Lancelin South Water

Report to the Department of Health

For the period

1 July to 30 September 2023

Contents

1.0 Water Provider Information

Provider Contact Details	
Name of Company	Lancelin South Water
Company Address	Suite 2, Ground Floor 233 Adelaide Terrace, Perth WA 6000
Company Phone	08 9655 1555
Company Email	admin@lancelinsouthwater.com.au
Chief Executive Officer / Director	Yi Qiang, Lancelin South Water
CEO Email	chetqiang@vimg.com.au
DoH Liaison Officer	Blair Shackleton, Lancelin South Water
DoH Liaison Officer Email	Blair.shackleton@lancelinsouthwater.com.au

1.1 Our Water System

Location

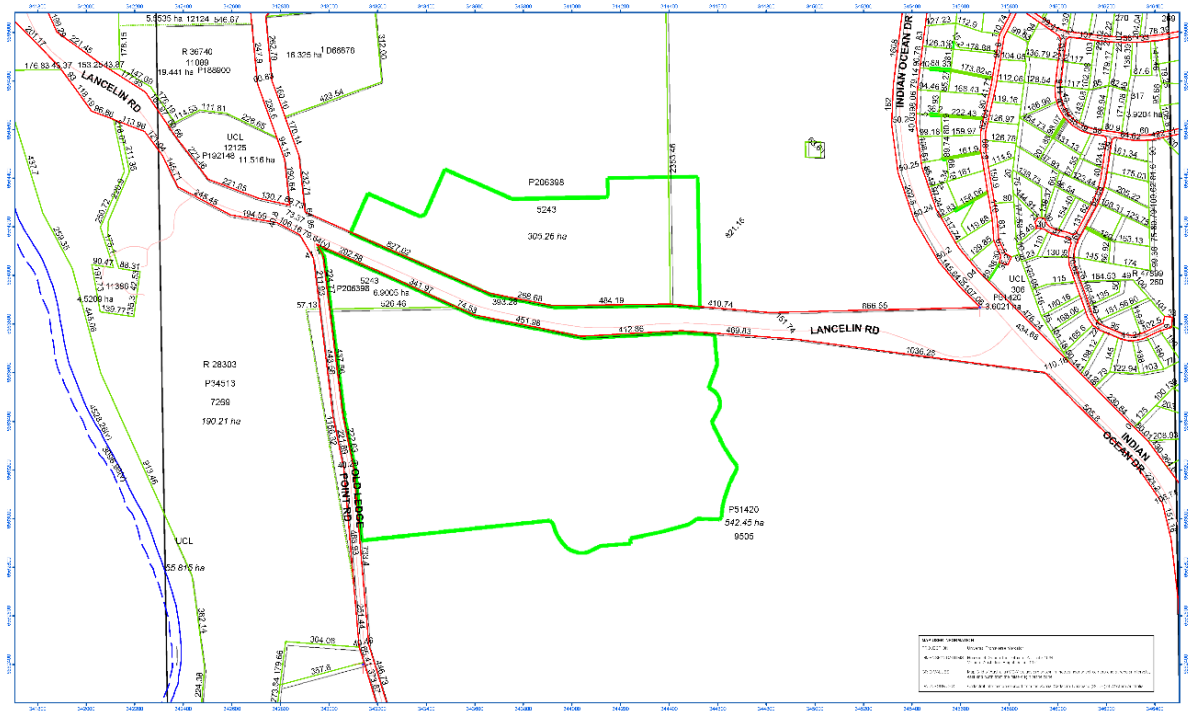
The Lancelin South development is located approximately 130 kilometres north of Perth and 2.2 kilometres southeast of the town of Lancelin, in the Shire of Gingin.

Licence Area

Lancelin South Water (LSW) holds a Water Services Licence (WL47) issued by the Economic Regulation Authority of Western Australia (ERAWA).

Lancelin South Water services the Lancelin South residential and commercial areas as indicated in Figure 1 below. Our Water Services Licence is available at the ERA web site at https://www.erawa.com.au/water/water-licensing/licence-holders#L

Figure 1 Lancelin South Operating Area



Our Infrastructure

Table 1: Summary of infrastructure

Infrastructure Summary	
Total number of connections(1) - June 2023	25
Number of Customers(2)	29
Total length of water mains	1.6 kilometres
Number of water quality localities	1
Chlorine residual target	0.4 to 0.6 mg/L

Note 1 Number of connections refers to properties connected to services and having regular meter readings collected.

