ANNUAL WATER QUALITY REPORT

1 JULY 2019 – 30 JUNE 2020

CONTENTS

INTRODUCTION

Purpose of this document

Our commitment to compliance with health related and non-health related water quality criteria of the Australian Drinking Water Guidelines (ADWG) is firmly established and reinforced through our Memorandum of Understanding (MoU) with the Department of Health. This document, in accordance with Section 11 of the MoU, reports the water quality performance for the period 1 July 2019 to 30 June 2020.

In addition to presenting water quality results and performance against the ADWG, this report describes the processes Lancelin South Water uses to collect, treat and distribute drinking water to our customers.

Table 1 Drinking Water Quality Results 1 July 2019 to 30 June 2020 at a glance

Water Quality Incidents	
Incidents reportable to Department of Health	Nil
Health related characteristics	**Compliance**
Escherichia coli	100%
Naegleria	100%
Chemical	100%
Pesticides	100%
Radiological	100%
Chlorine Disinfection	100%
Non-health characteristics	**Compliance**
Aesthetic characteristics (excluding chlorine)*	100%

Our Drinking Water Quality Policy

Lancelin South Water is committed to ensuring that drinking water supplied to our customers is safe, provided sustainably and meets or exceeds our customer expectations.

Our water is regularly monitored to ensure it meets the health related criteria set out in the Australian Drinking Water Guidelines.

We will achieve this by:

- Safely managing water quality throughout the treatment process from the source to the consumer taps;
- Using a risk based approach in our operations, in which potential threats to water quality are identified and managed;
- Undertaking regular water quality monitoring and public reporting of results;
- Robust contingency planning and incident response capabilities;
- Operating and maintaining our treatment plant and infrastructure following best practice principles;
- Continually assessing and upgrading plant and equipment to ensure performance;
- Maintaining communications with stakeholders and regulators;
- Welcoming consumer feedback on water quality;
- Carrying out verification of performance and management systems via external auditing.

INTRODUCTION

Drinking Water Quality Management Framework

Lancelin South Water bases its Drinking Water Quality Management System on the Framework for Management of Drinking Water Quality, within the Australian Drinking Water Guidelines (ADWG) endorsed by the National Health and Medical Research Council. This Framework:

- defines benchmark water quality guidelines and values for drinking water quality management;
- defines a preventative approach to the management and operation of a drinking water system, encompassing all steps in water production from source to consumer.

The WA Department of Health and Lancelin South Water signed a Memorandum of Understanding in June 2019, describing the requirements for compliance with microbiological, chemical and radiological drinking water quality criteria. The MoU is publicly available from the Lancelin South Water web site at http://www.lancelinsouthwater.com.au/forms-documents-and-publications/

The Lancelin South Water MoU incorporates the preventative water management strategy, from source to consumer, outlined in the ADWG Framework for Management of Drinking Water Quality. The MoU is structured to reflect the 12 guiding elements of the Framework and thereby integrates all facets of the drinking water quality management and assurance system. The MoU covers items such as the agreed monitoring program, management practices and procedures, approved chemicals and material 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 Department of Health. Until replaced with the Annual Water Quality report, quarterly Water Quality reports are publicly available on the Lancelin South web site at: http://www.lancelinsouthwater.com.au/reports/

Customer Service

Lancelin South Water operates under Water Services Licence number WL47, issued by the WA Economic Regulation Authority (ERA). We report annually to the ERA and are regularly audited against the Water Services Code of Conduct (Customer Service Standards).

Lancelin South Water can be contacted as follows:

Phone 08 9655 1555

Email admin@lancelinsouthwater.com.au

Useful Links

Lancelin South Water

Department of Health - Water Unit

NHMRC Australian Drinking Water Guidelines

Economic Regulation Authority WA - Water

Department of Water and Environmental Regulation – Water

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 contaminated 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 fowleri* 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, sulphate, 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><td>TDS (mg/L)</td><td>Quality</td></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 source water is within the ADWG guidelines and no specific treatment is required 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).

OUR WATER SYSTEM

Location

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

Licence Area

Lancelin South Water 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 the map below. Our Water Services Licence is available at the ERA web site at https://www.erawa.com.au/water/water-licensing/licence-holders#L

Our Infrastructure

Total number of connections (July 2020)	28
Number of Customers	16
Total length of water mains	1.6 km
Number of distribution water quality zones	1
Chlorine residual target	0.4 to 0.6 mg/L

Our Water Source

Lancelin South Water sources groundwater from a 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 Regulation (DWER).

