



BUSSELTON WATER

BUSSELTON WATER

Report to the Department of Health

for the period

1 October to 31 December 2016

Busselton Water
PO Box 57
Busselton WA 6280
P: (08) 9781 0500
F: (08) 9754 1075
www.busseltonwater.wa.gov.au

Submitted to:
The Advisory Committee for the Purity of Water
Busselton Water's Website
CEO, Busselton Water (Mr Chris Elliott)



Table of Contents

1.0	WATER PROVIDER INFORMATION	2
1.1	System Information	2
2.0	PERFORMANCE SUMMARY	3
2.1	Treated Water – Microbiological Water Quality	3
3.0	MICROBIAL PERFORMANCE (ROLLING 12 MONTHS ENDING 30 SEPTEMBER 2016)	4
3.1	Microbiological - Exception Notifications	4
3.2	Microbiological Charts - Busselton	5
3.2.1	<i>Escherichia coli (E. Coli)</i> – Distribution System	5
3.2.2	Thermophilic <i>Naegleria</i> – Distribution System	5
3.3	Microbiological Incident Specific Information	5
4.0	CHEMICAL – HEALTH RELATED PERFORMANCE	6
4.1	Chemical – Health Related – Exception Notifications	6
4.2	Chemical – Health Related	6
5.0	PHYSICAL AND CHEMICAL – AESTHETIC PERFORMANCE	8
5.1	Physical and Chemical - Aesthetic – Chart	8
6.0	RADIOLOGICAL PERFORMANCE	10
7.0	PLANNED SAMPLE SUMMARY (QUARTER ENDING 30 SEPTEMBER 2016)	10
7.1	Planned Sample Exceptions	10
8.0	GENERAL NOTES / OTHER NEWS	10

1.0 Water Provider Information

Water Provider Contact Details			
Name of Company	Busselton Water		
Company Address	1 Fairbairn Road, Busselton WA 6280		
Company Phone	08 9781 0500	Fax	08 9754 1075
Company Email	admin@busseltonwater.wa.gov.au		
Chief Executive Officer	Chris Elliott		
DoH Liaison Officer	Robin Belford, General Manager Operations		

1.1 System Information

Busselton Water operates one large interconnected water supply system with four bore sites consisting of eight production bores, supplying three water treatment plants. Busselton Water operates its distribution system as one locality ("Busselton") and has strategically-placed sampling points throughout the distribution system.

Busselton Water's water supply is sourced from bores constructed in the Leederville and Yarragadee aquifers. The raw groundwater has turbidity and total iron concentrations above the drinking water guideline limits but these are readily removed by oxidation, aeration and filtration, and then disinfected at Busselton Water's treatment plants before distribution into the reticulation network.

Busselton Water supplies potable water to more than 26,000 customers within the Busselton townsite and close environs such as Port Geographe, Siesta Park, Vasse and Wonnerup. As a sought-after tourist destination this figure can rise significantly during weekends and holiday periods. The average daily system demand for the reporting period was 15.1ML/day.

2.0 Performance Summary

2.1 Treated Water – Microbiological Water Quality

Microbiological water quality analyses for treated water samples are collected downstream of the chlorinators at the water treatment plants. Compliance limits are summarised in the following table.

Sixty-five samples were tested for thermotolerant coliforms and *E. coli*, and 60 samples were tested for Thermophilic *Naegleria*, during the fourth quarter of 2016 (October to December). No microbial activity in relation to these parameters was detected during the three months at any of the sample locations. Busselton Water remains 100% compliant with the 2004 Australian Drinking Water Guidelines and the Memorandum of Understanding with the Department of Health in respect to *E. coli* and *N. fowleri* ¹.