Note 2 The number of customers is determined by the ERA as the number of customer accounts holders, which includes lots sold as well as lots under construction that may have not yet been connected to services.

Our Water Source

Lancelin South Water sources all water from a production bore tapping the Leederville aquifer within the Perth Basin. Two monitoring bores are installed to allow monitoring of any impacts on or risks to the groundwater source, either from our operation or from other parties.

Lancelin South Water holds a Licence to Take Water (GWL176077(2)) issued by Department of Water and Environmental Regulations (DWER).

Source Protection

A Drinking Water Source Protection Plan (DWSPP) has been developed by Lancelin South Water. Lancelin South Water will work cooperatively with the DoH, as described in the MoU, to ensure the safety of the water supply.

The production bore is located within our locked, chain mesh fenced Water Treatment Plant (WTP) compound. To protect our source water, a Wellhead Protection Zone has been proclaimed over the area of the WTP compound.

Abstraction Amounts

Lancelin South Water's Licence to Take Water (GWL176077(2)) allows annual extraction up to 470 megalitres (470 million litres) from the Leederville aquifer. Lancelin South Water typically abstract less than 10 ML/year of groundwater.

Water Treatment

The Lancelin South Water treatment plant incorporates four steps to treat the raw bore water to produce safe drinking water that is supplied to our customers:

- Raw groundwater abstracted from the production bore is dosed with sodium hypochlorite solution, then filtered through a catalytic filter media, DMI65, to remove dissolved metals. This water is supplied to the Lancelin South residents as non-potable water (not for drinking);
- The non-potable water is further treated by filtration through successively, granular activated carbon to remove dissolved organic contaminants and then 5 µm and 1 µm cartridges to ensure particulate matter in the water is removed;
- Part of this filtered water is then treated using reverse osmosis desalination to reduce the salinity of the water;
- The desalinated water and filtered water streams are then blended and stored in the Drinking Water Tank. Water in this tank is continuously recirculated and dosed with sodium hypochlorite solution to maintain a residual chlorine disinfectant concentration. The water at Lancelin South is not fluoridated.

Lancelin South Water supplies on average 156 kL/property of drinking water each year.

Distribution Network

Lancelin South Water's distribution network delivers drinking water to customers within the Lancelin South area. The network operates as one interconnected system. Materials used in the reticulation network are predominantly Polyvinyl Chlorine (PVC) and High Density Polyethylene (HDPE), approved under Australian Standard AS/NZS 4020 (Testing of Products for Use in Contact with Drinking Water) or complying with the Department of Health document Materials and Substances in Contact with Drinking Water requirements or as scheduled in the MoU with the Department of Health.

Lancelin South Water samples the raw (source) water (Source Sample Point) and treated water; treated water is sampled at the outlet of the treated water tank (Treated Water Sample Point) and from a sample tap located within the Lancelin South residential area (Consumer Sample Point).

A separate distribution network supplies non-potable water (not for drinking) to Lancelin South customers. This water supply is identified using 'purple pipes', including a separate purple water meter, and is marked as "Not for Drinking". A 'Non-potable Water – Household Guide' is available from the Lancelin South Water web site at http://www.lancelinsouthwater.com.au/forms-documents-and-publications/

Our Team

Employees and contractors involved with the Lancelin South Water drinking water system have appropriate training and experience to be demonstrably competent with the treatment, supply and monitoring of drinking water.

2.0 Performance Summary

Table 2 Microbial Water Quality 1 July 2023 to 30 September 2023

Compliance from 1 July to 30 September 2023				
		Total Number of samples (1)	**Number of samples compliant**	**Percent of samples compliant**
Microbiological	*Escherichia coli (E.Coli)*	9	9	100
	Thermophilic *Naegleria*	3	3	100
	Naegleria Fowleri	3	3	100
Chemical	Health related	30	30	100
Radiological	Health related	2	2	100

Note 1: Number of samples taken for the quarter from the Treated Water Tank Sample Point and the Consumer Sample Point.

