ANNUAL 2022-23
WATER QUALITY REPORT

http://countryheightswater.com.au/

Contents

Tables

Figures

1. Summary

Country Heights Water Pty Ltd operates under Water Services Licence Number WL49 issued by the Economic Regulation Authority (ERA), Western Australia. It's operating area is confined to the Country Heights Estate within the Shire of Gingin, approximately 86 kilometres north-north-east of the Perth Central Business District, Western Australia.

1.1 Our Commitment

Our commitment to compliance with the water quality criteria, both health and non-health related, of the Australian Drinking Water Guidelines (ADWG; https://www.nhmrc.gov.au/about-us/publications/ australian-drinking-water-guidelines), is entrenched in a Memorandum of Understanding (MoU) with the Department of Health (DoH), WA. This annual report is in accordance with Section 11 of the MoU and documents the water quality performance for the period 1 July 2022 to 30 June 2023. In addition, this document also details the taking, treating and distribution of drinking water to our customers.

Table 1: Drinking Water Quality Results 2022-23.

Water Quality Incidents	Number
Reportable Incidents to DoH	nil
Health Related Characteristics	**Compliance**
Escherichia coli	100%
Naegleria	100%
Chemical	100%
Pesticides	100%
Radiological	100%
Per-and Polyfluoroalkyl Substances (PFAS)	100%
Chlorine Disinfection	100%
Non-Health Related Characteristics	**Compliance**
Aesthetic characteristics (excluding chlorine)	100%

1.2 Drinking Water Policy

We are committed to supply safe drinking water sustainably that meets or exceeds the expectations of our customer.

Our water is regularly sampled for laboratory analyses to ensure it meets the criteria set out in the ADWG. In pursuit of our commitments, we:

- Endorse and follow the ADWG guidelines.
- Fulfil the requirements of the MoU with the DoH.
- Safely manage water quality throughout the water supply, treatment and distribution process.
- Undertake regular water quality monitoring and provide timely public reporting of results.
- Adopt a risk-based approach in our operations to identify and manage potential threats to water quality.
- Plan for contingencies with incident response capabilities.
- Continue investment in our water treatment and distribution infrastructure.
- Maintain communications with stakeholders and regulators.
- Welcome and respond to consumer feedback on our services and water quality.

1.3 Drinking Water Quality Management Framework

We base our Drinking Water Quality Management System on the Framework for Management of Drinking Water Quality within the ADWG and endorsed by the National Health and Medical Research Council. This framework defines:

- Benchmark water quality guidelines and values for drinking water quality management.
- A preventative approach to the management and operation of a drinking water system, encompassing all steps in water supplies from source to consumer.

The DoH and Country Heights Water Pty Ltd executed a Memorandum of Understanding (MoU) on the 30th of November 2020 with a term of 5 years which was subsequently amended on the 31st of March 2023 (Binding Protocol 1 of the *Memorandum of Understanding Between the Department of Health and Country Heights Water Pty Ltd*). The MoU prescribes the requirements for compliance with microbiological, chemical and radiological drinking water quality criteria. The MoU, Water License and Drinking Water Source Protection Plan (DWSPP) are available from https://countryheightswater.com.au/licence-publications/

The MoU incorporates the preventative water management strategy, from source to consumer, detailed in the ADWG Framework for Management of Drinking Water Quality. It is structured to reflect the guiding elements of the framework and thereby integrates all facets of the drinking water quality management and assurance system. The MoU also includes the monitoring program, management practices and procedures, approved chemicals and materials to be used within the drinking water system, data management and reporting mechanisms and the type of incident and emergency responses required.

We report our performance quarterly to the DoH and on our web site:

(https://countryheightswater.com.au/water-quality-perfomance/).

The Annual Water Quality Report replaces the preceding quarterly reports for that year.

We recognise and support the ongoing work of the Advisory Committee for the Purity of Water (https://www.health.wa.gov.au/articles/a_e/advisory-committee-for-the-purity-of-water).

1.4 Contact Details

Country Heights Water's contact details are:

Table 2: Country Heights Water Contact Details.