Period	<i>Escherichia coli</i> (<i>E. Coli</i>)				Thermophilic <i>Naegleria</i>			<i>Naegleria fowleri</i> ¹		
	No. of Samples	No. of Non-conforming Samples	Maximum Individual Value	Rolling 12 Months Compliance*	No. of Samples	Detected	Rolling 12 Months Compliance*	No. of Samples	Detected	Rolling 12 Months Compliance*
Oct-16	25	0	est <1	100%	25	0	100%	0	-	100%
Nov-16	20	0	est <1	100%	20	0	100%	0	-	100%
Dec-16	20	0	est <1	100%	15	0	100%	0	-	100%
Total for Fourth Quarter 2016	65	0	-	-	60	0	-	0	-	-
Fourth Quarter 2016 Compliance	100%			-	100%		-	100%		-
Required Compliance (ADWG 2004) (MOU 2011)	100%				95%			100%		

Note 1 Tests for *Naegleria Fowleri* only required if Thermophilic *Naegleria* is detected.

Note 2 Although Busselton Water took samples for Thermophilic Amoeba and Thermophilic *Naegleria* on 28 December 2016, the PathWest laboratory was closed for the Christmas/New Year break and therefore the samples were not able to be analysed.

2.2 Distributed Water - Microbiological Water Quality

Microbiological water quality analyses for the seven locations within the distribution system are sampled weekly and are summarised in the following table.

Ninety-one samples were tested for thermotolerant coliforms and *E. coli*, and 84 samples were tested for Thermophilic *Naegleria* during the fourth quarter of 2016 (October to December). No microbial activity in relation to these parameters was detected during the three months at any of the sample locations. Busselton Water remains 100% compliant with the 2004 Australian Drinking Water Guidelines and the Memorandum of Understanding with the Department of Health in respect to *E. coli* and *N. fowleri*¹.

Period	<i>Escherichia coli</i> (<i>E. Coli</i>)				Thermophilic <i>Naegleria</i>			<i>Naegleria fowleri</i> ¹		
	No. of Samples	No. of Non-conforming Samples	Maximum Individual Value	Rolling 12 Months Compliance*	No. of Samples	Detected	Rolling 12 Months Compliance*	No. of Samples	Detected	Rolling 12 Months Compliance
Oct-16	35	0	est <1	100%	35	0	100%	0	-	100%
Nov-16	28	0	est <1	100%	28	0	100%	0	-	100%
Dec-16	28	0	est <1	100%	21	0	100%	0	-	100%
Total for Fourth Quarter 2016	91	0		-	84	0	-	0	-	-
Fourth Quarter 2016 Compliance	100%			-	100%		-	100%		-
Required Compliance (ADWG 2004) (MOU 2011)	98%				95%			100%		

Note 1 Tests for *N. fowleri* only required if Thermophilic *Naegleria* (TN) is detected.

Note 2 Although Busselton Water took samples for TA and TN on 28 December 2016, the PathWest laboratory was closed for the Christmas/New Year break and therefore the samples were not able to be analysed.

