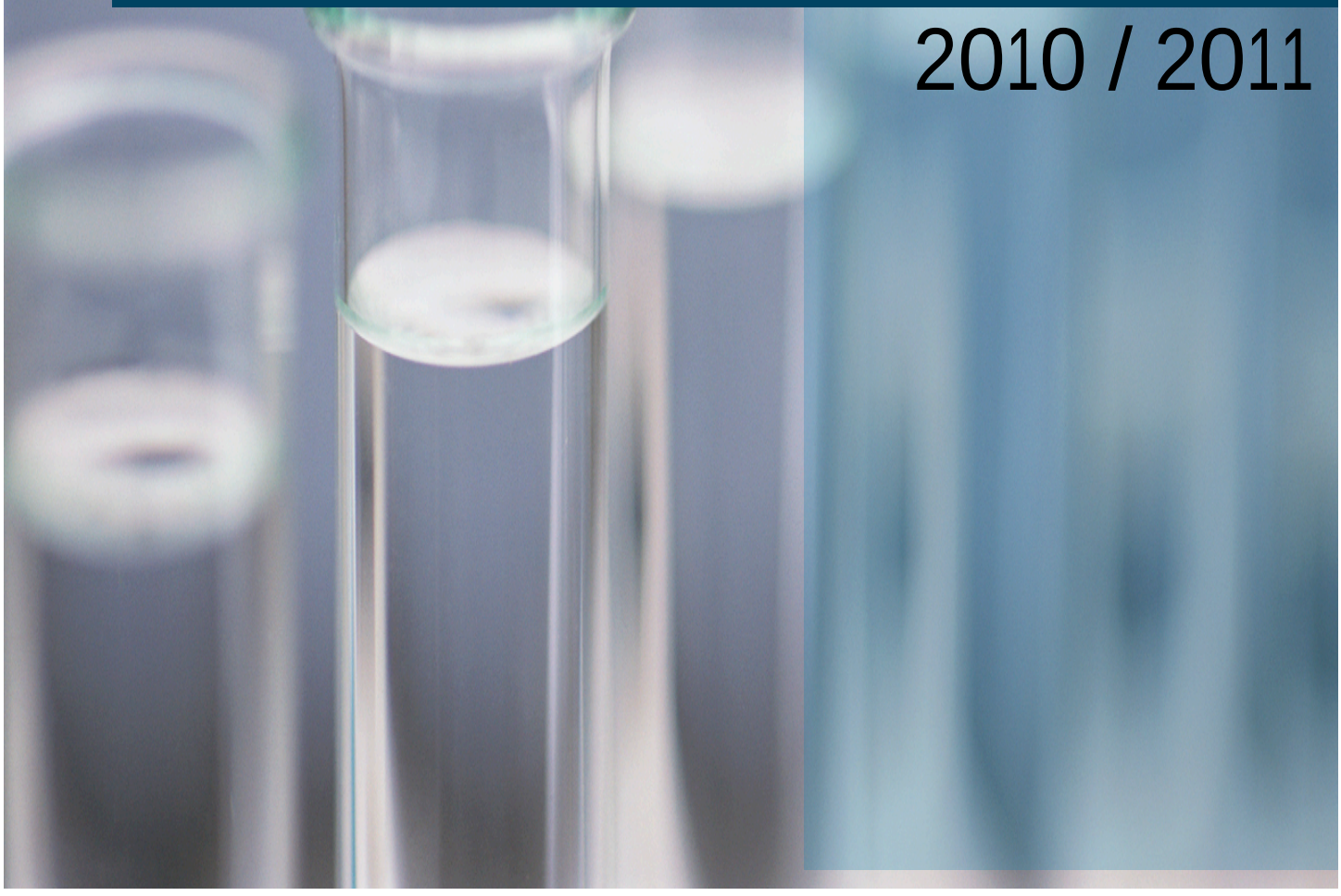
BUSSELTON WATER

Busselton Water

Annual Water Quality Report

2010 / 2011



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INTRODUCTION

I am pleased to present the Water Quality Report of Busselton Water for the year ended 30th June 2011.

The in-house Water Quality Committee at Busselton Water has again been active during the year working on its brief which is:

- To foster a culture of information sharing in the context of water quality
- To recommend methods for improved security and quality of water supplies.
- To monitor sampling results/trends analysis.
- To be responsible for the full implementation of the Australian Drinking Water Guidelines (ADWG) (2004).
- To ensure that management of the water supply system/water quality is given the highest priority to reflect public health considerations and community expectations, in accordance with Busselton Water's Policy 030 – Drinking Water Quality.

