / Scheme	Locality
Great Southern Region	Albany
	Esperance
	Katanning (GSTWS)
	Mt Barker
	Narrogin (GSTWS)
Goldfields & Agricultural Water Supply Scheme	Kalgoorlie
	Merredin
	Northam
	York
North West Region	Broome
	Derby
	Hedland
	Karratha
	Kununurra
South West Region	Collie (GSTWS)
	Manjimup
Mid-West Region	Dongara/Port Denison
	Exmouth
	Geraldton
	Moora

Notes:

1. Dunsborough is de-fluoridated (as fluoride is naturally occurring). Although the scheme is not covered by the Fluoridation Act, the recommended range and optimum concentration have been specified to provide a duty of care target (0.7-1.0mg/L and 0.9mg/L respectively).

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What drinking water guidelines must we meet?

The NHMRC define the requirements for safe drinking water in Australia through the *Australian Drinking Water Guidelines 2011 (ADWG).* These Guidelines include a framework for best practice management of drinking water supplies designed to integrate all facets of the drinking water quality management and assurance system.

We have a Memorandum of Understanding (MoU) with the Department of Health (DoH) which requires our compliance with the microbiological, chemical health and radiological parameters as specified in the *ADWG,* with exemptions to adherence with the nitrate guidelines in 10 towns in the Mid West and Goldfields and Agricultural regions (refer to *Understanding water quality test results – Nitrate* on page 34). This forms part of our Water Services Licence as issued by the Economic Regulation Authority. We, along with the DoH, recognise the practices and processes used to establish and maintain high levels of drinking water quality need to be open and transparent to the community.

For aesthetic parameters, the MoU states that we should comply as far as practical with the *ADWG* for non-health related characteristics. It is accepted full compliance with non-health related characteristics may take a number of years bearing in mind the significant investment required to achieve this.

For more information on our program of water quality improvements please refer *to Improving Your Water Quality* on page 42.

Multiple barrier approach

Preventing contamination and minimising risk is an essential part of providing our customers with safe drinking water. The *ADWG* emphasise the importance of using multiple barriers to ensure the safety of drinking water. Barriers include:

- Protected catchments and groundwater recharge areas (refer to *Source protection* on page 28);
- Large reservoirs with long water detention (storage) times;
- Water treatment (refer to *How is your water treated?* on page 23);
- Ensuring tanks and bores are sealed to prevent contamination;
- Disinfection of water; and
- Maintaining chlorine residuals through our distribution system.

We monitor the performance of our barriers based on set target levels, responding to issues that are identified and strive to improve their robustness and performance. We undertake an annual Barrier Risk Assessment and update as required when new information becomes available (refer to *Monitoring and Reporting Improvements* on page 42).

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Water Safety Plans

Having a Water Safety Plan (WSP) for each of our schemes is a large part of implementing the *ADWG* Framework for Management of Drinking Water Quality. WSPs use a systematic risk management approach from 'source to service', assessing the risks to each water supply scheme, ensuring appropriate preventative measures are in place and identifying the operational controls necessary to consistently ensure the safety of drinking water.

We review WSPs at least every five years to re-evaluate the schemes' risks and update any site or treatment details. During 2017-18, 40 schemes across the State were reviewed. In addition, 125 WSPs were updated to show recent capital upgrades and other modifications of those schemes.

Source Protection

We manage approximately 140 drinking water sources at over 250 localities across the State. Catchment management and protection is the first barrier in providing safe, good quality drinking water to the community. Our *Drinking Water Source Protection Policy* guides catchment operations and highlights our commitment to the primacy of drinking water quality over other catchment land uses.

We employ several strategies to effectively undertake drinking water source protection. The Department of Water and Environmental Regulation (DWER) delegates responsibility to us to undertake activities including surveillance, signage, raw water sampling and DWER Land Management in Public Drinking Water Source Areas (PDWSAs). Surveillance and by-law enforcement are key elements to control potentially polluting activities in PDWSAs. In 2017-18, approximately 19,700 surveillance hours were undertaken state-wide with 111 by-law offence prosecutions and over 478 warning letters sent out. In July 2017, we began issuing infringements under the *Water Services Regulations 2013* for catchment offences; 47 infringements were issued throughout the year. Further information on drinking water catchments and water quality infringements can be found in the brochure *Help keep our drinking water safe*. It is available in hard copy from each regional office or on our website.

Monitoring

In accordance with the *ADWG*, we run an extensive drinking water quality monitoring program to confirm the safety of the water we provide to our customers. In 2017-18, we took more than 68,000 water samples from water sources, treatment plants and pipe networks which supply our customers, and had in excess of 255,600 individual analyses performed by our contracted analytical laboratories.

All our water quality monitoring and reporting is coordinated through our Water Quality Management System (WQMS). This software provides many aspects of water quality management and acts as the central database for all information on drinking water quality including sampling program design, sampling analysis, monitoring and reporting.

Additionally WQMS automatically issues alerts for results outside guideline and operational limits and prompts remedial action as defined by our WSPs.

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Figure 21. Water sampling in a catchment in the Perth hills

Incident response

We are committed to protecting our water sources and supply schemes and have plans in place to manage any issues with minimum impacts on water quality and our customers.

We maintain a fleet of mobile ultra-filtration (UF) and chlorination plants which allow us to rapidly restore high quality drinking water supplies. Our UF plants can be mobilised quickly to provide a minimum of 500,000 litres of high quality water per day. Other treatment units, including a reverse osmosis unit, are available for specialised applications.

In addition, we conduct regular incident scenarios with DoH to continually improve our incident management processes.

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Engagement with Department of Health

DoH regulates drinking water quality in Western Australia. We have a MoU with the DoH for managing drinking water quality, which connects all facets of nationally and internationally recognised drinking water guidelines, standards, and quality management systems to ensure the safe and continuous supply of water to our customers. It requires us to notify the DoH within 24 hours when any sample exceeds a set health value or any event occurs which could pose a risk to public health.

We also provide updates to DoH throughout the year, with DoH regularly reviewing our monitoring results and corrective actions.

The MoU provides for the DoH to conduct reviews of the performance of our systems and databases used to manage drinking water quality. In consultation with the Economic Regulation Authority, DoH commission audits in line with our Water Services Licence.

For more information on the last audit, please visit the drinking water quality section of our website.

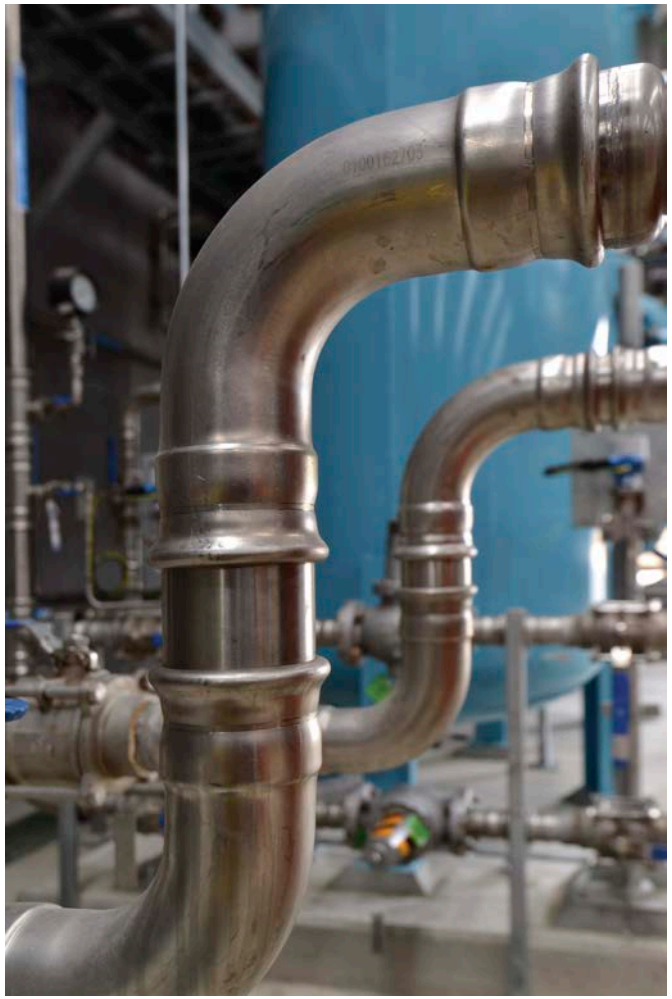

Figure 22. Advanced Water Recycling Plant

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Case study – Improving water quality in the Murchison

Water quality in the Murchison

In Western Australia, elevated nitrate concentrations are usually due to the natural process of plant decay underground that has occurred over geological time.

The groundwater supplied the Murchison towns of Cue, Meekatharra, Mount Magnet and Sandstone exceeds the *Australian Drinking Water Guidelines 2011 (ADWG)* health guideline for infant nitrate and the aesthetic parameters of chloride, sodium, silica and total dissolved solids.

The water in these towns may have an undesirable taste for some people, may be difficult to lather soap, and may leave white crystalline, silica, deposits on tiles, basins, and toilets and appliances.

The water is safe to drink, other than for bottle-fed infants under three months old. The Department of Health (DoH), through the Community Health Nurse, advises carers of infants under three months of age to use alternative water sources to prepare bottle feeds. We provide bottled water to local nursing posts for this purpose.

The DoH granted an exemption from compliance with the infant nitrate guidelines for 11 towns as we worked towards installing water treatment solutions to address elevated levels of nitrates (refer to section on *Nitrates*, page 34 for a list of these towns and the strategies in place to address nitrates).

Figure 23. An example of an in-house water treatment system as part of a six month trial

Community engagement

Six month trial – in-house water treatment system

In November 2016, 14 customers in Cue (12 households and two businesses) received free in-house water treatment systems (Figure 23) to see if smaller scale treatment is cost efficient and effective at meeting customer expectations for hardness, taste and scaling.

While feedback from trial participants did show promising results on improved scaling, the results were not consistent when it came to improving the hardness of water.

The “under the sink” reverse osmosis units performed effectively in removing salts, therefore reducing scale formation. The softeners’ performance, however, was variable, ranging from results reflecting

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expected performance changes to results suggesting no change to the water.

The trial, which also assessed cost effectiveness and ease of maintenance, as reported from the 14 trial participants, determined in-house treatment was not viable when compared to a centralised water treatment system. The trial also showed that customers valued improved aesthetic water quality as well as our engagement with them.

Understanding community perception on water quality

We undertook a research and development project in all four Murchison towns to understand customer perception of our water. To date, 160 face to face surveys have been completed with residents, showing people's perceptions focused on taste, impacts on appliances and fixtures, and perceived effect on the body.

There were a number of different perceptions of what causes the problems – silica, calcium, 'white stuff' etc. This shows us we need to not only provide a solution but also work closely with the community providing information on what is being done to address their concerns and how it will impact their water supply.

Project to improve water quality in the Murchison

We are progressing with a three year plan to build water treatment plants using electrodialysis reversal (EDR) in Cue, Meekatharra, Mount Magnet and Sandstone at an overall cost of more than $16 million (refer to *Desalination and electrodialysis* reversal section on page 24 for further information on EDR).

The water treatment plants will reduce the naturally high levels of salinity and nitrates and will improve aesthetic characteristics, such as scaling and hardness.

The four EDR plants will be installed in each town by mid to late 2020. For further information on the Murchison project, please refer to the website or via email to murchison@watercorporation.com.au

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Understanding water quality test results

The following summaries are intended to assist you with interpreting the results presented in this report. Additional information can be obtained by referring to the Fact Sheets contained in the *Australian Drinking Water Guidelines 2011* (*ADWG*) published by the National Health and Medical Research Council and our website www.watercorporation.com.au.

For the purposes of this report, all data are assessed in relation to the *ADWG*.

Escherichia coli (E. coli)

Most human pathogenic microorganisms are found in the gut and faeces of humans and other warm blooded animals along with other non-pathogenic microorganisms. The bacteria *E. coli* is found in abundance in the intestine of warm blooded animals and, although most species are not pathogenic to humans, they indicate possible contamination by human or animal waste. As it is impractical to test for the presence of all pathogenic microorganisms in water, the *ADWG* recommends testing for the microbial indicator bacterium *E. coli* to indicate the presence of contamination. If there is *E. coli* there may also be pathogenic organisms.

We employ a multiple barrier approach (refer to page 27) to prevent microbial contamination, however, if there is an *E. coli* detection it is immediately addressed to ensure the water supplied to customers is safe.

Thermophilic *Naegleria*

Naegleria are free living amoebae which are almost ubiquitous, being found in fresh water, soils and sediments. It is not associated with human waste. They grow more freely in waters between 27 to 46°C but may survive for long periods in cyst form in much colder waters and, under certain conditions, may proliferate in pipework and tanks. As they proliferate in warmer water they are referred to as thermophilic or *Naegleria* tolerant to 42°C. This organism is safe to drink but the species *Naegleria fowleri* can cause the disease primary amoebic meningoencephalitis if it enters the body through the nose. Adequate levels of chlorine or chloramine can control *Naegleria*. Any detection of thermophilic *Naegleria* is responded to immediately to ensure the potential risk to public health is managed.

Fluoride

Fluorine is one of the most abundant elements in the Earth's crust, and is typically found as the fluoride ion or as organic or inorganic fluorides. It is found naturally in groundwater supplies, and is present in most food and beverage products and toothpaste. Additional fluoride is added to a number of water supplies in Western Australia as directed by the Minister for Health (refer to *Fluoridation* on page 24). The fluoride concentration after dosing is set by the Fluoridation of Public Water Supplies Advisory Committee, and does not exceed 1 mg/L. Notwithstanding this, the *ADWG* health guideline for fluoride is 1.5 mg/L, applicable to both fluoridated and non-fluoridated localities.

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Nitrate

In Western Australia, elevated nitrate concentrations are usually due to the natural process of plant decay underground that has occurred over geological time. The *ADWG* specify a health guideline for nitrate of 50 mg/L (as nitrate) for bottle-fed infants less than three months old and a guideline of 100 mg/L (as nitrate) for adults and children over three months old. Health effects are very rare and no issues have been recorded in Western Australia.

All our water supplies meet the *ADWG* guideline limit for adults and children over three months. We have been granted infant nitrate exemptions by the Department of Health (DoH) for a number of towns in the Mid-West and Goldfields and Agricultural Regions. The community Health Nurse provides advice to mothers regarding the use of alternative water for the preparation of bottle feeds and we provide bottled water free of charge via the Community Health Nurse as required.

We are committed to reducing nitrates in the water supply in these towns by progressive improvement. Even with DoH-granted infant nitrate exemptions, we currently manage nitrates to below the infant health nitrate guideline at:

- Wiluna, Yalgoo and Leonora following the installation of water treatment plants;
- Laverton by blending water from low and high nitrate bores; and
- Menzies by carting water from Kalgoorlie (short term solution).

We are working on long-term solutions for the remaining towns:

- Cue, Meekatharra, Mt Magnet and Sandstone with planned treatment upgrades (see section *Where does our water come from? – Mid-West Region*, page 18).
- New Norcia and Menzies are being planned (refer to *Where does our water come from? – Goldfields and Agricultural Region,* page 15).

Figure 24. Water testing

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Trihalomethanes

Trihalomethanes (THMs) are present in drinking water as a by-product of disinfection using chlorination (and chloramination to a lesser extent). We are required to comply with the *ADWG* health guideline of 0.25 mg/L expressed as an average long term exposure. For the purposes of this report, THM compliance is assessed comparing the guideline with the mean annual THM concentration.

Alkalinity (as calcium carbonate)

Alkalinity is a measure of the parameters in water that have acid-neutralising ability, typically expressed in mg/L of equivalent calcium carbonate. Alkalinity can be affected by naturally occurring minerals or water treatment chemicals. There are no aesthetic or health considerations for alkalinity, and therefore the *ADWG* do not provide a guideline value.

Aluminium (acid-soluble)

Acid-soluble aluminium in water primarily originates from the addition of coagulants such as aluminium sulphate or poly-aluminium chloride in the water treatment process. These coagulants are added to aid the removal of colour and turbidity. Aluminium can accumulate in pipe sediments, and be re-suspended during periods of rapid changes to flow patterns. The *ADWG* specify an aesthetic guideline of 0.2 mg/L. No health guideline is set.

Chloride

Chloride is present in natural waters from the dissolution of salt deposits. In surface water, the concentration of chloride is typically less than 100 mg/L while groundwater can have higher concentrations, particularly if there is salt water intrusion. In Australian drinking water supplies chloride levels range up to 650 mg/L depending on local source characteristics.

Chloride is essential for humans and animals. It contributes to the osmotic activity of body fluids. Based on aesthetic considerations, the chloride concentration in drinking water should not exceed 250 mg/L (*ADWG*).

Hardness (as calcium carbonate)

Hard water requires more soap to obtain lather. It can also cause scale to form on hot water pipes and fittings. Hardness is caused by the presence of dissolved calcium and magnesium. Water with hardness:

- Less than 60 mg/L is soft and possibly corrosive (depends on pH, alkalinity and dissolved oxygen concentration);
- Between 60 and 200 mg/L is deemed good quality for all domestic uses;
- Between 200 and 500 mg/L will increase scale formation; and
- Greater than 500 mg/L will cause a high level scaling.

Hardness can be an important issue when purchasing appliances such as dishwashers. Hardness can be expressed in a number of units of measure. To convert the hardness values presented in this report (expressed in mg/L) to dH (German degree) units, divide by 17.8. To convert hardness to millimol (mmol) units, divide by 100 and to convert to milliequivalent (mEq) divide by 50. The *ADWG* specify an aesthetic hardness guideline of 200 mg/L.

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Iron

Iron occurs naturally in water as a result of contact with soil or rock in the catchment. It can accumulate in pipe sediments, and be re-suspended during periods of rapid changes to flow patterns. Elevated concentrations cause discoloured water and can stain laundry. The *ADWG* specify an aesthetic guideline of 0.3 mg/L, though we aim to manage below this guideline value.

Manganese

Manganese in water can come from contact with soil or rock in the catchment. It can accumulate in pipe sediments, and be re-suspended during periods of rapid changes to flow patterns.

Elevated manganese can make water look black and stain laundry. The *ADWG* specify an aesthetic guideline of 0.1 mg/L, though we aim to manage below this guideline due to customer impacts. For further information regarding guideline levels for other metals relevant to drinking water, refer to Appendix A, page 44.

pH

pH is a measure of water acidity (pH 7 is neutral). The *ADWG* specify a lower and upper aesthetic value of 6.5 and 8.5 respectively. The guidelines allow for a pH of up to 9.2 for new concrete tanks and cement-lined pipes, which can significantly increase the pH for a short period of time. Elevated pH is often caused by calcium carbonate leaching from the protective cement lining of the pipes after long transit times, or may be required as part of chloramine disinfection (refer to *Disinfection* section on page 24). These conditions may be found at a number of localities in our large water supply schemes. Where low pH is experienced, this is typically a consequence of the source characteristic rather than the influence of treatment. Buffering is a treatment process that stabilises the pH of the water.

Silica

In Australia, dissolved silica can range between 0.6 mg/L in some surface waters to 110 mg/L in ground waters. Dissolved silica can precipitate on some surfaces forming a white residue. In cases where customer complaints occur due to scale build-up, water hardness and silica concentrations are often identified as the primary cause. There is no adverse health considerations associated with silica in drinking water, but to minimise scale build up on surfaces silica should not exceed 80 mg/L (*ADWG*).

Sodium

Sodium is widespread in water due to the high solubility of sodium salts and the abundance of mineral deposits. In major Australian reticulated supplies, sodium concentrations range from 3 mg/L to 300 mg/L. While sodium is essential to human life, there is no agreed minimum daily intake level. Based on aesthetic consideration the concentration of sodium in drinking water should not exceed 180 mg/L (*ADWG*).

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Total Dissolved Solids

Total Dissolved Solids (TDS) consist of inorganic (natural) salts and small amounts of organic matter dissolved in water. TDSs comprise sodium, potassium, calcium, magnesium, chloride, sulphate, bicarbonate, carbonate, silica, organic matter, fluoride, iron, manganese, nitrate and phosphate.

Water with low TDS can taste flat, while water with high TDS tastes salty and causes scaling in pipes, fittings and household appliances. The *ADWG* provide guidance in the palatability of drinking water according to TDS concentration, as shown in Table 3.

Table 3. ADWG guidance in relation to TDS concentration in relation to drinking water palatability

TDS (mg/L)	Palatability
0 – 600	Good quality
600 – 900	Fair quality
900 – 1200	Poor quality
> 1200	Unpalatable

The ADWG guideline of 600 mg/L is based on taste.

True colour

Colour in water originates mainly from natural drainage through soil and vegetation in a catchment. Corroding metal pipes can also discolour the water, with iron producing a brownish colour and copper a faint blue colour. The *ADWG* specify an aesthetic guideline of 15 Hazen Units. Water Corporation measures true colour in True Colour Units (TCU) which are numerically identical to Hazen Units. As a guide, 15 TCU is just noticeable in a glass.

Turbidity

Turbidity is the cloudy appearance of water caused by the presence of suspended matter. The *ADWG* specify an aesthetic guideline of 5 Nephelometric Turbidity Units (NTU) which is just noticeable in a glass of water.

Sampling parameters

Appendix A contains a list of regularly sampled parameters within functional groups and their respective guideline values.

Figure 25. Harding Dam overflowing

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Our performance

Health related performance

We again achieved excellent microbiological performance in 2017-18 with 100 per cent of schemes complying with *Escherichia coli* and thermotolerant *Naegleria* requirements. We also achieved 100 per cent for chemical health performance (see Figure 26).

For this report, the target is achieved if the yearly average concentration for each chemical is less than the guideline value (refer to *Understanding water quality test results* on page 33).

Microbiological performance requirements of our Memorandum of Understanding (MoU) with the Department of Health (DoH) were all met for the past six years (Figure 27).

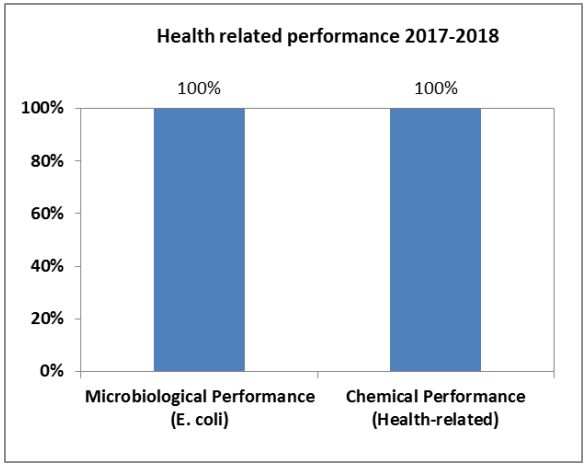

Figure 26. Microbiological and chemical health performance

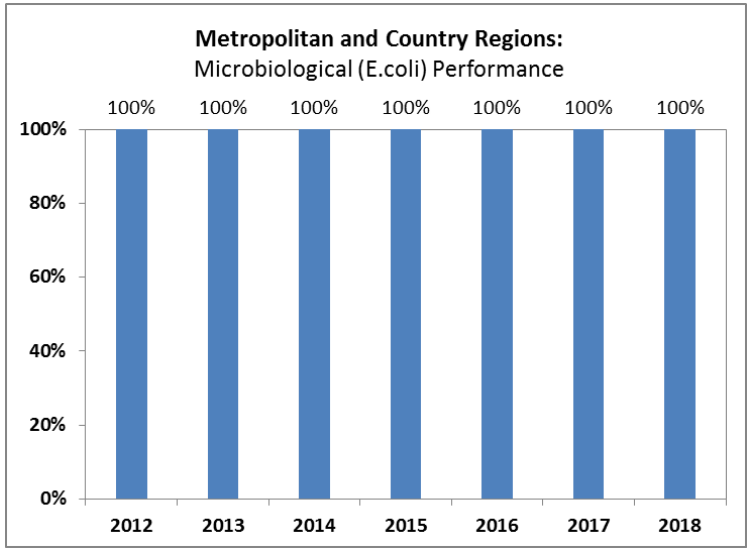

Figure 27. ix year microbiological performance

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Non-health (aesthetic) related performance

While we strive to meet the *Australian Drinking Water Guidelines 2011* (*ADWG*) for aesthetic characteristics, this is very difficult to achieve in a state as vast as Western Australia with such diverse water sources. We are committed to improving all aspects of drinking water quality, however, improvements in aesthetic water quality can be very costly and are often hard to achieve.

Detailed performance review for 2017-18

Appendix B provides a detailed summary of test results for each scheme throughout the State, where 94 per cent of analyses complied with aesthetic guidelines in 2017-18. In 2017-18, there were 165 out of 251 schemes where the mean concentration for the year for all aesthetic parameters was less than the aesthetic guidelines. Our performance for all aesthetic analyses (alkalinity, aluminium, true colour, hardness, iron, manganese, pH, TDS, turbidity, sodium, chloride and silica) across our 251 schemes was 94 per cent, with 8,248 out of 8,781 analyses complying with the aesthetic guidelines.

The results in Appendix B show a small number of exceedances above the guidelines in aesthetic quality. These exceedances are caused by the unique quality of local sources, lack of alternative sources, impact of the drying climate on groundwater production and abstraction from groundwater in proximity to the coast.

For many schemes, these excursions have no, or minimal, influence on the taste of the drinking water.

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Customer expectations

Customer contacts

Water quality related customer contacts (enquiries and complaints) are recorded and monitored continuously to identify any trends and areas for improvement. In 2017-18, our Operations Centre received 8,512 water quality related customer contacts (compared with 9,399 in 2016-17), of which 8,337 consisted of customer enquiries and 175 were related to complaints. Figure 28 shows the type and proportion of the total (8,512) water quality contacts (Note: miscellaneous contacts are predominately related to water hardness).

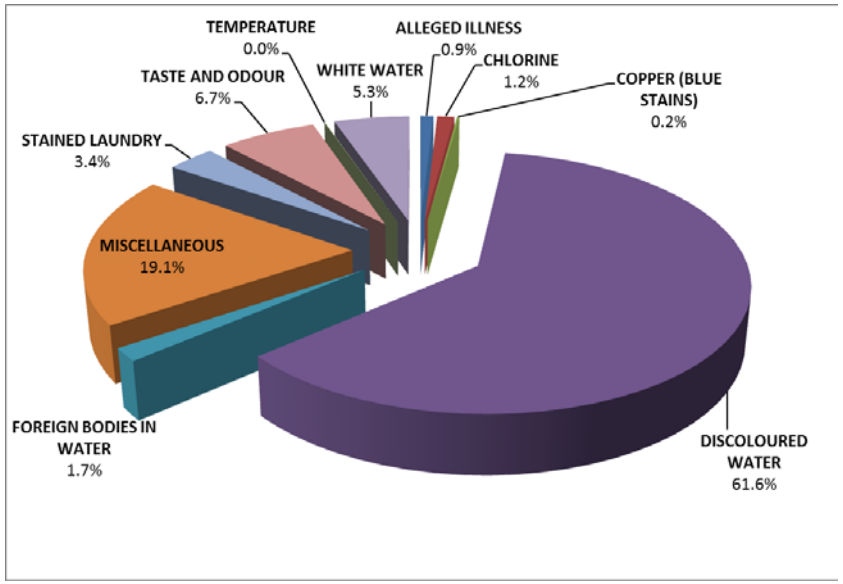

Figure 28. Water quality contacts profile 2017-18

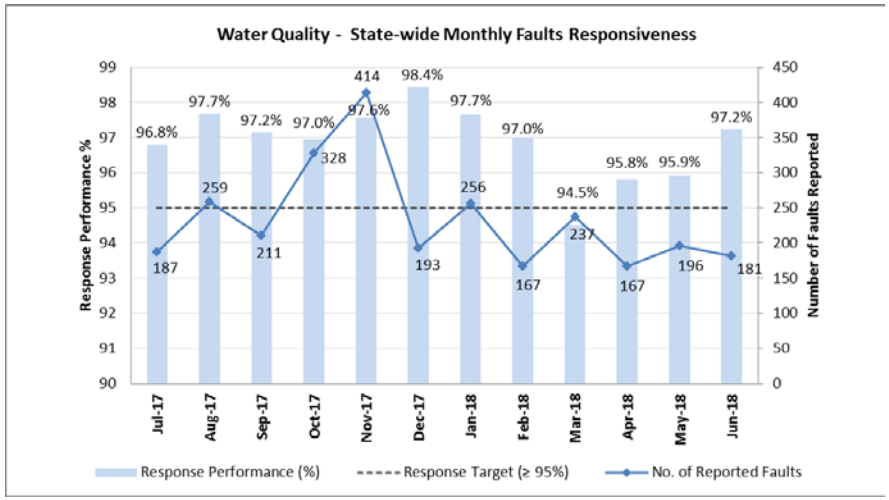

Figure 29. State-wide monthly response performance to water quality faults

For contacts related to water quality faults our Customer Charter states we will respond within two hours or at an agreed time. We have an agreed customer and business target to achieve this at least 95 per cent of the time.

In 2017-18, we exceeded this target by responding to 97 per cent of recorded faults within two hours or at an agreed time (as shown in Figure 29, the State-wide monthly faults responsiveness).

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Customer research

We measure community perceptions of the quality of their drinking water through our quarterly Customer Performance Index (CPI) survey.