Appendix A of this report describes the Water Quality parameters that are measured by Lancelin South Water, the reasons that they are measured and how to interpret the results.

3.0 Microbial Performance

3.1 Treated Water Microbial Water Quality

Microbiological samples are collected from the Treated Water and Consumer sample point fortnightly and summarised in Table 3 below.

Samples were analysed for thermotolerant coliforms, E. coli, Thermophilic *Naegleria* and *Naegleria fowleri* during the period. No microbial activity in relation to these parameters was detected during the three months at either of the sample locations.

Lancelin South Water remains fully compliant with the Australian Drinking Water Guidelines (ADWG) and the Memorandum of Understanding with the Department of Health in respect *to E. coli* and *N. fowleri.*

Table 3 Microbial Water Quality 1 July 2023 to 30 September 2023

Period	*Escherichia coli (E.Coli)*				Thermophilic *Naegleria*			*Naegleria Fowleri*		
	No of Samples	No of non conforming samples	Maximum Individual Value	Compliance	No of Samples	Detected	Compliance	No of Samples	Detected	Compliance
Jul-23	3	0	est <1	100	1	0	100	1	0	100
Aug-23	3	0	est <1	100	1	0	100	1	0	100
Sep-23	3	0	est <1	100	1	0	100	1	0	100
Total Third Quarter 2023	9	0	-	-	3	0	-	3	0	-
Third Quarter 2023 Performance	100%			-	100%		-	100%		-

3.2 Microbial – Exception Notifications

Microbial Water Quality Exceptions							
Locality	**Period Quarter**	**Date**	**Microbial Characteristic**	**MoU Alert Level**	**Remedial Action**	**DoH Notified**	**Close Out Date**
Lancelin South	Q3	01/07/23 to 30/09/23	NIL				

4.0 Chemical – Health Related Performance

The results of water samples collected from the bore (raw water) and the treated water sample points (Treated Water Tank and Consumer Sample point) during the period are summarised in Table 4 below. The results show that the water supply provided by Lancelin South Water is fully compliant with ADWG guidelines, our MoU with the DoH and licence requirements with the ERA.

4.1 Chemical – Health Related – Exception Notifications

Health Related Chemical Water Quality Exceptions							
Locality	**Period Quarter**	**Date**	**Health Related Chemical Characteristic**	**MoU Alert Level**	**Remedial Action**	**DoH Notified**	**Close Out Date**
Lancelin South	Q3	01/07/23 to 30/09/23	NIL				

4.2 Chemical – Health Related – Chart

Table 4 Chemical Health summary 1 July 2023 to 30 September 2023

Type	Unit	ADWG Guideline (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bore)		Distribution Water			
				Number Assessed	Maximum Individual Value	Number Assessed	Number Complying with ADWG Guideline	Maximum Individual Value (mg/L)	% Compliance
Antimony (Total)	mg/L	0.003	0.001	NR		1	1	<0.001	100
Cadmium (Total)	mg/L	0.002	0.0002	NR		1	1	<0.0002	100
Chloral Hydrate	mg/L	0.1	0.002	NR		1	1	<0.002	100
Chloroacetic acid	mg/L	0.15	0.002	NR		1	1	<0.002	100
Chromium (Total)	mg/L	0.05	0.001	NR		1	1	<0.001	100
Copper (Total)	mg/L	2.0	0.001	NR		1	1	0.017	100
Dichloroacetic acid	mg/L	0.1	0.002	NR		1	1	<0.002	100
Fluoride, F	mg/L	1.5	0.1	NR		1	1	<0.1	100
Lead (Total)	mg/L	0.01	0.001	NR		1	1	0.002	100