To this end the committee has a number of achievements made in 2010/11 including:

- Prepared the water quality framework at Busselton ready for full-time chlorination and the execution of a Memorandum of Understanding with the Department of Health;
- Successfully recommended to the Board of Busselton Water a new organisation-wide Drinking Water Quality Policy; and
- Review of the Committee's charter.

Approval to implement full-time chlorination works was received from the Minister for Water on the 13th June 2011, with tender specifications for design, construction, installation and staff training subsequently adopted and a tender called for the works.

Very importantly 2010/11 saw the installation of new Water Quality Incident Planning for Busselton Water. Four separate and detailed plans provide a management framework for:

- Incidents of *Naegleria* contamination;
- Incidents of *E.Coli* contamination;
- Other Exclusions from safe water quality parameters; and
- Loss of water availability.

I would like to thank the dedicated committee members, staff from Hunter Water Australia and members of the Advisory Committee for the Purity of Water for their big efforts made in 2010/2011.

In essence this year's Water Quality Report briefly summarises water quality performance for the 2010/2011 year and describes how Busselton Water collects, treats and distributes drinking water to its customers. It also provides some insight into the perceptions customers have in relation to the quality of their supplied water service.

Just as importantly the report also indicates how Busselton Water meets the health standards set in an informal arrangement which Busselton Water has with the Department of Health. This arrangement has progressively and mutually developed in 2010/11 and was signed by both parties as a formalised Memorandum of Understanding in September 2011, after the reporting period. Since water quality is its highest priority, Busselton Water is totally committed to supply a high standard of water to all of its customers and to endeavour to respond quickly and effectively should problems occur.

It is the sincere hope of both the appointed Board and the team of dedicated personnel employed by Busselton Water, that you may find this Water Quality Report to be an informative publication and one which will enhance your awareness of Busselton Water's commitment to customer service, water quality and professional management of the Busselton water supply system.

Keith White
Chief Executive Officer

CUSTOMERS

It is Busselton Water's commitment to supply drinking water of excellent quality to its customers 24 hours a day, 365 days a year.

Busselton Water supplies drinking water to a population of approximately 20,000, which increases to approximately 60,000 during the summer peak holiday periods.

A map of the extent of the supply area is provided at Appendix 1 to this report.

This year Busselton Water's customers consumed 3,730,820 kilolitres of water for homes, offices, commercial properties and industry through more than 298 kilometres of service mains.

It was pleasing to note that customers indicated within the 2011 Customer Survey that four out of five respondents are either very or somewhat satisfied with all aspects of their water supply service.

SUPPLY AND TREATMENT

Busselton Water is an independent water authority that provides potable water for domestic, commercial, light-industrial, and special rural consumers at Busselton and its environs. Busselton Water also provides bulk water to the Water Corporation for distribution to the Dunsborough reticulation system.

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.

The Department of Water has issued Groundwater Well Licences GWL 110851(5) and GWL 110850(2) to Busselton Water for the approved extraction of a total of 8.6 GL/annum.

The water supply is sourced from bores constructed in the Leederville and Yarragadee aquifers, which contain plentiful fresh groundwater. The raw groundwater has turbidity and total iron concentrations above the drinking water guideline limits but these are readily removed by aeration and filtration at Busselton Water's treatment plants. Following treatment, the water is pumped into enclosed storage tanks and disinfected by ultra-violet (UV) irradiation prior to being distributed to consumers. The treated and disinfected water meets the 2004 Australian Drinking Water Guidelines (NHMRC and NRMMC, 2004). At present there are no chemicals added during the treatment.

Water quality is generally stable during the year, however may vary slightly, seasonally, depending on the bore mixtures. Bore operation depends upon customer demand.

Busselton Water operates in accordance with the "Busselton Water Reserves Drinking Water Source Protection Plan – Busselton and Vasse Town Water Supply" issued by the Department of Water in June 2009.

Water quality is maintained in the reticulation system via mains flushing, asset renewal, installation of reduced pressure zone devices, spot chlorination and high quality of hygiene during maintenance. Busselton Water also ensures that its operations comply with the Department of Health's requirements pertaining to materials in contact with drinking water.

RADIO FREQUENCY METER RETROFIT PROJECT

The Radio Frequency Meter Retrofit Project is partially funded through Busselton Water and the Australian Government's Water for the Future initiative through the National Water Security Plan for Cities and Towns.

The installation of radio frequency (RF) metering will provide the side benefit of identifying occurrences of backflow, which further enhances the security of the supply system. Busselton Water is leading the way in Western Australia with the installation of a complete data collection system utilizing radio frequency technology (RF) fitted to all water meters within Busselton Water's licensed area. The RF meter provides Busselton Water with a comprehensive suite of real time information meaning more efficient management, monitoring and control of water consumption within its licensed area. This system improves quality control and access to services by providing accurate detailed usage patterns to water consumers, enabling them to adjust their usage accordingly and save money through early leak detection, enabling an environmentally sound approach to water quality and conservation.