For 2017-18, the feedback from our customers about their water quality was at a six year high – with the end of year average of 7.45 for providing an acceptable standard of water quality (up from 7.29 in 2016-17) and 7.53 for providing a consistent level of water quality (up from 7.40 in 2016-17).

In our CPI survey, customers are asked to indicate the degree to which they either agree or disagree with two statements in relation to water quality (where 1 is 'poor' and 10 is 'excellent'). The rating for these questions, for each quarter of the year, is reported in Table 4 and the annual average over the last 6 years is shown in Figure 30.

In May 2018 we concluded our formal extensive state wide community engagement and customer research program known as Tap In. This project has fed customer feedback into our strategic and business planning processes to continue to ensure that we are truly a customer led organisation. As part of Tap In we extensively tested customer perceptions of water quality across the State. The results revealed that customers were satisfied with the safety, smell, colour and taste of their drinking water across the Perth metropolitan area. However, there were a small number of regional areas where customers would like to see the taste of water improved. This feedback will be included in our aesthetic water quality program.

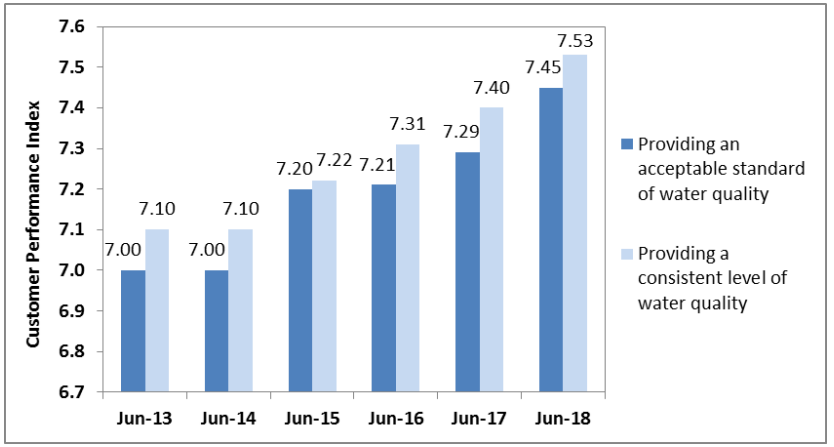

Figure 30. Customer performance index survey over the last 6 years

Table 4. Customer performance index throughout 2017-18

Survey Questions	2017-18				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	End of year average
How would you rate the Water Corporation on providing an acceptable standard of water quality?	7.24	7.43	7.61	7.53	7.45
How would you rate the Water Corporation on providing a consistent level of water quality?	7.39	7.51	7.65	7.56	7.53

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Improving your water quality

Monitoring and reporting improvements

We are continuing to strengthen the performance of our operational monitoring and Critical Control Point compliance. These key operational and monitoring requirements are detailed within scheme Water Safety Plans which we update regularly and review in detail on a periodic basis. Day to day monitoring and responding to Critical Control Points and other water quality issues is a key part of our business and we have a dedicated team in Operations Support undertaking this function.

Quality operational information and data is critical as it informs our Barrier Risk Assessment (BRA; refer to page 27 for further information on *Multiple barrier approach*). As a part of this process we fully review drinking water quality (DWQ) risks annually but also update as required or when new information becomes available. The BRA details water quality risks associated with each of our drinking water schemes across the state. The data and information collected is critical as it informs how our schemes are performing from a water quality risk perspective. The BRA process assists us with identifying and understanding the need for and prioritisation of capital investments to address the identified risks.

Water quality capital improvements

We continue to progress our program of water quality capital improvements. These projects ensure robust multiple barriers are in place from “source to service” for all our schemes. Some examples of work undertaken this year are described throughout this report.

Goldfields and Agricultural Region (GAR)

There has been a lot happening in the GAR over the past few years as we move towards sealing the Goldfields and Agricultural Water Supply Scheme (GAWSS) through constructing new, sealed water tanks to replace open reservoirs.

Construction of new 4 million litre water tank in Beverley began in mid-2017, with a new 4 million litre tank also to be constructed in Norseman. Sealing GAWSS will improve water quality and help to maintain chlorine residuals throughout the extensive GAWSS pipeline network.

Two new chlorine mobile dosing units were delivered to GAR this year, these units assist with boosting chloramine residuals and are a critical part of operational response and management, especially over the summer months.

North West Region (NWR)

Improvements include an upgrade of the Broome chlorinator to the latest SCADA (Supervisory Control and Data Acquisition) standard and installing auto shutdown and an upgrade to the Camballin water treatment plant.to improve water quality and water supply outcomes. To improve the protection of Harding Dam we have installed 1.6km of open ground fencing along with the fencing of 8 pipeline trestles.

Also underway, are improvements to fluoridation in the region with new or upgraded plants at Kununurra, Hedland and Derby. We provide fluoridation to towns at the direction of the Department of Health.

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Mid-West Region (MWR)

We have been working intensively to identify solutions for the schemes of Moora, Watheroo, Cue, Sandstone, Mt Magnet, Meekatharra and Horrocks. All these schemes have aesthetic and/or nitrate water quality issues, which will be addressed via water treatment. See *Case Study – Improving water quality in the Murchison* for specific examples (page 31).

Another project that is progressing well is the MWR bore sealing project. This project will ensure that bore headworks are in good condition. This is a large project for the MWR due to the number of schemes that are supplied from groundwater.

South West Region (SWR)

We have completed a bore sealing project similar to the project in the MWR. Two projects to install fluoridation plants at Australind and Eaton have been activated following a directive from the Department of Health. These projects will be completed in 2020.

A project to integrate the towns of Mullalyup and Kirup with the Greenbushes and Balingup scheme will be underway post-2017-18. This project will enable us to secure the supply to these towns and provide improved water quality.

Great Southern Region (GSR)

Treatment is still a big part of the water quality improvement program for the GSR with a new ultrafiltration plant project commencing at Cranbrook and one nearing completion at Ravensthorpe. We completed projects to upgrade water treatment at Yealering, Katanning and Jerramungup in 2017-18.

We are nearing the completion of a new 2.5 million litre tank, pump station and new water main in Kondinin. This will improve water quality for Kondinin and Hyden.

Perth Metropolitan Region and across the State

The growing Perth suburb of Yanchep will now be supplied with fluoridated water following the completion of the Yanchep Fluoridation plant.

We are also continuing to progress our chlorination program across the State. This project focuses on upgrading the visibility of all critical chlorinators to the latest SCADA standards. These improvements will ensure enhanced alarming, automation and reporting capability.

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Appendix A – List of sampling parameters

Table 5. Pesticide

Pesticide	Health Guideline Value (µg/L)
2,4-D ([2,4-dichlorophenoxy]acetic acid)	30 µg/L
Aldicarb	4 µg/L
Aldrin + Dieldrin	0.3 µg/L
Ametryn	70 µg/L
Amitraz	9 µg/L
Amitrole	9 µg/L
Asulam	70 µg/L
Atrazine	20 µg/L
Azinphos-methyl	30 µg/L
Bioresmethrin	100 µg/L
Bromacil	400 µg/L
Bromoxynil	10 µg/L
Carbaryl	30 µg/L
Carbendazim	90 µg/L
Carbofuran	10 µg/L
Chlorantraniliprole	6000 µg/L
Chlorfenvinphos	2 µg/L
Chlorothalonil	50 µg/L
Chlorpyrifos	10 µg/L
Chlorsulfuron	200 µg/L
Clopyralid	2000 µg/L
Cyfluthrin	50 µg/L
Cypermethrin	200 µg/L
Cyprodinil	90 µg/L
DDT (total isomers)	9 µg/L
Deltamethrin	40 µg/L
Diazinon	4 µg/L
Dicamba	100 µg/L
Dichlobenil	10 µg/L
Dichloroprop	100 µg/L
Dichloropropene	100 µg/L
Dichlorvos	5 µg/L
Diclofop-methyl	5 µg/L
Dieldrin	see Aldrin
Dimethoate	7 µg/L
Diquat	7 µg/L
Disulfoton	4 µg/L
Diuron	20 µg/L
2,2-DPA (2,2-Dichloropropionic acid, Dalapon)	500 µg/L
Endosulfan	20 µg/L
Ethion	4 µg/L
Etridiazole	100 µg/L
Fenamiphos	0.5 µg/L
Fenarimol	40 µg/L
Fenitrothion	7 µg/L
Fenthion	7 µg/L
Fenvalerate	60 µg/L
Fipronil	0.7 µg/L
Flamprop-methyl	4 µg/L
Fluazifop [1]	10 µg/L
Fluometuron	70 µg/L
Flupropanate	
Glyphosate	1000 µg/L
Heptachlor & heptachlor epoxide (total)	0.3 µg/L
Hexazinone	400 µg/L

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Pesticide	Health Guideline Value (µg/L)
Imazapyr	
Maldison (Malathion)	70 µg/L
MCPA	40 µg/L
Methidathion	6 µg/L
Methiocarb	7 µg/L
Methomyl	20 µg/L
Metolachlor	300 µg/L
Metribuzin	70 µg/L
Metsulfuron-methyl	40 µg/L
Mevinphos	5 µg/L
Napropamide	400 µg/L
Nicarbazin	1000 µg/L
Norflurazon	50 µg/L
Omethoate	1 µg/L
Oryzalin	400 µg/L
Oxamyl	7 µg/L
Paraquat	20 µg/L
Parathion-ethyl	20 µg/L
Parathion-methyl	0.7 µg/L
Pendimethalin	400 µg/L
Permethrin	200 µg/L
Picloram	300 µg/L
Piperonyl butoxide	600 µg/L
Pirimicarb	7 µg/L
Pirimiphos-methyl	90 µg/L
Polihexanide	700 µg/L
Propachlor	70 µg/L
Propargite	7 µg/L
Propiconazole	100 µg/L

Pesticide	Health Guideline Value (µg/L)
Propyzamid	70 µg/L
Pyrasulfotole	40 µg/L
Pyroxsulam	4000 µg/L
Simazine	20 µg/L
Temephos	400 µg/L
Terbacil	200 µg/L
Terbuthylazine	10 µg/L
Terbutryn	400 µg/L
Thiophanate	5 µg/L
Toltrazuril	4 µg/L
Triadimefon	90 µg/L
Triclopyr	20 µg/L
Trifluralin	90 µg/L
Vernolate	40 µg/L

Notes:

µg/L = micrograms per litre; 1000 µg = 1 miligram (mg)

[1] Guideline specific to WA and set by Department of Health (WA)

Other pesticides may be assessed as indicated

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Table 6. Organic compounds

Compound	Health Guideline Value (µg/L)	Aesthetic Guideline Value (µg/L)
Acrylamide	0.2	Not set
Benzene [1]	1	Not set
Carbon tetrachloride	3	Not set
Chloroacetic acids		
Chloroacetic acid	150	Not set
Dichloroacetic acid	100	Not set
Trichloroacetic acid	100	Not set
Chlorobenzene [1]	300	10
Chlorophenols		
2-chlorophenol	300	0.1
2,4-dichlorophenol	200	0.3
2,4,6-trichlorophenol	20	2
Dichlorobenzenes [1]		
1,2-dichlorobenzene (1,2-DCB)	1500	1
1,3-dichlorobenzene (1,3-DCB)	Not set	20
1,4-dichlorobenzene (1,4-DCB)	40	0.3
Dichloroethanes [1]		
1,1-dichloroethane	Not set	Not set
1,2-dichloroethane	3	Not set
Dichloroethenes [1]		
1,1-dichloroethene (1,1-DCE)	30	Not set
1,2-dichloroethene (1,2-DCE)	60	Not set
Dichloromethane [1]	4	Not set
Epichlorohydrin	0.5	Not set
Ethylbenzene [1]	300	3
Ethylenediamine tetra acetic (EDTA) [1]	250	Not set
Hexachlorobutadiene [1]	0.7	Not set
Nitrilotriacetic acid (NTA) [1]	200	Not set
Organotins [1]		
Dialkyltins	Not set	Not set
Tributyltin oxide	1	Not set
Plasticisers [1]		
Di(2-ethylhexyl) adipate	Not set	
Di(2-ethylhexyl) phthalate (DEHP)	10	Not set
Polycyclic aromatic hydrocarbons [1]		
Benzo-(a) pyrene	0.01	Not set
Styrene (vinylbenzene) [1]	30	4
Tetrachloroethene [1]	50	Not set
Toluene [1]	800	25
Total Trihalomethanes	250	Not set
Trichloroacetaldehyde (chloral hydrate)	20	Not set
Trichlorobenzenes (total) [1]	30	5
Trichloroethylene (TCE) [1]	Not set	Not set
Vinyl chloride [1]	0.3	Not set
Xylene [1]	600	20
1,1,1- Trichloroethane [1]	Not set	Not set

Notes:

µg/L = micrograms per litre; 1000 µg = 1 miligram (mg)

[1] These are part of the hydrocarbons suite in the sampling results tables

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Table 7. Radiological

Parameter	Health Guideline Value
Radium 226 & 228	1.0 mSv (millisieverts).
Radon 222	100 Bq/L (millibecquerels per litre)

Table 8. Inorganic Chemicals

Chemical	Health Guideline Value (mg/L)	Aesthetic Guideline Value (mg/L)
Chloride	Not set	250
Cyanide [1]	0.08	Not set
Fluoride	1.5	Not set
Iodide [1]	0.5	Not set
Nitrate [2]	50 mg/L	Not set
Silica	Not set	80
Sodium	Not set	180
Sulphate	500	250

Notes:

[1] Other health related chemicals in the summary of test results tables includes cyanide and iodide.

[2] Nitrate health guideline is for bottle-fed infants < 3 months of age. The health guideline for adults and children > 3 months is 100 mg/L.

Table 9. Physical Characteristics

Characteristics	Health Guideline Value	Aesthetic Guideline Value
Hardness as $CaCO_3$	Not set	200 mg/L
pH	Not set	6.5 – 8.5
Total filterable solids (by summation)	Not set	600 mg/L
True colour	Not set	15 TCU
Turbidity	Not set	5 NTU

Notes:

NTU = Nephelometric turbidity units

Table 10. Microbiological

Organism
Escherichia coli
Naegleria tolerant to ≤ 42°C

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Table 11. Metals

Metal	Health Guideline Value (mg/L)	Aesthetic Guideline Value (mg/L)
Aluminium (acid soluble aluminium)	Not set	0.2
Antimony [3]	0.003	Not set
Arsenic [3]	0.01	Not set
Barium [3]	2	Not set
Beryllium [3]	0.06	Not set
Boron [3]	4	Not set
Cadmium [3]	0.002	Not set
Chromium (as Cr[VI]) [3]	0.05	Not set
Copper [3]	2	1
Iron	Not set	0.3
Lead [3]	0.01	Not set
Manganese	0.5	0.1
Mercury [3]	0.001	Not set
Molybdenum [3]	0.05	Not set
Nickel [3]	0.02	Not set
Selenium [3]	0.01	Not set
Silver [3]	0.1	Not set
Uranium [3]	0.017	Not set
Zinc [3]	Not set	3

Notes:

[3] These are part of the metals suite in the sampling results tables

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Appendix B – Summary of test results

Perth Metropolitan Region

Health-related Tables 1 and 2

Aesthetic Tables 3, 4 and 5

Mid-West Region

Health-related Tables 6 and 7

Aesthetic Tables 8, 9 and 10

Goldfields and Agricultural Regions

Health-related Tables 11 and 12

Aesthetic Tables 13, 14 and 15

South West Region

Health-related Tables 16 and 17

Aesthetic Tables 18, 19 and 20

Great Southern Region

Health-related Tables 21 and 22

Aesthetic Tables 23, 24 and 25

North West Region

Health-related Tables 26 and 27

Aesthetic Tables 28, 29 and 30

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Table 1 **Health related variables**

Perth Region	E. coli				Thermophilic Naegleria			Fluoride					Hydrocarbons		Metals	
Locality	Samples Taken	Samples >0 cfu/100mL	Max cfu/100mL	Requirement Met	Samples Taken	Samples with Thermophilic Naegleria	Requirement Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met
									Min	Max	Mean					
Armadale/Kelmscott	286	0	0	✓	273	0	✓	52	0.70	0.90	0.80	✓	1	✓	2	✓
Bold Park	330	0	0	✓	147	0	✓	51	0.75	0.90	0.82	✓	0	(1)	2	✓
Buckland Hill	94	0	0	✓	78	0	✓	52	0.70	0.85	0.74	✓	0	(1)	2	✓
Dwellingup	13	0	0	✓	6	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Foothills	143	0	0	✓	143	0	✓	52	0.75	0.95	0.83	✓	0	(1)	2	✓
Greenmount	195	0	0	✓	104	0	✓	49	0.75	0.90	0.83	✓	0	(1)	3	✓
Greenmount/Darlington	117	0	0	✓	92	0	✓	52	0.70	0.85	0.80	✓	0	(1)	2	✓
Hamilton Hill	214	0	0	✓	98	0	✓	49	0.70	0.85	0.78	✓	0	(1)	2	✓
Hills Direct	693	0	0	✓	299	0	✓	41	0.65	0.90	0.81	✓	0	(1)	2	✓
Lexia	143	0	0	✓	67	0	✓	51	0.65	0.90	0.77	✓	0	(1)	2	✓
Mandurah	377	0	0	✓	325	0	✓	51	0.75	0.90	0.83	✓	2	✓	6	✓
Melville	169	0	0	✓	91	0	✓	52	0.65	0.85	0.75	✓	0	(1)	2	✓
Mirrabooka	338	0	0	✓	117	0	✓	52	0.65	0.85	0.76	✓	0	(1)	2	✓
Mt. Eliza	428	0	0	✓	137	0	✓	52	0.70	0.85	0.75	✓	2	(1)	2	✓
Mt. Hawthorn	156	0	0	✓	78	0	✓	52	0.70	0.95	0.83	✓	0	(1)	2	✓
Mt. Yokine	520	0	0	✓	182	0	✓	52	0.75	0.90	0.83	✓	0	(1)	2	✓
Mundaring	117	0	0	✓	117	0	✓	52	0.80	1.00	0.86	✓	0	(1)	3	✓
Neerabup	260	0	0	✓	117	0	✓	52	0.70	0.95	0.86	✓	0	(1)	2	✓
North Dandalup	13	0	0	✓	6	0	✓	2	0.80	0.85	0.83	✓	1	✓	2	✓
Pinjarra	65	0	0	✓	53	0	✓	50	0.80	0.90	0.84	✓	1	✓	2	✓
South Perth/Kewdale	520	0	0	✓	233	0	✓	52	0.70	0.95	0.82	✓	1	✓	2	✓
Tamworth Hill	454	0	0	✓	173	0	✓	63	0.80	0.90	0.84	✓	1	✓	2	✓
Thomsons Lake	325	0	0	✓	91	0	✓	49	0.70	0.85	0.75	✓	2	✓	2	✓
Two Rocks	104	0	0	✓	39	0	✓	2	0.15	0.15	0.15	✓	0	✓	3	✓
Wanneroo	481	0	0	✓	164	0	✓	50	0.70	0.85	0.76	✓	0	(1)	1	✓
West Yokine	256	0	0	✓	121	0	✓	52	0.75	0.90	0.83	✓	0	(1)	5	✓
Whitfords	143	0	0	✓	66	0	✓	49	0.65	0.85	0.77	✓	0	(1)	2	✓
Yanchep	104	0	0	✓	53	0	✓	27	<0.1	0.85	0.70	✓	0	(1)	2	✓

(1) No samples required in this 12 month period

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Table 2 **Health related variables**

Perth Region	Nitrate					Pesticides		Radiological		Trihalomethanes					Other Health Related	
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Requirement Met
		Min	Max	Mean							Min	Max	Mean			
Armadale/Kelmscott	2	<0.22	<0.22	<0.22	✓	1	✓	1	✓	10	0.071	0.110	0.096	✓	1	✓
Bold Park	2	<0.22	0.22	<0.22	✓	1	✓	0	(1)	12	0.016	0.067	0.044	✓	1	✓
Buckland Hill	5	<0.22	0.26	<0.22	✓	1	✓	0	(1)	11	0.050	0.094	0.071	✓	0	(1)
Dwellingup	4	0.35	0.66	0.53	✓	1	✓	0	(1)	2	0.056	0.069	0.063	✓	0	(1)
Foothills	2	1.23	1.32	1.28	✓	1	✓	2	✓	13	0.017	0.140	0.082	✓	0	(1)
Greenmount	5	0.79	2.38	1.36	✓	1	✓	0	(1)	13	0.031	0.170	0.122	✓	0	(1)
Greenmount/Darlington	2	0.88	1.28	1.10	✓	1	✓	2	✓	11	0.058	0.140	0.094	✓	0	(1)
Hamilton Hill	2	<0.22	<0.22	<0.22	✓	1	✓	2	✓	10	0.030	0.083	0.066	✓	0	(1)
Hills Direct	2	<0.22	<0.22	<0.22	✓	1	✓	1	✓	11	0.016	0.061	0.033	✓	1	✓
Lexia	2	1.28	7.48	4.40	✓	1	✓	1	✓	10	0.076	0.170	0.121	✓	0	(1)
Mandurah	15	<0.22	0.26	<0.22	✓	3	✓	2	✓	38	<0.001	0.079	0.009	✓	2	✓
Melville	4	<0.22	0.35	<0.22	✓	1	✓	0	(1)	13	0.030	0.098	0.061	✓	0	(1)
Mirrabooka	4	0.79	3.30	1.94	✓	1	✓	0	(1)	13	0.049	0.190	0.117	✓	0	(1)
Mt. Eliza	2	<0.22	0.35	<0.22	✓	1	✓	1	✓	13	0.034	0.120	0.060	✓	2	✓
Mt. Hawthorn	5	0.97	2.24	1.50	✓	1	✓	1	✓	11	0.094	0.170	0.131	✓	0	(1)
Mt. Yokine	5	1.01	2.16	1.72	✓	1	✓	0	(1)	4	0.096	0.130	0.114	✓	0	(1)
Mundaring	2	0.53	0.79	0.66	✓	1	✓	0	(1)	2	0.019	0.021	0.020	✓	0	(1)
Neerabup	4	0.26	10.56	7.22	✓	1	✓	0	(1)	7	0.032	0.054	0.042	✓	0	(1)
North Dandalup	5	<0.22	0.35	<0.22	✓	1	✓	0	(1)	2	0.009	0.060	0.035	✓	1	✓
Pinjarra	4	<0.22	<0.22	<0.22	✓	1	✓	1	✓	2	0.006	0.011	0.009	✓	1	✓
South Perth/Kewdale	3	<0.22	1.98	1.06	✓	1	✓	0	(1)	10	0.025	0.130	0.062	✓	1	✓
Tamworth Hill	5	<0.22	<0.22	<0.22	✓	2	✓	1	✓	22	<0.001	0.078	0.014	✓	0	(1)
Thomsons Lake	4	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	13	0.028	0.100	0.063	✓	1	✓
Two Rocks	4	3.96	7.92	5.54	✓	1	✓	0	(1)	6	0.009	0.019	0.011	✓	0	(1)
Wanneroo	5	<0.22	3.65	2.29	✓	1	✓	2	✓	11	0.072	0.150	0.109	✓	0	(1)
West Yokine	5	1.63	2.60	1.98	✓	1	✓	1	✓	12	0.098	0.160	0.135	✓	0	(1)
Whitfords	4	0.31	7.48	3.43	✓	1	✓	0	(1)	11	0.083	0.120	0.104	✓	0	(1)
Yanchep	5	4.09	4.84	4.40	✓	1	✓	0	(1)	11	0.001	0.050	0.008	✓	0	(1)

(1) No samples required in this 12 month period

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Table 3 **Aesthetic (Non-health related) Variables**

Perth Region	Alkalinity (as CaCO3)					Aluminium					Chloride					Hardness				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min Value	Max Value	Mean Value			Min	Max	Mean	
Armadale/Kelmscott	2	68.0	77.0	72.5	(1)	2	<0.008	0.018	0.009	✓	2	150.0	165.0	157.5	✓	2	76	88	82	✓
Bold Park	2	47.0	56.0	51.5	(1)	2	0.020	0.020	0.020	✓	2	46.0	105.0	75.5	✓	2	56	68	62	✓
Buckland Hill	5	64.0	78.0	73.6	(1)	5	0.016	0.025	0.021	✓	5	100.0	205.0	170.0	✓	5	66	73	70	✓
Dwellingup	4	10.0	14.0	11.5	(1)	4	0.008	0.012	0.010	✓	4	60.0	75.0	65.0	✓	4	30	35	32	✓
Foothills	2	87.0	110.0	98.5	(1)	2	0.014	0.018	0.016	✓	2	135.0	160.0	147.5	✓	2	96	98	97	✓
Greenmount	5	93.0	110.0	104.6	(1)	5	0.008	0.016	0.012	✓	5	130.0	170.0	151.0	✓	5	84	120	98	✓
Greenmount/Darlington	2	87.0	87.0	87.0	(1)	2	0.012	0.016	0.014	✓	2	115.0	165.0	140.0	✓	2	82	93	88	✓
Hamilton Hill	2	76.0	77.0	76.5	(1)	2	0.012	0.012	0.012	✓	2	160.0	160.0	160.0	✓	2	82	88	85	✓
Hills Direct	2	45.0	57.0	51.0	(1)	2	0.020	0.035	0.028	✓	2	80.0	90.0	85.0	✓	2	62	68	65	✓
Lexia	2	89.0	140.0	114.5	(1)	2	0.012	0.100	0.056	✓	2	90.0	110.0	100.0	✓	6	87	170	133	✓
Mandurah	15	45.0	60.0	52.7	(1)	15	0.020	0.055	0.032	✓	15	33.0	41.0	36.7	✓	15	45	59	55	✓
Melville	4	69.0	85.0	74.5	(1)	4	0.020	0.025	0.024	✓	4	145.0	190.0	165.0	✓	4	61	64	63	✓
Mirrabooka	4	52.0	110.0	66.8	(1)	4	0.018	0.030	0.023	✓	4	85.0	215.0	167.5	✓	4	90	140	123	✓
Mt. Eliza	2	71.0	85.0	78.0	(1)	2	0.020	0.025	0.023	✓	2	155.0	200.0	177.5	✓	2	70	72	71	✓
Mt. Hawthorn	5	110.0	150.0	120.0	(1)	5	0.008	0.012	0.010	✓	5	165.0	195.0	182.0	✓	5	87	120	100	✓
Mt. Yokine	5	100.0	150.0	122.0	(1)	5	0.008	0.014	0.011	✓	5	160.0	175.0	169.0	✓	5	95	130	113	✓
Mundaring	2	61.0	69.0	65.0	(1)	2	0.030	0.100	0.065	✓	2	135.0	160.0	147.5	✓	2	82	94	88	✓
Neerabup	4	65.0	180.0	143.8	(1)	4	0.008	0.014	0.011	✓	4	120.0	185.0	141.3	✓	4	91	200	163	✓
North Dandalup	5	24.0	53.0	45.4	(1)	5	0.016	0.045	0.029	✓	5	33.0	65.0	43.4	✓	5	41	64	54	✓
Pinjarra	4	42.0	58.0	52.3	(1)	4	0.020	0.055	0.034	✓	4	31.0	38.0	35.5	✓	4	44	62	55	✓
South Perth/Kewdale	3	50.0	97.0	81.3	(1)	3	0.010	0.025	0.017	✓	3	50.0	160.0	115.0	✓	3	57	110	85	✓
Tamworth Hill	5	52.0	58.0	55.2	(1)	5	0.025	0.035	0.032	✓	5	34.0	37.0	35.4	✓	5	55	63	58	✓
Thomsons Lake	4	74.0	89.0	82.5	(1)	4	0.010	0.012	0.011	✓	4	150.0	205.0	186.3	✓	4	83	99	94	✓
Two Rocks	4	190.0	200.0	197.5	(1)	4	<0.008	<0.008	<0.008	✓	4	100.0	105.0	102.5	✓	4	230	240	233	(2)
Wanneroo	5	60.0	110.0	89.6	(1)	5	0.010	0.020	0.014	✓	5	80.0	175.0	123.0	✓	5	67	130	102	✓
West Yokine	5	110.0	120.0	118.0	(1)	4	0.008	0.014	0.011	✓	5	155.0	175.0	165.0	✓	5	100	120	108	✓
Whitfords	4	62.0	140.0	96.0	(1)	4	<0.008	0.018	0.011	✓	4	105.0	130.0	115.0	✓	4	76	130	104	✓
Yanchep	5	200.0	220.0	210.0	(1)	4	<0.008	<0.008	<0.008	✓	5	100.0	110.0	106.0	✓	6	230	250	242	(2)

(1) No guideline value available as per ADWG 2011. (2) Elevated hardness is characteristic of the source supplying this locality

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Table 4 **Aesthetic (Non-health related) Variables**