Type	Unit	ADWG Guideline (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bore)		Distribution Water			
				Number Assessed	Maximum Individual Value	Number Assessed	Number Complying with ADWG Guideline	Maximum Individual Value (mg/L)	% Compliance
Nickel (Total)	mg/L	0.02	0.001	NR		1	1	<0.001	100
Nitrate	mg/L	50	0.05	NR		1	1	0.97	100
Nitrite	mg/L	3	0.05	NR		1	1	<0.003	100
Pentachlorophenol	mg/L	0.01	0.001	NR		1	1	<0.001	100
Total THM's	mg/L	0.25	0.001	NR		1	1	0.013	100
Trichloroacetic acid	mg/L	0.1	0.002	NR		1	1	<0.002	100
2,4,6-Trichlorophenol	mg/L	0.02	0.001	NR		1	1	<0.001	100
2,4-Dichlorophenol	mg/L	0.2	0.001	NR		1	1	<0.001	100
2-Chlorophenol	mg/L	0.3	0.001	NR		1	1	<0.001	100
Free Chlorine (1)(2)	mg/L	5	-	NR		12	12	0.8	100

Note 1: Chlorine analysis is an on-site test. All others are results from NATA accredited laboratory.

Note 2 A target of 1.0 mg/L free chlorine (above ADWG aesthetic-based value of 0.6 mg/L) is set at the outlet of the treated water tank to ensure effective disinfection and maintain microbiological safety of drinking water through the reticulation system and to the customer. Free chlorine measured at the consumer sample point ranged from 0.37 mg/L to 0.56 mg/L in the 1 July to 30 September 2023 period.

Australian Drinking Water Guidelines	ADWG	Not Detected	ND
Becquerels per Litre	Bq/L	Not Required	NR
Colony Forming Units	CFU	Nephelometric Turbidity Units	NTU
Hazen Units	HU	Acidity/basicity	pH
Milligrams per Litre	mg/L	Micro Siemens per centimetre	µS/cm
Not Applicable	NA		

5.0 Physical and Chemical – Aesthetic Performance

The results of water samples collected from the bore (raw water) and the treated water sample points (Treated Water Tank and Consumer Sample point) during the period are summarised in Table 4 below.

5.1 Physical and Chemical – Aesthetic – Chart

Table 5 Aesthetic summary 1 July 2023 to 30 September 2023

Type	Unit	ADWG Guideline (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bore)		Distribution Water			
				Number Assessed	Maximum Individual Value	Number Assessed	Number Complying with ADWG Guideline	Maximum Individual Value (mg/L)	% Compliance
Zinc (Total)	mg/L	3	0.005	NR		1	1	0.03	100
2-Chlorophenol [1]	mg/L	0.0001	0.001	NR		1	1	<0.001	-
2,4-Dichlorophenol[1]	mg/L	0.0003	0.001	NR		1	1	<0.001	-
2,4,6-Trichlorophenol[1]	mg/L	0.002	0.001	NR		1	1	<0.001	100
Free Chlorine [2] [3]	mg/L	0.6	-			12	7	0.80	58
pH [2]		6.5 – 8.5	-	6	6.84 – 7.27	12	12	7.08 – 7.92	100
Total Dissolved Solids [2]	mg/L	600	-	6	772	12	12	558	100
Turbidity [2]	mg/L	5	-	NR		12	12	0.95	100

Note 1: The laboratory limit of reporting (LOR) for 2-Chlorophenol and 2,4-Dichlorophenol is 0.001 mg/L, which are above the respective ADWG aesthetic related guideline values for these compounds and hence, the samples may not be compliant with the ADWG aesthetic related guidelines.

Note 2: pH, TDS, Free Chlorine and Turbidity are on-site test. All others are results from NATA accredited laboratory.

Note 3: A target of 1.0 mg/L free chlorine (above ADWG aesthetic-based value of 0.6 mg/L) is set at the outlet of the treated water tank to ensure effective disinfection and maintain microbiological safety of drinking water through the reticulation system and to the customer.

6.0 Radiological Performance

The results of water samples collected from the bore (raw water) and the treated water sample point (Treated Water Tank) during the period are summarised in Table 5 below.

Annual dose, calculated in accordance with ADWG (v3.7), is 0.4 mSv/year, well below the reference level of 1 mSv/year. It is noted that the source water is partially treated by reverse osmosis which will remove the radioactive materials from the water prior to supply to consumers.