Contact Details	
Trading Name	Country Heights Water Pty Ltd
Company Name	Country Heights Water Pty Ltd
Physical Address	1/189 St Georges Terrace, Perth WA 6000
Postal Address	PO Box 7584, Cloisters Square, WA 6850
Company Phone	+61 (0) 449 898 511
Company Email	admin@countryheightswater.com.au
Note: **If you have any concern and/or request for information pertaining to water quality and this document, please do not hesitate to write to us at: admin@countryheightswater.com.au.**	

2. Water Quality Parameters

Table 3: Water Quality Parameters.

Parameter	Description	ADWG Recommendations/Comments
Colour	True Colour in water originates mainly from water draining through soil and vegetation.	The aesthetic value is based on the colour that is noticeable in a glass which is generally accepted as <15HU.
Iron and Manganese	Sources: soil or rock. Iron and Manganese can both accumulate in pipe sediments and be re-suspended during periods of rapid changes to water flow patterns.	Based on aesthetic considerations, the concentration of: ▪ Iron should not exceed 0.3mg/L. ▪ Manganese should not exceed 0.1 mg/L. Manganese is not considered a health concern unless the concentration exceeds 0.5 mg/L.
Microbial pathogens	The most common and widespread health risk associated with drinking water is contamination by microorganisms. Organisms associated with the gut of humans and mammals cause the usual waterborne diseases. Tests are undertaken for *Escherichia coli* (*E. coli*) as an indicator of microbial contamination. Thermophilic *Naegleria* refers to a group of amoebae which includes *Naegleria fowleri*, the organism that causes the waterborne disease primary amoebic meningo-encephalitis. *Naegleria fowleri* is an environmental pathogen which naturally lives in fresh warm water.	Thermotolerant coliforms/*E.coli* should not be present in a minimum 100mL sample of drinking water. DoH has notification protocols in place regarding exception events for pathogens. Country Heights Water will immediately notify the DoH of any confirmed detection of thermotolerant coliforms, *E.coli* or thermophilic *Naegleria* species in any sample for microbiological analysis.
Pesticides, Per-and polyfluoro-alkyl substances (PFAS)	Drinking water must be monitored to ensure that no pesticide or other synthetic organic compound exceeds the respective guideline level.	The ADWG provides health related guidelines for an extensive range of pesticides and industrial chemicals.
pH	pH is a measure of free hydrogen ion concentrations in the water.	Based on aesthetic considerations, pH should be between 6.5 and 8.5 (broadly speaking pH 7 is neutral, <7 is acidic and >7 is alkaline)
Radioactivity	There are natural levels of radiation within the environment, and groundwater sources such as that sourced from the Yarragadee aquifer can have higher background levels than that of surface water systems.	For gross alpha and gross beta radioactivity, the screening level is 0.5 Becquerel per litre (Bq/L).
Total Dissolved Solids (mg/L)	Total Dissolved Solids (TDS) consist of inorganic (natural) salts and small amounts of organic matter dissolved in water and comprise sodium, potassium, calcium, magnesium, chloride, sulphate, bicarbonate, carbonate, silica, organic matter, fluoride, iron, manganese, nitrate and phosphate.	The palatability of drinking water according to TDS concentration: ▪ 0 to 600 mg/L - good quality; ▪ 600 to 900 mg/L - fair quality; ▪ 900 to 1,200 mg/L - poor quality and ▪ >1,200 mg/L – unpalatable. Water with low TDS can taste flat, while water with high TDS tastes salty and causes scaling in pipes, fittings and household appliances.
Trihalo-methanes (THMs)	THMs may be present in drinking water as a by-product of disinfection using chlorination.	The health guideline for total THM is 0.25 mg/L, expressed as an average long- term exposure.