Perth Region	Iron					Manganese					pH					Silicon				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (pH units)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min	Max	Mean			Min	Max	Mean			Min	Max	Mean			Min Value	Max Value	Mean Value	
Armadale/Kelmscott	2	0.015	0.020	0.018	✓	2	0.004	0.004	0.004	✓	3	7.39	7.92	7.60	✓	2	3.8	4.4	4.1	✓
Bold Park	2	0.025	0.030	0.028	✓	2	0.005	0.005	0.005	✓	2	7.69	7.73	7.71	✓	2	2.2	3.2	2.7	✓
Buckland Hill	5	0.010	0.060	0.028	✓	5	0.003	0.014	0.006	✓	5	7.80	8.14	7.98	✓	5	3.3	6.5	5.4	✓
Dwellingup	4	0.050	0.080	0.063	✓	4	<0.002	0.009	0.005	✓	4	6.75	7.36	6.98	✓	4	2.1	3.6	2.7	✓
Foothills	2	0.035	0.045	0.040	✓	2	0.006	0.006	0.006	✓	2	7.75	7.79	7.77	✓	2	12.0	15.0	13.5	✓
Greenmount	5	0.008	0.030	0.013	✓	5	<0.002	0.003	<0.002	✓	5	7.91	8.31	8.09	✓	5	9.4	17.0	13.3	✓
Greenmount/Darlington	2	0.025	0.025	0.025	✓	2	0.004	0.004	0.004	✓	2	8.04	8.07	8.06	✓	2	8.2	9.5	8.9	✓
Hamilton Hill	2	0.006	0.008	0.007	✓	2	0.004	0.004	0.004	✓	2	7.74	8.03	7.89	✓	2	4.3	4.7	4.5	✓
Hills Direct	2	0.010	0.120	0.065	✓	2	0.003	0.020	0.012	✓	3	7.55	7.71	7.63	✓	2	1.8	2.8	2.3	✓
Lexia	2	0.015	0.030	0.023	✓	2	0.002	0.009	0.006	✓	3	6.97	8.05	7.69	✓	2	16.0	21.0	18.5	✓
Mandurah	15	<0.003	0.180	0.019	✓	15	<0.002	0.020	<0.002	✓	15	7.75	8.64	8.13	✓	15	0.7	1.8	1.1	✓
Melville	4	0.030	0.045	0.036	✓	4	0.004	0.007	0.006	✓	4	7.78	8.14	7.99	✓	4	4.7	6.0	5.4	✓
Mirrabooka	4	0.025	0.050	0.036	✓	4	<0.002	0.003	<0.002	✓	4	6.90	7.83	7.18	✓	4	14.0	18.0	15.5	✓
Mt. Eliza	2	0.030	0.070	0.050	✓	2	0.005	0.007	0.006	✓	2	7.86	7.97	7.92	✓	2	5.1	6.4	5.8	✓
Mt. Hawthorn	5	0.025	0.060	0.039	✓	5	0.003	0.006	0.004	✓	5	7.53	8.01	7.77	✓	5	16.0	18.0	17.4	✓
Mt. Yokine	5	0.010	0.140	0.049	✓	5	<0.002	0.016	0.005	✓	5	7.54	7.85	7.74	✓	5	16.0	18.0	17.0	✓
Mundaring	2	<0.003	0.006	<0.003	✓	2	<0.002	<0.002	<0.002	✓	6	8.05	8.51	8.26	✓	2	5.7	5.7	5.7	✓
Neerabup	4	0.008	0.020	0.015	✓	4	<0.002	0.004	<0.002	✓	4	7.29	7.67	7.50	✓	4	17.0	21.0	19.8	✓
North Dandalup	5	0.010	0.030	0.018	✓	5	<0.002	<0.002	<0.002	✓	5	7.34	8.72	8.04	✓	5	1.2	3.3	1.8	✓
Pinjarra	4	0.004	0.010	0.006	✓	4	<0.002	<0.002	<0.002	✓	4	8.00	8.53	8.28	✓	4	0.9	1.5	1.2	✓
South Perth/Kewdale	3	0.015	0.020	0.018	✓	3	0.003	0.003	0.003	✓	3	7.40	7.79	7.59	✓	3	1.8	16.0	9.6	✓
Tamworth Hill	5	<0.003	0.008	0.005	✓	5	<0.002	<0.002	<0.002	✓	6	7.83	8.33	8.07	✓	5	0.8	1.4	1.2	✓
Thomsons Lake	4	<0.003	0.004	<0.003	✓	4	<0.002	0.006	0.004	✓	4	7.73	7.89	7.83	✓	4	3.3	6.0	5.0	✓
Two Rocks	4	<0.003	<0.003	<0.003	✓	4	<0.002	<0.002	<0.002	✓	4	7.37	7.72	7.52	✓	4	11.0	12.0	11.8	✓
Wanneroo	5	0.008	0.015	0.010	✓	5	0.002	0.004	0.003	✓	5	7.14	7.98	7.58	✓	5	17.0	18.0	17.8	✓
West Yokine	5	0.010	0.035	0.024	✓	5	<0.002	0.004	0.003	✓	5	7.81	7.95	7.88	✓	5	18.0	19.0	18.2	✓
Whitfords	4	0.008	0.020	0.015	✓	4	<0.002	0.006	0.003	✓	4	7.61	8.12	7.76	✓	4	17.0	20.0	17.8	✓
Yanchep	5	<0.003	<0.003	<0.003	✓	5	<0.002	<0.002	<0.002	✓	5	7.30	7.51	7.38	✓	5	15.0	15.0	15.0	✓

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Table 5 **Aesthetic (Non-health related) Variables**

Perth Region	Sodium					TDS					True Colour					Turbidity				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (TCU)			Guideline Met	Samples Taken	Value (NTU)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min	Max	Mean			Min	Max	Mean	
Armadale/Kelmscott	2	95.0	105.0	100.0	✓	2	381	428	405	✓	2	<1	<1	<1	✓	2	0.1	0.3	0.2	✓
Bold Park	2	27.0	60.0	43.5	✓	2	161	276	219	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Buckland Hill	5	63.0	130.0	109.6	✓	5	284	479	418	✓	5	<1	<1	<1	✓	5	<0.1	0.4	0.2	✓
Dwellingup	4	33.0	39.0	36.0	✓	4	139	163	148	✓	4	<1	2	2	✓	4	0.2	0.8	0.5	✓
Foothills	2	85.0	125.0	105.0	✓	2	407	503	455	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Greenmount	5	84.0	115.0	103.0	✓	5	397	513	463	✓	5	<1	<1	<1	✓	5	<0.1	0.2	<0.1	✓
Greenmount/Darlington	2	77.0	100.0	88.5	✓	2	357	445	401	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Hamilton Hill	2	95.0	97.0	96.0	✓	2	407	413	410	✓	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Hills Direct	2	51.0	51.0	51.0	✓	2	235	245	240	✓	2	<1	<1	<1	✓	2	0.4	0.7	0.6	✓
Lexia	2	53.0	71.0	62.0	✓	2	369	454	412	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Mandurah	15	20.0	25.0	22.7	✓	15	139	161	150	✓	15	<1	<1	<1	✓	15	<0.1	1.2	<0.1	✓
Melville	4	89.0	130.0	109.3	✓	4	364	470	411	✓	4	<1	<1	<1	✓	4	0.1	0.4	0.3	✓
Mirrabooka	4	61.0	115.0	97.5	✓	4	352	534	466	✓	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Mt. Eliza	2	100.0	140.0	120.0	✓	2	398	495	447	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Mt. Hawthorn	5	115.0	140.0	127.0	✓	5	512	582	544	✓	5	<1	<1	<1	✓	5	<0.1	0.3	0.2	✓
Mt. Yokine	5	110.0	145.0	127.0	✓	5	496	580	545	✓	5	<1	<1	<1	✓	5	<0.1	0.3	<0.1	✓
Mundaring	2	82.0	100.0	91.0	✓	2	360	418	389	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Neerabup	4	69.0	115.0	82.5	✓	4	470	539	512	✓	4	<1	<1	<1	✓	4	0.1	0.4	0.3	✓
North Dandalup	5	22.0	35.0	26.4	✓	5	141	161	153	✓	5	<1	<1	<1	✓	5	<0.1	0.2	<0.1	✓
Pinjarra	4	21.0	24.0	22.5	✓	4	129	160	147	✓	4	<1	<1	<1	✓	4	<0.1	<0.1	<0.1	✓
South Perth/Kewdale	3	28.0	110.0	77.7	✓	3	168	484	356	✓	3	<1	<1	<1	✓	3	<0.1	0.2	<0.1	✓
Tamworth Hill	5	19.0	23.0	21.4	✓	5	144	158	151	✓	5	<1	<1	<1	✓	5	<0.1	0.2	<0.1	✓
Thomsons Lake	4	90.0	130.0	118.8	✓	4	386	520	473	✓	4	<1	<1	<1	✓	4	<0.1	<0.1	<0.1	✓
Two Rocks	4	55.0	59.0	56.8	✓	4	504	535	523	✓	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Wanneroo	5	58.0	115.0	78.4	✓	5	298	516	398	✓	5	<1	<1	<1	✓	5	<0.1	0.2	<0.1	✓
West Yokine	5	110.0	130.0	123.0	✓	5	502	536	528	✓	5	<1	<1	<1	✓	5	<0.1	0.2	<0.1	✓
Whitfords	4	65.0	80.0	74.0	✓	4	360	440	393	✓	4	<1	<1	<1	✓	4	0.1	0.2	0.1	✓
Yanchep	5	51.0	54.0	53.0	✓	5	519	549	535	✓	5	<1	<1	<1	✓	5	<0.1	0.2	<0.1	✓

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Table 6 Health related variables

Mid West	E. coli				Thermophilic Naegleria			Fluoride					Hydrocarbons		Metals	
Locality	Samples Taken	Samples >0 cfu/100mL	Max cfu/100mL	Requirement Met	Samples Taken	Samples with Thermophilic Naegleria	Requirement Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met
									Min	Max	Mean					
Badgingarra	13	0	0	✓	9	0	✓	3	<0.1	<0.1	<0.1	✓	0	(1)	3	✓
Bindoon /Chittering	52	0	0	✓	27	0	✓	2	0.35	0.35	0.35	✓	0	(1)	2	✓
Bolgart	13	0	0	✓	9	0	✓	2	0.15	0.20	0.18	✓	0	(1)	2	✓
Calingiri	13	0	0	✓	9	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Carnamah	13	0	0	✓	13	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Carnarvon	64	0	0	✓	38	0	✓	2	0.35	0.50	0.43	✓	0	(1)	2	✓
Cervantes	52	0	0	✓	10	0	✓	2	0.15	0.15	0.15	✓	0	(1)	2	✓
Coomberdale	13	0	0	✓	8	0	✓	2	0.75	0.80	0.78	✓	0	(1)	2	✓
Coorow	13	0	0	✓	13	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Coral Bay	12	0	0	✓	12	0	✓	2	<0.1	<0.1	<0.1	✓	1	✓	2	✓
Cue	13	0	0	✓	13	0	✓	2	0.30	0.30	0.30	✓	0	(1)	2	✓
Dandaragan	13	0	0	✓	9	0	✓	2	0.25	0.25	0.25	✓	0	(1)	2	✓
Denham	50	0	0	✓	23	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Dongara/Denison	52	0	0	✓	25	0	✓	53	0.35	0.95	0.75	✓	0	(1)	2	✓
Eneabba	13	0	0	✓	13	0	✓	2	0.15	0.15	0.15	✓	0	(1)	6	✓
Exmouth	66	0	0	✓	38	0	✓	55	0.20	0.75	0.63	✓	0	(1)	1	✓
Gascoyne Junction	26	0	0	✓	26	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Geraldton	168	0	0	✓	168	0	✓	56	0.70	0.90	0.79	✓	1	✓	4	✓
Gingin	52	0	0	✓	17	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Greenhead	52	0	0	✓	12	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	1	✓
Guilderton	52	0	0	✓	17	0	✓	2	0.20	0.25	0.23	✓	0	(1)	2	✓
Horrocks	13	0	0	✓	13	0	✓	2	0.35	0.35	0.35	✓	0	(1)	2	✓
Jurien Bay	52	0	0	✓	10	0	✓	2	0.25	0.30	0.28	✓	0	(1)	2	✓
Kalbarri	52	0	0	✓	25	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Lancelin	52	0	0	✓	17	0	✓	2	0.20	0.20	0.20	✓	0	(1)	2	✓
Latham	52	0	0	✓	13	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Ledge Point	52	0	0	✓	9	0	✓	2	0.15	0.15	0.15	✓	0	(1)	2	✓
Leeman	52	0	0	✓	13	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	6	✓
Meekatharra	51	0	0	✓	13	0	✓	2	0.55	0.60	0.58	✓	0	(1)	16	✓
Mingenew	13	0	0	✓	13	0	✓	2	0.15	0.20	0.18	✓	0	(1)	2	✓
Moora	52	0	0	✓	15	0	✓	54	0.15	0.85	0.74	✓	0	(1)	2	✓
Morawa	52	0	0	✓	13	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Mt Magnet	52	0	0	✓	13	0	✓	2	0.30	0.30	0.30	✓	0	(1)	2	✓
Mullewa	13	0	0	✓	13	0	✓	2	0.70	0.80	0.75	✓	0	(1)	2	✓
Nabawa	18	0	0	✓	12	0	✓	2	0.70	0.80	0.75	✓	0	(1)	1	✓
New Norcia	13	0	0	✓	9	0	✓	2	0.15	0.20	0.18	✓	0	(1)	2	✓
Nilgern (Ocean Farms)	13	0	0	✓	9	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Northampton	52	0	0	✓	13	0	✓	2	0.70	0.80	0.75	✓	0	(1)	2	✓
Perenjori	13	0	0	✓	13	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Piawaning	26	0	0	✓	8	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Port Kalbarri	13	0	0	✓	13	0	✓	2	0.10	0.15	0.13	✓	0	(1)	2	✓
Sandstone	12	0	0	✓	12	0	✓	2	0.40	0.50	0.45	✓	0	(1)	7	✓
Seabird	19	0	0	✓	9	0	✓	2	0.25	0.35	0.30	✓	0	(1)	2	✓
Seaview Park	13	0	0	✓	9	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Sovereign Hills	26	0	0	✓	17	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	6	✓
Three Springs	13	0	0	✓	13	0	✓	3	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Watheroo	13	0	0	✓	9	0	✓	2	<0.1	0.10	<0.1	✓	0	(1)	2	✓
Woodridge	13	0	0	✓	9	0	✓	2	0.25	0.25	0.25	✓	0	(1)	2	✓
Yalgoo	13	0	0	✓	13	0	✓	2	0.15	0.15	0.15	✓	0	(1)	2	✓
Yerecoin	13	0	0	✓	9	0	✓	2	<0.1	0.15	<0.1	✓	0	(1)	2	✓
Yuna	13	0	0	✓	13	0	✓	2	0.75	0.80	0.78	✓	0	(1)	2	✓

(1) No samples required in this 12 month period. (2) Schemes for Dongara/Denison, Exmouth & Moora not meeting the dosing range of 0.7-1.0mg/L

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Table 7 **Health related variables**

Mid West	Nitrate					Pesticides		Radiological		Trihalomethanes					Other Health Related	
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Requirement Met
		Min	Max	Mean							Min	Max	Mean			
Badgingarra	2	0.70	0.84	0.79	✓	1	✓	0	(1)	1	<0.001	<0.001	<0.001	✓	0	(1)
Bindoon /Chittering	2	<0.22	<0.22	<0.22	✓	1	✓	1	✓	2	0.006	0.006	0.006	✓	0	(1)
Bolgart	2	27.72	35.64	31.68	✓	1	✓	1	✓	2	0.003	0.006	0.005	✓	0	(1)
Calingiri	4	13.20	24.20	18.48	✓	1	✓	0	(1)	2	0.012	0.014	0.013	✓	0	(1)
Carnamah	2	0.66	0.84	0.75	✓	1	✓	0	(1)	2	0.008	0.009	0.009	✓	0	(1)
Carnarvon	2	3.34	3.56	3.48	✓	1	✓	1	✓	2	0.003	0.004	0.004	✓	0	(1)
Cervantes	4	14.96	16.72	15.84	✓	1	✓	0	(1)	2	0.010	0.014	0.012	✓	0	(1)
Coomberdale	2	<0.22	0.40	<0.22	✓	1	✓	0	(1)	2	0.025	0.041	0.033	✓	0	(1)
Coorow	2	0.75	0.79	0.79	✓	1	✓	0	(1)	2	0.009	0.011	0.010	✓	0	(1)
Coral Bay	1	0.40	0.40	0.40	✓	1	✓	1	✓	2	<0.001	<0.001	<0.001	✓	0	(1)
Cue	5	41.80	55.44	50.69	(2)	1	✓	0	(1)	2	0.003	0.007	0.005	✓	0	(1)
Dandaragan	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.005	0.005	0.005	✓	0	(1)
Denham	2	<0.22	0.40	<0.22	✓	1	✓	0	(1)	2	0.004	0.005	0.005	✓	0	(1)
Dongara/Denison	4	2.90	3.92	3.26	✓	1	✓	1	✓	2	0.009	0.011	0.010	✓	0	(1)
Eneabba	4	<0.22	<0.22	<0.22	✓	1	✓	1	✓	2	0.006	0.007	0.007	✓	0	(1)
Exmouth	2	7.48	7.92	7.70	✓	1	✓	2	✓	2	0.002	0.003	0.003	✓	0	(1)
Gascoyne Junction	2	<0.22	0.26	<0.22	✓	1	✓	2	✓	2	0.011	0.017	0.014	✓	0	(1)
Geraldton	4	2.90	3.43	3.08	✓	2	✓	2	✓	4	0.005	0.016	0.010	✓	0	(1)
Gingin	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.003	0.006	0.005	✓	0	(1)
Greenhead	2	3.92	4.09	4.00	✓	1	✓	1	✓	2	0.002	0.003	0.003	✓	0	(1)
Guilderton	6	34.32	38.28	35.95	✓	1	✓	0	(1)	2	0.019	0.020	0.020	✓	0	(1)
Horrocks	4	<0.22	0.31	<0.22	✓	1	✓	0	(1)	2	0.016	0.018	0.017	✓	0	(1)
Jurien Bay	5	12.76	14.96	14.26	✓	1	✓	0	(1)	2	0.007	0.009	0.008	✓	0	(1)
Kalbarri	2	3.04	3.17	3.12	✓	1	✓	0	(1)	2	<0.001	0.002	<0.001	✓	0	(1)
Lancelin	2	4.18	6.16	5.19	✓	1	✓	0	(1)	2	0.008	0.009	0.009	✓	0	(1)
Latham	2	0.75	0.75	0.75	✓	1	✓	1	✓	2	0.046	0.049	0.048	✓	0	(1)
Ledge Point	4	20.68	21.56	20.90	✓	1	✓	1	✓	2	0.006	0.019	0.013	✓	0	(1)
Leeman	2	3.78	3.96	3.87	✓	1	✓	0	(1)	2	0.002	0.004	0.003	✓	0	(1)
Meekatharra	5	54.56	67.32	60.72	(2)	1	✓	1	✓	2	0.004	0.005	0.005	✓	0	(1)
Mingenew	2	4.36	5.28	4.84	✓	1	✓	0	(1)	2	0.003	0.005	0.004	✓	0	(1)
Moora	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.011	0.012	0.012	✓	0	(1)
Morawa	2	<0.22	0.84	0.44	✓	1	✓	2	✓	2	0.003	0.014	0.009	✓	0	(1)
Mt Magnet	7	59.40	79.64	65.74	(2)	1	✓	1	✓	2	0.004	0.006	0.005	✓	0	(1)
Mullewa	2	2.86	3.39	3.12	✓	1	✓	0	(1)	2	0.022	0.034	0.028	✓	0	(1)
Nabawa	2	3.39	3.56	3.48	✓	1	✓	0	(1)	2	0.013	0.015	0.014	✓	0	(1)
New Norcia	12	41.80	52.80	48.31	(2)	1	✓	1	✓	2	0.008	0.010	0.009	✓	0	(1)
Nilgern (Ocean Farms)	2	24.20	25.52	24.86	✓	1	✓	0	(1)	2	0.001	0.006	0.004	✓	0	(1)
Northampton	2	2.38	3.30	2.86	✓	1	✓	0	(1)	2	0.023	0.029	0.026	✓	0	(1)
Perenjori	2	0.66	0.79	0.75	✓	1	✓	0	(1)	2	0.003	0.012	0.008	✓	0	(1)
Piawaning	2	9.68	11.44	10.56	✓	1	✓	0	(1)	2	0.081	0.091	0.086	✓	0	(1)
Port Kalbarri	2	0.40	0.53	0.44	✓	1	✓	0	(1)	2	0.003	0.005	0.004	✓	0	(1)
Sandstone	7	48.84	58.08	54.30	(2)	1	✓	2	✓	2	<0.001	0.002	<0.001	✓	0	(1)
Seabird	2	0.22	0.31	0.26	✓	1	✓	0	(1)	2	0.033	0.050	0.042	✓	0	(1)
Seaview Park	5	19.80	25.08	23.14	✓	1	✓	0	(1)	2	0.001	0.003	0.002	✓	0	(1)
Sovereign Hills	6	3.56	5.72	4.93	✓	1	✓	1	✓	2	0.025	0.026	0.026	✓	0	(1)
Three Springs	2	1.63	1.80	1.72	✓	1	✓	0	(1)	2	0.005	0.006	0.006	✓	0	(1)
Watheroo	5	<0.22	0.57	0.35	✓	1	✓	2	✓	4	0.067	0.140	0.114	✓	0	(1)
Woodridge	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.092	0.097	0.095	✓	0	(1)
Yalgoo	2	32.56	34.32	33.44	✓	1	✓	0	(1)	2	0.014	0.016	0.015	✓	0	(1)
Yerecoin	2	9.68	12.76	11.22	✓	4	✓	1	✓	2	0.064	0.094	0.079	✓	0	(1)
Yuna	2	2.77	3.12	2.95	✓	1	✓	0	(1)	2	0.018	0.024	0.021	✓	0	(1)

(1) No samples required in this 12 month period. (2) Cue, Meekatharra, Mount Magnet, New Norcia and Sandstone have been granted an exemption from compliance with the child health nitrate guideline by the Department of Health. Carers of infants younger than 3 months should seek advice from the Community Health Nurse regarding the use of alternative water sources for the preparation of bottle feeds. The Water Corporation provides bottled water free of charge for this purpose. Note: The water supplied has always met the guideline for adults and children over the age of 3 months - for a full list of towns with nitrate exemptions and how we are improving water quality in these towns - please refer to *'Understanding water quality test results - Nitrate'* section of the annual report.

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Table 8 **Aesthetic (Non-health related) Variables**

Mid West	Alkalinity (as CaCO3)					Aluminium					Chloride					Hardness				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min Value	Max Value	Mean Value			Min	Max	Mean	
Badgingarra	2	27.0	52.0	39.5	(1)	2	<0.008	<0.008	<0.008	✓	2	215.0	220.0	217.5	✓	2	42	44	43	✓
Bindoon /Chittering	2	89.0	93.0	91.0	(1)	2	<0.008	<0.008	<0.008	✓	2	160.0	160.0	160.0	✓	2	51	53	52	✓
Bolgart	2	32.0	38.0	35.0	(1)	2	0.008	0.030	0.019	✓	2	270.0	285.0	277.5	(2)	2	130	150	140	✓
Calingiri	4	16.0	39.0	29.8	(1)	4	<0.008	<0.008	<0.008	✓	4	295.0	560.0	441.3	(2)	4	110	230	175	✓
Carnamah	2	10.0	11.0	10.5	(1)	2	<0.008	0.008	<0.008	✓	2	420.0	420.0	420.0	(2)	2	130	130	130	✓
Carnarvon	2	91.0	100.0	95.5	(1)	2	<0.008	<0.008	<0.008	✓	2	165.0	210.0	187.5	✓	2	170	230	200	✓
Cervantes	4	220.0	240.0	230.0	(1)	4	<0.008	<0.008	<0.008	✓	4	275.0	305.0	288.8	(2)	4	310	350	330	(3)
Coomberdale	2	16.0	38.0	27.0	(1)	2	0.012	0.020	0.016	✓	2	250.0	250.0	250.0	✓	2	74	81	78	✓
Coorow	2	11.0	20.0	15.5	(1)	2	<0.008	<0.008	<0.008	✓	2	405.0	415.0	410.0	(2)	2	120	150	135	✓
Coral Bay	1	82.0	82.0	82.0	(1)	1	<0.008	<0.008	<0.008	✓	1	55.0	55.0	55.0	✓	1	93	93	93	✓
Cue	2	65.0	67.0	66.0	(1)	2	<0.008	<0.008	<0.008	✓	2	280.0	290.0	285.0	(2)	2	190	190	190	✓
Dandaragan	2	110.0	110.0	110.0	(1)	2	<0.008	<0.008	<0.008	✓	2	245.0	245.0	245.0	✓	2	93	100	97	✓
Denham	2	22.0	23.0	22.5	(1)	2	<0.008	<0.008	<0.008	✓	2	165.0	175.0	170.0	✓	2	69	71	70	✓
Dongara/Denison	4	62.0	140.0	83.0	(1)	4	<0.008	<0.008	<0.008	✓	4	355.0	400.0	381.3	(2)	4	110	120	118	✓
Eneabba	4	15.0	21.0	17.0	(1)	4	<0.008	<0.008	<0.008	✓	4	310.0	335.0	325.0	(2)	4	100	100	100	✓
Exmouth	2	250.0	250.0	250.0	(1)	2	<0.008	<0.008	<0.008	✓	2	250.0	260.0	255.0	(2)	2	340	350	345	(3)
Gascoyne Junction	2	23.0	24.0	23.5	(1)	2	<0.008	<0.008	<0.008	✓	2	90.0	135.0	112.5	✓	2	47	74	61	✓
Geraldton	4	56.0	63.0	60.5	(1)	4	<0.008	<0.008	<0.008	✓	4	370.0	400.0	385.0	(2)	4	120	120	120	✓
Gingin	2	29.0	35.0	32.0	(1)	2	<0.008	0.010	<0.008	✓	2	100.0	110.0	105.0	✓	2	27	30	29	✓
Greenhead	2	25.0	25.0	25.0	(1)	2	<0.008	0.010	<0.008	✓	2	290.0	295.0	292.5	(2)	2	110	110	110	✓
Guilderton	2	190.0	200.0	195.0	(1)	2	<0.008	<0.008	<0.008	✓	2	315.0	335.0	325.0	(2)	2	310	330	320	(3)
Horrocks	4	120.0	130.0	125.0	(1)	4	<0.008	<0.008	<0.008	✓	4	570.0	610.0	593.8	(2)	4	140	140	140	✓
Jurien Bay	5	240.0	270.0	250.0	(1)	5	<0.008	<0.008	<0.008	✓	5	210.0	560.0	322.0	(2)	5	310	430	344	(3)
Kalbarri	2	8.0	9.0	8.5	(1)	2	<0.008	<0.008	<0.008	✓	2	190.0	195.0	192.5	✓	2	65	65	65	✓
Lancelin	2	200.0	210.0	205.0	(1)	2	<0.008	<0.008	<0.008	✓	2	185.0	215.0	200.0	✓	2	270	270	270	(3)
Latham	2	42.0	42.0	42.0	(1)	2	<0.008	<0.008	<0.008	✓	2	290.0	325.0	307.5	(2)	2	91	110	101	✓
Ledge Point	4	200.0	220.0	210.0	(1)	4	<0.008	<0.008	<0.008	✓	4	155.0	170.0	165.0	✓	4	250	270	260	(3)
Leeman	2	24.0	26.0	25.0	(1)	2	<0.008	<0.008	<0.008	✓	2	280.0	300.0	290.0	(2)	2	100	110	105	✓
Meekatharra	5	160.0	170.0	164.0	(1)	5	<0.008	<0.008	<0.008	✓	5	305.0	325.0	314.0	(2)	5	280	310	292	(3)
Mingenew	2	22.0	29.0	25.5	(1)	2	<0.008	<0.008	<0.008	✓	2	300.0	335.0	317.5	(2)	2	68	79	74	✓
Moora	2	12.0	25.0	18.5	(1)	2	<0.008	<0.008	<0.008	✓	2	245.0	255.0	250.0	✓	2	65	66	66	✓
Morawa	2	21.0	22.0	21.5	(1)	2	<0.008	0.008	<0.008	✓	2	300.0	320.0	310.0	(2)	2	77	81	79	✓
Mt Magnet	2	180.0	180.0	180.0	(1)	2	<0.008	<0.008	<0.008	✓	2	265.0	280.0	272.5	(2)	2	280	280	280	(3)
Mullewa	2	74.0	77.0	75.5	(1)	2	0.008	0.010	0.009	✓	2	380.0	385.0	382.5	(2)	2	120	130	125	✓
Nabawa	2	60.0	64.0	62.0	(1)	2	0.012	0.016	0.014	✓	2	365.0	365.0	365.0	(2)	2	120	120	120	✓
New Norcia	7	28.0	32.0	29.6	(1)	2	<0.008	0.010	<0.008	✓	7	520.0	655.0	573.6	(2)	7	220	250	234	(3)
Nilgern (Ocean Farms)	2	220.0	230.0	225.0	(1)	2	<0.008	0.012	<0.008	✓	2	135.0	135.0	135.0	✓	2	250	260	255	(3)
Northampton	2	69.0	71.0	70.0	(1)	2	<0.008	0.010	<0.008	✓	2	385.0	390.0	387.5	(2)	2	120	120	120	✓
Perenjori	2	26.0	28.0	27.0	(1)	2	<0.008	0.008	<0.008	✓	2	310.0	320.0	315.0	(2)	2	84	84	84	✓
Piawaning	2	39.0	43.0	41.0	(1)	2	<0.008	<0.008	<0.008	✓	2	155.0	165.0	160.0	✓	2	120	120	120	✓
Port Kalbarri	2	69.0	74.0	71.5	(1)	2	<0.008	<0.008	<0.008	✓	2	325.0	335.0	330.0	(2)	2	120	120	120	✓
Sandstone	2	98.0	100.0	99.0	(1)	2	<0.008	0.008	<0.008	✓	2	305.0	325.0	315.0	(2)	2	320	340	330	(3)
Seabird	2	84.0	86.0	85.0	(1)	2	<0.008	<0.008	<0.008	✓	2	215.0	215.0	215.0	✓	2	100	100	100	✓
Seaview Park	5	170.0	180.0	176.0	(1)	5	<0.008	<0.008	<0.008	✓	5	90.0	90.0	90.0	✓	5	190	210	196	✓
Sovereign Hills	2	150.0	200.0	175.0	(1)	2	<0.008	<0.008	<0.008	✓	2	180.0	250.0	215.0	✓	2	240	250	245	(3)
Three Springs	2	22.0	24.0	23.0	(1)	2	<0.008	<0.008	<0.008	✓	2	350.0	370.0	360.0	(2)	2	89	91	90	✓
Watheroo	5	190.0	200.0	192.0	(1)	5	<0.008	<0.008	<0.008	✓	5	180.0	210.0	192.0	✓	5	250	270	260	(3)
Woodridge	2	50.0	57.0	53.5	(1)	2	0.050	0.065	0.058	✓	2	180.0	190.0	185.0	✓	2	50	50	50	✓
Yalgoo	2	96.0	100.0	98.0	(1)	2	<0.008	<0.008	<0.008	✓	2	115.0	125.0	120.0	✓	2	86	88	87	✓
Yerecoin	2	41.0	49.0	45.0	(1)	2	<0.008	<0.008	<0.008	✓	2	155.0	185.0	170.0	✓	2	110	130	120	✓
Yuna	2	62.0	66.0	64.0	(1)	2	0.018	0.025	0.022	✓	2	385.0	395.0	390.0	(2)	2	120	120	120	✓

(1) No guideline value available as per ADWG 2011. (2) Elevated chloride is characteristic of the source supplying this locality. (3) Elevated hardness is characteristic of the source supplying this locality.

