



ROTTNEST IS

PROGRAMMED
Facility Management

Programmed Facility Management

For the

Rottnest Island Authority

**Quarterly Drinking Water Report to the
Department of Health by the Rottnest Island
Authority
July – September 2019**





Table of Contents

1. Water Provider Information	2
1.1. System Information	2
1.1.1. Consumers	2
1.1.2. Distribution System & Water Supply	2
1.1.3. Sampling Schedule & Procedure	3
2. Performance Summary	5
3. Microbial Performance	6
3.1. Microbial – Compliance Summary	6
3.2. Microbial – Exception Notifications	6
3.3. Microbial Incident Specific Information	6
4. Chemical: Health Related Performance.....	8
4.1. Chemical: Health Related - Compliance Summary	8
4.2. Chemical: Health Related - Exception Notifications.....	9
4.3. Chemical: Health Related Incident Specific Information.....	9
5. Chemical: Aesthetic Performance	10
5.1. Chemical: Aesthetic – Compliance Summary.....	10
5.2. Chemical: Aesthetic - Incident Specific Information	11
6. Radiological Performance	12
6.1. Radiological – Compliance Summary.....	12
7. Planned Sample Summary.....	12
7.1. Planned Sample – Compliance Summary	12
7.2. Planned Sample - Exception Notifications	12
8. Customer Complaints.....	13
9. Comments	13



1. Water Provider Information

Rottnest Island Authority Contact Details	
Name of Company	Rottnest Island Authority
Company Address	1st Floor E – Shed, Victoria Quay, Fremantle WA 6160
Company Phone	Ph. (08) 9432 9300 Fax (08) 9432 9301
Company Website	www.rotnnestisland.com
Company Email	enquiries@rotnnestisland.com
Executive Director	Michelle Reynolds
Manager, Major Contracts	Eamonn Williams
Utilities Manager (PFM)	Orrin Neale

1.1. System Information

1.1.1. Consumers

The water demand on Rottnest Island is related to tenancy and is highly seasonal, being low in winter and high in summer. Historical data indicates that over 770,000 visits are typically made to Rottnest Island on a yearly basis, with 46,716 total visitor numbers recorded for July 2019, 44,973 in August 2019 and 65,078 in September 2019.

The number of beds on Rottnest Island for guests is approximately 2,150, with the average length of stay being 3.5 nights. In addition to this, there are approximately 250 permanent residents on Rottnest Island, which also fluctuates in accordance with high and low seasons.

1.1.2. Distribution System & Water Supply

The Rottnest Island distribution system is relatively small, consisting of approximately 22km of mains. Water is located from 15 freshwater bores located in the Wadjemup Borefield and five saline (seawater) bores located in the Longreach Borefield.

The freshwater Wadjemup bores make up approximately 15% of the water source for Rottnest Island. However, these are no longer used for potable water consumption. The freshwater Wadjemup bores are utilised as a supplementary contingency water supply for the golf course irrigation.

Water abstracted from the saline Longreach bores feed into the desalination plant, where reverse osmosis occurs. Desalinated water is then disinfected through a dual chlorination system, which ensures the provision of safe drinking water to Rottnest Island customers.

The water demand on Rottnest Island is highly seasonal, and the monthly consumption can range from approximately 14,000kL in July to 22,000kL in the summer months.

Rottnest Island has a combined storage capacity of 14,000kL, which provides approximately 22 days of potable water storage at full capacity; however, water security is targeted at a minimum of seven days storage during peak periods.

Remote locations outside the main settlement, such as the outer island ablutions, the Research House (2 Stables Road), Wadjemup Lighthouse and surrounding area, are supplied with water via a tanker. The supplied water in these areas is deemed not suitable for drinking and warning signs are posted accordingly.



Image 1 Example of Public Signage

1.1.3. Sampling Schedule & Procedure

Potable water sampling is carried out in accordance with the Australian Drinking Water Guidelines (ADWG) and is scheduled in accordance with the Rottnest Island Drinking Water Quality Management Plan dated April 2017.

To respond to emerging trends, and to further ensure the safety of the drinking water quality, further monitoring or adjustment of the schedule can occur in response to:

- Risk assessment;
- New information or industry best practice;
- Guidance or specialist recommendations from Government Departments; or
- Post incident.

There have been no alterations to the sampling schedule within this reporting period.