Parameter	Description	ADWG Recommendations/Comments
Turbidity (NTU)	Turbidity is the cloudy appearance of water caused by the presence of suspended particulate matter.	Based on aesthetic considerations, the guideline is <5 Nephelometric Turbidity Units (NTU). If disinfection is required, then a turbidity of less than 1 NTU (clear water) is desirable at the point of disinfection (a slightly milky or muddy water will have a turbidity of 5NTU.
Note: milligram per litre (mg/L) is the commonly used unit for concentration, the mass of a constituent dissolved in 1 litre of water, generally synonymous with parts per million (ppm).		

3. Water Supply, Treatment and Distribution

3.1 Location

Country Heights Water operates within the Shire of Gingin, approximately 86 kilometres north-east of Perth, Western Australia. The Bore and Water Treatment Plant are 6 kilometres north of the Gingin settlement (Figure 1).

3.2 Licence Area

Country Heights Water Pty Ltd is a licensed water services provider to an approved operating area, supplying potable water services to the Country Heights Estate residential development (Figure 1).

Country Heights Water operates under Water Services Licence Number WL49, issued by the Economic Regulation Authority, Western Australia (ERA). We report annually to the ERA and are audited against the Water Services Code of Conduct (Customer Service Standards).

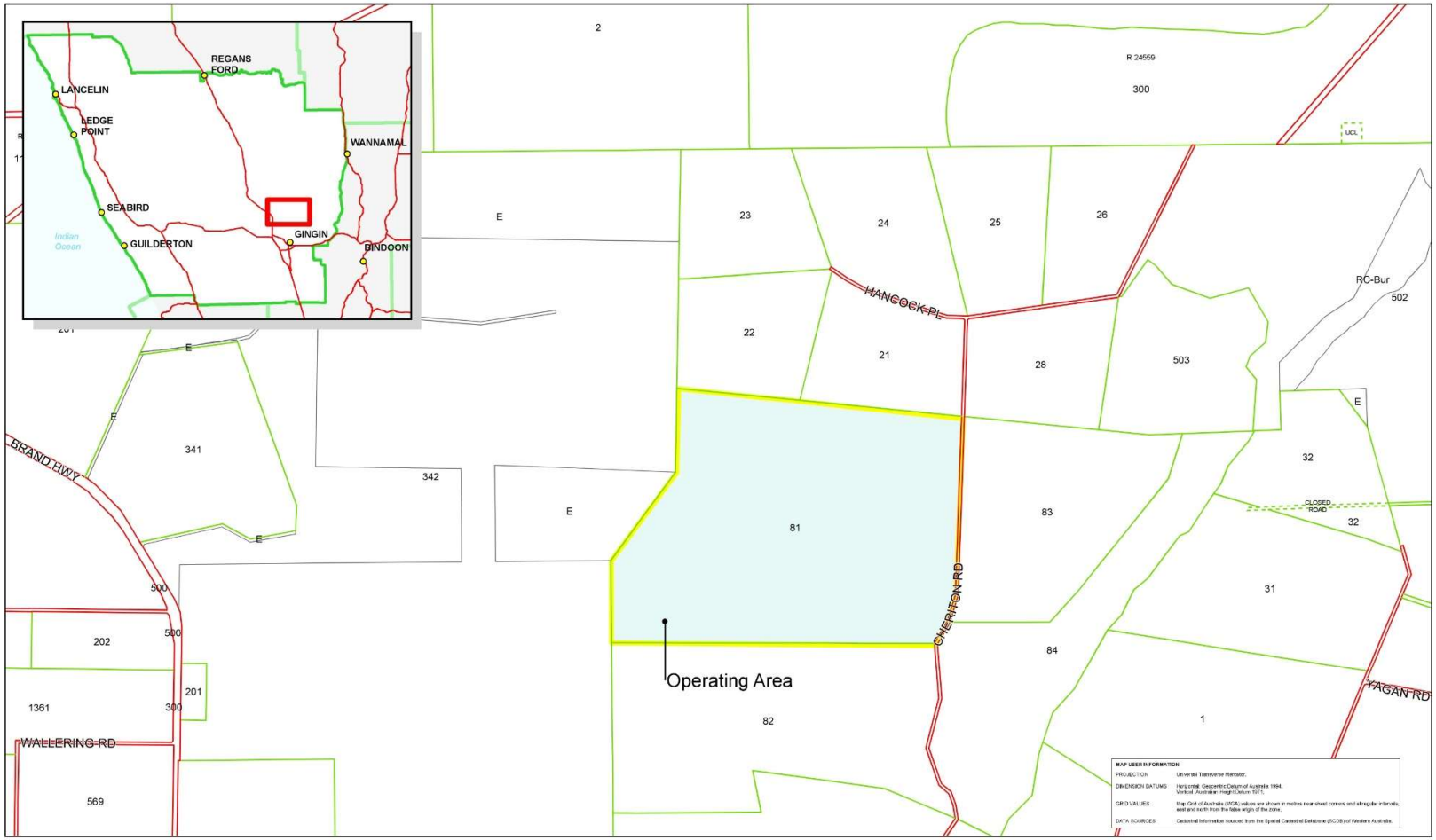
Table 4: Water Services License Details.

