



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**

October – December 2019





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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 60,792 total visitor numbers recorded for October 2019 and 73,852 in November 2019. Data for visitor numbers for December 2019 was not available at the time of reporting.

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 150 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			
October - December 2019			
	No. of Analyses Completed	No. of Analyses Within Guidelines	No. of Non-conformances to Guidelines
Microbial			
Bacterial (<i>E.coli</i>)	63	63	0
Thermotolerant Coliforms	63	63	0
Thermophilic Amoebae	27	27	0
Amoeba (Thermophilic <i>Naegleria</i>)	27	27	0
Chemical & Physical			
Health	253	253	0
Aesthetic	268	219	49
Radiological			
Gross Alpha	8	8	0
Gross Beta	8	8	0

3. Microbial Performance

During the October – December 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 October – December 2019				
Microbial Characteristic	Memorandum of Understanding Compliance Criteria	No. of Analyses	No. of Analyses Complying with Memorandum of Understanding	% Compliance
Bacterial				
<i>E.coli</i>	Non-Detect	63	63	100%
Thermotolerant Coliforms	Non-Detect	63	63	100%
Amoeba				
Thermophilic Amoebae	Non-Detect	27	27	100%
Thermophilic Naegleria	Non-Detect	27	27	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 was, however, two 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 17/12/2019. A detection of Total Coliforms.
- b. Sample date 23/12/2019. A detection of Total Coliforms, Faecal Coliforms and *E.coli*.



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.

This procedure was followed on the 23rd December 2019.

In response to the Total Coliform detection in Tank 7 on the 17th December, it was dosed with one tablet of Calcium Hypochlorite.

4. Chemical: Health Related Performance

During the October to December 2019 reporting period, there were no samples returned with exceedances of Chemical Health parameters in the potable water distribution system.

4.1. Chemical: Health Related - Compliance Summary

Rottnest Island Distribution System October - December 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	32	32	100%	< 0.003
Bromate	0.02	112	112	100%	0.012
Cadmium (Cd)*	0.002	0	0	100%	-
Chlorine Total (Cl) <i>(in house testing Total Residual)</i>	5	49	49	100%	1.16
Copper (Cu)	2	4	4	100%	0.009
Fluoride (F)	1.5	24	24	100%	< 0.5
Lead (Pb)	0.01	4	4	100%	< 0.001
Manganese (Mn)*	0.5	0	0	100%	-
Nickel (Ni)	0.02	4	4	100%	< 0.001
Nitrate (NO ₃) (Nitrate as nitrate)	50 mg-NO ₃ /L	4	4	100%	< 0.02
Nitrite (NO ₂)	3 mg-NO ₂ /L	10	10	100%	< 0.02
Trihalomethanes (THMs)	0.25	10	10	100%	0.009

*Cadmium and Manganese are tested at a 6-monthly regime. Testing was completed in September 2019 and as such will not be tested until March 2020.



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 October – December 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 October - December 2019 reporting period, there were 49 sample exceedances of Chemical Aesthetic parameters in the potable water distribution system, details are outlined in section 5.2.

Rottneest Island Distribution System October - December 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	10	10	100%	< 0.01
Chloride (Cl ⁻)	250	1	1	100%	150
Chlorine Free Residual (Cl) <i>(in house testing)</i>	0.6	49	4	8%	1.03
Colour	15 (HU)	7	7	100%	< 2
Hardness (CaCO ₃)	200	1	1	100%	13
Iron (Fe)	0.3	32	31	97%	3.8
pH	6.5 – 8.5	32	29	91%	7.8
Sodium (Na)	180	112	112	100%	120
Sulphate	250	1	1	100%	< 5
Sulphide (H ₂ S)	0.05	4	4	100%	< 0.05
TDS	600	1	1	100%	300
Turbidity	5 (NTU)	7	7	100%	1.1
Zinc (Zn)	3	4	4	100%	0.021

5.2. Chemical: Aesthetic - Incident Specific Information

There were three instances where analytical results exceeded the aesthetic guidelines for chemical and physical properties, totalling 49 sample exceedances. These are summarised below:

- **pH:** There was three recorded pH exceedance in the distribution system at locations R12/004 - Bathurst, R12/006 – Sawtooth Shed and R12/008 – Stables for samples taken on 30th December. These samples were returned with results below the aesthetic guideline of 6.5. The results were as follows:
 - R12/004 – pH 6.2
 - R12/006 – pH 6.0
 - R12/008 – pH 5.9

Upon receiving the preliminary results for this sampling round on 3rd January, the sampling points were retested with a different Myron and found to have results just about the pH6.5 threshold defined in the Australian Drinking Water Guidelines. The permeate flow through the calcite filter was adjusted and enough calcite was ensured in the trains at the desalination plant. The faulty Myron was tagged and removed from service.

- **Chlorine (free):** During the quarter, 45 out of 49 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 1.03mg/L reported at R12/006 on 5th November.

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.