Source Protection

A Drinking Water Source Protection Plan (DWSPP) has been developed by Lancelin South Water as required by the DoH as part of the MoU.

The production bore is located within our locked, chain mesh fenced Water Treatment Plant (WTP) compound. To protect our source water, a P1 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 using production bore 3/09.

Table 2 Bore Water Extraction Amounts

Reporting Period	Megalitres (ML)
1 July 2019 to 30 June 2020	6.3
1 July 2018 to 30 June 2019	4.3
1 July 2017 to 30 June 2018	9.7

Water Treatment

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

1. 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 irrigation water (not for drinking);
2. The irrigation 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;
3. Part of this filtered water is then treated using reverse osmosis desalination to reduce the salinity of the water;
4. 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.

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 PVC and HDPE, approved either under Australian Standard AS/NZS 4020: 2005 (Testing of Products for Use in Contact with Drinking Water) or as scheduled in the MoU with the Department of Health.

A separate distribution network supplies irrigation 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.

SYSTEM OPERATION

Customer Service

Lancelin South Water are committed to ensuring our customers are satisfied with the water services they receive.

Table 3: History of Customer Complaints

Period	Number of Customer Complaints Regarding Water Quality
1 July 2019 – 30 June 2020	Nil
1 July 2018 – 30 June 2019	Nil
1 July 2017 – 30 June 2018	Nil

Annual and recent Quarterly Water Quality reports are publicly available from the Lancelin South Water website Reports Page.

The LSW website provides a summary table of water quality for the most recent reporting period and a 12 month rolling average.

Notifiable incidents

During the period 1 July 2019 to 30 June 2020 there have been no water quality incidents that are reportable to the Department of Health.

Improvements

LSW are committed to carrying out regular servicing and maintenance of equipment and infrastructure to ensure that drinking water quality is not compromised at any time. We implement system and management improvements as required to maintain reliability of service and minimise risk to quality of water supplied to customers.

In November 2019, a major upgrade of the drinking water treatment plant was implemented, including a new iron removal filter, new reverse osmosis desalination system and new control system.

In January 2020, a chlorine dosing pump failed and in April 2020, the iron removal filter controller failed. Both incidents were rectified without any adverse effect on drinking water delivered to customers.

Water Monitoring

LSW monitoring of water quality occurs at 3 levels:

1. Continuous monitoring by on-line instrumentation with out-of-specification recording raising an alarm, relayed automatically to service personnel;
2. Periodic monitoring by personnel in the field using hand held analytical equipment;
3. Periodic sampling with analysis by NATA[1] registered laboratories.

Sampling and field monitoring are performed in accordance with industry standards. All microbial, detailed chemical and radiological analysis is carried out by a laboratory accredited by NATA for the required analyses.

[1] NATA – National Association of Testing Authorities

WATER QUALITY RESULTS

Drinking Water - Microbiological

There were no recorded microbiological non-conformances recorded during the 1 July 2019 to 30 June 2020 reporting period. Results for the period are included in Table 4 below.

Table 4 Microbiological Samples 1 July 2019 to 30 June 2020 (From Consumer Sample Point)

Characteristic	Number of Samples Collected	Unit	ADWG Limit	Number of Samples NOT meeting ADWG limit	% Compliance
Escherichia coli	24	CFU/100 mL	0	0	100
Thermophilic *Naegleria*	14	org / 250 mL	ND (1)	0	100
Naegleria fowleri	0 (2)	org / 250 mL	ND (1)	0	100

Notes:

(1) ND = Not detected
(2) Analysis for *Naegleria fowleri* is only performed when a test for Thermophilic *Naegleria* returns a positive result.

Drinking Water - Chemical - Health Related

During the 1 July 2019 to 30 June 2020 reporting period, one sample collected from the Treated Water Sample Point indicated chlorine concentration above the ADWG Health related guideline. This arose from a failure of the on-line chlorine analyser / controller; this analyser has since been replaced.

All samples collected for chemical analysis at the Consumer Sample Point during the 1 July 2019 to 30 June 2020 reporting period were compliant with ADWG Health related guideline.

The results for the period are included in Table 5 below.