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Table 9 **Aesthetic (Non-health related) Variables**

Mid West	Iron					Manganese					pH					Silicon				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (pH units)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min	Max	Mean			Min	Max	Mean			Min	Max	Mean			Min Value	Max Value	Mean Value	
Badgingarra	2	0.006	0.010	0.008	✓	2	0.002	0.004	0.003	✓	2	6.10	6.59	6.35	(1)	2	42.0	42.0	42.0	✓
Bindoon /Chittering	2	0.025	0.025	0.025	✓	2	<0.002	<0.002	<0.002	✓	2	7.13	7.20	7.17	✓	2	36.0	37.0	36.5	✓
Bolgart	2	0.015	0.025	0.020	✓	2	<0.002	<0.002	<0.002	✓	2	6.97	7.27	7.12	✓	2	18.0	41.0	29.5	✓
Calingiri	4	0.020	0.070	0.043	✓	4	<0.002	<0.002	<0.002	✓	4	6.63	6.95	6.73	✓	4	15.0	18.0	16.5	✓
Carnamah	2	0.015	0.025	0.020	✓	2	<0.002	<0.002	<0.002	✓	2	6.77	6.78	6.78	✓	2	24.0	26.0	25.0	✓
Carnarvon	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.46	7.71	7.59	✓	2	36.0	46.0	41.0	✓
Cervantes	4	<0.003	<0.003	<0.003	✓	4	<0.002	<0.002	<0.002	✓	4	7.52	7.82	7.64	✓	4	13.0	14.0	13.3	✓
Coomberdale	2	0.070	0.120	0.095	✓	2	<0.002	0.003	<0.002	✓	2	8.10	8.47	8.29	✓	2	21.0	24.0	22.5	✓
Coorow	2	0.020	0.030	0.025	✓	2	<0.002	<0.002	<0.002	✓	2	6.37	7.02	6.70	✓	2	25.0	28.0	26.5	✓
Coral Bay	1	0.010	0.010	0.010	✓	1	0.002	0.002	0.002	✓	1	7.50	7.50	7.50	✓	1	0.5	0.5	0.5	✓
Cue	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.67	7.75	7.71	✓	2	80.0	85.0	82.5	(2)
Dandaragan	2	0.045	0.050	0.048	✓	2	<0.002	<0.002	<0.002	✓	2	7.03	7.11	7.07	✓	2	41.0	42.0	41.5	✓
Denham	2	0.045	0.090	0.068	✓	2	<0.002	<0.002	<0.002	✓	2	7.30	7.49	7.40	✓	2	2.0	2.5	2.3	✓
Dongara/Denison	4	0.006	0.025	0.012	✓	4	<0.002	<0.002	<0.002	✓	4	7.15	7.28	7.21	✓	4	20.0	22.0	20.8	✓
Eneabba	4	0.015	0.030	0.020	✓	4	<0.002	0.003	<0.002	✓	4	6.98	7.51	7.22	✓	4	44.0	46.0	44.8	✓
Exmouth	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.57	7.68	7.63	✓	2	15.0	16.0	15.5	✓
Gascoyne Junction	2	<0.003	0.004	<0.003	✓	2	<0.002	0.003	<0.002	✓	2	7.05	7.38	7.22	✓	2	4.6	5.0	4.8	✓
Geraldton	4	0.008	0.025	0.016	✓	4	<0.002	<0.002	<0.002	✓	4	6.82	7.17	7.08	✓	4	21.0	23.0	22.0	✓
Gingin	2	0.045	0.050	0.048	✓	2	<0.002	<0.002	<0.002	✓	2	7.51	7.59	7.55	✓	2	30.0	31.0	30.5	✓
Greenhead	2	0.015	0.060	0.038	✓	2	<0.002	<0.002	<0.002	✓	2	6.86	7.55	7.21	✓	2	23.0	24.0	23.5	✓
Guilderton	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.85	7.96	7.91	✓	2	9.0	9.2	9.1	✓
Horrocks	4	0.030	0.060	0.043	✓	4	0.004	0.020	0.009	✓	4	7.27	7.45	7.37	✓	4	14.0	16.0	15.3	✓
Jurien Bay	5	<0.003	0.004	<0.003	✓	5	<0.002	<0.002	<0.002	✓	5	7.32	7.72	7.49	✓	5	14.0	15.0	14.8	✓
Kalbarri	2	0.006	0.015	0.011	✓	2	<0.002	<0.002	<0.002	✓	2	6.51	6.97	6.74	✓	2	43.0	45.0	44.0	✓
Lancelin	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.51	7.73	7.62	✓	2	15.0	15.0	15.0	✓
Latham	2	0.040	0.045	0.043	✓	2	<0.002	<0.002	<0.002	✓	2	8.93	9.14	9.04	(1)	2	44.0	47.0	45.5	✓
Ledge Point	4	<0.003	0.004	<0.003	✓	4	<0.002	<0.002	<0.002	✓	4	7.50	7.95	7.78	✓	4	14.0	15.0	14.8	✓
Leeman	2	0.015	0.030	0.023	✓	2	<0.002	<0.002	<0.002	✓	2	7.46	7.76	7.61	✓	2	23.0	25.0	24.0	✓
Meekatharra	5	<0.003	<0.003	<0.003	✓	5	<0.002	<0.002	<0.002	✓	5	7.97	8.18	8.08	✓	5	75.0	80.0	78.0	✓
Mingenew	2	0.035	0.035	0.035	✓	2	0.002	0.002	0.002	✓	2	6.76	7.47	7.12	✓	2	55.0	55.0	55.0	✓
Moora	2	0.050	0.070	0.060	✓	2	<0.002	<0.002	<0.002	✓	2	6.94	7.05	7.00	✓	2	22.0	24.0	23.0	✓
Morawa	2	0.020	0.050	0.035	✓	2	<0.002	0.004	<0.002	✓	2	6.80	6.89	6.85	✓	2	47.0	47.0	47.0	✓
Mt Magnet	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.96	8.02	7.99	✓	2	80.0	80.0	80.0	✓
Mullewa	2	0.025	0.070	0.048	✓	2	<0.002	<0.002	<0.002	✓	2	8.09	8.27	8.18	✓	2	22.0	23.0	22.5	✓
Nabawa	2	0.025	0.040	0.033	✓	2	<0.002	0.003	<0.002	✓	2	7.72	7.82	7.77	✓	2	21.0	22.0	21.5	✓
New Norcia	7	0.020	0.040	0.027	✓	7	<0.002	<0.002	<0.002	✓	7	6.37	6.90	6.58	✓	7	45.0	48.0	46.4	✓
Nilgern (Ocean Farms)	2	<0.003	0.920	0.460	✓	2	<0.002	0.018	0.009	✓	2	7.38	7.48	7.43	✓	2	20.0	20.0	20.0	✓
Northampton	2	0.010	0.020	0.015	✓	2	<0.002	0.002	<0.002	✓	2	8.14	8.29	8.22	✓	2	22.0	23.0	22.5	✓
Perenjori	2	0.010	0.040	0.025	✓	2	<0.002	<0.002	<0.002	✓	2	7.33	7.50	7.42	✓	2	46.0	48.0	47.0	✓
Piawaning	2	0.004	0.006	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	7.05	7.16	7.11	✓	2	16.0	17.0	16.5	✓
Port Kalbarri	2	0.008	0.030	0.019	✓	2	<0.002	0.010	0.005	✓	7	7.22	7.64	7.42	✓	2	44.0	44.0	44.0	✓
Sandstone	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.48	7.64	7.56	✓	2	37.0	38.0	37.5	✓
Seabird	2	0.015	0.030	0.023	✓	2	<0.002	<0.002	<0.002	✓	2	7.75	7.98	7.87	✓	2	17.0	17.0	17.0	✓
Seaview Park	5	<0.003	<0.003	<0.003	✓	5	<0.002	<0.002	<0.002	✓	5	7.71	7.96	7.86	✓	5	17.0	18.0	17.2	✓
Sovereign Hills	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.73	7.80	7.77	✓	2	18.0	19.0	18.5	✓
Three Springs	2	0.035	0.045	0.040	✓	2	0.005	0.007	0.006	✓	2	7.32	7.56	7.44	✓	2	47.0	50.0	48.5	✓
Watheroo	5	0.010	0.040	0.017	✓	5	<0.002	0.004	<0.002	✓	5	7.26	7.53	7.44	✓	5	13.0	14.0	13.4	✓
Woodridge	2	0.015	0.025	0.020	✓	2	0.004	0.005	0.005	✓	2	7.23	7.27	7.25	✓	2	25.0	25.0	25.0	✓
Yalgoo	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.61	7.69	7.65	✓	2	85.0	85.0	85.0	(2)
Yerecoin	2	0.010	0.015	0.013	✓	2	<0.002	<0.002	<0.002	✓	2	7.14	7.16	7.15	✓	2	14.0	17.0	15.5	✓
Yuna	2	0.050	0.080	0.065	✓	2	0.003	0.003	0.003	✓	2	7.57	7.82	7.70	✓	2	21.0	22.0	21.5	✓

(1) Badgingarra - Low pH was a result of problematic pH adjustment with water temporarily supplied without pH adjustment; Latham - High pH due to long mains supplying this locality. (2) Elevated silica is characteristic of the souce supplying this locality.

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Table 10 **Aesthetic (Non-health related) Variables**

Mid West	Sodium					TDS					True Colour					Turbidity				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (TCU)			Guideline Met	Samples Taken	Value (NTU)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min	Max	Mean			Min	Max	Mean	
Badgingarra	2	130.0	145.0	137.5	✓	2	466	520	493	✓	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Bindoon /Chittering	2	115.0	115.0	115.0	✓	2	465	469	467	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Bolgart	2	150.0	155.0	152.5	✓	2	583	628	606	(2)	2	<1	<1	<1	✓	2	0.4	0.9	0.7	✓
Calingiri	4	170.0	300.0	246.3	(1)	4	583	1042	850	(2)	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Carnamah	2	240.0	240.0	240.0	(1)	2	792	799	796	(2)	2	<1	<1	<1	✓	2	<0.1	0.3	0.2	✓
Carnarvon	2	89.0	105.0	97.0	✓	2	525	647	586	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Cervantes	4	145.0	170.0	161.3	✓	4	881	947	920	(2)	4	<1	<1	<1	✓	4	<0.1	0.1	<0.1	✓
Coomberdale	2	135.0	145.0	140.0	✓	2	504	518	511	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Coorow	2	225.0	230.0	227.5	(1)	2	782	789	786	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Coral Bay	1	39.0	39.0	39.0	✓	1	243	243	243	✓	1	<1	<1	<1	✓	1	<0.1	<0.1	<0.1	✓
Cue	2	170.0	180.0	175.0	✓	2	816	829	823	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Dandaragan	2	165.0	165.0	165.0	✓	2	648	660	654	(2)	2	<1	<1	<1	✓	2	0.1	0.3	0.2	✓
Denham	2	98.0	110.0	104.0	✓	2	366	382	374	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Dongara/Denison	4	225.0	250.0	243.8	(1)	4	772	937	846	(2)	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Eneabba	4	175.0	185.0	178.8	✓	4	611	650	634	(2)	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Exmouth	2	135.0	135.0	135.0	✓	2	873	877	875	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Gascoyne Junction	2	53.0	69.0	61.0	✓	2	217	300	259	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Geraldton	4	235.0	255.0	242.5	(1)	4	792	859	823	(2)	4	<1	<1	<1	✓	4	<0.1	0.2	0.2	✓
Gingin	2	60.0	64.0	62.0	✓	2	264	265	265	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Greenhead	2	155.0	160.0	157.5	✓	2	574	586	580	✓	2	<1	<1	<1	✓	2	<0.1	0.3	0.2	✓
Guilderton	2	175.0	185.0	180.0	✓	2	933	961	947	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Horrocks	4	415.0	420.0	416.3	(1)	4	1302	1352	1328	(2)	4	<1	<1	<1	✓	4	0.2	0.4	0.3	✓
Jurien Bay	5	125.0	295.0	180.0	✓	5	793	1396	997	(2)	5	<1	<1	<1	✓	5	<0.1	0.1	<0.1	✓
Kalbarri	2	99.0	100.0	99.5	✓	2	392	392	392	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Lancelin	2	98.0	100.0	99.0	✓	2	677	705	691	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Latham	2	190.0	195.0	192.5	(1)	2	666	707	687	(2)	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Ledge Point	4	100.0	105.0	102.5	✓	4	682	712	698	(2)	4	<1	<1	<1	✓	4	<0.1	0.1	<0.1	✓
Leeman	2	160.0	160.0	160.0	✓	2	566	594	580	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Meekatharra	5	200.0	210.0	204.0	(1)	5	1021	1090	1068	(2)	5	<1	<1	<1	✓	5	<0.1	<0.1	<0.1	✓
Mingenew	2	190.0	195.0	192.5	(1)	2	644	679	662	(2)	2	<1	<1	<1	✓	2	<0.1	0.3	0.2	✓
Moora	2	130.0	135.0	132.5	✓	2	488	490	489	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Morawa	2	190.0	200.0	195.0	(1)	2	638	673	656	(2)	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Mt Magnet	2	175.0	185.0	180.0	✓	2	976	978	977	(2)	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Mullewa	2	235.0	235.0	235.0	(1)	2	839	839	839	(2)	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Nabawa	2	245.0	250.0	247.5	(1)	2	804	818	811	(2)	2	<1	<1	<1	✓	2	0.2	0.3	0.3	✓
New Norcia	7	295.0	345.0	323.6	(1)	7	1055	1227	1145	(2)	7	<1	<1	<1	✓	7	0.1	0.5	0.3	✓
Nilgern (Ocean Farms)	2	90.0	90.0	90.0	✓	2	661	674	668	(2)	2	<1	<1	<1	✓	2	<0.1	7.5	3.8	✓
Northampton	2	245.0	250.0	247.5	(1)	2	842	846	844	(2)	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Perenjori	2	190.0	195.0	192.5	(1)	2	661	675	668	(2)	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Piawaning	2	85.0	87.0	86.0	✓	2	406	407	407	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Port Kalbarri	2	215.0	215.0	215.0	(1)	2	758	774	766	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Sandstone	2	180.0	190.0	185.0	(1)	2	935	974	955	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Seabird	2	135.0	140.0	137.5	✓	2	554	559	557	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Seaview Park	5	57.0	66.0	61.2	✓	5	480	502	494	✓	5	<1	<1	<1	✓	5	<0.1	0.1	<0.1	✓
Sovereign Hills	2	105.0	120.0	112.5	✓	2	668	683	676	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Three Springs	2	210.0	210.0	210.0	(1)	2	715	734	725	(2)	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Watheroo	5	90.0	96.0	93.2	✓	5	624	651	638	(2)	5	<1	<1	<1	✓	5	<0.1	0.2	<0.1	✓
Woodridge	2	125.0	130.0	127.5	✓	2	469	474	472	✓	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Yalgoo	2	92.0	93.0	92.5	✓	2	498	500	499	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Yerecoin	2	84.0	92.0	88.0	✓	2	392	459	426	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Yuna	2	240.0	255.0	247.5	(1)	2	838	844	841	(2)	2	<1	<1	<1	✓	2	0.4	1.2	0.8	✓

(1) Elevated Sodium is characteristic of the source supplying this locality. (2) Elevated TDS is characteristic of the source supplying this locality.

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Table 11 **Health related variables**

Goldfields and Agricultural Region	E. coli				Thermophilic Naegleria			Fluoride					Hydrocarbons		Metals	
Locality	Samples Taken	Samples >0 cfu/100mL	Max cfu/100mL	Requirement Met	Samples Taken	Samples with Thermophilic Naegleria	Requirement Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met
									Min	Max	Mean					
Ardath	12	0	0	✓	12	0	✓	2	0.80	0.85	0.83	✓	0	(1)	2	✓
Avon Hills	60	0	0	✓	60	0	✓	2	0.80	0.80	0.80	✓	0	(1)	2	✓
Ballidu	12	0	0	✓	12	0	✓	2	0.85	0.95	0.90	✓	0	(1)	2	✓
Beacon	12	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Bencubbin	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Beverley	52	0	0	✓	26	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Bind Bindi	12	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Broad Arrow	12	0	0	✓	12	0	✓	2	0.80	0.90	0.85	✓	0	(1)	2	✓
Bruce Rock	52	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Bullfinch	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	1	✓	2	✓
Buntine	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Cadoux	12	0	0	✓	12	0	✓	2	0.80	0.95	0.88	✓	0	(1)	2	✓
Coolgardie	52	0	0	✓	26	0	✓	2	0.80	0.90	0.85	✓	0	(1)	2	✓
Corrigin	52	0	0	✓	26	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Cunderdin	52	0	0	✓	12	0	✓	2	0.80	0.85	0.83	✓	0	(1)	2	✓
Dalwallinu	52	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Dowerin	12	0	0	✓	12	0	✓	2	0.80	0.95	0.88	✓	0	(1)	2	✓
Goomalling	52	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Greater Bodallin	12	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Greater Burracoppin	36	0	0	✓	36	0	✓	2	0.80	0.85	0.83	✓	0	(1)	2	✓
Greater Doolakine	36	0	0	✓	36	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Greater Meckering	39	0	0	✓	39	0	✓	2	0.75	0.85	0.80	✓	0	(1)	2	✓
Greenhills	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Jennacubbine	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Kalannie	12	0	0	✓	12	0	✓	2	0.85	1.00	0.93	✓	0	(1)	2	✓
Kalgoorlie	156	0	0	✓	132	0	✓	54	0.80	0.95	0.87	✓	0	(1)	4	✓
Kambalda	52	0	0	✓	52	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Kellerberrin	52	0	0	✓	26	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Koolyanobbing	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Koorda	12	0	0	✓	12	0	✓	2	0.80	0.95	0.88	✓	0	(1)	2	✓
Kununoppin	12	0	0	✓	12	0	✓	2	0.80	0.95	0.88	✓	0	(1)	2	✓
Laverton	12	0	0	✓	8	0	✓	4	0.70	0.95	0.83	✓	0	(1)	6	✓
Leonora	52	0	0	✓	17	0	✓	2	0.50	0.50	0.50	✓	0	(1)	2	✓
Marvel Loch	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Menzies	12	0	0	✓	8	0	✓	2	0.80	0.85	0.83	✓	0	(1)	14	✓
Merredin	52	0	0	✓	52	0	✓	52	0.80	1.00	0.87	✓	0	(1)	2	✓
Miling	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Mukinbudin	12	0	0	✓	12	0	✓	2	0.85	1.00	0.93	✓	0	(1)	2	✓
Muntadgin	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Narembeen	12	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Norseman	52	0	0	✓	26	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Northam	78	0	0	✓	78	0	✓	52	0.80	1.00	0.86	✓	0	(1)	2	✓
Nungarin	12	0	0	✓	12	0	✓	2	0.80	0.90	0.85	✓	0	(1)	2	✓
Ora Banda	12	0	0	✓	12	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Pithara	12	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Quairading	52	0	0	✓	26	0	✓	2	0.80	0.95	0.88	✓	0	(1)	2	✓
Seabrook	12	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Shackleton	12	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Southern Cross	51	0	0	✓	38	0	✓	2	0.85	0.85	0.85	✓	0	(1)	2	✓
Spencers Brook	12	0	0	✓	12	0	✓	2	0.80	0.90	0.85	✓	0	(1)	2	✓
Tammin	24	0	0	✓	24	0	✓	2	0.85	0.95	0.90	✓	0	(1)	2	✓
Toodyay	52	0	0	✓	26	0	✓	2	0.80	0.85	0.83	✓	0	(1)	2	✓
Trayning	12	0	0	✓	12	0	✓	2	0.80	0.95	0.88	✓	0	(1)	2	✓
Warralakin	12	0	0	✓	12	0	✓	2	0.85	0.90	0.88	✓	0	(1)	2	✓
Westonia	12	0	0	✓	12	0	✓	2	0.85	1.00	0.93	✓	0	(1)	2	✓
Wiluna	14	0	0	✓	14	0	✓	2	0.20	0.20	0.20	✓	0	(1)	2	✓
Wongan Hills	52	0	0	✓	26	0	✓	2	0.80	0.85	0.83	✓	0	(1)	3	✓
Wubin	12	0	0	✓	12	0	✓	2	0.80	0.85	0.83	✓	0	(1)	2	✓
Wyalkatchem	12	0	0	✓	12	0	✓	2	0.80	0.95	0.88	✓	0	(1)	2	✓
York	78	0	0	✓	78	0	✓	52	0.80	1.00	0.86	✓	0	(1)	2	✓

(1) No samples required in this 12 month period

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Table 12 **Health related variables**

Goldfields and Agricultural Region	Nitrate					Pesticides		Radiological		Trihalomethanes					Other Health Related	
Locality	Samples Taken	Concentration (mg/L)			*Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Requirement Met
		Min	Max	Mean							Min	Max	Mean			
Ardath	2	0.70	2.46	1.58	✓	1	✓	0	(1)	2	0.007	0.009	0.008	✓	0	(1)
Avon Hills	2	0.70	0.75	0.75	✓	1	✓	0	(1)	2	0.009	0.016	0.013	✓	0	(1)
Ballidu	2	1.45	1.63	1.54	✓	1	✓	0	(1)	2	0.024	0.063	0.044	✓	0	(1)
Beacon	2	1.19	4.84	3.04	✓	1	✓	0	(1)	2	0.010	0.059	0.035	✓	0	(1)
Bencubbin	2	2.60	5.28	3.96	✓	1	✓	0	(1)	2	0.006	0.007	0.007	✓	0	(1)
Beverley	2	0.88	1.63	1.28	✓	1	✓	0	(1)	2	0.020	0.034	0.027	✓	0	(1)
Bind Bindi	2	0.66	0.97	0.84	✓	1	✓	0	(1)	2	0.012	0.026	0.019	✓	0	(1)
Broad Arrow	2	1.89	2.64	2.29	✓	1	✓	0	(1)	2	0.073	0.077	0.075	✓	1	✓
Bruce Rock	2	1.10	2.16	1.63	✓	1	✓	0	(1)	2	0.009	0.011	0.010	✓	0	(1)
Bullfinch	2	4.84	5.28	5.06	✓	1	✓	2	✓	2	0.013	0.075	0.044	✓	2	✓
Buntine	2	0.26	3.56	1.94	✓	1	✓	0	(1)	2	0.007	0.100	0.054	✓	0	(1)
Cadoux	2	0.40	0.62	0.53	✓	1	✓	0	(1)	2	0.013	0.022	0.018	✓	0	(1)
Coolgardie	2	1.50	3.08	2.29	✓	1	✓	0	(1)	2	0.032	0.052	0.042	✓	0	(1)
Corrigin	2	0.79	0.88	0.84	✓	1	✓	0	(1)	2	0.009	0.011	0.010	✓	0	(1)
Cunderdin	2	0.70	0.79	0.75	✓	1	✓	0	(1)	2	0.005	0.039	0.022	✓	0	(1)
Dalwallinu	2	0.84	1.10	0.97	✓	1	✓	0	(1)	2	0.018	0.024	0.021	✓	0	(1)
Dowerin	2	0.97	1.50	1.23	✓	1	✓	0	(1)	2	0.011	0.018	0.015	✓	0	(1)
Goomalling	2	0.70	0.88	0.79	✓	1	✓	0	(1)	2	0.008	0.033	0.021	✓	0	(1)
Greater Bodallin	2	0.57	0.66	0.62	✓	1	✓	0	(1)	2	0.008	0.010	0.009	✓	0	(1)
Greater Burracoppin	2	0.70	1.32	1.01	✓	1	✓	0	(1)	2	0.006	0.012	0.009	✓	0	(1)
Greater Doolakine	2	0.79	1.01	0.92	✓	1	✓	0	(1)	2	0.014	0.033	0.024	✓	0	(1)
Greater Meckering	2	0.26	0.84	0.53	✓	1	✓	0	(1)	2	0.008	0.038	0.023	✓	0	(1)
Greenhills	2	0.57	1.67	1.14	✓	1	✓	0	(1)	2	0.011	0.021	0.016	✓	0	(1)
Jennacubbine	2	0.62	1.98	1.32	✓	1	✓	0	(1)	2	0.015	0.021	0.018	✓	0	(1)
Kalannie	2	1.01	4.84	2.95	✓	1	✓	0	(1)	2	0.011	0.082	0.047	✓	0	(1)
Kalgoorlie	4	1.41	3.26	2.29	✓	2	✓	2	✓	4	0.036	0.120	0.070	✓	0	(1)
Kambalda	2	1.19	3.43	2.33	✓	1	✓	0	(1)	2	0.069	0.110	0.090	✓	0	(1)
Kellerberrin	2	0.26	0.66	0.48	✓	1	✓	0	(1)	2	0.009	0.040	0.025	✓	0	(1)
Koolyanobbing	2	1.14	3.12	2.16	✓	1	✓	0	(1)	2	0.008	0.008	0.008	✓	0	(1)
Koorda	2	0.48	0.66	0.57	✓	1	✓	0	(1)	2	0.007	0.018	0.013	✓	0	(1)
Kununoppin	2	0.97	1.54	1.28	✓	1	✓	0	(1)	2	0.011	0.017	0.014	✓	0	(1)
Laverton*	10	26.84	31.68	29.04	✓	1	✓	0	(1)	2	0.088	0.090	0.089	✓	0	(1)
Leonora*	10	22.00	31.24	28.51	✓	1	✓	0	(1)	2	<0.001	<0.001	<0.001	✓	0	(1)
Marvel Loch	2	0.79	3.12	1.98	✓	1	✓	0	(1)	2	0.005	0.042	0.024	✓	0	(1)
Menzies*	6	1.36	3.26	2.68	✓	1	✓	0	(1)	2	0.064	0.100	0.082	✓	0	(1)
Merredin	2	0.53	1.28	0.92	✓	1	✓	0	(1)	2	0.017	0.022	0.020	✓	0	(1)
Miling	2	1.14	3.17	2.16	✓	1	✓	0	(1)	2	0.013	0.013	0.013	✓	0	(1)
Mukinbudin	2	1.10	4.40	2.77	✓	1	✓	0	(1)	2	0.014	0.024	0.019	✓	0	(1)
Muntadgin	2	0.70	1.63	1.19	✓	1	✓	0	(1)	2	0.005	0.015	0.010	✓	0	(1)
Narembeen	2	0.70	1.32	1.01	✓	1	✓	0	(1)	2	0.009	0.017	0.013	✓	0	(1)
Norseman	2	1.23	2.07	1.67	✓	1	✓	0	(1)	2	0.038	0.071	0.055	✓	0	(1)
Northam	2	0.66	1.32	1.01	✓	1	✓	2	✓	2	0.017	0.038	0.028	✓	0	(1)
Nungarin	2	0.70	1.01	0.88	✓	1	✓	0	(1)	2	0.014	0.014	0.014	✓	0	(1)
Ora Banda	2	<0.22	1.50	0.75	✓	1	✓	0	(1)	2	0.072	0.077	0.075	✓	0	(1)
Pithara	2	0.66	1.10	0.88	✓	1	✓	0	(1)	2	0.018	0.026	0.022	✓	0	(1)
Quairading	2	0.75	1.54	1.14	✓	1	✓	0	(1)	2	0.006	0.060	0.033	✓	0	(1)
Seabrook	2	0.92	0.97	0.97	✓	1	✓	1	✓	2	0.015	0.015	0.015	✓	0	(1)
Shackleton	2	0.66	1.63	1.14	✓	1	✓	0	(1)	2	0.011	0.025	0.018	✓	0	(1)
Southern Cross	2	1.14	1.89	1.54	✓	1	✓	0	(1)	2	0.008	0.011	0.010	✓	0	(1)
Spencers Brook	2	<0.22	0.88	0.44	✓	1	✓	0	(1)	2	0.020	0.027	0.024	✓	0	(1)
Tammin	2	0.66	0.79	0.75	✓	1	✓	0	(1)	2	0.020	0.047	0.034	✓	0	(1)
Toodyay	2	0.57	0.75	0.66	✓	1	✓	0	(1)	2	0.004	0.019	0.012	✓	0	(1)
Trayning	2	0.88	1.06	0.97	✓	1	✓	0	(1)	2	0.017	0.031	0.024	✓	0	(1)
Warralakin	2	0.97	2.60	1.80	✓	1	✓	0	(1)	2	0.013	0.018	0.016	✓	0	(1)
Westonia	2	1.06	1.85	1.45	✓	1	✓	0	(1)	2	0.014	0.021	0.018	✓	0	(1)
Wiluna*	2	35.20	36.52	35.86	✓	1	✓	0	(1)	2	0.002	0.003	0.003	✓	0	(1)
Wongan Hills	2	0.48	1.67	1.10	✓	1	✓	0	(1)	2	0.012	0.012	0.012	✓	0	(1)
Wubin	2	0.97	2.68	1.85	✓	1	✓	0	(1)	2	0.008	0.010	0.009	✓	0	(1)
Wyalkatchem	2	0.62	0.66	0.66	✓	1	✓	0	(1)	2	0.009	0.022	0.016	✓	0	(1)
York	2	0.70	0.88	0.79	✓	1	✓	0	(1)	2	0.002	0.022	0.012	✓	0	(1)

(1) No samples required in this 12 month period.