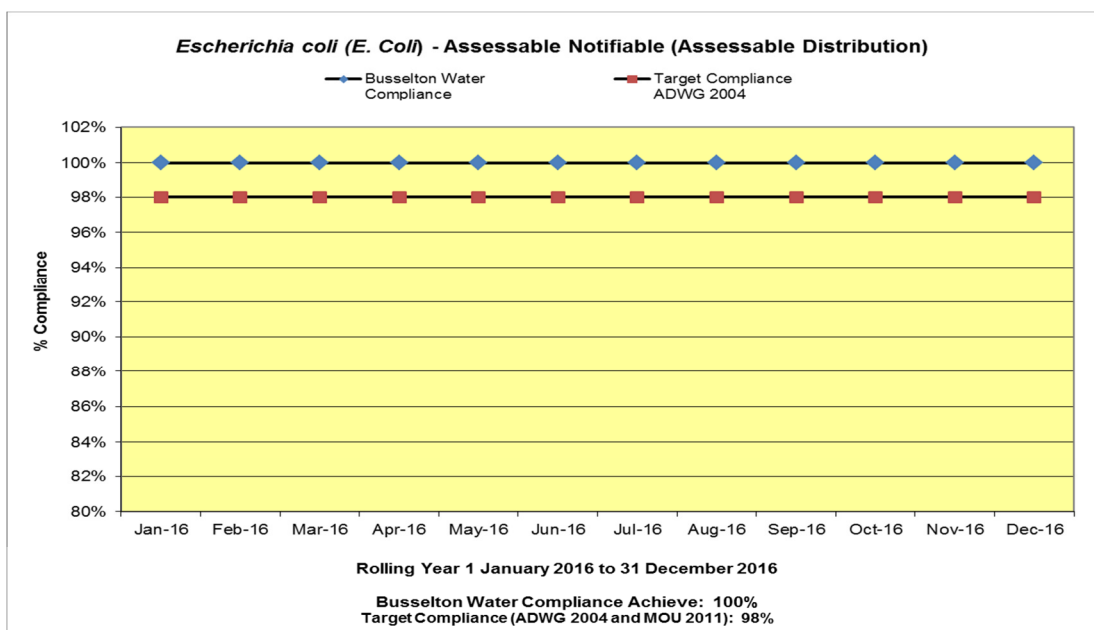
3.0 Microbial Performance (Rolling 12 Months ending 31 December 2016)

3.1 Microbiological - Exception Notifications

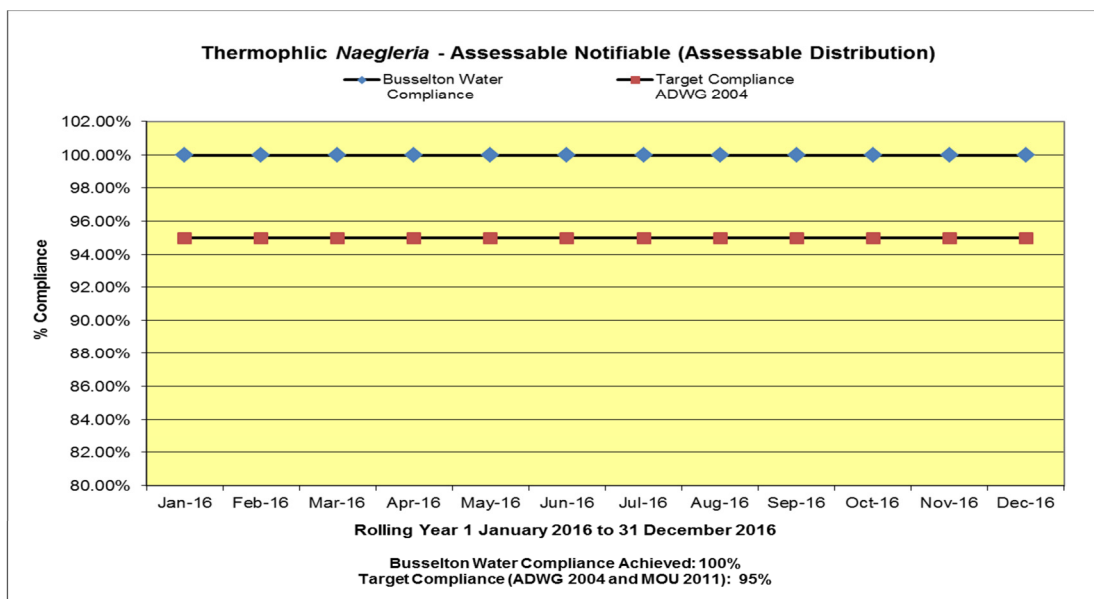
Microbiological Water Quality Exceptions							
Region/Scheme/ Zone/ Service Provider	Population Served	Date	Microbiological Characteristic	MoU Alert Level	Remedial Action	DoH Notified	Close Out Date
Busselton	>26,000	01/01/2016 to 31/12/2016	NIL				