Table 5 Chemical – Health Related – Compliance Summary 1 July 2019 to 30 June 2020 (From Consumer Sample Point)

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value	Number of Samples NOT meeting ADWG limit	% Compliance
Free Chlorine	28	28	mg/L	5	1.5	0	100
Fluoride	1	1	mg/L	1.5	0.20	0	100
Nitrite	1	1	mg/L as NO_2	3	<0.066	0	100
Nitrate	1	1	mg/L as NO_3	50	0.89	0	100
Total Antimony	1	1	mg/L	0.003	<0.001	0	100
Total Cadmium	1	1	mg/L	0.002	<0.0001	0	100
Total Chromium	1	1	mg/L	0.05	<0.01	0	100
Total Copper	1	1	mg/L	2	0.007	0	100
Total Lead	1	1	mg/L	0.01	<0.001	0	100
Total Manganese	2	2	mg/L	0.5	<0.01	0	100

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value	Number of Samples NOT meeting ADWG limit	% Compliance
Total Nickel	1	1	mg/L	0.02	<0.001	0	100
2-Chlorophenol	1	1	mg/L	0.3	<0.001	0	100
2,4-Dichlorophenol	1	1	mg/L	0.2	<0.001	0	100
2,4,6-Trichlorophenol	1	1	mg/L	0.02	<0.001	0	100
Pentachlorophenol	1	1	mg/L	0.01	<0.001	0	100
Total THM's	2	2	mg/L	0.25	0.13	0	100
Chloroacetic acid	2	2	mg/L	0.15	0.03	0	100
Dichloroacetic acid	2	2	mg/L	0.1	0.004	0	100
Trichloroacetic acid	2	2	mg/L	0.1	0.011	0	100
Chloral Hydrate	2	2	mg/L	0.1	<0.002	0	100

Drinking Water - Chemical - Aesthetic

During the 1 July 2019 to 30 June 2020 reporting period, thirteen (13) samples of a total of twenty eight (28) samples (46%) taken from the Consumer Sample Point indicated Free Chlorine concentration above the ADWG Aesthetic related guideline of 0.6 mg/L.

One sample from the Consumer Sample Point taken during the 1 July 2019 to 30 June 2020 reporting period indicated <1 µg/L for both 2-chlorophenol and for 2,4-dichlorophenol. The related guideline for these compounds is 0.1 µg/L and 0.3 µg/L respectively, lower than the laboratory limit of reporting and hence, the samples are reported as non-compliant with ADWG aesthetic guideline.

Table 6 Chemical – Aesthetic Related – Compliance Summary 1 July 2019 to 30 June 2020 (From Consumer Sample Point)

Aesthetic Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Aesthetic Limit	Maximum Value	Number of Samples NOT meeting ADWG limit	% Compliance
pH	28	28	pH Units	6.5-8.5	7.0-7.8	0	100
Total Dissolved Solids	8	8	mg/L	600	520	0	100
Free Chlorine	28	28	mg/L	0.6	1.5	13	54
Turbidity	2	2	NTU	5	0.5	0	100
Colour (True)	2	2	PCU	15	<5	0	100
Chloride, Cl	2	2	mg/L	250	240	0	100
Sulfate, SO_4	2	2	mg/L	250	26	0	100
Ammonia Nitrogen	2	2	mg/L as NH_3	0.5	<0.025	0	100
Sodium, Na	2	2	mg/L	180	110	0	100

Aesthetic Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Aesthetic Limit	Maximum Value	Number of Samples NOT meeting ADWG limit	% Compliance
Total Hardness by Calculation	2	2	mg $CaCO_3$/L	200	160	0	100
Total Aluminium	2	2	mg/L	0.2	0.01	0	100
Total Iron	2	2	mg/L	0.3	<0.01	0	100
Total Zinc	1	1	mg/L	3	0.019	0	100
2-Chlorophenol(1)	1	1	mg/L	0.0001	<0.001	1	0
2,4-Dichlorophenol(1)	1	1	mg/L	0.0003	<0.001	1	0
2,4,6-Trichlorophenol	1	1	mg/L	0.002	<0.001	0	100

Notes:

(1) The laboratory limit of reporting (LOR) is 0.001 mg/L, which is above the ADWG guideline value and hence, the analysis is reported as non-compliant.

Source Water - Chemical - Health Related

All samples from the Source Water Sample Point taken during the 1 July 2019 to 30 June 2020 reporting period were compliant with the ADWG guidelines (excluding pesticides, see below).