In addition to the sampling regime presented in the Drinking Water Quality Management Plan, Rottnest Island Authority are additionally testing:

- Tanks 4 and 7, however, the data does not form part of the statistical data required for analysis in this quarterly report;
- Drinking fountains, as recommended by the Department of Health in 2017; and
- Bromate, following testing for additional minerals and metals in 2017. Bromate was identified, and weekly sampling occurs to monitor the results.

2. Performance Summary

Water Quality Meeting the Australian Drinking Water Guidelines v.3.5 2018			
July - September 2019			
	¹No. of Analyses Completed	No. of Analyses Within Guidelines	No. of Non-conformances to Guidelines
Microbial			
Bacterial (<i>E.coli</i>)	58	58	0
Thermotolerant Coliforms	58	58	0
Thermophilic Amoebae	24	24	0
Amoeba (Thermophilic <i>Naegleria</i>)	24	24	0
Chemical & Physical			
Health	248	248	0
Aesthetic	252	206	46
Radiological			
Gross Alpha	0	0	0
Gross Beta	0	0	0

3. Microbial Performance

During the July – September 2019 reporting period, there were no reported exceedances of Microbial Health against the Australian Drinking Water Guidelines in the potable water distribution system.

3.1. Microbial – Compliance Summary

Rottnest Island Distribution System July – September 2019				
Microbial Characteristic	¹ Memorandum of Understanding Compliance Criteria	No. of Analyses	No. of Analyses Complying with Memorandum of Understanding	% Compliance
Bacterial				
<i>E.coli</i>	Non-Detect	58	58	100%
Thermotolerant Coliforms	Non-Detect	58	58	100%
Amoeba				
Thermophilic Amoebae	Non-Detect	24	24	100%
Thermophilic Naegleria	Non-Detect	24	24	100%

3.2. Microbial – Exception Notifications

Date	¹ Microbial Characteristic	Memorandum of Understanding Alert Level	Remedial Action	Department of Health Notified	Close Out Date
Nothing to report					

3.3. Microbial Incident Specific Information

There were no reported exceedances for Microbial Health in the potable water distribution system over the period.

There were, however, five exceedances detected at Tank 7. The Department of Health has requested to be notified of all exceedances associated with Tank 7 and so the following formal notifications were sent:

- a. Sample date 09/07/2019. A detection of *E.coli*.
- b. Sample date 16/07/2019. A detection of total coliforms.



- c. Sample date 23/07/2019. A detection of total coliforms.
- d. Sample date 06/08/2019. A detection of *E.coli*, total coliforms and thermotolerant coliforms.
- e. Sample date 12/08/2019. A detection of total coliforms and thermotolerant coliforms, as well as higher than normal heterotrophic plate count of 420.

In response to *E.coli* detects in Tank 7, a management process for mitigation was implemented in consultation with Department of Health as follows:

- **Preventative** - Small dose chlorine through reinjection of treated water. When Train 3 is in operation, there is a small amount of recycled reinjection water added to the system.
- **Reactive** - When an *E. coli* detection occurs, chlorine levels are monitored and adjusted to maintain suitable disinfection.
- **Long Term** - Repairs to the roofing system is planned for 2020.

4. Chemical: Health Related Performance

During the July to September 2019 reporting period, there were zero samples returned with exceedances of Chemical Health parameters in the potable water distribution system.

4.1. Chemical: Health Related - Compliance Summary

Rottneest Island Distribution System July - September 2019					
Health Characteristic	Australian Drinking Water Guidelines (mg/L)	No. of Analyses	No. of Analyses Complying with Australian Drinking Water Guidelines	% Compliance with Australian Drinking Water Guidelines	Max Value of Analysis (mg/L)
Antimony (Sb)	0.003	24	24	100%	<0.005
Bromate	0.02	104	104	100%	0.016
Cadmium (Cd)	0.002	8	8	100%	<0.0002
Chlorine Total (Cl) <i>(in house testing Total Residual)</i>	5	46	46	100%	1.25
Copper (Cu)	2	3	3	100%	0.011
Fluoride (F)	1.5	24	24	100%	<0.5
Lead (Pb)	0.01	3	3	100%	<0.001
Manganese (Mn)	0.5	8	8	100%	<0.005
Nickel (Ni)	0.02	3	3	100%	<0.001
Nitrate (NO ₃) (Nitrate as nitrate)	50 mg-NO ₃ /L	3	3	100%	0.03
Nitrite (NO ₂)	3 mg-NO ₂ /L	11	11	100%	<0.02
Trihalomethanes (THMs)	0.25	11	11	100%	0.09



4.2. Chemical: Health Related - Exception Notifications

There were no chemical health related exception notifications during the reporting period.