Contact Details	
Company Name	Country Heights Water Pty Ltd ABN 72 624 317 746
License Area	OWR-OA-313 (A), (Lot 1 Cheriton Road known as the Country Heights Estate).
License Number	WL49 available at: https://www.countryheightswater.com.au/documents/WaterServicesLicenceWL49V3,1April2022-28032023111723-0001.pdf.
Commenced	21 November 2018
Expiry	20 November 2043

3.3 Infrastructure

Table 5: System Information.

Summary	
Number of connections	45 in Stage 1; Stage 2 currently under construction
Number of customers	17 building contracts; 10 customers
Average water supplied (L/day)	23,712
Sources of water	Bore (Leederville Aquifer)
Treatment systems	Two 375-kilolitre storage tanks with a single filtration train, pH adjustment and liquid chlorination
Length of mains (m)	4,954
Number of water quality localities (zones)	1
Number of sample points	2
Notes: **The number of connections refers to properties (including residences, lots under construction and vacant lots) that have been connected to the reticulation network.** **The number of customers refers to customer account holders registered with Country Heights Water that draw water for drinking water supplies and construction.**	



DATE	No.	DESCRIPTION	DRN	CHK	APR

APPROVED:

CHAIR
ECONOMIC REGULATION AUTHORITY

DATE: 21 / 11 / 2018

WATER SERVICES ACT 2012
COUNTRY HEIGHTS ESTATE WATER RESERVE
POTABLE WATER SUPPLY SERVICES
LICENSEE : Athena Water Solutions Ptd Ltd

DRAWN - Location Maintenance and Delivery, Landgate	CHECKED	APPROVED	PLAN No.	ISSUE	ORG SIZE
FILE No.	SCALE 1 :25,000	DATE	OWR-OA-313		A3

Landgate Ref: Job_29FE33-18-19

Figure 1: Operating Area.

3.4 Water Source

Country Heights Water Pty Ltd holds a Licence to Take Water GWL178900(2), issued by the Department of Water and Environmental Regulation (DWER), under the *Rights in Water and Irrigation Act 1914,* to abstract 200,000 kilolitres per annum from the Leederville-Parmelia Aquifer using a single bore located at the Water Treatment Plant. Currently we use only about 4% of our annual water entitlement.

3.5 Water Source Protection Plan

The Drinking Water Source Protection Plan (DWSPP), https//www.countryheightswater.com.au/documents/DrinkingWaterSourceProtectionPlanRev1-2017.pdf) was developed to identify and assess risks to groundwater quality and to develop management practices to mitigate those risks. This aligns with the requirements of DWER to protect the safety of the drinking water supply. We sample ground water routinely to monitor quality and works cooperatively with DWER and the DoH to ensure the ongoing safety of the water source.

The production bore, the Water Treatment Plant and the two 375-kilolitre Water Storage Tanks are inside a secured, sign posted, fenced and locked compound.

3.6 Water Treatment

Water from the Leederville confined aquifer is pumped into a 375-kilolitre raw water tank from where the water is passed through a sediment filter (which produces high quality water without iron, manganese and turbidity not using any chemicals) prior to pH adjustment (using sodium hydroxide [NaOH] when pH is too low and hydrochloric acid [HCl] when pH is too high) before disinfection with chlorine.