6.1 Radiological – Exception Notifications

Radiological Water Quality Exceptions							
Locality	**Period Quarter**	**Date**	**Radiological Characteristic**	**MoU Alert Level**	**Remedial Action**	**DoH Notified**	**Close Out Date**
Lancelin South	Q3	01/07/23 to 30/09/23	NIL				

6.2 Radiological – Chart

Table 6 Radiological summary 1 July 2023 to 30 September 2023

Type	Unit	ADWG Guideline (Bq/L)	Raw Water (Bore)			Distribution Water		
			Number Assessed	Number Complying with ADWG Guideline	Maximum Individual Value	Number Assessed	Number Complying with ADWG Guideline	Maximum Individual Value
Gross Alpha	Bq/L	0.5	1	1	0.352 ± 0.081	1	1	0.202 ± 0.056
Gross Beta activity – 40K	Bq/L	0.5	1	1	0.291 ± 0.061	1	1	0.096 ± 0.043

7.0 PFAS Performance

No sampling of the source water or the consumer sample point was carried out for Per- and polyfluoroalkyl substances (PFAS) over the period July to September 2023.

8.0 Sampling Summary

8.1 Sampling History (1 July to 30 September 2023)

Locality	Microbiological			Physical and Chemical			Radiological		
	Planned	Taken	% Taken	Planned	Taken	% Taken	Planned	Taken	% Taken
Lancelin South	12	12	100	84	84	100	4	4	100

8.2 Exceptions to Planned Sampling

Planned Sample Exceptions			
Locality	Characteristic (Microbial / Physical and Chemical / Radiological)	Number of Samples	Reason for missed sample
Lancelin South		NIL	

8.3 Planned Sampling

Regular fortnightly checks of pH, chlorine, turbidity and water temperature using handheld instrumentation at the WTP (Source and Treated Water sample points) and the Lancelin South sales office (Consumer sample point) are carried out by Urbaqua on behalf of Lancelin South Water.

Appendix A. Understanding Water Quality

Refer to the Australian Drinking Water Guidelines for more detailed information.

Parameter	Description	Management and Control
Micro-organisms & Pathogens *E. coli* *Naegleria*	Micro-organisms (or microbes) are microscopic living organisms, occurring naturally in our environment – in the air, in the soil and in water bodies. Some are beneficial to life, but some can have serious health impacts to humans. Pathogens (pathogenic micro-organisms) are micro-organisms that cause disease or illness. The most common and widespread health risk to people is associated with drinking water contamination by pathogens. Organisms associated with faecal matter from humans or other mammals cause several waterborne diseases. It is impossible to test for the presence of all pathogens that may be present in water. The ADWG recommends testing for the presence of *Escherichia coli* (*E. coli*) as an indicator of faecal pathogen contamination. Thermophilic *Naegleria* refers to a group of common water borne amoebae which includes *Naegleria fowleri*, the organism that causes the serious disease primary amoebic meningoencephalitis (PAM). *Naegleria fowleri* is an environmental pathogen which naturally lives in fresh warm water.	The ADWG state that thermotolerant coliforms/*E. coli* should not be present in a minimum 100 mL sample of drinking water. The Department of Health WA has notification protocols in place regarding *exception events* for pathogens. Lancelin South Water will immediately notify the Department of Health of any confirmed detection of thermotolerant coliforms, *E.coli* or *Naegleria* species in any sample for microbiological analysis. Lancelin South Water practice a multi-barrier approach to minimise the risk of microbial contamination.
Turbidity	Turbidity is the cloudiness sometimes seen in water. It is caused by small solid particles suspended in the water. The presence of particles in the water is an aesthetic problem but also impacts on the ability to adequately disinfect the water. Turbidity is usually reported as Nephelometric Turbidity Units (NTU). It is difficult to see turbidity below about 5 NTU with the naked eye.	The ADWG specify an aesthetic guideline for turbidity of 5 NTU. A turbidity of less than 1 NTU is desirable in drinking water for optimal disinfection. LSW remove turbidity from the water through multiple filtration stages.

<table>
<tr><th>Parameter</th><th>Description</th><th>Management and Control</th></tr>
<tr><td>Colour</td><td>Colour in natural water is due mainly to the presence of dissolved organic matter including humic and fulvic acids, which originate from soil and decaying vegetable matter. Colour can also be caused by high levels of dissolved iron or manganese.