Chemical: Health Related Water Quality Exceptions July – September 2019					
Date	Chemical Characteristic	Memorandum of Understanding Alert Level	Remedial Action	Department of Health Notified	Close Out Date
Nothing to report					

4.3. Chemical: Health Related Incident Specific Information

There were no exceedances of routine monitoring parameters set in the Memorandum of Understanding (MOU) and agreed between the Rottnest Island Authority and Department of Health for Rottnest Island during this quarter.

5. Chemical: Aesthetic Performance

5.1. Chemical: Aesthetic – Compliance Summary

During the July - September 2019 reporting period, there were 46 sample exceedances of Chemical Aesthetic parameters in the potable water distribution system, details are outlined in section 5.2.

Rottnest Island Distribution System July - September 2019					
Aesthetic Characteristic	Australian Drinking Water Guidelines (mg/L unless stated)	No. of Analyses	No. of Analyses Complying with Australian Drinking Water Guidelines	% Compliance with Australian Drinking Water Guidelines	Max Value of Analysis (mg/L)
Aluminium (Al)	0.2	3	3	100%	< 0.05
Ammonia (NH ₃)	0.5	11	11	100%	0.03
Chloride (Cl ⁻)	250	1	1	100%	160
Chlorine Free Residual (Cl) <i>(in house testing)</i>	0.6	46	1	2%	1.08
Colour	15 (HU)	6	6	100%	<2
Hardness (CaCO ₃)	200	1	1	100%	14
Iron (Fe)	0.3	24	24	100%	0.29
pH	6.5 – 8.5	31	30	97%	10
Sodium (Na)	180	104	104	100%	110
Sulphate	250	1	1	100%	<5
Sulphide (H ₂ S)	0.05	3	3	100%	<0.05
TDS	600	1	1	100%	570
Turbidity	5 (NTU)	6	6	100%	<1
Zinc (Zn)	3	3	3	100%	0.025

5.2. Chemical: Aesthetic - Incident Specific Information

There were two instances where analytical results exceeded the aesthetic guidelines for chemical and physical properties, totalling 46 sample exceedances. These are summarised below:

- **pH:** There was one recorded pH exceedance in the distribution system at location R12/002 - Longreach. This occurred on 11 September, 2019 with a reading of 10. Due to location R12/002 being on a 'deadleg' within the distribution line, a decision was made to flush this location to reduce pH levels. pH levels returned results within the Australian Drinking Water Guidelines within a 24 hour period.
- **Chlorine (free):** During the quarter, 45 out of 46 recorded samples were reported with chlorine values above the Australian Drinking Water Guidelines aesthetic limit of 0.6mg/L.

The Australian Drinking Water Guidelines state that chlorine has an aesthetic odour threshold of 0.6mg/L, however the reported concentrations exceeding this threshold do not pose any health risks, as values are below the specific health guideline value of 5.0mg/L.

The results for exceeding the aesthetic limit were found across multiple distribution sampling points over the three month period. No results were returned close to the health limit, with the maximum value of 1.08mg/L reported at R12/008 on 12 August 2019.

Whilst impacts to aesthetic quality of drinking water may occur due to greater concentrations of chlorine, it is important to note that adequate disinfection is paramount for the provision of safe drinking water.

6. Radiological Performance

6.1. Radiological – Compliance Summary

Biennial testing for gross alpha and gross beta occurred in February 2019 and identified exceedances in gross beta at five out of eight sampling locations (R12/001, 002, 005, 006, 008). It should be noted that Potassium 40 was not tested at this time and the correction calculations were not undertaken.

In response to these exceedances, further testing for radium 226 (alpha emitting) and 228 (beta emitting) occurred at eight sample locations R12/001 – R12/008.

This sampling was undertaken on the 7th May 2019. Radium 226 and 228 results were received in this reporting period and were noted by the laboratory report to be below detection limit for their sample size. Further sampling will be undertaken in November/December 2019.