3.2 Microbiological Charts - Busselton

3.2.1 *Escherichia coli* (E. Coli) – Distribution System



3.2.2 Thermophilic *Naegleria* – Distribution System



3.3 Microbiological Incident Specific Information

Microbiological Incidents				
Region/Scheme/ Zone/ Service Provider	Date of Incident	Details of Incident	MoU Alert Level	Remedial Action
Busselton	NIL			

4.0 Chemical – Health Related Performance

The results of water samples collected from the operating production bores (raw water) and at the assessable distribution sampling points (distribution water) during the fourth quarter of 2016 (October to December) are summarised in Table 4.2 for health related guidelines. They show that the water supply is 100% compliant with the 2004 health-related guidelines for drinking water, the operating licence issued by the ERA, the protocols of Busselton Water's Memorandum of Understanding with the Department of Health and the groundwater licence issued by the Department of Water.

4.1 Chemical – Health Related – Exception Notifications

Health-Related Chemical Water Quality Exceptions							
Region/Scheme/Zone/ Service Provider	Population served	Date	Health Related Chemical Characteristic	MoU Alert Level	Remedial Action	DoH Notified	Close Out Date
Busselton	>26,000	01/10/2016 to 31/12/2016	NIL				

4.2 Chemical – Health Related

Type	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
			Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value mg/L	Compliance (%)
Bromodichloromethane	0.25*	0.0005	NR	-	-	3	3	ND	100%
Bromoform	0.25*	0.0005	NR	-	-	3	3	0.0041	100%
Chlorine (Total)	5		NR	-	-	156	156	0.88	100%
Chloroform	0.25*	0.0005	NR	-	-	3	3	ND	100%
Dibromochloromethane	0.25*	0.0005	NR	-	-	3	3	0.0013	100%

Type	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
			Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value mg/L	Compliance (%)
Fluoride	1.5	0.1	NR	-	-	21	21	0.6	100%
Manganese (Soluble)	0.5	0.005	24	24	0.1	21	21	ND	100%
Manganese (Total)	0.5	0.005	24	24	0.099	21	21	ND	100%
Nitrate	50	0.05	8	8	ND	0	-	-	-
Nitrite	3	0.005	8	8	0.011	0	-	-	-
Total Trihalomethanes	0.25*	0.0005	NR	-	-	3	3	0.006	100%

Note 1 Chlorine Total is a Busselton Water in-house test. All others are accredited test results.

Note 2 * The concentration of trihalomethanes, either individually or in total, in drinking water should not exceed 0.25 mg/L

Note 3 Busselton Water does not add fluoride to the water. The naturally occurring fluoride levels vary from bore to bore. The maximum value shown is not indicative of the level throughout the Busselton water supply. Fluoride levels in the drinking water vary with location and time and can be between 0.03 and 0.6 mg/L.

ADWG	Australian Drinking Water Guidelines
Bq/L	Becquerel per litre
CFU	colony forming units
HU	Hazen Units
mg/L	milligrams per litre
NA	Not Applicable
ND	Not Detected
NR	Not Required
NTU	Nephelometric Turbidity Units
pH	Acidity
us/cm	Micro Sieverts per centimetre

5.0 Physical and Chemical – Aesthetic Performance

The results of water samples collected from the operating production bores (i.e. raw water) and at the assessable distribution sampling points (i.e. distribution water) during the fourth quarter of 2016 (October to December) are summarised in Table 5.1 for aesthetic related guidelines. The process of aeration and filtration reduces colour and iron content to below those levels specified in the Australian Drinking Water Guidelines 2004 (ADWG 2004).