Table 7 Chemical – Health Related – Analysis Summary 1 July 2019 to 30 June 2020 (Source Water Sample Point)

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value
Free Chlorine	1	1	mg/L	5	0.04
Nitrite Nitrogen	1	1	mg/L	0.9	0.07
Nitrate Nitrogen	1	1	mg/L	11	0.07
Total Manganese	1	1	mg/L	0.5	0.08
Total Arsenic	2	2	mg/L	0.007	<0.001
Total Barium	2	2	mg/L	0.7	0.16
Total Boron	2	2	mg/L	4	0.05
Total Mercury	2	2	mg/L	0.001	<0.0001
Total Molybdenum	2	2	mg/L	0.05	<0.001
Total Selenium	2	2	mg/L	0.01	<0.001
Total Beryllium	2	2	mg/L	0.06	<0.01
Total Silver	2	2	mg/L	0.1	<0.001
Total Uranium	2	2	mg/L	0.02	<0.001

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value
2-Chlorophenol	1	1	mg/L	0.3	<0.001
2,4-Dimethylphenol	1	1	mg/L	0.2	<0.001
2,4,6-Trichlorophenol	1	1	mg/L	0.02	<0.001

No samples for pesticides from the Source Water Sample Point taken during the 1 July 2019 to 30 June 2020 reporting period returned a result above the laboratory level of reporting. The laboratory level of reporting for one sample for Amitrole and one sample for Fenamiphos was above the ADWG guideline value.

Table 8 Pesticides – Analysis Summary 1 July 2019 to 30 June 2020 (Source Water Sample Point)

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value
Aldrin	2	2	mg/L	0.0003	<0.000001
Amitraz	1	1	mg/L	0.009	<0.0001
Amitrole	1	1	mg/L	0.0009	<0.001
Atrazine	1	1	mg/L	0.02	<0.0001
Azinphos ethyl	1	1	mg/L	0.03	<0.00002

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value
Azinphos Methyl	2	2	mg/L	0.03	<0.001
Bromophos Ethyl	2	2	mg/L	0.01	<0.0001
Carbofenothion	1	1	mg/L	0.0005	<0.00002
Chlordane	2	2	mg/L	0.002	<0.000002
Chlorfenvinphos	2	2	mg/L	0.002	<0.0002
Chlorothalonil	1	1	mg/L	0.05	<0.00001
Chlorpyrifos	2	2	mg/L	0.01	<0.0001
Clopyralid	1	1	mg/L	2	<0.0004
2,4-D	1	1	mg/L	0.03	<0.0001
o,p-DDT	1	1	mg/L	0.009	<0.000001
p,p-DDT	1	1	mg/L	0.009	<0.000001
Diazinon	2	2	mg/L	0.004	<0.00001
Dicamba	1	1	mg/L	0.1	<0.0001
Dichlorvos	1	1	mg/L	0.005	<0.0002
Diclofop Methyl	1	1	mg/L	0.005	<0.0001
Dieldrin	2	2	mg/L	0.0003	<0.000002

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value
Dimethoate	2	2	mg/L	0.007	<0.0001
Disulfoton	1	1	mg/L	0.004	<0.00005
Diuron	1	1	mg/L	0.02	<0.0005
Endosulfan I	1	1	mg/L	0.02	<0.0001
Endosulfan II	1	1	mg/L	0.02	<0.0001
Endosulfan Sulfate	1	1	mg/L	0.02	<0.0001
Ethion	2	2	mg/L	0.004	<0.00002
Ethoprophos	1	1	mg/L	0.001	<0.00001
Fenamiphos	2	2	mg/L	0.0005	<0.001
Fenchlorophos (Ronnel)	1	1	mg/L	Note 1	<0.01
Fenitrothion	1	1	mg/L	0.007	<0.0001
Fensulfothion	1	1	mg/L	0.01	<0.00001
Fenthion	1	1	mg/L	0.007	<0.00005
Fipronil	1	1	mg/L	0.0007	<0.00002
Fluometuron	1	1	mg/L	0.07	<0.0001
Fosamine	1	1	mg/L	0.03	<0.0001

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value
Heptachlor	2	2	mg/L	0.0003	<0.000002
Hexazinone	1	1	mg/L	0.4	<0.0004
Lindane	2	2	mg/L	0.01	<0.000002
Malathion	2	2	mg/L	0.07	<0.00002
MCPA	1	1	mg/L	0.04	<0.0001
Methoxychlor	2	2	mg/L	0.3	<0.00002
Metolachlor	1	1	mg/L	0.3	<0.0002
Metsulfuron Methyl	1	1	mg/L	0.04	<0.0005
Mevinphos	1	1	mg/L	0.005	<0.00002
Molinate	1	1	mg/L	0.004	<0.0001
Monocrotophos	1	1	mg/L	0.002	<0.00002
Omethoate	1	1	mg/L	0.001	<0.00001
Paraquat	1	1	mg/L	0.02	<0.001
Parathion	1	1	mg/L	0.02	<0.0002
Parathion Ethyl	1	1	mg/L	0.02	<0.00002
Parathion Methyl	2	2	mg/L	0.0007	<0.0005