The presence of turbidity in the water may appear as Colour – True Colour is the Colour present after removal of turbidity.</td><td>The ADWG value for colour is based on the colour that is just noticeable in a glass to the naked eye. This is generally accepted as 15 Hazen Units (HU).

LSW remove colour using granular activated carbon and reverse osmosis processes.</td></tr>
<tr><td>Metals</td><td>Metals can be present in natural waters from contact with rocks, soil, pipes and equipment. Many metals in water do not present a health hazard but some do.

Iron is present in the groundwater from the Leederville aquifer. Whilst not health related, elevated concentrations can discolour the water and can stain laundry.

Manganese is also present at low concentration in the groundwater. Manganese can discolour the water and stain laundry.</td><td>The ADWG specify an aesthetic guideline value of 0.3 milligrams per litre [1] (mg/L) for iron.

The ADWG specify a health guideline of 0.5 mg/L and an aesthetic guideline value of 0.1 mg/L for manganese.

LSW removes most metals from the source water through oxidation with sodium hypochlorite and filtration through catalytic media.</td></tr>
<tr><td>Total Dissolved Solids</td><td>Total Dissolved Solids (TDS) consist of inorganic (natural) salts and small amounts of organic matter dissolved in water. Water with low TDS can taste flat, while water with high TDS tastes salty and causes scaling in and corrosion of pipes, fittings and household appliances.

TDS includes sodium, potassium, calcium, magnesium, carbonate, bicarbonate, chloride, Sulfate, nitrate, phosphate, silica, dissolved metals, dissolved organic species and other less common elements.</td><td>The ADWG provide guidance in the palatability of drinking water according to TDS concentration, as shown below:

<table><tr><th>TDS (mg/L)</th><th>Quality</th></tr><tr><td>0 – 600</td><td>Good</td></tr><tr><td>600 – 900</td><td>Fair</td></tr><tr><td>900 – 1200</td><td>Poor</td></tr><tr><td>>1200</td><td>Unpalatable</td></tr></table>
Groundwater from our production bore is typically around 800 mg/L - 900 mg/L TDS. LSW desalinate the water using reverse osmosis to provide water to customers at below 500 mg/L.</td></tr>
</table>

Parameter	Description	Management and Control
Radionuclides	There are natural levels of radiation within the environment emanating from rocks and soil. Water from the Leederville aquifer (source for Lancelin South) typically has quite low levels of radionuclides. The radioactivity of radionuclides is reported in units of Becquerels per Litre (Bq/L)	The Australian Drinking Water Guidelines recommend a screening level of 0.5 Becquerels per Litre (Bq/L). LSW regularly monitor to ensure that the treated water is within the ADWG guidelines for radionuclides.
pH	pH is a measure of water acidity - pH 7 is neutral, low pH is acidic and high pH is alkaline. Low pH may cause corrosion to taps, water heaters and other household appliances. High pH may be associated with scaling.	The ADWG specify a lower and upper aesthetic value of 6.5 and 8.5 respectively. LSW source water is within the ADWG guidelines, and no specific pH adjustment is required.
Trihalomethanes	Trihalomethanes (THMs) may be present in drinking water as a by-product of disinfection using chlorination.	The ADWG health guideline for total THM is 0.25 mg/L, expressed as an average long-term exposure. LSW regularly monitor the drinking water to ensure that THM remains below guideline levels.
Pesticides Industrial chemicals	Pesticides are chemical compounds used for the control of 'pests' (including insects, weeds, fungi, rodents, etc). These compounds, when at high enough concentration may be toxic to humans, can enter the drinking water system through over-spray, wind-borne dust, transmission through groundwater and other mechanisms. Industrial chemicals of significance to water quality include synthetic organic compounds, many of which are, at high enough concentration, toxic to humans.	The ADWG provides health related guidelines for an extensive range of pesticides and industrial chemicals. The LSW groundwater source is protected by a P1 Wellhead protection zone and a Drinking Water Source Protection Plan. LSW regularly monitor the drinking water to ensure that no pesticide or other synthetic organic compound exceeds the respective guideline level.

Note:

(1) 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).