*Wiluna, Laverton, Leonora and Menzies have been granted an exemption from compliance with the child health nitrate guideline by the Department of Health. Carers of infants younger than 3 months should seek advice from the Community Health Nurse regarding the use of alternative water sources for the preparation of bottle feeds. The Water Corporation provides bottled water free of charge for this purpose. Note: The water supplied has always met the guideline for adults and children over the age of 3 months and these towns currently meet the child health nitrate guideline - for a full list of towns with nitrate exemptions and how we are improving water quality in these towns - please refer to *'Understanding water quality test results - Nitrate'* section of the annual report.

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Table 13 **Aesthetic (Non-health related) Variables**

Goldfields and Agricultural Region	Alkalinity (as CaCO3)					Aluminium					Chloride					Hardness				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min Value	Max Value	Mean Value			Min	Max	Mean	
Ardath	2	70.0	70.0	70.0	(1)	2	0.018	0.065	0.042	✓	2	160.0	170.0	165.0	✓	2	90	92	91	✓
Avon Hills	2	60.0	72.0	66.0	(1)	2	0.040	0.065	0.053	✓	2	110.0	155.0	132.5	✓	2	72	96	84	✓
Ballidu	2	67.0	70.0	68.5	(1)	2	0.030	0.060	0.045	✓	2	160.0	175.0	167.5	✓	2	89	100	95	✓
Beacon	2	60.0	77.0	68.5	(1)	2	0.025	0.035	0.030	✓	2	140.0	165.0	152.5	✓	2	82	100	91	✓
Bencubbin	2	71.0	80.0	75.5	(1)	2	0.012	0.025	0.019	✓	2	165.0	170.0	167.5	✓	2	99	100	100	✓
Beverley	2	66.0	72.0	69.0	(1)	2	0.030	0.055	0.043	✓	2	130.0	160.0	145.0	✓	2	74	97	86	✓
Bind Bindi	2	76.0	76.0	76.0	(1)	2	0.030	0.055	0.043	✓	2	155.0	165.0	160.0	✓	2	95	99	97	✓
Broad Arrow	2	56.0	69.0	62.5	(1)	2	0.045	0.045	0.045	✓	2	155.0	175.0	165.0	✓	2	98	100	99	✓
Bruce Rock	2	53.0	75.0	64.0	(1)	2	0.050	0.050	0.050	✓	2	145.0	155.0	150.0	✓	2	86	97	92	✓
Bullfinch	2	55.0	82.0	68.5	(1)	2	0.012	0.016	0.014	✓	2	120.0	165.0	142.5	✓	2	70	110	90	✓
Buntine	2	71.0	80.0	75.5	(1)	2	0.025	0.050	0.038	✓	2	140.0	170.0	155.0	✓	2	97	100	99	✓
Cadoux	2	71.0	76.0	73.5	(1)	2	0.040	0.065	0.053	✓	2	150.0	160.0	155.0	✓	2	89	100	95	✓
Coolgardie	2	55.0	65.0	60.0	(1)	2	0.040	0.060	0.050	✓	2	145.0	180.0	162.5	✓	2	94	100	97	✓
Corrigin	2	67.0	72.0	69.5	(1)	2	0.020	0.055	0.038	✓	2	160.0	165.0	162.5	✓	2	89	92	91	✓
Cunderdin	2	67.0	74.0	70.5	(1)	2	0.045	0.075	0.060	✓	2	150.0	155.0	152.5	✓	2	85	85	85	✓
Dalwallinu	2	58.0	77.0	67.5	(1)	2	0.035	0.040	0.038	✓	2	145.0	165.0	155.0	✓	2	100	110	105	✓
Dowerin	2	56.0	74.0	65.0	(1)	2	0.035	0.040	0.038	✓	2	150.0	150.0	150.0	✓	2	89	100	95	✓
Goomalling	2	53.0	75.0	64.0	(1)	2	0.020	0.065	0.043	✓	2	145.0	160.0	152.5	✓	2	95	99	97	✓
Greater Bodallin	2	74.0	74.0	74.0	(1)	2	0.045	0.065	0.055	✓	2	150.0	165.0	157.5	✓	2	89	100	95	✓
Greater Burracoppin	2	71.0	73.0	72.0	(1)	2	0.035	0.065	0.050	✓	2	150.0	165.0	157.5	✓	2	86	91	89	✓
Greater Doolakine	2	61.0	63.0	62.0	(1)	2	0.035	0.075	0.055	✓	2	140.0	160.0	150.0	✓	2	83	87	85	✓
Greater Meckering	2	68.0	75.0	71.5	(1)	2	0.050	0.080	0.065	✓	2	150.0	150.0	150.0	✓	2	84	87	86	✓
Greenhills	2	68.0	72.0	70.0	(1)	2	0.040	0.080	0.060	✓	2	145.0	160.0	152.5	✓	2	85	93	89	✓
Jennacubbine	2	71.0	74.0	72.5	(1)	2	0.050	0.080	0.065	✓	2	135.0	160.0	147.5	✓	2	87	99	93	✓
Kalannie	2	63.0	67.0	65.0	(1)	2	0.025	0.060	0.043	✓	2	155.0	175.0	165.0	✓	2	94	98	96	✓
Kalgoorlie	4	52.0	68.0	61.0	(1)	4	0.030	0.055	0.044	✓	4	155.0	180.0	167.5	✓	4	97	110	104	✓
Kambalda	2	57.0	71.0	64.0	(1)	2	0.018	0.035	0.027	✓	2	160.0	170.0	165.0	✓	2	91	110	101	✓
Kellerberrin	2	63.0	79.0	71.0	(1)	2	0.030	0.070	0.050	✓	2	145.0	165.0	155.0	✓	2	90	100	95	✓
Koolyanobbing	2	54.0	70.0	62.0	(1)	2	0.040	0.040	0.040	✓	2	160.0	170.0	165.0	✓	2	100	100	100	✓
Koorda	2	61.0	70.0	65.5	(1)	2	0.035	0.050	0.043	✓	2	150.0	160.0	155.0	✓	2	89	100	95	✓
Kununoppin	2	63.0	76.0	69.5	(1)	2	0.035	0.040	0.038	✓	2	135.0	160.0	147.5	✓	2	88	96	92	✓
Laverton	6	85.0	98.0	92.2	(1)	2	<0.008	<0.008	<0.008	✓	6	120.0	135.0	127.5	✓	6	110	120	113	✓
Leonora	6	110.0	120.0	115.0	(1)	2	<0.008	<0.008	<0.008	✓	6	155.0	175.0	161.7	✓	6	140	160	148	✓
Marvel Loch	2	60.0	79.0	69.5	(1)	2	0.035	0.045	0.040	✓	2	155.0	165.0	160.0	✓	2	90	95	93	✓
Menzies	6	58.0	69.0	63.0	(1)	2	0.025	0.055	0.040	✓	6	150.0	180.0	166.7	✓	6	96	110	99	✓
Merredin	2	65.0	75.0	70.0	(1)	2	0.045	0.065	0.055	✓	2	155.0	160.0	157.5	✓	2	88	92	90	✓
Miling	2	60.0	77.0	68.5	(1)	2	0.030	0.050	0.040	✓	2	150.0	165.0	157.5	✓	2	100	110	105	✓
Mukinbudin	2	58.0	76.0	67.0	(1)	2	0.035	0.050	0.043	✓	2	130.0	165.0	147.5	✓	2	80	91	86	✓
Muntadgin	2	70.0	74.0	72.0	(1)	2	0.030	0.060	0.045	✓	2	155.0	160.0	157.5	✓	2	88	93	91	✓
Narembeen	2	69.0	72.0	70.5	(1)	2	0.025	0.065	0.045	✓	2	150.0	170.0	160.0	✓	2	89	94	92	✓
Norseman	2	58.0	75.0	66.5	(1)	2	0.025	0.030	0.028	✓	2	170.0	195.0	182.5	✓	2	120	120	120	✓
Northam	2	61.0	69.0	65.0	(1)	2	0.035	0.075	0.055	✓	2	160.0	160.0	160.0	✓	2	88	93	91	✓
Nungarin	2	70.0	73.0	71.5	(1)	2	0.035	0.070	0.053	✓	2	145.0	165.0	155.0	✓	2	87	97	92	✓
Ora Banda	2	65.0	67.0	66.0	(1)	2	0.020	0.035	0.028	✓	2	175.0	185.0	180.0	✓	2	110	120	115	✓
Pithara	2	72.0	76.0	74.0	(1)	2	0.025	0.060	0.043	✓	2	155.0	160.0	157.5	✓	2	91	92	92	✓
Quairading	2	63.0	64.0	63.5	(1)	2	0.020	0.060	0.040	✓	2	145.0	175.0	160.0	✓	2	94	100	97	✓
Seabrook	2	58.0	70.0	64.0	(1)	2	0.045	0.080	0.063	✓	2	135.0	170.0	152.5	✓	2	74	92	83	✓
Shackleton	2	66.0	70.0	68.0	(1)	2	0.020	0.050	0.035	✓	2	155.0	155.0	155.0	✓	2	84	91	88	✓
Southern Cross	2	55.0	74.0	64.5	(1)	2	0.025	0.055	0.040	✓	2	155.0	165.0	160.0	✓	2	86	100	93	✓
Spencers Brook	2	64.0	69.0	66.5	(1)	2	0.035	0.090	0.063	✓	2	140.0	160.0	150.0	✓	2	77	93	85	✓
Tammin	2	54.0	74.0	64.0	(1)	2	0.035	0.050	0.043	✓	2	150.0	160.0	155.0	✓	2	84	91	88	✓
Toodyay	2	67.0	69.0	68.0	(1)	2	0.045	0.085	0.065	✓	2	135.0	160.0	147.5	✓	2	85	92	89	✓
Trayning	2	60.0	75.0	67.5	(1)	2	0.025	0.045	0.035	✓	2	130.0	165.0	147.5	✓	2	85	100	93	✓
Warralakin	2	58.0	73.0	65.5	(1)	2	0.045	0.050	0.048	✓	2	140.0	165.0	152.5	✓	2	86	100	93	✓
Westonia	2	59.0	75.0	67.0	(1)	2	0.050	0.080	0.065	✓	2	150.0	165.0	157.5	✓	2	88	99	94	✓
Wiluna	2	80.0	80.0	80.0	(1)	2	<0.008	<0.008	<0.008	✓	2	70.0	70.0	70.0	✓	2	110	120	115	✓
Wongan Hills	2	70.0	81.0	75.5	(1)	2	0.030	0.065	0.048	✓	2	155.0	155.0	155.0	✓	2	94	95	95	✓
Wubin	2	77.0	79.0	78.0	(1)	2	0.025	0.050	0.038	✓	2	150.0	175.0	162.5	✓	2	98	110	104	✓
Wyalkatchem	2	71.0	73.0	72.0	(1)	2	0.030	0.055	0.043	✓	2	150.0	165.0	157.5	✓	2	89	98	94	✓
York	2	65.0	71.0	68.0	(1)	2	0.045	0.085	0.065	✓	2	135.0	165.0	150.0	✓	2	81	96	89	✓

(1) No guideline value available as per ADWG 2011. (2) Elevated hardness is characteristic of the source supplying this locality

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Table 14 **Aesthetic (Non-health related) Variables**

Goldfields and Agricultural Region	Iron					Manganese					pH					Silica				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (pH units)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min	Max	Mean			Min	Max	Mean			Min	Max	Mean			Min Value	Max Value	Mean Value	
Ardath	2	0.008	0.008	0.008	✓	2	<0.002	<0.002	<0.002	✓	2	8.47	8.50	8.49	✓	2	5.1	5.5	5.3	✓
Avon Hills	2	<0.003	0.035	0.018	✓	2	<0.002	0.002	<0.002	✓	2	8.18	8.18	8.18	✓	2	5.9	6.5	6.2	✓
Ballidu	2	0.006	0.015	0.011	✓	2	<0.002	<0.002	<0.002	✓	2	8.16	8.41	8.29	✓	2	5.2	6.1	5.7	✓
Beacon	2	0.004	0.015	0.010	✓	2	<0.002	<0.002	<0.002	✓	2	7.49	8.66	8.08	✓	2	5.8	5.9	5.9	✓
Bencubbin	2	0.015	0.020	0.018	✓	2	<0.002	<0.002	<0.002	✓	2	8.08	8.68	8.38	✓	2	4.8	6.2	5.5	✓
Beverley	2	<0.003	0.006	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.63	8.64	8.64	(1)	2	5.4	5.6	5.5	✓
Bind Bindi	2	0.004	0.008	0.006	✓	2	<0.002	<0.002	<0.002	✓	2	8.82	8.85	8.84	(1)	2	5.4	5.9	5.7	✓
Broad Arrow	2	0.040	0.120	0.080	✓	2	<0.002	0.004	<0.002	✓	2	7.84	7.86	7.85	✓	2	5.8	6.0	5.9	✓
Bruce Rock	2	0.006	0.020	0.013	✓	2	<0.002	<0.002	<0.002	✓	2	7.98	8.26	8.12	✓	2	6.0	6.1	6.1	✓
Bullfinch	2	0.006	0.008	0.007	✓	2	<0.002	<0.002	<0.002	✓	2	8.41	8.58	8.50	✓	2	5.3	5.8	5.6	✓
Buntine	2	0.015	0.025	0.020	✓	2	<0.002	<0.002	<0.002	✓	2	8.68	8.74	8.71	(1)	2	5.0	6.1	5.6	✓
Cadoux	2	0.008	0.015	0.012	✓	2	<0.002	<0.002	<0.002	✓	2	8.33	8.62	8.48	✓	2	5.2	6.0	5.6	✓
Coolgardie	2	0.010	0.015	0.013	✓	2	<0.002	<0.002	<0.002	✓	2	7.44	7.73	7.59	✓	2	5.5	5.8	5.7	✓
Corrigin	2	0.004	0.006	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	8.57	8.70	8.64	(1)	2	5.0	6.0	5.5	✓
Cunderdin	2	<0.003	0.008	0.004	✓	2	<0.002	<0.002	<0.002	✓	2	8.07	8.43	8.25	✓	2	5.4	5.8	5.6	✓
Dalwallinu	2	0.010	0.025	0.018	✓	2	<0.002	<0.002	<0.002	✓	2	8.83	8.99	8.91	(1)	2	6.0	6.0	6.0	✓
Dowerin	2	0.004	0.008	0.006	✓	2	<0.002	<0.002	<0.002	✓	2	8.49	8.60	8.55	(1)	2	5.9	6.1	6.0	✓
Goomalling	2	<0.003	0.006	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.50	8.55	8.53	(1)	2	6.3	6.3	6.3	✓
Greater Bodallin	2	0.004	0.006	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	8.49	8.57	8.53	(1)	2	5.9	6.0	6.0	✓
Greater Burracoppin	2	0.004	0.008	0.006	✓	2	<0.002	<0.002	<0.002	✓	2	8.33	8.58	8.46	✓	2	5.5	5.7	5.6	✓
Greater Doolakine	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.47	8.68	8.58	(1)	2	5.4	5.7	5.6	✓
Greater Meckering	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.32	8.58	8.45	✓	2	5.2	5.8	5.5	✓
Greenhills	2	0.004	0.006	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	7.55	8.70	8.13	✓	2	5.1	6.2	5.7	✓
Jennacubbine	2	0.008	0.015	0.012	✓	2	<0.002	<0.002	<0.002	✓	2	8.68	8.88	8.78	(1)	2	5.5	5.9	5.7	✓
Kalannie	2	0.008	0.015	0.012	✓	2	<0.002	<0.002	<0.002	✓	2	7.90	8.43	8.17	✓	2	5.9	6.1	6.0	✓
Kalgoorlie	4	0.006	0.015	0.010	✓	4	<0.002	<0.002	<0.002	✓	4	7.66	7.78	7.70	✓	4	5.7	6.0	5.9	✓
Kambalda	2	0.015	0.020	0.018	✓	2	<0.002	<0.002	<0.002	✓	2	7.92	8.02	7.97	✓	2	5.4	6.5	6.0	✓
Kellerberrin	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.05	8.43	8.24	✓	2	6.2	6.2	6.2	✓
Koolyanobbing	2	0.010	0.090	0.050	✓	2	<0.002	0.006	0.003	✓	2	8.30	8.41	8.36	✓	2	5.9	6.0	6.0	✓
Koorda	2	0.004	0.010	0.007	✓	2	<0.002	<0.002	<0.002	✓	2	8.35	8.66	8.51	(1)	2	5.2	5.9	5.6	✓
Kununoppin	2	0.004	0.010	0.007	✓	2	<0.002	<0.002	<0.002	✓	2	8.68	9.25	8.97	(1)	2	5.4	5.9	5.7	✓
Laverton	6	0.006	0.015	0.009	✓	6	<0.002	<0.002	<0.002	✓	6	7.78	7.96	7.84	✓	6	35.0	37.0	36.3	✓
Leonora	6	<0.003	<0.003	<0.003	✓	6	<0.002	<0.002	<0.002	✓	6	7.43	7.79	7.63	✓	6	21.0	30.0	23.2	✓
Marvel Loch	2	0.008	0.010	0.009	✓	2	<0.002	<0.002	<0.002	✓	2	7.77	8.43	8.10	✓	2	5.1	5.9	5.5	✓
Menzies	6	0.015	0.025	0.022	✓	6	<0.002	<0.002	<0.002	✓	6	7.88	8.02	7.94	✓	6	5.3	6.6	5.9	✓
Merredin	2	0.004	0.010	0.007	✓	2	<0.002	<0.002	<0.002	✓	2	8.46	8.57	8.52	(1)	2	5.2	6.2	5.7	✓
Miling	2	0.015	0.080	0.048	✓	2	<0.002	0.005	0.003	✓	2	8.64	8.95	8.80	(1)	2	5.7	6.0	5.9	✓
Mukinbudin	2	0.004	0.025	0.015	✓	2	<0.002	<0.002	<0.002	✓	2	7.88	8.63	8.26	✓	2	6.1	6.4	6.3	✓
Muntadgin	2	<0.003	0.010	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	8.41	8.55	8.48	✓	2	5.2	5.5	5.4	✓
Narembeen	2	0.008	0.010	0.009	✓	2	<0.002	<0.002	<0.002	✓	2	8.43	8.47	8.45	✓	2	5.3	5.7	5.5	✓
Norseman	2	0.008	0.010	0.009	✓	2	<0.002	<0.002	<0.002	✓	2	7.55	7.78	7.67	✓	2	5.7	6.4	6.1	✓
Northam	2	0.006	0.008	0.007	✓	2	<0.002	<0.002	<0.002	✓	2	8.31	8.33	8.32	✓	2	5.8	6.2	6.0	✓
Nungarin	2	0.004	0.006	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	8.80	8.81	8.81	(1)	2	5.6	5.7	5.7	✓
Ora Banda	2	<0.003	0.160	0.080	✓	2	<0.002	0.006	0.003	✓	2	8.22	8.46	8.34	✓	2	6.0	6.3	6.2	✓
Pithara	2	0.015	0.020	0.018	✓	2	<0.002	<0.002	<0.002	✓	2	8.66	8.85	8.76	(1)	2	4.8	6.0	5.4	✓
Quairading	2	0.004	0.015	0.010	✓	2	<0.002	<0.002	<0.002	✓	2	7.47	8.47	7.97	✓	2	5.8	6.2	6.0	✓
Seabrook	2	<0.003	0.010	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	8.55	8.89	8.72	(1)	2	5.3	6.4	5.9	✓
Shackleton	2	0.004	0.006	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	8.56	8.59	8.58	(1)	2	5.1	6.5	5.8	✓
Southern Cross	2	0.006	0.010	0.008	✓	2	<0.002	<0.002	<0.002	✓	2	8.32	8.45	8.39	✓	2	6.0	6.1	6.1	✓
Spencers Brook	2	0.004	0.004	0.004	✓	2	<0.002	<0.002	<0.002	✓	2	8.39	8.41	8.40	✓	2	5.7	5.8	5.8	✓
Tammin	2	0.006	0.015	0.011	✓	2	<0.002	<0.002	<0.002	✓	2	8.31	8.51	8.41	✓	2	5.8	6.2	6.0	✓
Toodyay	2	0.004	0.010	0.007	✓	2	<0.002	<0.002	<0.002	✓	2	8.47	8.62	8.55	(1)	2	5.5	5.7	5.6	✓
Trayning	2	0.004	0.008	0.006	✓	2	<0.002	<0.002	<0.002	✓	2	8.72	9.14	8.93	(1)	2	5.8	6.4	6.1	✓
Warralakin	2	<0.003	0.006	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.14	8.72	8.43	✓	2	5.4	6.1	5.8	✓
Westonia	2	0.004	0.100	0.052	✓	2	<0.002	0.020	0.010	✓	2	8.38	8.54	8.46	✓	2	5.8	6.0	5.9	✓
Wiluna	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.84	7.85	7.85	✓	2	85.0	85.0	85.0	(2)
Wongan Hills	2	<0.003	0.008	0.004	✓	2	<0.002	<0.002	<0.002	✓	2	8.56	8.68	8.62	(1)	2	5.3	5.7	5.5	✓
Wubin	2	0.015	0.035	0.025	✓	2	<0.002	<0.002	<0.002	✓	2	8.72	8.83	8.78	(1)	2	5.2	5.9	5.6	✓
Wyalkatchem	2	0.004	0.008	0.006	✓	2	<0.002	<0.002	<0.002	✓	2	8.34	8.54	8.44	✓	2	5.1	6.1	5.6	✓
York	2	<0.003	0.025	0.013	✓	2	<0.002	<0.002	<0.002	✓	2	8.42	8.58	8.50	✓	2	5.4	5.8	5.6	✓

(1) Elevated pH is a result of the pH adjustment as part of Chloramination process. Experience shows that pH at this level is not objectionable to our customers. (2) Elevated Silica is a natural characteristic of the source supplying this locality.

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Table 15 **Aesthetic (Non-health related) Variables**

Goldfields and Agricultural Region	Sodium					TDS					True Colour					Turbidity				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (TCU)			Guideline Met	Samples Taken	Value (NTU)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min	Max	Mean			Min	Max	Mean	
Ardath	2	98.0	105.0	101.5	✓	2	411	435	423	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Avon Hills	2	77.0	98.0	87.5	✓	2	325	414	370	✓	2	<1	<1	<1	✓	2	<0.1	1.7	0.9	✓
Ballidu	2	100.0	110.0	105.0	✓	2	416	442	429	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Beacon	2	80.0	110.0	95.0	✓	2	361	453	407	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Bencubbin	2	99.0	105.0	102.0	✓	2	438	445	442	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Beverley	2	81.0	99.0	90.0	✓	2	354	420	387	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Bind Bindi	2	95.0	100.0	97.5	✓	2	412	435	424	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Broad Arrow	2	95.0	99.0	97.0	✓	2	401	443	422	✓	2	<1	<1	<1	✓	2	0.3	0.9	0.6	✓
Bruce Rock	2	85.0	105.0	95.0	✓	2	368	430	399	✓	2	<1	<1	<1	✓	2	0.2	0.4	0.3	✓
Bullfinch	2	77.0	105.0	91.0	✓	2	332	453	393	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Buntine	2	99.0	105.0	102.0	✓	2	403	445	424	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Cadoux	2	97.0	100.0	98.5	✓	2	400	428	414	✓	2	<1	1	<1	✓	2	0.1	0.2	0.2	✓
Coolgardie	2	85.0	100.0	92.5	✓	2	378	437	408	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Corrigin	2	99.0	105.0	102.0	✓	2	416	422	419	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Cunderdin	2	96.0	97.0	96.5	✓	2	401	405	403	✓	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Dalwallinu	2	97.0	100.0	98.5	✓	2	399	440	420	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Dowerin	2	91.0	99.0	95.0	✓	2	389	422	406	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Goomalling	2	96.0	100.0	98.0	✓	2	388	429	409	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Greater Bodallin	2	94.0	105.0	99.5	✓	2	402	438	420	✓	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Greater Burracoppin	2	86.0	100.0	93.0	✓	2	390	426	408	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Greater Doolakine	2	85.0	100.0	92.5	✓	2	367	408	388	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Greater Meckering	2	97.0	97.0	97.0	✓	2	400	403	402	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Greenhills	2	90.0	96.0	93.0	✓	2	388	415	402	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Jennacubbine	2	86.0	100.0	93.0	✓	2	373	425	399	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Kalannie	2	95.0	97.0	96.0	✓	2	400	435	418	✓	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Kalgoorlie	4	94.0	105.0	99.5	✓	4	398	451	425	✓	4	<1	<1	<1	✓	4	0.2	0.3	0.3	✓
Kambalda	2	88.0	105.0	96.5	✓	2	394	442	418	✓	2	<1	<1	<1	✓	2	0.2	0.3	0.3	✓
Kellerberrin	2	95.0	105.0	100.0	✓	2	389	439	414	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Koolyanobbing	2	100.0	105.0	102.5	✓	2	422	430	426	✓	2	<1	<1	<1	✓	2	0.2	0.7	0.5	✓
Koorda	2	96.0	99.0	97.5	✓	2	392	420	406	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Kununoppin	2	88.0	94.0	91.0	✓	2	369	421	395	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Laverton	6	93.0	110.0	99.7	✓	6	474	526	501	✓	6	<1	<1	<1	✓	6	<0.1	<0.1	<0.1	✓
Leonora	6	115.0	130.0	122.5	✓	6	587	622	607	(1)	6	<1	<1	<1	✓	6	<0.1	0.1	<0.1	✓
Marvel Loch	2	95.0	100.0	97.5	✓	2	413	416	415	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Menzies	6	95.0	105.0	98.7	✓	6	403	448	423	✓	6	<1	<1	<1	✓	6	0.1	0.3	0.2	✓
Merredin	2	96.0	100.0	98.0	✓	2	408	411	410	✓	2	<1	2	<1	✓	2	<0.1	0.2	<0.1	✓
Miling	2	96.0	105.0	100.5	✓	2	405	447	426	✓	2	<1	<1	<1	✓	2	0.2	0.5	0.4	✓
Mukinbudin	2	76.0	100.0	88.0	✓	2	345	435	390	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Muntadgin	2	94.0	105.0	99.5	✓	2	403	423	413	✓	2	<1	<1	<1	✓	2	<0.1	0.3	0.2	✓
Narembeen	2	98.0	105.0	101.5	✓	2	404	432	418	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Norseman	2	96.0	110.0	103.0	✓	2	429	486	458	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Northam	2	91.0	98.0	94.5	✓	2	394	417	406	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Nungarin	2	89.0	100.0	94.5	✓	2	385	429	407	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Ora Banda	2	96.0	105.0	100.5	✓	2	425	455	440	✓	2	<1	<1	<1	✓	2	<0.1	6.6	3.3	✓
Pithara	2	95.0	96.0	95.5	✓	2	413	413	413	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Quairading	2	95.0	95.0	95.0	✓	2	394	424	409	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Seabrook	2	85.0	97.0	91.0	✓	2	355	427	391	✓	2	<1	<1	<1	✓	2	0.2	0.3	0.3	✓
Shackleton	2	93.0	100.0	96.5	✓	2	394	416	405	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Southern Cross	2	90.0	100.0	95.0	✓	2	389	434	412	✓	2	<1	<1	<1	✓	2	0.2	0.3	0.3	✓
Spencers Brook	2	82.0	96.0	89.0	✓	2	365	412	389	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Tammin	2	97.0	98.0	97.5	✓	2	388	423	406	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Toodyay	2	87.0	99.0	93.0	✓	2	368	417	393	✓	2	<1	<1	<1	✓	2	<0.1	0.3	0.2	✓
Trayning	2	88.0	100.0	94.0	✓	2	365	451	408	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Warralakin	2	79.0	110.0	94.5	✓	2	360	446	403	✓	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Westonia	2	85.0	100.0	92.5	✓	2	381	435	408	✓	2	<1	<1	<1	✓	2	0.2	1.4	0.8	✓
Wiluna	2	53.0	53.0	53.0	✓	2	421	429	425	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Wongan Hills	2	94.0	100.0	97.0	✓	2	417	429	423	✓	2	<1	<1	<1	✓	2	0.4	0.4	0.4	✓
Wubin	2	96.0	105.0	100.5	✓	2	416	453	435	✓	2	<1	<1	<1	✓	2	<0.1	0.3	0.2	✓
Wyalkatchem	2	96.0	100.0	98.0	✓	2	402	428	415	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
York	2	85.0	98.0	91.5	✓	2	363	422	393	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓

(1) Elevated TDS is a natural characteristic of the source supplying this locality

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Table 16 **Health related variables**

South West Region	E. coli				Thermophilic Naegleria			Fluoride					Hydrocarbons		Metals	
Locality	Samples Taken	Samples >0 cfu/100mL	Max cfu/100mL	Requirement Met	Samples Taken	Samples with Thermophilic Naegleria	Requirement Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met
									Min	Max	Mean					
Allanson	13	0	0	✓	6	0	✓	4	0.65	0.90	0.78	✓	0	(1)	2	✓
Augusta	65	0	0	✓	32	0	✓	2	0.20	0.25	0.23	✓	0	(1)	2	✓
Australind	117	0	0	✓	117	0	✓	4	0.20	0.25	0.21	✓	2	✓	4	✓
Balingup	12	0	0	✓	6	0	✓	2	0.10	0.10	0.10	✓	0	(1)	2	✓
Binningup	52	0	0	✓	26	0	✓	4	0.55	0.85	0.75	✓	0	(1)	2	✓
Boyanup	52	0	0	✓	13	0	✓	2	0.15	0.15	0.15	✓	0	(1)	2	✓
Boyup Brook	52	0	0	✓	12	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Bridgetown	65	0	0	✓	31	0	✓	2	0.10	0.10	0.10	✓	0	(1)	2	✓
Brunswick Junction	52	0	0	✓	14	0	✓	2	0.20	0.20	0.20	✓	0	(1)	2	✓
Capel	52	0	0	✓	13	0	✓	2	0.20	0.20	0.20	✓	2	✓	4	✓
Collie	78	0	0	✓	31	0	✓	52	0.20	1.00	0.75	✓	0	(1)	4	✓
Cowaramup	52	0	0	✓	6	0	✓	2	0.20	0.25	0.23	✓	2	✓	2	✓
Dalyellup	65	0	0	✓	39	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Dardanup	21	0	0	✓	11	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Darkan	13	0	0	✓	6	0	✓	4	0.65	0.90	0.78	✓	0	(1)	2	✓
Donnybrook	52	0	0	✓	25	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	5	✓
Dunsborough	91	0	0	✓	91	0	✓	56	0.75	0.95	0.86	✓	0	(1)	2	✓
Eaton	89	0	0	✓	67	0	✓	2	0.15	0.15	0.15	✓	0	(1)	2	✓
Greenbushes	27	0	0	✓	13	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Harvey	52	0	0	✓	52	0	✓	52	0.20	0.90	0.82	✓	0	(1)	2	✓
Hester TWS	13	0	0	✓	6	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Kirup	14	0	0	✓	7	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Logue Brook	13	0	0	✓	7	0	✓	2	0.60	0.80	0.70	✓	1	✓	2	✓
Manjimup	65	0	0	✓	31	0	✓	52	0.75	0.90	0.82	✓	0	(1)	2	✓
Margaret River	91	0	0	✓	46	0	✓	2	0.20	0.25	0.23	✓	0	(1)	2	✓
Mullalyup	13	0	0	✓	6	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Myalup	13	0	0	✓	13	0	✓	2	0.80	0.90	0.85	✓	0	(1)	2	✓
Nannup	35	0	0	✓	13	0	✓	3	<0.1	<0.1	<0.1	✓	0	(1)	4	✓
Northcliffe	13	0	0	✓	6	0	✓	2	0.35	0.35	0.35	✓	0	(1)	2	✓
Pemberton	52	0	0	✓	13	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Peppermint Grove	52	0	0	✓	8	0	✓	2	0.25	0.25	0.25	✓	0	(1)	2	✓
Preston Beach	52	0	0	✓	13	0	✓	2	<0.1	0.10	<0.1	✓	1	✓	2	✓
Quinninup	12	0	0	✓	6	0	✓	2	0.45	0.50	0.48	✓	0	(1)	2	✓
Waroona	52	0	0	✓	52	0	✓	54	<0.1	0.90	0.80	✓	0	(1)	2	✓
Yarloop	13	0	0	✓	6	0	✓	2	0.80	0.85	0.83	✓	1	✓	2	✓

(1) No samples required in this 12 month period.

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Table 17 **Health related variables**

South West Region	Nitrate					Pesticides		Radiological		Trihalomethanes					Other Health Related	
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Requirement Met
		Min	Max	Mean							Min	Max	Mean			
Allanson	2	<0.22	0.62	0.31	✓	1	✓	2	✓	2	0.120	0.180	0.150	✓	0	(1)
Augusta	4	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.017	0.023	0.020	✓	0	(1)
Australind	8	<0.22	<0.22	<0.22	✓	2	✓	0	(1)	4	0.005	0.075	0.024	✓	3	✓
Balingup	2	0.40	0.70	0.57	✓	1	✓	2	✓	2	0.083	0.086	0.085	✓	0	(1)
Binningup	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	<0.001	0.002	<0.001	✓	0	(1)
Boyanup	2	<0.22	<0.22	<0.22	✓	1	✓	2	✓	2	<0.001	<0.001	<0.001	✓	0	(1)
Boyup Brook	4	<0.22	0.48	<0.22	✓	1	✓	0	(1)	3	0.089	0.110	0.103	✓	0	(1)
Bridgetown	2	0.22	0.57	0.40	✓	1	✓	2	✓	2	0.031	0.067	0.049	✓	0	(1)
Brunswick Junction	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.009	0.015	0.012	✓	0	(1)
Capel	4	<0.22	0.26	<0.22	✓	2	✓	2	✓	2	<0.001	0.001	<0.001	✓	1	✓
Collie	8	<0.22	1.50	0.40	✓	2	✓	4	✓	4	0.045	0.140	0.088	✓	0	(1)
Cowaramup	4	<0.22	<0.22	<0.22	✓	1	✓	2	✓	4	0.085	0.170	0.121	✓	0	(1)
Dalyellup	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.050	0.055	0.053	✓	0	(1)
Dardanup	2	<0.22	<0.22	<0.22	✓	1	✓	2	✓	2	<0.001	0.002	<0.001	✓	0	(1)
Darkan	2	<0.22	0.44	<0.22	✓	1	✓	0	(1)	4	0.160	0.230	0.185	✓	1	✓
Donnybrook	3	12.32	14.96	13.77	✓	1	✓	1	✓	2	0.008	0.009	0.009	✓	0	(1)
Dunsborough	4	<0.22	0.26	<0.22	✓	1	✓	1	✓	2	0.023	0.029	0.026	✓	0	(1)
Eaton	2	<0.22	0.31	<0.22	✓	1	✓	2	✓	2	<0.001	0.023	0.012	✓	0	(1)
Greenbushes	4	<0.22	0.79	0.44	✓	1	✓	0	(1)	2	0.055	0.071	0.063	✓	0	(1)
Harvey	2	<0.22	<0.22	<0.22	✓	1	✓	2	✓	2	<0.001	0.007	0.004	✓	0	(1)
Hester TWS	3	0.26	0.75	0.53	✓	1	✓	0	(1)	2	0.086	0.130	0.108	✓	0	(1)
Kirup	4	<0.22	18.04	8.14	✓	1	✓	2	✓	2	0.008	0.061	0.035	✓	0	(1)
Logue Brook	2	<0.22	3.30	1.67	✓	1	✓	0	(1)	2	0.005	0.040	0.023	✓	1	✓
Manjimup	2	<0.22	0.22	<0.22	✓	4	✓	2	✓	2	0.073	0.100	0.087	✓	0	(1)
Margaret River	4	<0.22	<0.22	<0.22	✓	1	✓	1	✓	2	0.120	0.120	0.120	✓	1	✓
Mullalyup	2	<0.22	14.08	7.04	✓	1	✓	0	(1)	2	0.016	0.055	0.036	✓	0	(1)
Myalup	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.001	0.006	0.004	✓	0	(1)
Nannup	5	<0.22	1.85	0.97	✓	2	✓	4	✓	3	0.043	0.096	0.077	✓	0	(1)
Northcliffe	3	0.70	0.79	0.75	✓	1	✓	2	✓	2	0.063	0.079	0.071	✓	1	✓
Pemberton	2	1.28	1.63	1.45	✓	4	✓	0	(1)	2	0.085	0.100	0.093	✓	0	(1)
Peppermint Grove	4	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	<0.001	<0.001	<0.001	✓	0	(1)
Preston Beach	4	3.92	6.16	5.50	✓	1	✓	0	(1)	4	0.110	0.150	0.130	✓	0	(1)
Quinninup	4	0.44	0.88	0.70	✓	1	✓	1	✓	2	0.100	0.110	0.105	✓	0	(1)
Waroona	2	<0.22	<0.22	<0.22	✓	1	✓	2	✓	4	0.050	0.100	0.070	✓	0	(1)
Yarloop	2	<0.22	<0.22	<0.22	✓	1	✓	2	✓	2	0.002	0.084	0.043	✓	0	✓

(1) No samples required in this 12 month period.

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Table 18 **Aesthetic (Non-health related) Variables**

South West Region	Alkalinity (as CaCO3)					Aluminium					Chloride					Hardness				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min Value	Max Value	Mean Value			Min	Max	Mean	
Allanson	2	14.0	23.0	18.5	(1)	2	0.014	0.016	0.015	✓	2	85.0	90.0	87.5	✓	2	50	58	54	✓
Augusta	4	63.0	66.0	64.0	(1)	4	<0.008	<0.008	<0.008	✓	4	135.0	150.0	141.3	✓	4	91	100	96	✓
Australind	8	120.0	140.0	126.3	(1)	8	<0.008	0.010	<0.008	✓	8	140.0	170.0	159.4	✓	8	77	110	92	✓
Balingup	2	71.0	98.0	84.5	(1)	2	0.035	0.040	0.038	✓	2	85.0	95.0	90.0	✓	2	98	110	104	✓
Binningup	2	52.0	56.0	54.0	(1)	2	0.040	0.045	0.043	✓	2	34.0	35.0	34.5	✓	2	55	55	55	✓
Boyanup	2	110.0	120.0	115.0	(1)	2	<0.008	<0.008	<0.008	✓	2	95.0	100.0	97.5	✓	2	100	110	105	✓
Boyup Brook	4	73.0	92.0	84.0	(1)	4	0.025	0.050	0.036	✓	4	85.0	100.0	92.5	✓	4	97	120	112	✓
Bridgetown	2	83.0	83.0	83.0	(1)	2	0.030	0.065	0.048	✓	2	90.0	95.0	92.5	✓	2	100	100	100	✓
Brunswick Junction	2	120.0	130.0	125.0	(1)	2	<0.008	<0.008	<0.008	✓	2	160.0	170.0	165.0	✓	2	81	82	82	✓
Capel	4	76.0	79.0	78.0	(1)	4	<0.008	<0.008	<0.008	✓	4	55.0	60.0	58.8	✓	4	47	51	49	✓
Collie	8	5.0	22.0	12.9	(1)	8	0.012	0.035	0.020	✓	8	50.0	105.0	80.0	✓	8	25	53	39	✓
Cowaramup	4	29.0	45.0	37.8	(1)	4	0.010	0.030	0.020	✓	4	80.0	90.0	83.8	✓	4	37	43	40	✓
Dalyellup	2	130.0	140.0	135.0	(1)	2	<0.008	<0.008	<0.008	✓	2	90.0	95.0	92.5	✓	2	74	74	74	✓
Dardanup	2	60.0	84.0	72.0	(1)	2	<0.008	<0.008	<0.008	✓	2	85.0	85.0	85.0	✓	2	27	27	27	✓
Darkan	2	21.0	28.0	24.5	(1)	2	0.018	0.025	0.022	✓	2	80.0	105.0	92.5	✓	2	46	63	55	✓
Donnybrook	3	53.0	71.0	59.7	(1)	3	0.050	0.160	0.102	✓	3	165.0	250.0	220.0	✓	3	65	120	98	✓
Dunsborough	4	140.0	160.0	152.5	(1)	4	<0.008	<0.008	<0.008	✓	4	110.0	140.0	125.0	✓	4	65	83	72	✓
Eaton	2	100.0	100.0	100.0	(1)	2	<0.008	<0.008	<0.008	✓	2	115.0	130.0	122.5	✓	2	110	110	110	✓
Greenbushes	4	69.0	99.0	84.8	(1)	4	0.025	0.075	0.045	✓	4	80.0	95.0	90.0	✓	4	100	110	105	✓
Harvey	2	12.0	51.0	31.5	(1)	2	0.016	0.035	0.026	✓	2	33.0	60.0	46.5	✓	2	32	53	43	✓
Hester TWS	3	68.0	100.0	88.3	(1)	3	0.035	0.055	0.042	✓	3	85.0	90.0	86.7	✓	3	92	120	104	✓
Kirup	4	10.0	59.0	33.3	(1)	3	0.008	0.140	0.053	✓	4	45.0	245.0	128.8	✓	4	18	110	53	✓
Logue Brook	2	54.0	56.0	55.0	(1)	2	0.030	0.045	0.038	✓	2	33.0	60.0	46.5	✓	2	53	56	55	✓
Manjimup	2	30.0	36.0	33.0	(1)	2	0.010	0.045	0.028	✓	2	70.0	75.0	72.5	✓	2	73	77	75	✓
Margaret River	4	31.0	54.0	41.3	(1)	4	0.010	0.035	0.021	✓	4	85.0	90.0	86.3	✓	4	37	42	40	✓
Mullalyup	2	9.0	58.0	33.5	(1)	2	0.010	0.330	0.170	✓	2	85.0	250.0	167.5	✓	2	26	130	78	✓
Myalup	2	44.0	55.0	49.5	(1)	2	0.030	0.050	0.040	✓	2	37.0	38.0	37.5	✓	2	45	62	54	✓
Nannup	5	3.0	9.0	6.8	(1)	5	0.012	0.020	0.017	✓	5	50.0	60.0	55.0	✓	5	37	49	43	✓
Northcliffe	3	28.0	37.0	31.3	(1)	3	0.025	0.045	0.032	✓	3	75.0	80.0	78.3	✓	3	55	69	62	✓
Pemberton	2	17.0	27.0	22.0	(1)	2	0.016	0.030	0.023	✓	2	75.0	80.0	77.5	✓	2	45	54	50	✓
Peppermint Grove	4	87.0	89.0	88.3	(1)	4	<0.008	<0.008	<0.008	✓	4	60.0	60.0	60.0	✓	4	54	57	56	✓
Preston Beach	4	250.0	280.0	272.5	(1)	4	<0.008	<0.008	<0.008	✓	4	170.0	235.0	198.8	✓	4	310	330	325	(2)
Quinninup	4	24.0	36.0	30.8	(1)	4	0.025	0.035	0.029	✓	4	75.0	85.0	80.0	✓	4	65	72	68	✓
Waroona	2	42.0	51.0	46.5	(1)	2	0.035	0.040	0.038	✓	2	42.0	45.0	43.5	✓	2	64	66	65	✓
Yarloop	2	55.0	55.0	55.0	(1)	2	0.025	0.025	0.025	✓	2	35.0	36.0	35.5	✓	2	56	57	57	✓

(1) No guideline value available as per ADWG 2011. (2) Elevated hardness is characteristic of the source supplying this locality.

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Table 19 **Aesthetic (Non-health related) Variables**

South West Region	Iron					Manganese					pH					Silicon				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (pH units)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min	Max	Mean			Min	Max	Mean			Min	Max	Mean			Min Value	Max Value	Mean Value	
Allanson	2	0.045	0.140	0.093	✓	2	0.010	0.012	0.011	✓	2	7.01	7.31	7.16	✓	2	2.1	2.3	2.2	✓
Augusta	4	0.060	0.070	0.063	✓	4	<0.002	<0.002	<0.002	✓	4	7.30	7.58	7.45	✓	4	11.0	16.0	14.0	✓
Australind	8	0.070	0.200	0.103	✓	8	<0.002	0.006	0.004	✓	8	7.18	8.04	7.70	✓	8	22.0	55.0	41.3	✓
Balingup	2	0.020	0.030	0.025	✓	2	<0.002	0.009	0.005	✓	2	8.14	8.29	8.22	✓	2	1.6	3.9	2.8	✓
Binningup	2	<0.003	0.010	0.005	✓	2	<0.002	<0.002	<0.002	✓	2	8.16	8.39	8.28	✓	2	1.0	1.1	1.1	✓
Boyanup	2	0.020	0.060	0.040	✓	2	<0.002	0.003	<0.002	✓	2	7.76	7.86	7.81	✓	2	18.0	19.0	18.5	✓
Boyup Brook	4	0.025	0.040	0.029	✓	4	<0.002	0.012	0.004	✓	4	7.73	8.02	7.86	✓	4	2.0	3.5	3.0	✓
Bridgetown	2	0.030	0.035	0.033	✓	2	<0.002	0.003	<0.002	✓	2	7.78	7.81	7.80	✓	2	3.3	3.5	3.4	✓
Brunswick Junction	2	0.100	0.100	0.100	✓	2	0.005	0.005	0.005	✓	2	7.74	7.94	7.84	✓	2	50.0	55.0	52.5	✓
Capel	4	0.050	0.060	0.055	✓	4	<0.002	<0.002	<0.002	✓	4	6.40	6.82	6.56	✓	4	14.0	14.0	14.0	✓
Collie	8	0.040	0.180	0.084	✓	8	0.008	0.050	0.017	✓	8	6.26	7.04	6.64	✓	8	1.0	5.1	2.2	✓
Cowaramup	4	0.070	0.260	0.128	✓	4	0.003	0.008	0.005	✓	4	7.12	7.61	7.35	✓	4	6.7	8.4	7.6	✓
Dalyellup	2	0.070	0.090	0.080	✓	2	0.014	0.016	0.015	✓	2	7.75	7.80	7.78	✓	2	15.0	16.0	15.5	✓
Dardanup	2	0.006	0.015	0.011	✓	2	<0.002	<0.002	<0.002	✓	2	6.91	7.61	7.26	✓	2	20.0	20.0	20.0	✓
Darkan	2	0.060	0.080	0.070	✓	2	0.006	0.016	0.011	✓	2	7.24	8.34	7.79	✓	2	1.9	3.5	2.7	✓
Donnybrook	3	0.008	0.100	0.056	✓	3	<0.002	0.003	<0.002	✓	3	6.76	7.16	6.92	✓	3	9.4	15.0	11.4	✓
Dunsborough	4	0.006	0.010	0.008	✓	4	<0.002	<0.002	<0.002	✓	4	8.07	8.34	8.17	✓	4	17.0	19.0	17.5	✓
Eaton	2	0.070	0.080	0.075	✓	2	<0.002	<0.002	<0.002	✓	2	7.08	7.29	7.19	✓	2	25.0	26.0	25.5	✓
Greenbushes	4	0.025	0.030	0.028	✓	4	<0.002	0.012	0.004	✓	4	7.75	8.10	7.93	✓	4	1.2	3.5	2.8	✓
Harvey	2	0.004	0.030	0.017	✓	2	<0.002	0.008	0.004	✓	2	6.98	8.21	7.60	✓	2	0.9	5.5	3.2	✓
Hester TWS	3	0.025	0.035	0.028	✓	3	<0.002	0.012	0.005	✓	3	8.18	8.56	8.35	✓	3	2.3	3.4	3.0	✓
Kirup	4	0.004	0.015	0.009	✓	4	<0.002	0.003	<0.002	✓	4	7.02	7.52	7.30	✓	4	2.2	9.8	6.3	✓
Logue Brook	2	0.020	0.020	0.020	✓	2	<0.002	<0.002	<0.002	✓	2	7.59	7.74	7.67	✓	2	1.6	4.1	2.9	✓
Manjimup	2	0.045	0.060	0.053	✓	2	0.007	0.016	0.012	✓	2	7.18	7.58	7.38	✓	2	4.6	6.3	5.5	✓
Margaret River	4	0.070	0.220	0.123	✓	4	0.004	0.007	0.006	✓	4	7.03	7.66	7.40	✓	4	6.7	8.7	7.7	✓
Mullalyup	2	0.006	0.060	0.033	✓	2	<0.002	0.009	0.005	✓	2	6.97	8.05	7.51	✓	2	1.8	9.0	5.4	✓
Myalup	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.33	8.47	8.40	✓	2	1.6	1.7	1.7	✓
Nannup	5	<0.003	0.050	0.023	✓	5	<0.002	0.020	0.008	✓	5	6.34	7.55	7.03	✓	5	5.3	6.8	6.1	✓
Northcliffe	3	0.020	0.030	0.027	✓	3	0.003	0.035	0.015	✓	3	7.40	7.78	7.59	✓	3	4.9	6.5	5.5	✓
Pemberton	2	0.015	0.035	0.025	✓	2	0.014	0.016	0.015	✓	2	7.60	7.80	7.70	✓	2	4.4	5.9	5.2	✓
Peppermint Grove	4	0.020	0.040	0.031	✓	4	<0.002	<0.002	<0.002	✓	4	6.99	7.24	7.10	✓	4	15.0	15.0	15.0	✓
Preston Beach	4	0.004	0.010	0.006	✓	4	<0.002	<0.002	<0.002	✓	4	8.28	8.37	8.32	✓	4	16.0	17.0	16.8	✓
Quinninup	4	0.030	0.050	0.041	✓	4	0.002	0.016	0.009	✓	4	7.68	8.12	7.89	✓	4	5.1	6.3	5.6	✓
Waroona	2	0.004	0.008	0.006	✓	2	<0.002	<0.002	<0.002	✓	2	7.78	7.97	7.88	✓	2	2.1	4.8	3.5	✓
Yarloop	2	0.004	0.008	0.006	✓	2	<0.002	<0.002	<0.002	✓	2	7.69	7.94	7.82	✓	2	1.0	1.1	1.1	✓

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Table 20 **Aesthetic (Non-health related) Variables**

South West Region	Sodium					TDS					True Colour					Turbidity				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (TCU)			Guideline Met	Samples Taken	Value (NTU)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min	Max	Mean			Min	Max	Mean	
Allanson	2	45.0	53.0	49.0	✓	2	190	218	204	✓	2	<1	3	2	✓	2	0.3	0.6	0.5	✓
Augusta	4	67.0	71.0	69.5	✓	4	346	369	358	✓	4	<1	<1	<1	✓	4	<0.1	0.3	0.2	✓
Australind	8	91.0	125.0	112.3	✓	8	495	547	526	✓	8	<1	<1	<1	✓	8	0.1	0.5	0.3	✓
Balingup	2	45.0	52.0	48.5	✓	2	285	338	312	✓	2	<1	<1	<1	✓	2	0.1	0.3	0.2	✓
Binningup	2	22.0	23.0	22.5	✓	2	144	152	148	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Boyanup	2	61.0	63.0	62.0	✓	2	382	392	387	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Boyup Brook	4	48.0	54.0	51.0	✓	4	297	338	318	✓	4	<1	<1	<1	✓	4	0.2	0.3	0.3	✓
Bridgetown	2	47.0	50.0	48.5	✓	2	304	313	309	✓	2	<1	1	<1	✓	2	0.2	0.9	0.6	✓
Brunswick Junction	2	115.0	115.0	115.0	✓	2	531	536	534	✓	2	<1	<1	<1	✓	2	0.3	0.4	0.4	✓
Capel	4	45.0	50.0	46.5	✓	4	260	272	265	✓	4	<1	<1	<1	✓	4	<0.1	0.3	<0.1	✓
Collie	8	32.0	51.0	41.9	✓	8	127	222	174	✓	8	<1	3	<1	✓	8	0.3	1.7	0.7	✓
Cowaramup	4	44.0	51.0	47.3	✓	4	215	243	231	✓	4	1	4	2	✓	4	0.2	0.8	0.6	✓
Dalyellup	2	75.0	80.0	77.5	✓	2	409	419	414	✓	2	<1	<1	<1	✓	2	0.4	0.4	0.4	✓
Dardanup	2	66.0	74.0	70.0	✓	2	264	303	284	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Darkan	2	40.0	54.0	47.0	✓	2	188	241	215	✓	2	<1	3	2	✓	2	0.5	0.5	0.5	✓
Donnybrook	3	115.0	145.0	135.0	✓	3	429	537	499	✓	3	<1	<1	<1	✓	3	0.1	0.4	0.3	✓
Dunsborough	4	120.0	140.0	130.0	✓	4	493	556	525	✓	4	<1	<1	<1	✓	4	<0.1	0.1	<0.1	✓
Eaton	2	64.0	68.0	66.0	✓	2	395	414	405	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Greenbushes	4	46.0	51.0	48.5	✓	4	278	339	310	✓	4	<1	<1	<1	✓	4	0.2	0.4	0.3	✓
Harvey	2	20.0	32.0	26.0	✓	2	134	140	137	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Hester TWS	3	43.0	51.0	47.7	✓	3	277	337	313	✓	3	<1	<1	<1	✓	3	0.2	0.3	0.2	✓
Kirup	4	30.0	145.0	81.5	✓	4	122	527	305	✓	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Logue Brook	2	21.0	40.0	30.5	✓	2	148	201	175	✓	2	<1	<1	<1	✓	2	0.1	0.4	0.3	✓
Manjimup	2	39.0	41.0	40.0	✓	2	222	240	231	✓	2	<1	<1	<1	✓	2	0.3	0.4	0.4	✓
Margaret River	4	45.0	51.0	48.0	✓	4	220	259	238	✓	4	1	4	2	✓	4	0.3	1.0	0.6	✓
Mullalyup	2	53.0	150.0	101.5	✓	2	195	556	376	✓	2	<1	<1	<1	✓	2	<0.1	0.4	0.2	✓
Myalup	2	25.0	26.0	25.5	✓	2	138	159	149	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Nannup	5	49.0	57.0	52.8	✓	5	209	234	220	✓	5	<1	<1	<1	✓	5	<0.1	0.3	<0.1	✓
Northcliffe	3	47.0	51.0	48.7	✓	3	225	248	239	✓	3	<1	<1	<1	✓	3	0.1	0.3	0.2	✓
Pemberton	2	53.0	55.0	54.0	✓	2	232	234	233	✓	2	<1	<1	<1	✓	2	0.2	0.2	0.2	✓
Peppermint Grove	4	44.0	48.0	46.0	✓	4	279	287	282	✓	4	<1	<1	<1	✓	4	<0.1	0.3	0.2	✓
Preston Beach	4	97.0	135.0	111.3	✓	4	775	841	811	(1)	4	<1	1	<1	✓	4	<0.1	0.2	<0.1	✓
Quinninup	4	45.0	52.0	46.8	✓	4	233	247	243	✓	4	<1	<1	<1	✓	4	0.1	0.3	0.2	✓
Waroona	2	23.0	25.0	24.0	✓	2	162	178	170	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Yarloop	2	22.0	23.0	22.5	✓	2	153	159	156	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓

(1) Elevated TDS is characteristic of the source supplying this locality.