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value
2-Chlorophenol	1	1	mg/L	0.3	<0.001
2,4-Dimethylphenol	1	1	mg/L	0.2	<0.001
2,4,6-Trichlorophenol	1	1	mg/L	0.02	<0.001
Pentachlorophenol	1	1	mg/L	0.01	<0.001
Picloram	1	1	mg/L	0.3	<0.0002
Pirimiphos Ethyl	1	1	mg/L	0.0005	<0.00001
Pirimiphos Methyl	1	1	mg/L	0.09	<0.00001
Profenofos	1	1	mg/L	0.0003	<0.00001
Propazine	1	1	mg/L	0.05	<0.0001
Propiconazole	1	1	mg/L	0.1	<0.0004
Simazine	1	1	mg/L	0.02	<0.0001
Sulprofos	1	1	mg/L	0.01	<0.00005
2,4,5-T	1	1	mg/L	0.1	<0.0001
Temephos	2	2	mg/L	0.4	<0.025
Terbufos	1	1	mg/L	0.0009	<0.00001
Terbutryn	1	1	mg/L	0.4	<0.0001

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Health Limit	Maximum Value
Tetrachlorovinphos	1	1	mg/L	0.1	<0.00001
Tricholrofon	1	1	mg/L	0.007	<0.00002
Triclopyr	1	1	mg/L	0.02	<0.0001
Trifluralin	1	1	mg/L	0.09	<0.0001

Note 1: The ADWG cites that there is insufficient data to set a guideline value based on health considerations

Source Water - Chemical - Aesthetic

All samples collected from the Source Water Sample Point during the 1 July 2019 to 30 June 2020 reporting period were above the ADWG aesthetic guidelines for total dissolved solids, chloride, total hardness and iron, as expected. The source water is treated prior to supply to consumers in Lancelin South to ensure that these water quality issues are addressed.

The laboratory level of reporting for one sample for 2-chlorophenol and one sample for 2,4-dichlorophenol during the 1 July 2019 to 30 June 2020 reporting period were above the ADWG guideline values.

The results for the period are included in Table 9 below.

Table 9 Chemical – Aesthetic related – Analysis Summary 1 July 2019 to 30 June 2020 (Source Water Sample Point)

Aesthetic Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Aesthetic Limit	Maximum Value
pH	19	19	pH Units	6.5-8.5	7.28
Total Dissolved Solids	13	13	mg/L	600	926
Turbidity	8	8	NTU	5	1.7
Free Chlorine	1	1	mg/L	0.6	0.04
Chloride, Cl	1	1	mg/L	250	357
Sulfate, SO_4	1	1	mg/L	250	24
Sodium, Na	1	1	mg/L	180	162
Total Hardness by Calculation	1	1	mg $CaCO_3$/L	200	244
Total Aluminium	1	1	mg/L	0.2	20
Total Iron	1	1	mg/L	0.3	1.2
Ammonia-N	1	1	mg/L as NH_3	0.5	0.16
Total Manganese	1	1	mg/L	0.1	0.06
2-Chlorophenol	1	1	mg/L	0.0001	<0.001
2,4-Dimethylphenol	1	1	mg/L	0.0003	<0.001
2,4,6-Trichlorophenol	1	1	mg/L	0.002	<0.001

Source Water - Radiological

All samples collected from the Source Water Sample Point during the 1 July 2019 to 30 June 2020 reporting period were below the ADWG recommended screening values for gross alpha activity and gross beta activity (after subtraction of the potassium-40 contribution). The results for the reporting period are included in Table 10 below.

Table 10 Radiological – Analysis Summary 1 July 2019 to 30 June 2020 (Source Water Sample Point)

Health Characteristic	Number of Samples Collected	Number of Samples Analysed	Unit	ADWG Screening Value	Maximum Value
Gross Alpha activity	1	1	Bq/L	0.5	0.32
Gross Beta activity (-^{40}K)	1	1	Bq/L	0.5	0.24

An increase in radiological activity of the source water after abstraction from the ground and through the treatment process to the customer tap, is highly improbable. It can therefore be confidently inferred that the drinking water radiological activity will be no higher than that of the source water and that the Lancelin South Water drinking water supply is compliant with the ADWG.