7. Planned Sample Summary

7.1. Planned Sample – Compliance Summary

Planned Samples July - September 2019								
Microbial			Chemical			Radiological		
Planned ¹	Taken ²	% Taken	Planned ¹	Taken ²	% Taken	Planned	Taken	% Taken
82	82	100%	500	500	100%	0	0	-

¹ A planned sample is defined as being included in the sampling schedule for this period.

² Physical number of samples taken for this period.

7.2. Planned Sample - Exception Notifications

Of the planned samples detailed in table 7.1, there were no exceptions for this reporting period.

Planned Sample Exceptions July - September 2019			
Sampling Point	Date Due	Characteristic	Reason for Missing Sample
Nothing to report			

8. Customer Complaints

There were no complaints received for the July to September 2019 reporting period.

9. Comments

PFAS testing

In June 2019, the DoH recommended testing for per- and poly-fluoroalkyl substances (PFAS). Sampling occurred at location R12/002 (Longreach Bay) and location R12/007 (Geordie Bay). PFAS results were received in the July to September reporting period and were below detection limit.

The Department of Health have recommended repeating this testing on an annual basis. Results are presented in the below table.

Rottnest Island Distribution System July - September 2019					
Health Characteristic	Australian Drinking Water Guidelines (ug/L)	No. of Analyses	No. of Analyses Complying with Australian Drinking Water Guidelines	% Compliance with Australian Drinking Water Guidelines	Max Value of Analysis (ug/L)
Sum of Perfluorooctane sulfonate (PFOS) and perfluorohexane sulfonate (PFHxS)	0.07	2	2	100%	<0.01
Perfluorooctanoic acid PFOA	0.56	2	2	100%	<0.01

Bromate management

Rottnest Island Authority continues to monitor and manage bromate formation across the distribution network. On 26 September 2019, the Department of Health Quarterly Meeting was held between Rottnest Island Authority, Programmed Facilities Management and Department of Health. Bromate management was discussed, and as a result of a historical data review, the following was proposed at a subsequent meeting between Programmed Facilities Management and Rottnest Island Authority:

- **Bromate** - Remove sampling at Tank 7, as results show there has been no exceedances in this tank. Sampling to remain at locations R12/001 - R12/008 and Tank 4.
- **Bromide** - Remove locations R12/001 - R12/008 and Tank 4 from the bromide sampling suite. Sampling to remain in Tank 7.

The above changes reflect that there has been no bromate or bromide exceedances in the locations to be removed. Additionally, in the locations removed, bromate or bromide should not be chemically present due to the process of chemical reaction from the storage tanks to the distribution line.

In addition to the removal of some locations, Rottnest Island Authority has made the decision to preserve bromate samples to get a better understanding of the drinking water quality at the time of sampling. Preservation of samples aims to mitigate the opportunity for bromate formation during transit times. It is believed, from testing, that without preservation samples can be 30% over the actual values at time of sampling.

The Department of Health approved these changes in the sampling schedule on the condition regular testing for bromate and bromide take place until the root cause of bromate on Rottnest Island has been identified and mitigated.

Drinking Fountain Monitoring Initiative

The Rottnest Island Authority commenced a drinking fountain monitoring initiative in December 2017 following a recommendation from the Department of Health.

Results obtained from the sampling program, supported the island's drinking fountain replacement project, which included the replacement of all existing drinking fountains and the addition of new amenities around the settlement. The final drinking fountain installation was completed in October 2018.

The drinking fountain monitoring program and sampling results are reported separately to the distribution system or network, which are represented in Tables 3.1, 4.1 and 5.1.

The drinking fountain results are represented in the below table for the specified period.

Rottnest Island Drinking Fountain July – September 2019					
Health Characteristic	Australian Drinking Water Guidelines (mg/L)	No. of Analyses	No. of Analyses Complying with Australian Drinking Water Guidelines	% Compliance with Australian Drinking Water Guidelines	Max Value of Analysis (mg/L)
Antimony (Sb)	0.003	98	98	100%	<0.005
Cadmium (Cd)	0.002	98	98	100%	<0.0002
Copper (Cu)	2	98	98	100%	0.04
Lead (Pb)	0.01	98	98	100%	<0.001
Nickel (Ni)	0.02	98	98	100%	0.002
Aesthetic Characteristic	ADWG Guideline (mg/L)	No. of Analyses	No. of Analyses Complying with ADWG	% Compliance with ADWG	Max Value of Analysis (mg/L)
Zinc (Zn)	3	98	98	100%	0.29

There were zero instances of exceedances during the reporting quarter.