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Table 21 Health related variables

Great Southern Region	E. coli				Thermophilic Naegleria			Fluoride					Hydrocarbons		Metals	
Locality	Samples Taken	Samples >0 cfu/100mL	Max cfu/100mL	Requirement Met	Samples Taken	Samples with Thermophilic Naegleria	Requirement Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met
									Min	Max	Mean					
Albany	161	0	0	✓	79	0	✓	52	0.40	0.85	0.75	✓	0	(1)	8	✓
Boddington	52	0	0	✓	52	0	✓	4	0.45	0.90	0.73	✓	0	(1)	2	✓
Borden	12	0	0	✓	6	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Bremer Bay	52	0	0	✓	25	0	✓	4	0.55	0.55	0.55	✓	0	(1)	2	✓
Brookton	52	0	0	✓	52	0	✓	4	0.70	0.85	0.78	✓	0	(1)	2	✓
Broomehill	12	0	0	✓	12	0	✓	4	0.80	0.85	0.83	✓	0	(1)	2	✓
Bullaring	12	0	0	✓	12	0	✓	4	0.70	0.85	0.78	✓	0	(1)	2	✓
Condingup	12	0	0	✓	8	0	✓	2	0.30	0.30	0.30	✓	0	(1)	2	✓
Cranbrook	12	0	0	✓	6	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Cuballing	12	0	0	✓	12	0	✓	4	0.60	0.80	0.75	✓	0	(1)	2	✓
Denmark	65	0	0	✓	31	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Dudinin TWS	12	0	0	✓	12	0	✓	4	0.75	0.90	0.81	✓	1	✓	2	✓
Dumbleyung	12	0	0	✓	12	0	✓	5	0.75	0.85	0.80	✓	0	(1)	2	✓
Esperance	91	0	0	✓	61	0	✓	52	0.45	0.85	0.67	✓	0	(1)	4	✓
Frankland	12	0	0	✓	6	0	✓	2	<0.1	<0.1	<0.1	✓	2	✓	2	✓
Gibson	12	0	0	✓	8	0	✓	2	0.35	0.35	0.35	✓	0	(1)	2	✓
Gnowangerup	52	0	0	✓	52	0	✓	4	0.80	0.85	0.81	✓	2	✓	2	✓
Grass Patch	12	0	0	✓	8	0	✓	4	0.60	0.75	0.70	✓	0	(1)	3	✓
Harrismith TWS	12	0	0	✓	12	0	✓	4	0.70	0.90	0.79	✓	0	(1)	2	✓
Highbury	12	0	0	✓	12	0	✓	4	0.55	0.80	0.74	✓	0	(1)	2	✓
Hopetoun	50	0	0	✓	34	0	✓	2	0.10	0.10	0.10	✓	0	(1)	2	✓
Hyden	12	0	0	✓	12	0	✓	4	0.30	0.85	0.70	✓	1	✓	2	✓
Jerramungup	12	0	0	✓	6	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Karlgarin	12	0	0	✓	12	0	✓	4	0.80	0.85	0.83	✓	0	(1)	2	✓
Katanning	65	0	0	✓	65	0	✓	52	0.65	0.90	0.81	✓	0	(1)	2	✓
Kendenup	12	0	0	✓	6	0	✓	4	0.75	0.80	0.78	✓	2	✓	2	✓
Kojonup	52	0	0	✓	52	0	✓	5	0.75	0.85	0.80	✓	0	(1)	2	✓
Kondinin	12	0	0	✓	12	0	✓	4	0.70	0.85	0.80	✓	1	✓	2	✓
Kukerin	12	0	0	✓	12	0	✓	5	0.75	0.85	0.80	✓	0	(1)	2	✓
Kulin	12	0	0	✓	12	0	✓	4	0.70	0.85	0.76	✓	1	✓	2	✓
Lake Grace	51	0	0	✓	51	0	✓	4	0.65	0.85	0.74	✓	0	(1)	2	✓
Lake King	12	0	0	✓	8	0	✓	4	0.75	0.85	0.81	✓	0	(1)	2	✓
Mt Barker	52	0	0	✓	25	0	✓	52	0.60	0.85	0.77	✓	0	(1)	2	✓
Munglinup	12	0	0	✓	8	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Muradup	12	0	0	✓	12	0	✓	4	0.80	0.85	0.83	✓	0	(1)	2	✓
Narrikup	12	0	0	✓	6	0	✓	4	0.65	0.80	0.75	✓	2	✓	2	✓
Narrogin	65	0	0	✓	65	0	✓	52	0.50	0.90	0.76	✓	0	(1)	2	✓
Newdegate	12	0	0	✓	12	0	✓	4	0.75	0.85	0.80	✓	0	(1)	2	✓
Nyabing	12	0	0	✓	12	0	✓	4	0.80	0.90	0.83	✓	0	(1)	2	✓
Ongerup	12	0	0	✓	6	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Pingaring	12	0	0	✓	12	0	✓	4	0.65	0.85	0.78	✓	0	(1)	2	✓
Pingelly	52	0	0	✓	52	0	✓	5	0.65	0.85	0.78	✓	0	(1)	2	✓
Pingrup	12	0	0	✓	12	0	✓	4	0.85	0.85	0.85	✓	0	(1)	2	✓
Popanyinning	12	0	0	✓	12	0	✓	4	0.60	0.80	0.75	✓	0	(1)	2	✓
Ravensthorpe	12	0	0	✓	8	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Rocky Gully	12	0	0	✓	6	0	✓	4	0.75	0.80	0.79	✓	0	(1)	2	✓
Salmon Gums	12	0	0	✓	8	0	✓	2	0.35	0.35	0.35	✓	0	(1)	2	✓
Tambellup	12	0	0	✓	12	0	✓	4	0.80	0.85	0.83	✓	0	(1)	2	✓
Tincurrin TWS	12	0	0	✓	12	1	✓	4	0.70	0.90	0.79	✓	0	(1)	2	✓
Varley	12	0	0	✓	8	0	✓	4	0.55	0.85	0.75	✓	0	(1)	2	✓
Wagin	52	0	0	✓	52	0	✓	4	0.75	0.80	0.79	✓	0	(1)	2	✓
Walpole	52	0	0	✓	25	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓
Wandering	12	0	0	✓	12	0	✓	4	0.30	0.80	0.66	✓	2	✓	2	✓
Wellstead	12	0	0	✓	6	0	✓	2	0.20	0.25	0.23	✓	0	(1)	2	✓
Wickepin TWS	12	0	0	✓	12	0	✓	4	0.70	0.85	0.79	✓	0	(1)	2	✓
Williams	12	0	0	✓	12	0	✓	4	0.70	0.85	0.78	✓	0	(1)	2	✓
Woodanilling	12	0	0	✓	12	0	✓	4	0.60	0.85	0.75	✓	0	(1)	2	✓
Yealering	12	0	0	✓	12	0	✓	4	0.70	0.90	0.84	✓	0	(1)	2	✓

(1) No samples required in this 12 month period.

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Table 22 Health related variables

Great Southern Region	Nitrate					Pesticides		Radiological		Trihalomethanes					Other Health Related	
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Requirement Met
		Min	Max	Mean							Min	Max	Mean			
Albany	20	0.40	1.32	0.92	✓	4	✓	8	✓	8	0.053	0.150	0.111	✓	0	(1)
Boddington	2	0.22	0.75	0.48	✓	1	✓	0	(1)	4	0.093	0.170	0.128	✓	0	(1)
Borden	2	<0.22	0.22	<0.22	✓	1	✓	0	(1)	2	0.028	0.036	0.032	✓	0	(1)
Bremer Bay	4	24.64	26.40	25.30	✓	1	✓	2	✓	2	0.097	0.110	0.104	✓	0	(1)
Brookton	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.074	0.096	0.087	✓	0	(1)
Broomehill	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.085	0.110	0.101	✓	0	(1)
Bullaring	4	<0.22	0.44	0.26	✓	1	✓	0	(1)	4	0.100	0.140	0.118	✓	0	(1)
Condingup	4	0.26	2.02	1.41	✓	1	✓	2	ü	2	0.011	0.013	0.012	✓	0	(1)
Cranbrook	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.034	0.065	0.049	✓	0	(1)
Cuballing	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.084	0.120	0.109	✓	0	(1)
Denmark	4	0.48	0.88	0.70	✓	1	✓	0	(1)	4	0.037	0.062	0.052	✓	2	✓
Dudinin TWS	4	<0.22	0.26	<0.22	✓	1	✓	0	(1)	3	0.061	0.110	0.082	✓	0	(1)
Dumbleyung	2	0.31	0.40	0.35	✓	1	✓	0	(1)	5	0.100	0.180	0.136	✓	0	✓
Esperance	8	12.76	27.72	16.10	✓	2	✓	0	(1)	4	0.005	0.037	0.021	✓	0	(1)
Frankland	4	<0.22	<0.22	<0.22	✓	1	✓	1	✓	4	0.033	0.080	0.049	✓	2	✓
Gibson	4	8.36	15.40	11.44	✓	1	✓	2	✓	2	0.026	0.056	0.041	✓	1	✓
Gnowangerup	4	<0.22	0.26	<0.22	✓	1	✓	0	(1)	4	0.031	0.170	0.128	✓	2	✓
Grass Patch	4	10.56	20.24	15.53	✓	1	✓	2	✓	2	0.045	0.081	0.063	✓	0	(1)
Harrismith TWS	4	<0.22	0.48	<0.22	✓	1	✓	0	(1)	4	0.150	0.190	0.170	✓	0	(1)
Highbury	4	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.070	0.110	0.089	✓	1	✓
Hopetoun	4	0.92	4.22	3.30	✓	1	✓	0	(1)	2	0.008	0.014	0.011	✓	0	(1)
Hyden	4	<0.22	0.26	<0.22	✓	1	✓	0	(1)	4	0.060	0.095	0.076	✓	0	(1)
Jerramungup	4	<0.22	0.40	<0.22	✓	1	✓	0	(1)	2	0.054	0.066	0.060	✓	0	(1)
Karlgarin	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.049	0.094	0.073	✓	0	(1)
Katanning	4	<0.22	<0.22	<0.22	✓	1	✓	2	✓	4	0.050	0.066	0.057	✓	0	(1)
Kendenup	4	0.84	1.32	1.10	✓	1	✓	0	(1)	4	0.100	0.160	0.125	✓	2	✓
Kojonup	2	<0.22	0.31	<0.22	✓	1	✓	1	✓	5	0.090	0.150	0.110	✓	0	(1)
Kondinin	4	<0.22	0.26	<0.22	✓	1	✓	0	(1)	4	0.070	0.085	0.076	✓	0	(1)
Kukerin	5	0.40	0.53	0.44	✓	1	✓	0	(1)	5	0.080	0.170	0.126	✓	0	(1)
Kulin	4	<0.22	0.31	<0.22	✓	1	✓	0	(1)	4	0.120	0.210	0.175	✓	0	(1)
Lake Grace	4	<0.22	0.35	<0.22	✓	1	✓	0	(1)	4	0.093	0.160	0.133	✓	0	(1)
Lake King	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.069	0.110	0.082	✓	0	(1)
Mt Barker	4	0.79	1.41	1.10	✓	1	✓	0	(1)	4	0.091	0.150	0.128	✓	0	(1)
Munglinup	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.050	0.100	0.075	✓	0	(1)
Muradup	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.098	0.170	0.125	✓	0	(1)
Narrikup	4	0.70	1.10	0.97	✓	1	✓	0	(1)	4	0.092	0.140	0.112	✓	2	✓
Narrogin	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.068	0.130	0.099	✓	0	(1)
Newdegate	2	<0.22	0.35	<0.22	✓	1	✓	0	(1)	4	0.120	0.140	0.128	✓	0	(1)
Nyabing	4	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.070	0.079	0.075	✓	0	(1)
Ongerup	2	0.31	0.97	0.66	✓	1	✓	0	(1)	2	0.064	0.066	0.065	✓	0	(1)
Pingaring	4	0.31	0.48	0.40	✓	1	✓	0	(1)	4	0.180	0.260	0.213	✓	0	(1)
Pingelly	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	5	0.069	0.180	0.103	✓	0	(1)
Pingrup	2	<0.22	0.35	<0.22	✓	1	✓	0	(1)	4	0.030	0.051	0.039	✓	0	(1)
Popanyinning	2	<0.22	0.26	<0.22	✓	1	✓	0	(1)	4	0.110	0.170	0.150	✓	0	(1)
Ravensthorpe	4	<0.22	<0.22	<0.22	✓	4	✓	0	(1)	4	0.060	0.110	0.081	✓	0	(1)
Rocky Gully	4	1.01	1.41	1.23	✓	1	✓	0	(1)	2	0.088	0.100	0.094	✓	0	(1)
Salmon Gums	4	1.06	1.54	1.23	✓	1	✓	0	(1)	2	0.110	0.120	0.115	✓	0	(1)
Tambellup	2	<0.22	0.35	<0.22	✓	1	✓	0	(1)	4	0.071	0.110	0.084	✓	0	(1)
Tincurrin TWS	4	0.26	0.48	0.40	✓	1	✓	0	(1)	4	0.078	0.150	0.119	✓	0	(1)
Varley	2	0.22	0.22	0.22	✓	1	✓	0	(1)	2	0.050	0.057	0.054	✓	0	(1)
Wagin	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.100	0.170	0.140	✓	0	✓
Walpole	4	0.62	0.97	0.84	✓	1	✓	0	(1)	4	0.087	0.100	0.096	✓	0	(1)
Wandering	2	0.31	0.44	0.40	✓	1	✓	2	✓	4	0.110	0.140	0.118	✓	2	✓
Wellstead	2	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	2	0.035	0.048	0.042	✓	1	✓
Wickepin TWS	4	<0.22	<0.22	<0.22	✓	1	✓	0	(1)	4	0.084	0.130	0.107	✓	0	(1)
Williams	2	<0.22	0.57	0.31	✓	1	✓	0	(1)	4	0.057	0.160	0.114	✓	0	(1)
Woodanilling	2	<0.22	0.31	<0.22	✓	1	✓	0	(1)	4	0.082	0.180	0.133	✓	1	✓
Yealering	4	<0.22	0.53	<0.22	✓	1	✓	0	(1)	4	0.094	0.190	0.136	✓	0	(1)

(1) No samples required in this 12 month period.

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Table 23 **Aesthetic (Non-health related) Variables**

Great Southern Region	Alkalinity (as CaCO3)					Aluminium					Chloride					Hardness				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min Value	Max Value	Mean Value			Min	Max	Mean	
Albany	20	130.0	230.0	199.0	(1)	20	<0.008	0.010	<0.008	✓	20	105.0	140.0	123.3	✓	20	180	310	260	(3)
Boddington	2	14.0	14.0	14.0	(1)	2	0.014	0.025	0.020	✓	2	80.0	90.0	85.0	✓	2	45	49	47	✓
Borden	2	12.0	20.0	16.0	(1)	2	0.040	0.085	0.063	✓	2	13.0	16.0	14.5	✓	2	16	23	20	✓
Bremer Bay	4	280.0	290.0	282.5	(1)	4	<0.008	<0.008	<0.008	✓	4	180.0	190.0	186.3	✓	4	160	170	168	✓
Brookton	2	15.0	21.0	18.0	(1)	2	0.030	0.045	0.038	✓	2	100.0	100.0	100.0	✓	2	55	62	59	✓
Broomehill	2	17.0	21.0	19.0	(1)	1	0.030	0.030	0.030	✓	2	105.0	125.0	115.0	✓	2	63	66	65	✓
Bullaring	4	28.0	35.0	30.8	(1)	4	0.018	0.035	0.023	✓	4	95.0	120.0	110.0	✓	4	65	75	71	✓
Condingup	4	120.0	140.0	132.5	(1)	4	<0.008	<0.008	<0.008	✓	4	375.0	390.0	382.5	(2)	4	76	85	81	✓
Cranbrook	2	5.0	7.0	6.0	(1)	2	0.020	0.025	0.023	✓	2	21.0	22.0	21.5	✓	2	17	18	18	✓
Cuballing	2	11.0	16.0	13.5	(1)	2	0.018	0.018	0.018	✓	2	100.0	115.0	107.5	✓	2	54	58	56	✓
Denmark	4	6.0	8.0	6.8	(1)	4	0.010	0.016	0.013	✓	4	180.0	205.0	193.8	✓	4	60	75	67	✓
Dudinin TWS	4	25.0	36.0	28.5	(1)	4	0.012	0.018	0.015	✓	4	95.0	115.0	105.0	✓	4	65	84	74	✓
Dumbleyung	2	28.0	30.0	29.0	(1)	2	0.016	0.025	0.021	✓	2	95.0	115.0	105.0	✓	2	69	74	72	✓
Esperance	8	250.0	290.0	263.8	(1)	8	<0.008	<0.008	<0.008	✓	8	180.0	205.0	188.8	✓	8	300	400	340	(3)
Frankland	4	2.0	3.0	2.5	(1)	4	0.010	0.025	0.016	✓	4	12.0	15.0	13.8	✓	4	9	14	11	✓
Gibson	4	68.0	73.0	70.0	(1)	4	<0.008	<0.008	<0.008	✓	4	220.0	225.0	221.3	✓	4	36	46	40	✓
Gnowangerup	4	18.0	26.0	23.0	(1)	4	0.030	0.035	0.034	✓	4	110.0	125.0	116.3	✓	4	66	73	69	✓
Grass Patch	4	260.0	280.0	272.5	(1)	4	<0.008	0.014	0.009	✓	4	175.0	200.0	187.5	✓	4	330	350	335	(3)
Harrismith TWS	4	18.0	29.0	24.0	(1)	4	0.014	0.030	0.021	✓	4	95.0	120.0	102.5	✓	4	62	69	65	✓
Highbury	4	11.0	18.0	14.3	(1)	4	0.012	0.025	0.016	✓	4	90.0	115.0	101.3	✓	4	48	58	51	✓
Hopetoun	4	37.0	190.0	144.3	(1)	4	<0.008	<0.008	<0.008	✓	4	155.0	265.0	196.3	✓	4	87	190	162	✓
Hyden	4	14.0	31.0	24.0	(1)	4	0.016	0.025	0.022	✓	4	55.0	120.0	100.0	✓	4	40	75	66	✓
Jerramungup	4	7.0	12.0	9.5	(1)	4	0.014	0.018	0.016	✓	4	36.0	50.0	42.3	✓	4	17	23	19	✓
Karlgarin	2	25.0	29.0	27.0	(1)	2	0.014	0.016	0.015	✓	2	115.0	120.0	117.5	✓	2	74	80	77	✓
Katanning	4	16.0	20.0	17.3	(1)	4	<0.008	0.025	0.014	✓	4	110.0	120.0	115.0	✓	4	53	63	60	✓
Kendenup	4	210.0	220.0	215.0	(1)	4	<0.008	<0.008	<0.008	✓	4	115.0	135.0	123.8	✓	4	270	280	273	(3)
Kojonup	2	18.0	21.0	19.5	(1)	2	0.014	0.030	0.022	✓	2	110.0	120.0	115.0	✓	2	63	65	64	✓
Kondinin	4	26.0	30.0	28.5	(1)	4	0.020	0.020	0.020	✓	4	105.0	125.0	116.3	✓	4	75	78	77	✓
Kukerin	5	27.0	35.0	29.6	(1)	5	0.014	0.025	0.020	✓	5	95.0	120.0	108.0	✓	5	62	78	70	✓
Kulin	4	21.0	29.0	24.0	(1)	4	0.018	0.030	0.023	✓	4	95.0	120.0	103.8	✓	4	61	71	67	✓
Lake Grace	4	25.0	35.0	28.5	(1)	4	0.014	0.030	0.021	✓	4	100.0	120.0	107.5	✓	4	71	77	73	✓
Lake King	2	26.0	34.0	30.0	(1)	2	0.018	0.025	0.022	✓	2	110.0	120.0	115.0	✓	2	74	77	76	✓
Mt Barker	4	180.0	230.0	210.0	(1)	4	<0.008	0.010	<0.008	✓	4	115.0	125.0	120.0	✓	4	280	290	283	(3)
Munglinup	2	5.0	5.0	5.0	(1)	2	0.010	0.014	0.012	✓	2	25.0	30.0	27.5	✓	2	14	14	14	✓
Muradup	2	24.0	26.0	25.0	(1)	2	0.025	0.025	0.025	✓	2	120.0	120.0	120.0	✓	2	68	71	70	✓
Narrikup	4	210.0	220.0	212.5	(1)	4	<0.008	0.010	<0.008	✓	4	115.0	135.0	123.8	✓	4	270	290	275	(3)
Narrogin	2	11.0	17.0	14.0	(1)	2	0.014	0.020	0.017	✓	2	90.0	100.0	95.0	✓	2	48	50	49	✓
Newdegate	2	26.0	35.0	30.5	(1)	2	0.018	0.020	0.019	✓	2	105.0	120.0	112.5	✓	2	78	81	80	✓
Nyabing	4	13.0	17.0	15.0	(1)	4	0.010	0.020	0.015	✓	4	110.0	115.0	112.5	✓	4	60	63	62	✓
Ongerup	2	11.0	15.0	13.0	(1)	2	<0.008	0.010	<0.008	✓	2	21.0	24.0	22.5	✓	2	17	19	18	✓
Pingaring	4	30.0	36.0	32.5	(1)	4	0.014	0.018	0.017	✓	4	100.0	125.0	112.5	✓	4	79	87	83	✓
Pingelly	2	13.0	23.0	18.0	(1)	2	0.020	0.035	0.028	✓	2	95.0	115.0	105.0	✓	2	54	64	59	✓
Pingrup	2	14.0	23.0	18.5	(1)	2	<0.008	0.012	<0.008	✓	2	110.0	120.0	115.0	✓	2	59	66	63	✓
Popanyinning	2	11.0	13.0	12.0	(1)	2	0.012	0.035	0.024	✓	2	85.0	105.0	95.0	✓	2	48	52	50	✓
Ravensthorpe	4	23.0	30.0	25.8	(1)	4	0.030	0.070	0.050	✓	4	26.0	31.0	28.3	✓	4	23	29	25	✓
Rocky Gully	4	210.0	230.0	217.5	(1)	4	<0.008	0.010	<0.008	✓	4	110.0	130.0	121.3	✓	4	270	290	278	(3)
Salmon Gums	4	180.0	190.0	187.5	(1)	4	0.016	0.025	0.020	✓	4	41.0	45.0	43.5	✓	4	100	110	108	✓
Tambellup	2	24.0	27.0	25.5	(1)	2	0.025	0.030	0.028	✓	2	120.0	130.0	125.0	✓	2	70	78	74	✓
Tincurrin TWS	4	23.0	27.0	24.0	(1)	4	0.025	0.050	0.035	✓	4	95.0	120.0	103.8	✓	4	59	72	67	✓
Varley	2	29.0	30.0	29.5	(1)	2	0.020	0.025	0.023	✓	2	105.0	120.0	112.5	✓	2	76	79	78	✓
Wagin	2	13.0	14.0	13.5	(1)	2	0.012	0.030	0.021	✓	2	90.0	100.0	95.0	✓	2	46	51	49	✓
Walpole	4	23.0	33.0	26.5	(1)	4	0.010	0.030	0.020	✓	4	80.0	135.0	107.5	✓	4	34	50	41	✓
Wandering	2	16.0	17.0	16.5	(1)	2	0.012	0.018	0.015	✓	2	85.0	105.0	95.0	✓	2	49	52	51	✓
Wellstead	2	4.0	8.0	6.0	(1)	2	0.012	0.020	0.016	✓	2	20.0	37.0	28.5	✓	2	11	16	14	✓
Wickepin TWS	4	10.0	22.0	14.0	(1)	4	0.014	0.020	0.017	✓	4	85.0	120.0	101.3	✓	4	44	59	52	✓
Williams	2	8.0	8.0	8.0	(1)	2	0.018	0.025	0.022	✓	2	60.0	85.0	72.5	✓	2	29	41	35	✓
Woodanilling	2	15.0	16.0	15.5	(1)	2	0.016	0.016	0.016	✓	2	105.0	115.0	110.0	✓	2	56	60	58	✓
Yealering	4	21.0	30.0	27.0	(1)	4	0.020	0.035	0.026	✓	4	90.0	120.0	103.8	✓	4	61	68	64	✓

(1) No guideline value available as per ADWG 2011. (2) Elevated chloride is characteristic of the source supplying this locality. (3) Elevated hardness is characteristic of the source supplying this locality

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Table 24 **Aesthetic (Non-health related) Variables**

Great Southern Region	Iron					Manganese					pH					Silicon				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (pH units)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min	Max	Mean			Min	Max	Mean			Min	Max	Mean			Min Value	Max Value	Mean Value	
Albany	20	0.020	0.280	0.098	✓	20	<0.002	0.003	<0.002	✓	20	7.40	7.85	7.58	✓	20	62.0	81.0	67.5	✓
Boddington	2	0.040	0.100	0.070	✓	2	0.007	0.020	0.014	✓	2	7.38	7.55	7.47	✓	2	43.0	44.0	43.5	✓
Borden	2	0.008	0.015	0.012	✓	2	<0.002	<0.002	<0.002	✓	2	6.86	7.12	6.99	✓	2	5.5	8.5	7.0	✓
Bremer Bay	4	<0.003	0.006	<0.003	✓	4	<0.002	<0.002	<0.002	✓	4	8.08	8.21	8.14	✓	4	180.0	190.0	185.0	✓
Brookton	2	0.090	0.200	0.145	✓	2	0.006	0.020	0.013	✓	2	7.62	7.75	7.69	✓	2	47.0	48.0	47.5	✓
Broomehill	2	0.120	0.180	0.150	✓	2	0.003	0.006	0.005	✓	2	7.31	7.57	7.44	✓	2	54.0	56.0	55.0	✓
Bullaring	4	0.080	0.480	0.195	✓	4	0.002	0.035	0.011	✓	4	7.58	7.87	7.69	✓	4	49.0	56.0	51.8	✓
Condingup	4	0.020	0.050	0.034	✓	4	<0.002	<0.002	<0.002	✓	4	6.65	6.99	6.79	✓	4	290.0	320.0	303.8	✓
Cranbrook	2	0.040	0.060	0.050	✓	2	<0.002	<0.002	<0.002	✓	2	6.73	7.24	6.99	✓	2	9.0	10.0	9.5	✓
Cuballing	2	0.160	0.160	0.160	✓	2	0.016	0.040	0.028	✓	2	7.27	7.46	7.37	✓	2	53.0	59.0	56.0	✓
Denmark	4	0.010	0.015	0.011	✓	4	<0.002	<0.002	<0.002	✓	4	6.62	7.12	6.92	✓	4	90.0	110.0	99.8	✓
Dudinin TWS	4	0.120	0.180	0.150	✓	4	<0.002	0.005	0.003	✓	4	8.89	9.25	9.13	(2)	4	47.0	54.0	49.8	✓
Dumbleyung	2	0.100	0.120	0.110	✓	2	0.007	0.009	0.008	✓	2	8.25	8.47	8.36	✓	2	50.0	54.0	52.0	✓
Esperance	8	<0.003	0.080	0.013	✓	8	<0.002	<0.002	<0.002	✓	8	7.46	7.91	7.65	✓	8	98.0	115.0	107.9	✓
Frankland	4	0.010	0.030	0.016	✓	4	<0.002	<0.002	<0.002	✓	4	6.31	7.16	6.84	✓	4	4.8	7.0	6.0	✓
Gibson	4	0.040	0.080	0.058	✓	4	<0.002	<0.002	<0.002	✓	4	6.49	6.83	6.69	✓	4	185.0	185.0	185.0	✓
Gnowangerup	4	0.070	0.160	0.128	✓	4	0.002	0.007	0.005	✓	4	7.46	8.52	7.97	✓	4	54.0	57.0	55.5	✓
Grass Patch	4	<0.003	0.015	0.006	✓	4	<0.002	<0.002	<0.002	✓	4	8.10	8.27	8.17	✓	4	100.0	115.0	107.5	✓
Harrismith TWS	4	0.120	0.320	0.200	✓	4	0.006	0.030	0.020	✓	4	8.22	8.89	8.61	(2)	4	47.0	57.0	50.3	✓
Highbury	4	0.090	0.360	0.188	✓	4	0.010	0.018	0.014	✓	4	7.17	7.42	7.28	✓	4	45.0	58.0	52.3	✓
Hopetoun	4	<0.003	0.030	0.008	✓	4	<0.002	0.003	<0.002	✓	4	6.58	7.75	7.37	✓	4	105.0	150.0	121.3	✓
Hyden	4	0.020	0.060	0.048	✓	4	<0.002	<0.002	<0.002	✓	4	6.97	7.63	7.35	✓	4	25.0	58.0	48.3	✓
Jerramungup	4	0.045	0.080	0.059	✓	4	<0.002	<0.002	<0.002	✓	4	6.99	7.30	7.13	✓	4	21.0	31.0	25.0	✓
Karlgarin	2	0.040	0.070	0.055	✓	2	<0.002	<0.002	<0.002	✓	2	7.41	7.50	7.46	✓	2	58.0	58.0	58.0	✓
Katanning	4	0.070	0.360	0.218	✓	4	0.004	0.012	0.008	✓	4	7.04	7.50	7.38	✓	4	50.0	58.0	53.5	✓
Kendenup	4	0.030	0.045	0.036	✓	4	<0.002	<0.002	<0.002	✓	4	7.84	8.08	7.96	✓	4	60.0	66.0	63.0	✓
Kojonup	2	0.080	0.140	0.110	✓	2	0.002	0.003	0.003	✓	2	7.11	7.54	7.33	✓	2	52.0	55.0	53.5	✓
Kondinin	4	0.050	0.090	0.060	✓	4	<0.002	0.002	<0.002	✓	4	7.51	8.18	7.79	✓	4	55.0	56.0	55.5	✓
Kukerin	5	0.050	0.090	0.068	✓	5	<0.002	<0.002	<0.002	✓	5	7.65	8.30	7.91	✓	5	48.0	57.0	51.4	✓
Kulin	4	0.090	0.220	0.130	✓	4	0.005	0.020	0.011	✓	4	7.64	8.60	8.20	✓	4	47.0	56.0	50.8	✓
Lake Grace	4	0.080	0.140	0.100	✓	4	0.003	0.007	0.005	✓	4	8.11	8.81	8.54	(2)	4	47.0	56.0	50.3	✓
Lake King	2	0.090	0.090	0.090	✓	2	0.005	0.006	0.006	✓	2	7.72	7.93	7.83	✓	2	49.0	59.0	54.0	✓
Mt Barker	4	0.030	0.640	0.220	✓	4	<0.002	0.004	<0.002	✓	4	7.66	8.03	7.80	✓	4	61.0	66.0	64.3	✓
Munglinup	2	0.060	0.100	0.080	✓	2	<0.002	0.003	<0.002	✓	2	6.66	6.76	6.71	✓	2	12.0	16.0	14.0	✓
Muradup	2	0.120	0.200	0.160	✓	2	0.002	0.005	0.004	✓	2	7.56	7.96	7.76	✓	2	57.0	60.0	58.5	✓
Narrikup	4	0.060	0.120	0.083	✓	4	<0.002	<0.002	<0.002	✓	4	7.66	7.92	7.76	✓	4	62.0	67.0	64.5	✓
Narrogin	2	0.220	0.300	0.260	✓	2	0.007	0.025	0.016	✓	2	6.83	7.42	7.13	✓	2	44.0	48.0	46.0	✓
Newdegate	2	0.080	0.100	0.090	✓	2	0.002	0.006	0.004	✓	2	7.60	8.16	7.88	✓	2	52.0	58.0	55.0	✓
Nyabing	4	0.080	0.200	0.135	✓	4	<0.002	0.007	0.003	✓	4	7.06	7.51	7.28	✓	4	52.0	58.0	54.8	✓
Ongerup	2	0.006	0.010	0.008	✓	2	<0.002	<0.002	<0.002	✓	2	6.59	6.90	6.75	✓	2	11.0	15.0	13.0	✓
Pingaring	4	0.040	0.090	0.059	✓	4	<0.002	0.003	<0.002	✓	4	9.10	9.52	9.29	(2)	4	50.0	59.0	53.5	✓
Pingelly	2	0.140	0.240	0.190	✓	2	0.016	0.055	0.036	✓	2	7.40	8.08	7.74	✓	2	50.0	51.0	50.5	✓
Pingrup	2	0.080	0.100	0.090	✓	2	<0.002	0.009	0.005	✓	2	6.68	6.72	6.70	✓	2	55.0	63.0	59.0	✓
Popanyinning	2	0.080	0.300	0.190	✓	2	0.009	0.055	0.032	✓	2	7.02	7.17	7.10	✓	2	47.0	49.0	48.0	✓
Ravensthorpe	4	0.080	0.240	0.138	✓	4	<0.002	0.009	0.004	✓	4	6.86	7.66	7.21	✓	4	17.0	21.0	18.5	✓
Rocky Gully	4	0.040	0.070	0.050	✓	4	<0.002	<0.002	<0.002	✓	4	8.21	8.31	8.26	✓	4	60.0	65.0	63.8	✓
Salmon Gums	4	<0.003	0.004	<0.003	✓	4	<0.002	<0.002	<0.002	✓	4	8.43	8.53	8.46	✓	4	60.0	66.0	63.5	✓
Tambellup	2	0.240	0.240	0.240	✓	2	0.004	0.008	0.006	✓	2	8.06	8.22	8.14	✓	2	56.0	58.0	57.0	✓
Tincurrin TWS	4	0.240	0.520	0.370	(1)	4	0.009	0.055	0.023	✓	4	7.09	7.84	7.41	✓	4	46.0	55.0	50.3	✓
Varley	2	0.090	0.100	0.095	✓	2	0.004	0.005	0.005	✓	2	7.44	7.56	7.50	✓	2	51.0	59.0	55.0	✓
Wagin	2	0.120	0.280	0.200	✓	2	0.008	0.025	0.017	✓	2	7.11	7.26	7.19	✓	2	44.0	48.0	46.0	✓
Walpole	4	0.004	0.020	0.010	✓	4	<0.002	0.025	0.007	✓	4	7.08	7.63	7.36	✓	4	60.0	92.0	75.0	✓
Wandering	2	0.070	0.180	0.125	✓	2	0.005	0.008	0.007	✓	2	7.35	7.44	7.40	✓	2	48.0	52.0	50.0	✓
Wellstead	2	0.060	0.160	0.110	✓	2	<0.002	0.014	0.007	✓	2	5.91	7.10	6.51	✓	2	12.0	21.0	16.5	✓
Wickepin TWS	4	0.080	0.180	0.113	✓	4	0.008	0.016	0.012	✓	4	7.16	7.58	7.42	✓	4	44.0	55.0	49.0	✓
Williams	2	0.035	0.100	0.068	✓	2	0.014	0.025	0.020	✓	2	6.52	6.54	6.53	✓	2	35.0	43.0	39.0	✓
Woodanilling	2	0.120	0.120	0.120	✓	2	0.010	0.016	0.013	✓	2	6.99	7.06	7.03	✓	2	50.0	59.0	54.5	✓
Yealering	4	0.070	0.340	0.170	✓	4	0.002	0.035	0.013	✓	4	8.05	9.14	8.65	(2)	4	48.0	57.0	51.8	✓