The treated water is then distributed to maintain the residual chlorine in the reticulation at a level of 0.4 milligrams per litre.

Treatment is monitored continuously and regularly tested by a NATA accredited laboratory to ensure it meets the requirements of the ADWG and DoH.

The water is not fluoridated.

3.7 Distribution Network

The treated water is stored in a 375-kilolitre storage tank adjacent to the Water Treatment Plant for distribution (gravity fed) by a reticulation network to customers in the Country Heights Estate.

Materials used within the bore installation, Water Treatment Plant, storage tanks and reticulation network are approved under Australian Standard AS/NZS 4020 (Testing of Products for Use in Contact with Drinking Water) and comply with the DoH directive *Materials and Substances in Contact with Drinking Water Requirements* and the MOU.

3.8 Team

Employees, consultants (Pendragon Environmental Solutions) and contractors (Athena Water Services) involved with the management and operations of the water supply system have appropriate training and experience to be demonstrably competent with the treatment, supply and monitoring of drinking water.

3.9 Incident Response

Whilst we make every effort to prevent incidents from occurring, there will inevitably be equipment malfunctions, human errors, extreme weather conditions or unforeseen events that adversely affect our operations. Consequently we have plans in place to respond to and manage such events such that water quality are not impacted.

Incident response exercises are conducted annually as required by the DoH in accordance with the MoU.

In 2023 we conducted a mock incident workshop, attended by representatives from Country Heights Water, Pendragon Environmental Solutions, Athena Water Services and the Shire of Gingin, which considered the impacts of a bush fire and the requirements to maintain water supply and prevent potential contamination of drinking water. Several actions were considered and implemented with the Country Heights Estate and key persons included in the Shire of Gingin Emergency Planning.

4. System Operation

4.1 Customer Service

We are committed to customer service and satisfaction with regard to all our services.

Table 6: Customer Complaints Log.

Period	Number of Customer Complaints
1 July 2022 to 30 June 2023	Nil pertaining to water quality.

4.2 Notifiable Incidents

There were no notifiable water quality incidents during the period 1 July 2022 to 30 June 2023.

4.3 Improvement

We are committed and indeed undertake regular maintenance and services of infrastructure and equipment to ensure that drinking water quality is not compromised at any time. We implement improvements to the system and management regime as and when required to maintain reliability of service and to minimise risk to quantity and quality of water supplied to customers.

Since the Country Heights Estate is in the early stages of development, we have an ongoing program to improve. As part of this program, we engage suitably qualified and experienced service providers and engineering firms as necessary to review our processes and infrastructure and advise us on when and where improvements and/or additions are to be implemented.

4.4 Water Monitoring

We monitor water quantity and water quality by:

- Continuous remote monitoring using on-line instrumentation with automatic alarms to relay out-of-specification values to service personnel (Athena Water Services).
- Frequent periodic, as required and/or monthly, monitoring and inspection by personnel (Athena Water Services).
- Regular monthly field measurements and sampling (Athena Water Services and Pendragon Environmental Solutions) with analysis by a NATA registered laboratory (ALS Environmental Division, Perth).

Sampling and field monitoring are performed in accordance with best practice and industry standards. Microbial, chemical and radiological analyses are performed at the NATA accredited ALS Environmental Division, Perth.

5. Drinking Water Quality

5.1 Drinking Water Compliance: Microbiology

There were no microbiological non-conformances in drinking water delivered to the Country Heights Estate between 1 July 2022 and 30 June 2023:

Table 7: Microbiological Samples.

Characteristic	No of Samples Analysed	Units	ADWG Limit	Number of Samples NOT meeting ADWG Limit	%Compliance
Escherichia coli	13	CFU/100 mL	0	0	100
Thermophilic *Naegleria*	13	organisms/250 mL	ND	0	100
Naegleria Fowleri	0	organisms/250 mL	ND	0	100
Notes: **ND denotes not detected.** **Analysis for *Naegleria Fowleri* is only performed when a test for thermophilic *Naegleria* returns a positive result.** **Samples are obtained after treatment from the outgoing delivery pipeline to the Estate.**					

Chlorine is monitored continuously at the Water Treatment Plant and maintained at a level of 0.4mg/L.