5.1 Physical and Chemical - Aesthetic – Chart

Type	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
			Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value (mg/L)	Compliance (%)
Alkalinity (Bicarbonate)	-	5	8	8	190	1	1	180	100%
Alkalinity (Carbonate)	-	5	8	8	<1	1	1	ND	100%
Alkalinity (Hydroxide)	-	5	8	8	<1	1	1	ND	100%
Alkalinity (Total)	-	5	8	8	160	1	1	150	100%
Ammonia	0.5	0.005	NR	-	-	1	1	0.01	100%
Aluminium (Soluble)	0.2	0.02	8	8	ND	1	1	ND	100%
Aluminium (Total)	0.2	0.02	8	8	ND	1	1	ND	100%
Calcium	-	0.2	-	-	-	1	1	23	100%
Chloride	250	1	8	8	110	-	-	-	-
Colour True	15 HU	1HU	24	24	6 HU	21	21	ND	100%
Electrical Conductivity	-	2 us/cm	24	24	700 us/cm	21	21	590 us/cm	100%
Filterable Reactive Phosphorus	-	0.005	8	8	0.006	NR	-	-	-
Filterable Reactive Phosphorus as PO4	-	0.01	8	8	0.02	NR	-	-	-
Hardness	200	5	8	8	120	1	1	110	100%
Iron (Soluble)	0.3	0.005	24	3	17	21	21	0.009	100%
Iron (Total)	0.3	0.005	24	3	13	21	21	0.043	100%
Magnesium	-	0.1	NR	-	-	1	1	12	100%
pH	pH 6.5-8.5		23	23	pH 7.5	156	156	pH 8.4	100%

Type	ADWG 2004 Limit (mg/L)	Lab Limit of Reporting (mg/L)	Raw Water (Bores)			Distribution Water			
			Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value	Number Assessed	Number Complying with ADWG 2004 Limit	Maximum Individual Value (mg/L)	Compliance (%)
Salinity (as Total Dissolved Solids)	500	10	23	23	380	NR	-	-	
Silica	80	0.05	8	8	19	NR	-	-	
Sodium	180	0.5	8	8	81	NR	-	-	
Sulphate	250	1	7	7	18	NR	-	-	
Total Hardness by Calculation	200	1	8	8	120	1	1	110	100%
Turbidity	5 NTU		23	23	0.96 NTU	156	156	0.33 NTU	100%

Note 1 pH and Turbidity are Busselton Water in-house tests. All others are accredited test results.

Note 2 Dissolved Fe results reported higher than Total Fe in raw water. Confirmed by re -analysis.

ADWG	Australian Drinking Water Guidelines
Bq/L	Becquerel per litre
CFU	colony forming units
HU	Hazen Units
mg/L	milligrams per litre
NA	Not Applicable
ND	Not Detected
NR	Not Required
NTU	Nephelometric Turbidity Units
pH	Acidity
us/cm	Micro Sieverts per centimetre

6.0 Radiological Performance

Radiological Performance is tested annually in April.

7.0 Planned Sample Summary (Quarter Ending 31 December 2016)

Region/ Scheme/ Zone	Microbiological			Physical and Chemical			Radiological			Fluoride		
	Planned	Taken	% Taken	Planned	Taken	% Taken	Planned	Taken	% Taken	Planned	Taken	% Taken
Busselton	156	144	92.3%	982	981	99.9%	0	0	N/A	21	21	100%

Note Chemical testing totals shown in Table 7.0 relate to scheduled NATA and in-house sampling undertaken in accordance with Busselton Water's Water Quality Monitoring Program, which has been endorsed by the Department of Health.

7.1 Planned Sample Exceptions

Planned Sample Exceptions			
Region/ Scheme/ Zone	Characteristic (Microbiological/ Physical and Chemical/ Radiological)	Number of Samples	Reason for missed sample
Busselton	Physical and Chemical	1	pH at Bore 12 was not tested in December 2016 as the bore was offline.
Busselton	Microbiological	12	Twelve microbiological samples (i.e. five Treated water samples and seven Distributed water samples) were taken on 28 December 2017 however the PathWest laboratory, which is sub-contracted by SGS Australia Pty Ltd to undertake Thermophilic Amoeba and Thermophilic Naegleria testing, was closed for the week between Christmas and New Year.

8.0 General Notes / Other News

Nil