- **Iron (Fe):** During the reporting quarter, 1 of the 32 recorded samples were reported with iron values above the Australian Drinking Water Guidelines aesthetic limit of 0.3mg/L. There is no health based guideline set within the Australian Drinking Water Guidelines for iron.

The results for exceeding the aesthetic limit were found at R12-007 on 26th November 2019. The exceedance was recorded as 3.8mg/L.

6. Radiological Performance

6.1. Radiological – Compliance Summary

Retesting of the Biennial testing for gross alpha and gross beta occurred on the 29th October 2019 and identified no exceedances in gross alpha or gross beta at any of the sampling points on the distribution line. The Australian Drinking Water Guidelines has a health limit of 0.5Bq/L for both gross alpha and gross beta.

Rottnest Island Distribution System October - December 2019					
Radiological Characteristic	Australian Drinking Water Guidelines (Bq/L)	No. of Analyses	No. of Analyses Complying with Australian Drinking Water Guidelines	% Compliance with Australian Drinking Water Guidelines	Max Value of Analysis (Bq/L)
Gross Alpha	0.5	8	8	100%	0.016
Gross Beta	0.5	8	8	100%	0.035

7. Planned Sample Summary

7.1. Planned Sample – Compliance Summary

Planned Samples October - December 2019								
Microbial			Chemical			Radiological		
Planned ¹	Taken ²	% Taken	Planned ¹	Taken ²	% Taken	Planned	Taken	% Taken
90	90	100%	512	517	101%	16	16	100%

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 October - December 2019			
Sampling Point	Date Due	Characteristic	Reason for Missing Sample
Nothing to report			

8. Customer Complaints

There were three customer complaint received for the October to December 2019 reporting period. These complaints were received in relation to the colour of water within an accommodation unit in North Thompson and residential properties in South Thomson. None of these complaints were made through the online complaints system.

Immediate actions were taken to improve water aesthetic appearance including, flushing and water sampling. The water in the properties was tested for Iron, Lead and Zinc levels. Sample results are discussed in Section 9. Water discolouration has been found to be from Iron staining. Plans are in place for the long term remediation of the issue.

9. Comments

Bromate management

Rottnest Island Authority continues to monitor and manage bromate formation across the distribution network based on the decision from the Department of Health Quarterly Meeting held between the Rottnest Island Authority, Programmed Facility Management and the Department of Health on 26th September 2019. Bromate is tested weekly at the locations R12/001 – R12/008 and Tank 4. Bromide is tested weekly at Tank 7.

The Australian Drinking Water Guidelines has a health limit of 0.02mg/L for bromate. There have been no reported exceedances for bromate in the October to December 2019 quarter.

Rottnest Island Distribution System October - December 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)
Bromate	0.02	112	112	100%	0.012

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 October – December 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%	<0.003
Cadmium (Cd)	0.002	98	98	100%	<0.0002
Copper (Cu)	2	98	98	100%	0.081
Lead (Pb)	0.01	98	98	100%	0.003
Nickel (Ni)	0.02	98	98	100%	0.004
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%	0.19

There were no instances of exceedances during the reporting quarter.

Ad Hoc Water Sampling

During the reporting quarter, there were four instances of ad hoc water sampling from the drinking water supply in response to advice received on discoloration. These were for residential properties and accommodation units.

12 Parker Point Road

This residential property was tested after the resident reported that the water was potentially irritating their eyes. The water in the property was tested from three points for metals and microbials. There were no exceedances recorded in this property.

Unit 325

Unit 325 is a visitor accommodation unit that was tested for iron after reports of discoloured water. Three water points were tested within the unit, all of which returned with an aesthetic exceedance for iron as outlined in the Australian Drinking Water Guidelines. Further sampling was also actioned two weeks later with further iron exceedance. Flushing is no longer sufficient to manage the exceedance and future works are required to rectify the issue.

Unit 325 Ad Hoc Sampling – Iron

Sample Date	Kitchen Sink	Shower Tap	Bathroom Tap
17-12-19	1.8mg/L	1.7mg/L	1.1mg/L
30-12-19	4.8mg/L	2.1mg/L	2.3mg/L

27 Parker Point Road and 8C Brand Way

These residential properties were tested for iron following a ground disturbance and reports of discoloured water. Testing showed iron exceedances from two of the six samples taken. Further sampling one week later found no exceedances.

27 Parker Point Road Ad Hoc Sampling - Iron

Sample Date	Kitchen Sink	Shower Tap	Bathroom Tap
23-12-19	< 0.05mg/L	< 0.05mg/L	0.06mg/L
30-12-19	< 0.05mg/L	< 0.05mg/L	< 0.05mg/L

8C Brand Way Ad Hoc Sampling - Iron

Sample Date	Kitchen Sink	Shower Tap	Bathroom Tap
23-12-19	0.05mg/L	< 0.05mg/L	< 0.05mg/L
30-12-19	< 0.05mg/L	< 0.05mg/L	< 0.05mg/L