5.2 Drinking Water Compliance: Chemical Health Related

There were no inorganic chemical constituents in water from the Water Treatment Plant above the ADWG health guidelines:

Table 8: Inorganic Chemical Health Related Compliance Summary.

Characteristic	Number of Samples Analysed	Unit	ADWG Health Guideline Value	Maximum Value	Number of Samples NOT Meeting ADWG Guideline Value	%Compliance
Antimony, Sb	5	mg/L	0.003	<0.001	0	100
Arsenic, As	5	mg/L	0.01	<0.001	0	100
Barium, Ba	5	mg/L	0.7	0.024	0	100
Boron, B	5	mg/L	4	0.05	0	100
Cadmium, Cd	5	mg/L	0.002	<0.0001	0	100
Copper, Cu	5	mg/L	2	0.01	0	100
Cyanide, CN	4	mg/L	0.08	<0.004	0	100
Fluoride, F	5	mg/L	1.5	<0.1	0	100
Lead, Pb	5	mg/L	0.01	0.001	0	100
Manganese, Mn	5	mg/L	0.5	0.008	0	100
Mercury, Hg	5	mg/L	0.001	<0.0001	0	100
Molybdenum, Mo	5	mg/L	0.05	<0.001	0	100
Nickel, Ni	5	mg/L	0.02	0.011	0	100
Nitrate, N	5	mg/L	50	0.09	0	100
Nitrite, N	5	mg/L	3	<0.03	0	100
Selenium, Se	5	mg/L	0.01	<0.01	0	100
Silver, Ag	5	mg/L	0.1	<0.001	0	100

5.3 Drinking Water Compliance: Chemical Aesthetic Related

There were no inorganic chemical constituents in water from the Water Treatment Plant above the ADWG aesthetic guidelines:

Table 9: Inorganic Physical and Chemical Aesthetic Related Compliance Summary.

Characteristic	Number of Samples Analysed	Unit	ADWG Aesthetic Guideline Value	Maximum Value	Number of Samples NOT Meeting ADWG Aesthetic Guideline Value	%Compliance
Aluminium, Al	5	mg/L	0.2	<0.100	0	100
Ammonia as N	5	mg/L	0.4	0.03	0	100
Bicarbonate, HCO_3	5	mg/L	200	29	0	100
Chloride, Cl	5	mg/L	250	165	0	100
Iron, Fe	5	mg/L	0.3	<0.050	0	100
pH	5	pH units	6.5 – 8.5	6.8 – 7.5	0	100
Sodium, Na	5	mg/L	180	89	0	100
Sulfate (SO_4)	5	mg/L	250	11	0	100
Total Dissolved Solids at 180°C	5	mg/L	600	309	0	100
Total Hardness	5	mg$CaCO_3$/L	200	42	0	100
Turbidity	5	NTU	5	2.2	0	100
Zinc, Zn	5	mg/L	3	0.099	0	100

5.4 Source Water Quality: Pesticides

A broad pesticide screen of the source (bore) water did not detect any pesticides:

Table 10: Pesticide Screen.

Health Characteristic: Pesticides	No of Analyses	No of Analyses Complying	% Compliance	Maximum Concentration (µg/L)
Dithiocarbamates as Carbons Disulfide: Metham-sodium	1	1	100	<0.2
Phenoxyacetic Acid Herbicides: Dicamba, MCPA, 2.4-D, Triclopyr, Picloram and Clopyralid	1	1	100	<0.01
Glyphosate and AMPA	1	1	100	<10
Quaternary Ammonium Herbicides: Paraquat and Diquat	1	1	100	<0.05
Sulfonylurea Herbicides: Metsulfuron Methyl	1	1	100	<0.10
Triazoles: Amitrole	1	1	100	<0.10
Phenolics and Related Compounds: Pentachlorophenol and Dalapon	1	1	100	<0.10

5.5 Water Quality: PFAS Components

PFAS are a large, complex group of manufactured chemicals that are ingredients in various everyday products e.g. they are used to keep food from sticking to packaging or cookware, make clothes and carpets resistant to stains and water, and create a more effective foam for firefighting. PFAS are used in industries such as aerospace, automotive, construction, and electronics.