(1) Caused by mobilisation of sediment within the distribution system (2) Elevated pH is caused by leaching of calcium carbonate from the protective cement lining of the pipes after long water transit times. This characteristic is found in a number of our localities on our large water supply schemes. Experience shows that pH at this level is not objectionable to our customers.

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Table 25 **Aesthetic (Non-health related) Variables**

Great Southern Region	Sodium					TDS					True Colour					Turbidity				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (TCU)			Guideline Met	Samples Taken	Value (NTU)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min	Max	Mean			Min	Max	Mean	
Albany	20	62.0	81.0	67.5	✓	20	500	651	586	✓	20	<1	<1	<1	✓	20	0.2	1.2	0.5	✓
Boddington	2	43.0	44.0	43.5	✓	2	179	194	187	✓	2	<1	2	<1	✓	2	0.3	0.7	0.5	✓
Borden	2	5.5	8.5	7.0	✓	2	46	67	57	✓	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Bremer Bay	4	180.0	190.0	185.0	(1)	4	881	887	885	(2)	4	<1	<1	<1	✓	4	<0.1	<0.1	<0.1	✓
Brookton	2	47.0	48.0	47.5	✓	2	211	215	213	✓	2	1	3	2	✓	2	0.2	0.6	0.4	✓
Broomehill	2	54.0	56.0	55.0	✓	2	233	246	240	✓	2	2	2	2	✓	2	0.4	0.7	0.6	✓
Bullaring	4	49.0	56.0	51.8	✓	4	227	268	249	✓	4	<1	2	<1	✓	4	0.2	1.8	0.7	✓
Condingup	4	290.0	320.0	303.8	(1)	4	980	1024	1010	(2)	4	<1	<1	<1	✓	4	0.1	0.2	0.1	✓
Cranbrook	2	9.0	10.0	9.5	✓	2	56	62	59	✓	2	<1	<1	<1	✓	2	0.3	0.6	0.5	✓
Cuballing	2	53.0	59.0	56.0	✓	2	213	239	226	✓	2	2	2	2	✓	2	0.5	0.8	0.7	✓
Denmark	4	90.0	110.0	99.8	✓	4	325	374	352	✓	4	<1	<1	<1	✓	4	<0.1	<0.1	<0.1	✓
Dudinin TWS	4	47.0	54.0	49.8	✓	4	222	267	239	✓	4	1	3	2	✓	4	0.3	0.6	0.4	✓
Dumbleyung	2	50.0	54.0	52.0	✓	2	228	250	239	✓	2	<1	2	<1	✓	2	0.2	0.4	0.3	✓
Esperance	8	98.0	115.0	107.9	✓	8	760	900	805	(2)	8	<1	<1	<1	✓	8	<0.1	0.3	<0.1	✓
Frankland	4	4.8	7.0	6.0	✓	4	30	45	36	✓	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Gibson	4	185.0	185.0	185.0	(1)	4	628	648	639	(2)	4	<1	<1	<1	✓	4	0.2	0.5	0.3	✓
Gnowangerup	4	54.0	57.0	55.5	✓	4	249	251	250	✓	4	1	4	2	✓	4	0.4	1.6	0.8	✓
Grass Patch	4	100.0	115.0	107.5	✓	4	787	831	809	(2)	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Harrismith TWS	4	47.0	57.0	50.3	✓	4	215	260	229	✓	4	<1	2	<1	✓	4	0.4	1.3	0.7	✓
Highbury	4	45.0	58.0	52.3	✓	4	194	236	215	✓	4	<1	3	2	✓	4	0.4	1.8	0.8	✓
Hopetoun	4	105.0	150.0	121.3	✓	4	547	654	609	(2)	4	<1	<1	<1	✓	4	<0.1	0.3	<0.1	✓
Hyden	4	25.0	58.0	48.3	✓	4	129	266	225	✓	4	<1	<1	<1	✓	4	0.1	0.4	0.3	✓
Jerramungup	4	21.0	31.0	25.0	✓	4	87	122	102	✓	4	<1	<1	<1	✓	4	0.1	0.2	0.2	✓
Karlgarin	2	58.0	58.0	58.0	✓	2	261	263	262	✓	2	<1	<1	<1	✓	2	0.2	0.3	0.3	✓
Katanning	4	50.0	58.0	53.5	✓	4	224	240	233	✓	4	1	4	3	✓	4	0.3	0.8	0.6	✓
Kendenup	4	60.0	66.0	63.0	✓	4	592	618	605	(2)	4	<1	<1	<1	✓	4	0.1	0.4	0.2	✓
Kojonup	2	52.0	55.0	53.5	✓	2	236	242	239	✓	2	1	3	2	✓	2	0.2	0.6	0.4	✓
Kondinin	4	55.0	56.0	55.5	✓	4	254	265	260	✓	4	<1	2	<1	✓	4	0.2	0.4	0.3	✓
Kukerin	5	48.0	57.0	51.4	✓	5	222	273	246	✓	5	<1	2	<1	✓	5	0.1	0.3	0.2	✓
Kulin	4	47.0	56.0	50.8	✓	4	219	258	231	✓	4	<1	3	2	✓	4	0.2	1.0	0.5	✓
Lake Grace	4	47.0	56.0	50.3	✓	4	232	269	245	✓	4	1	3	2	✓	4	0.1	0.4	0.3	✓
Lake King	2	49.0	59.0	54.0	✓	2	241	271	256	✓	2	1	1	1	✓	2	0.3	0.4	0.4	✓
Mt Barker	4	61.0	66.0	64.3	✓	4	575	633	608	(2)	4	<1	2	<1	✓	4	0.1	3.7	1.2	✓
Munglinup	2	12.0	16.0	14.0	✓	2	64	75	70	✓	2	<1	3	2	✓	2	0.8	2.4	1.6	✓
Muradup	2	57.0	60.0	58.5	✓	2	255	261	258	✓	2	2	3	3	✓	2	0.3	0.8	0.6	✓
Narrikup	4	62.0	67.0	64.5	✓	4	591	618	603	(2)	4	<1	<1	<1	✓	4	0.2	0.5	0.4	✓
Narrogin	2	44.0	48.0	46.0	✓	2	187	212	200	✓	2	2	3	3	✓	2	0.3	0.7	0.5	✓
Newdegate	2	52.0	58.0	55.0	✓	2	245	273	259	✓	2	<1	2	<1	✓	2	0.1	0.3	0.2	✓
Nyabing	4	52.0	58.0	54.8	✓	4	224	238	231	✓	4	<1	5	2	✓	4	0.3	0.8	0.6	✓
Ongerup	2	11.0	15.0	13.0	✓	2	66	80	73	✓	2	<1	1	<1	✓	2	<0.1	0.2	<0.1	✓
Pingaring	4	50.0	59.0	53.5	✓	4	243	276	258	✓	4	<1	1	<1	✓	4	0.1	0.3	0.2	✓
Pingelly	2	50.0	51.0	50.5	✓	2	209	238	224	✓	2	1	1	1	✓	2	0.5	0.8	0.7	✓
Pingrup	2	55.0	63.0	59.0	✓	2	236	249	243	✓	2	1	2	2	✓	2	0.3	0.4	0.4	✓
Popanyinning	2	47.0	49.0	48.0	✓	2	187	211	199	✓	2	<1	2	<1	✓	2	0.3	1.1	0.7	✓
Ravensthorpe	4	17.0	21.0	18.5	✓	4	97	121	106	✓	4	1	4	3	✓	4	1.0	1.7	1.4	✓
Rocky Gully	4	60.0	65.0	63.8	✓	4	586	619	603	(2)	4	<1	<1	<1	✓	4	0.1	0.5	0.3	✓
Salmon Gums	4	60.0	66.0	63.5	✓	4	383	404	395	✓	4	<1	<1	<1	✓	4	<0.1	0.1	<0.1	✓
Tambellup	2	56.0	58.0	57.0	✓	2	260	270	265	✓	2	2	4	3	✓	2	0.8	0.9	0.9	✓
Tincurrin TWS	4	46.0	55.0	50.3	✓	4	212	255	230	✓	4	1	4	2	✓	4	0.6	2.2	1.3	✓
Varley	2	51.0	59.0	55.0	✓	2	247	272	260	✓	2	2	2	2	✓	2	0.2	0.3	0.3	✓
Wagin	2	44.0	48.0	46.0	✓	2	188	208	198	✓	2	1	5	3	✓	2	0.2	0.8	0.5	✓
Walpole	4	60.0	92.0	75.0	✓	4	226	326	278	✓	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Wandering	2	48.0	52.0	50.0	✓	2	194	224	209	✓	2	<1	2	<1	✓	2	0.4	1.6	1.0	✓
Wellstead	2	12.0	21.0	16.5	✓	2	50	92	71	✓	2	<1	2	<1	✓	2	0.5	1.1	0.8	✓
Wickepin TWS	4	44.0	55.0	49.0	✓	4	180	243	208	✓	4	<1	3	2	✓	4	0.1	0.5	0.3	✓
Williams	2	35.0	43.0	39.0	✓	2	134	181	158	✓	2	<1	2	<1	✓	2	0.4	0.6	0.5	✓
Woodanilling	2	50.0	59.0	54.5	✓	2	219	241	230	✓	2	2	2	2	✓	2	0.5	0.6	0.6	✓
Yealering	4	48.0	57.0	51.8	✓	4	218	257	235	✓	4	<1	3	<1	✓	4	0.1	1.1	0.6	✓

(1) Elevated sodium is characteristic of the source supplying this locality. (2) Elevated TDS is characteristic of the source supplying this locality.

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Table 26 Health related variables

North West Region	E. coli				Thermophilic Naegleria			Fluoride					Hydrocarbons		Metals	
Locality	Samples Taken	Samples >0 cfu/100mL	Max cfu/100mL	Requirement Met	Samples Taken	Samples with Thermophilic Naegleria	Requirement Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met
									Min	Max	Mean					
Broome	91	0	0	✓	78	0	✓	52	0.30	0.80	0.70	✓	1	✓	2	✓
Burrup LNG	12	0	0	✓	12	0	✓	1	0.70	0.70	0.70	✓	2	✓	2	✓
Burrup Supply	12	0	0	✓	12	0	✓	2	0.65	0.70	0.68	✓	2	✓	2	✓
Camballin	12	0	0	✓	12	0	✓	2	0.25	0.25	0.25	✓	0	(1)	2	✓
Cape Lambert TWS	12	0	0	✓	12	0	✓	2	0.65	0.85	0.75	✓	2	✓	2	✓
Derby	58	0	0	✓	58	0	✓	52	0.50	0.65	0.59	✓	0	(1)	2	✓
Fitzroy Crossing	12	0	0	✓	12	0	✓	2	0.25	0.25	0.25	✓	0	(1)	2	✓
Halls Creek	49	0	0	✓	49	0	✓	2	0.65	0.65	0.65	✓	0	(1)	2	✓
Hedland	91	0	0	✓	78	0	✓	54	0.55	0.80	0.66	✓	1	✓	2	✓
Karratha	93	0	0	✓	91	0	✓	52	0.60	0.85	0.73	✓	2	✓	2	✓
Kununurra	64	0	0	✓	51	0	✓	28	0.35	0.65	0.56	✓	0	(1)	2	✓
Marble Bar	12	0	0	✓	12	0	✓	2	0.50	0.55	0.52	✓	1	✓	2	✓
Newman	65	0	0	✓	52	0	✓	2	0.20	0.25	0.23	✓	0	(1)	3	✓
Nullagine	12	0	0	✓	12	0	✓	2	0.40	0.45	0.43	✓	0	(1)	2	✓
Onslow TWS	52	0	0	✓	24	0	✓	2	0.75	0.90	0.83	✓	1	✓	2	✓
Point Samson	12	0	0	✓	12	0	✓	2	0.65	0.80	0.73	✓	0	(1)	2	✓
Roebourne	51	0	0	✓	46	0	✓	2	0.70	0.80	0.75	✓	0	(1)	2	✓
Wickham	51	0	0	✓	45	0	✓	2	0.70	0.75	0.73	✓	0	(1)	2	✓
Wyndham	50	0	0	✓	50	0	✓	2	<0.1	<0.1	<0.1	✓	0	(1)	2	✓

(1) No samples required in this 12 month period.

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Table 27 Health related variables

North West Region	Nitrate					Pesticides		Radiological		Trihalomethanes					Other Health Related	
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Guideline Met	Samples Taken	Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Requirement Met
		Min	Max	Mean							Min	Max	Mean			
Broome	2	5.00	5.50	5.25	✓	1	✓	0	(1)	2	0.002	0.003	0.003	✓	0	(1)
Burrup LNG	2	1.50	1.50	1.50	✓	2	✓	1	✓	1	<0.001	0.002	<0.001	✓	0	(1)
Burrup Supply	2	1.40	1.50	1.45	✓	1	✓	1	✓	2	<0.001	0.002	<0.001	✓	2	✓
Camballin	2	<0.05	<0.05	<0.05	✓	1	✓	2	✓	2	<0.001	<0.001	<0.001	✓	0	(1)
Cape Lambert TWS	2	0.15	1.40	0.78	✓	1	✓	2	✓	2	0.003	0.080	0.049	✓	2	✓
Derby	2	<0.05	<0.05	<0.05	✓	1	✓	0	(1)	2	0.002	0.002	0.002	✓	0	(1)
Fitzroy Crossing	2	0.87	0.91	0.89	✓	3	✓	0	(1)	2	<0.001	<0.001	<0.001	✓	0	(1)
Halls Creek	2	0.90	0.92	0.91	✓	1	✓	2	✓	2	0.001	0.002	0.002	✓	0	(1)
Hedland	2	0.74	0.75	0.75	✓	1	✓	2	✓	4	0.002	0.005	0.004	✓	0	(1)
Karratha	2	0.19	1.60	0.90	✓	1	✓	2	✓	2	0.008	0.094	0.051	✓	1	✓
Kununurra	4	<0.05	<0.05	<0.05	✓	1	✓	0	(1)	2	0.016	0.042	0.029	✓	1	✓
Marble Bar	2	1.50	1.80	1.65	✓	1	✓	0	(1)	2	0.002	0.009	0.006	✓	0	(1)
Newman	2	0.28	0.44	0.36	✓	1	✓	0	(1)	2	0.002	0.005	0.004	✓	0	(1)
Nullagine	2	0.51	1.20	0.86	✓	1	✓	1	✓	2	0.001	0.005	0.003	✓	0	(1)
Onslow TWS	2	0.43	0.48	0.46	✓	1	✓	2	✓	2	<0.001	0.002	<0.001	✓	1	✓
Point Samson	2	0.33	1.40	0.87	✓	1	✓	1	✓	3	0.002	0.082	0.039	✓	1	✓
Roebourne	2	0.18	1.40	0.79	✓	1	✓	0	(1)	2	0.003	0.130	0.088	✓	0	(1)
Wickham	2	0.99	1.50	1.25	✓	1	✓	1	✓	2	<0.001	0.088	0.031	✓	0	(1)
Wyndham	2	0.11	0.18	0.15	✓	1	✓	0	(1)	4	0.044	0.100	0.072	✓	0	(1)

(1) No samples required in this 12 month period.

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Table 28 **Aesthetic (Non-health related) Variables**

North West Region	Alkalinity (as CaCO3)					Aluminium					Chloride					Hardness				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min Value	Max Value	Mean Value			Min	Max	Mean	
Broome	2	82.0	82.0	82.0	(1)	2	<0.008	<0.008	<0.008	✓	2	120.0	130.0	125.0	✓	2	61	68	65	✓
Burrup LNG	2	130.0	150.0	140.0	(1)	2	<0.008	<0.008	<0.008	✓	2	48.0	50.0	49.0	✓	2	160	160	160	✓
Burrup Supply	2	130.0	140.0	135.0	(1)	2	<0.008	<0.008	<0.008	✓	2	50.0	55.0	52.5	✓	2	160	170	165	✓
Camballin	2	58.0	59.0	58.5	(1)	2	<0.008	<0.008	<0.008	✓	2	38.0	55.0	46.5	✓	2	46	56	51	✓
Cape Lambert TWS	2	120.0	160.0	140.0	(1)	2	<0.008	0.010	<0.008	✓	2	39.0	65.0	52.0	✓	2	130	190	160	✓
Derby	2	160.0	170.0	165.0	(1)	2	<0.008	<0.008	<0.008	✓	2	85.0	90.0	87.5	✓	2	13	16	15	✓
Fitzroy Crossing	2	180.0	180.0	180.0	(1)	2	<0.008	<0.008	<0.008	✓	2	43.0	44.0	43.5	✓	2	160	160	160	✓
Halls Creek	2	340.0	340.0	340.0	(1)	2	<0.008	<0.008	<0.008	✓	2	175.0	230.0	202.5	✓	2	330	350	340	(2)
Hedland	2	190.0	220.0	205.0	(1)	2	<0.008	<0.008	<0.008	✓	2	110.0	130.0	120.0	✓	2	200	210	205	(2)
Karratha	2	130.0	260.0	195.0	(1)	2	<0.008	<0.008	<0.008	✓	2	43.0	135.0	89.0	✓	2	150	350	250	(3)
Kununurra	4	190.0	210.0	202.5	(1)	4	<0.008	<0.008	<0.008	✓	4	16.0	19.0	17.5	✓	4	160	170	168	✓
Marble Bar	2	360.0	430.0	395.0	(1)	2	<0.008	<0.008	<0.008	✓	2	215.0	220.0	217.5	✓	2	340	370	355	(2)
Newman	2	160.0	160.0	160.0	(1)	2	<0.008	<0.008	<0.008	✓	2	75.0	80.0	77.5	✓	2	150	160	155	✓
Nullagine	2	160.0	200.0	180.0	(1)	2	<0.008	<0.008	<0.008	✓	2	70.0	100.0	85.0	✓	2	190	190	190	✓
Onslow TWS	2	170.0	210.0	190.0	(1)	2	<0.008	<0.008	<0.008	✓	2	95.0	115.0	105.0	✓	2	200	200	200	✓
Point Samson	2	130.0	170.0	150.0	(1)	2	<0.008	0.010	<0.008	✓	2	41.0	80.0	60.5	✓	2	140	200	170	✓
Roebourne	2	130.0	170.0	150.0	(1)	2	<0.008	<0.008	<0.008	✓	2	43.0	85.0	64.0	✓	2	130	210	170	✓
Wickham	2	130.0	260.0	195.0	(1)	2	0.010	0.014	0.012	✓	2	44.0	125.0	84.5	✓	2	140	310	225	(3)
Wyndham	2	42.0	42.0	42.0	(1)	2	0.025	0.030	0.028	✓	2	25.0	29.0	27.0	✓	2	33	39	36	✓

(1) No guideline value available as per ADWG 2011. (2) Elevated hardness is characteristic of the souce supplying this locality. (3) Elevated hardness is a characteristic of the source supplying this locality for part of the year (Millstream).

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Table 29 **Aesthetic (Non-health related) Variables**

North West Region	Iron					Manganese					pH					Silicon				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (pH units)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met
		Min	Max	Mean			Min	Max	Mean			Min	Max	Mean			Min Value	Max Value	Mean Value	
Broome	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.95	7.99	7.97	✓	2	90.0	95.0	92.5	(1)
Burrup LNG	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.25	8.43	8.34	✓	2	50.0	55.0	52.5	✓
Burrup Supply	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.18	8.45	8.32	✓	2	50.0	55.0	52.5	✓
Camballin	2	0.025	0.035	0.030	✓	2	<0.002	0.003	<0.002	✓	2	7.17	7.39	7.28	✓	2	23.0	25.0	24.0	✓
Cape Lambert TWS	2	0.004	0.004	0.004	✓	2	<0.002	<0.002	<0.002	✓	2	7.74	8.00	7.87	✓	2	18.0	50.0	34.0	✓
Derby	2	0.008	0.020	0.014	✓	2	<0.002	<0.002	<0.002	✓	2	7.58	7.61	7.60	✓	2	15.0	16.0	15.5	✓
Fitzroy Crossing	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.17	7.94	7.56	✓	2	21.0	22.0	21.5	✓
Halls Creek	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.75	7.96	7.86	✓	2	46.0	47.0	46.5	✓
Hedland	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.83	7.88	7.86	✓	2	50.0	55.0	52.5	✓
Karratha	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.82	8.30	8.06	✓	2	17.0	60.0	38.5	✓
Kununurra	4	<0.003	<0.003	<0.003	✓	4	0.004	0.016	0.007	✓	4	7.56	7.65	7.62	✓	4	49.0	55.0	53.5	✓
Marble Bar	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.31	7.37	7.34	✓	2	38.0	41.0	39.5	✓
Newman	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.02	7.13	7.08	✓	2	18.0	19.0	18.5	✓
Nullagine	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.07	7.23	7.15	✓	2	26.0	32.0	29.0	✓
Onslow TWS	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.03	8.16	8.10	✓	2	75.0	80.0	77.5	✓
Point Samson	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	8.10	8.23	8.17	✓	2	24.0	50.0	37.0	✓
Roebourne	2	<0.003	<0.003	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.81	7.84	7.83	✓	2	18.0	55.0	36.5	✓
Wickham	2	0.004	0.010	0.007	✓	2	<0.002	<0.002	<0.002	✓	2	8.01	8.16	8.09	✓	2	32.0	55.0	43.5	✓
Wyndham	2	<0.003	0.004	<0.003	✓	2	<0.002	<0.002	<0.002	✓	2	7.71	8.17	7.94	✓	2	2.9	8.0	5.5	✓

(1) Elevated silica is characteristic of the souce supplying this locality.

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Table 30 **Aesthetic (Non-health related) Variables**

North West Region	Sodium					TDS					True Colour					Turbidity				
Locality	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Concentration (mg/L)			Guideline Met	Samples Taken	Value (TCU)			Guideline Met	Samples Taken	Value (NTU)			Guideline Met
		Min Value	Max Value	Mean Value			Min	Max	Mean			Min	Max	Mean			Min	Max	Mean	
Broome	2	93.0	93.0	93.0	✓	2	452	472	462	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Burrup LNG	2	28.0	32.0	30.0	✓	2	384	391	388	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Burrup Supply	2	29.0	34.0	31.5	✓	2	380	403	392	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Camballin	2	37.0	44.0	40.5	✓	2	236	264	250	✓	2	<1	<1	<1	✓	2	0.1	0.1	0.1	✓
Cape Lambert TWS	2	37.0	41.0	39.0	✓	2	343	452	398	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Derby	2	110.0	135.0	122.5	✓	2	416	467	442	✓	2	<1	<1	<1	✓	2	0.2	0.5	0.4	✓
Fitzroy Crossing	2	36.0	37.0	36.5	✓	2	390	393	392	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Halls Creek	2	180.0	190.0	185.0	(1)	2	999	1080	1040	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Hedland	2	94.0	110.0	102.0	✓	2	599	648	624	(2)	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Karratha	2	46.0	77.0	61.5	✓	2	385	778	582	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Kununurra	4	20.0	32.0	28.5	✓	4	371	424	407	✓	4	<1	<1	<1	✓	4	<0.1	0.2	<0.1	✓
Marble Bar	2	200.0	215.0	207.5	(1)	2	1092	1201	1147	(2)	2	<1	<1	<1	✓	2	0.1	0.2	0.2	✓
Newman	2	56.0	64.0	60.0	✓	2	439	442	441	✓	2	<1	<1	<1	✓	2	<0.1	0.2	<0.1	✓
Nullagine	2	55.0	89.0	72.0	✓	2	470	574	522	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Onslow TWS	2	51.0	57.0	54.0	✓	2	551	573	562	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓
Point Samson	2	39.0	45.0	42.0	✓	2	359	501	430	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Roebourne	2	47.0	48.0	47.5	✓	2	363	513	438	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Wickham	2	34.0	70.0	52.0	✓	2	352	738	545	✓	2	<1	<1	<1	✓	2	<0.1	<0.1	<0.1	✓
Wyndham	2	19.0	19.0	19.0	✓	2	115	126	121	✓	2	<1	<1	<1	✓	2	<0.1	0.1	<0.1	✓

(1) Elevated sodium is characteristic of the souce supplying this locality. (2) Elevated TDS is a characteristic of the source supplying this locality.