PFAS molecules have a chain of linked carbon and fluorine atoms. Because the carbon-fluorine bond is one of the strongest, these chemicals do not degrade easily in the environment and are highly mobile. Multiple health effects associated with PFAS exposure have been identified and are supported by different scientific studies. Concerns about the public health impact of PFAS have arisen for the following reasons:

- Widespread exposure and occurrence: PFAS are used in hundreds of products globally and studies found PFAS in the blood and urine of people.
- Persistent: PFAS remain in the environment for an unknown length of time.
- Bioaccumulation: people may encounter different PFAS chemicals in various ways and over time may take in more of the chemicals than they excrete, a process that leads to bioaccumulation in bodies.

Research to date reveals possible links between human exposures to PFAS and adverse health outcomes. These health effects include altered metabolism, fertility, reduced foetal growth and increased risk of being overweight or obese, increased risk of some cancers, and reduced ability of the immune system to fight infections. While knowledge about the potential health effects of PFAS has grown, many questions remain unanswered with further investigation and research continuing.

Groundwater is drawn from the confined Leederville aquifer through a cased and screened bore with seals hence provide a high level of protection from potential contaminants in the surface and superficial aquifers. Whilst the risk of PFAS contamination of the drinking water is assessed as highly unlikely, we obtained samples of groundwater during March 2023, submitted to ALS Environmental Laboratories for determination of Perfluoroalkyl Sulfonic Acids, Perfluoroalkyl Carboxylic Acids, Perfluoroalkyl Sulfonamides, Fluorotelomer Sulfonic Acids and Sums of PFAS; these substances were all below their PFAS Super Ultra Trace Levels, hence are absent in groundwater at the Country Heights Estate:

Table 11: PFAS Components.

PFAS Substances	Number of Samples Analysed	Unit	ADWG Guideline Value	Maximum Value	Number of Samples NOT Meeting ADWG Guideline Value	% Compliance
Sum of perfluoro octane sulfonate (PFOS) and perfluoro hexane sulfonate (PFHxS)	1	µg/L	0.07	<0.0002	0	100
Perfluoro octanoic acid (PFOA)	1	µg/L	0.56	<0.0002	0	100

5.6 Source Water Quality: Radioactivity

Samples of source (bore) water were obtained during February 2023 and submitted to ALS for determination of Gross Alpha and Beta Activity indicated that:

- Gross Alpha Activity was measured at <0.05 Bq/L; and
- Gross Beta Activity (excluding K-40) at <0.10 Bq/L,

hence, both samples were below their laboratory limits of reporting and are below the Australian Drinking Water Guidelines Screening values for drinking water at 0.5 Bq/L for Gross Alpha and 0.5 Bq/L for Gross Beta (excluding K-40 activity).

Glossary

Word	Meaning
ADWG	Australian Drinking Water Guidelines
Bq/L	Becquerels per litre
CFU	Colony-Forming Unit
Country Heights Estate	A residential development 6 kilometres north of Gingin
Country Heights Water (CHW)	Country Heights Water Pty Ltd, ABN 72 624 317 746
DoH	Department of Health, Western Australia
DWER	Department of Water and Environmental Regulation, Western Australia
DWSPP	Drinking Water Source Protection Plan
ERA	Economic Regulation Authority, Western Australia
HU	Hazen Units
mg/L	milligrams per litre
µg/L	micrograms per litre
MoU	Memorandum of Understanding
NATA	National Association of Testing Authorities
ND	Not Detected
NTU	Nephelometric Turbidity Units
TDS	Total Dissolved Solids
WA	Western Australia