WATER QUALITY

The Memorandum of Understanding with the Department of Health for Drinking Water was signed off in September 2011, after the end of the reporting period. During the period of negotiations, Busselton Water has, in the spirit of the draft MoU, adopted the 2004 Australian Drinking Water Guidelines for microbiological and chemical sampling. A new water sampling regime has been implemented to the requirements of the 2004 Australian Drinking Water Guidelines with the approval of the Department of Health. An in-house Water Quality Database is currently being developed to record and monitor all microbiological and chemical sampling results to alert operational staff of any exceptions to the 2004 Australian Drinking Water Guidelines. An Exception Reporting Protocol has been actioned and additional protocols are in the development stage.

In accordance with the draft MoU and the associated Exception Reporting Protocol, any incidents of non-compliance with health guideline values that may involve a health impact are reported and recorded by Busselton Water.

A copy of Busselton Water's Drinking Water Quality Policy is provided at Appendix 2 to this report.

The following charts indicate the performance levels achieved by Busselton Water in the last 12 months.

WATER SAMPLING 2010/2011

During the 2010-11 review, 364 water samples were collected from seven distribution points for total coliform, thermotolerant coliform and thermophilic amoebae analysis. No coliforms, total or thermotolerant, were detected in any of these samples, therefore the scheme is 100% compliant with the guidelines. In the event of thermophilic amoeba being detected, the sample is then analysed to determine if it is of the genus *Naegleria*; and if present, species identification is required. Thermophilic amoebae were detected on 25 occasions during 2010-11, 12 of which were *Naegleria*; however, none were identified as the harmful *Naegleria fowleri* species (100% compliance). The frequency of thermophilic amoebae have been declining even though the number (and frequency) of samples collected have been increasing; compliance for thermophilic amoebae from 83 % to 87 % to 93 % over the past three years.

Busselton bore water is consistently above 24°C and this presents a health concern for Busselton Water as the warm water temperature is ideal for the growth of *Naegleria* and the species *N. Fowleri. N. Fowleri* is a free living organism which if exposed to the nasal passage can cause rare but fatal meningoencephalitis.

In response to all detections of *Naegleria* during 2010/11, Busselton deployed spot chlorination units to the affected areas (in accordance with its *Naegleria* Response Protocol, approved by the Department of Health in 2010). The spot chlorination units remained in place until resampling achieved a clear result in all instances.

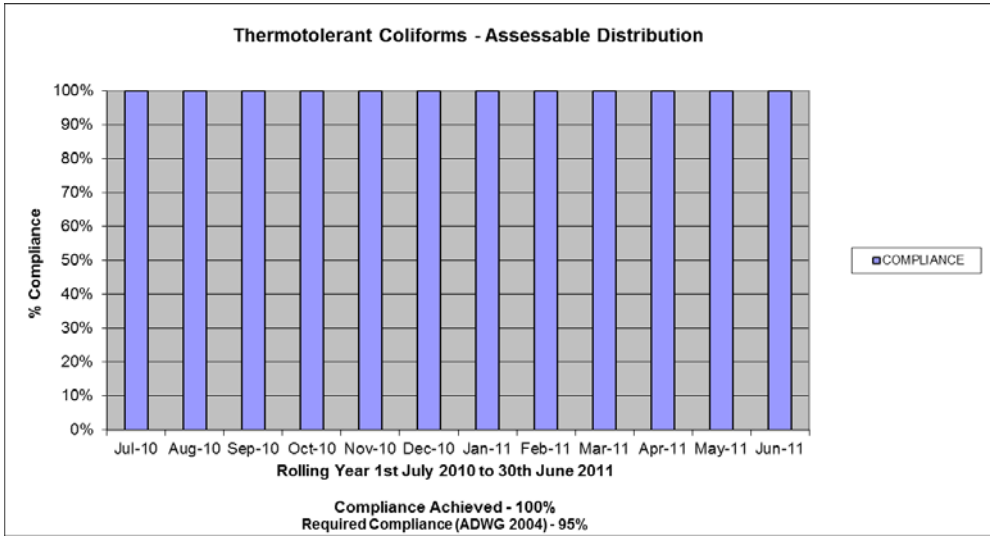
Thermotolerant coliforms are generally used as indicator for *E.coli*. Thermotolerant coliforms are the normal inhabitants of the intestine of mammals and are present in high numbers in human and animal faeces.

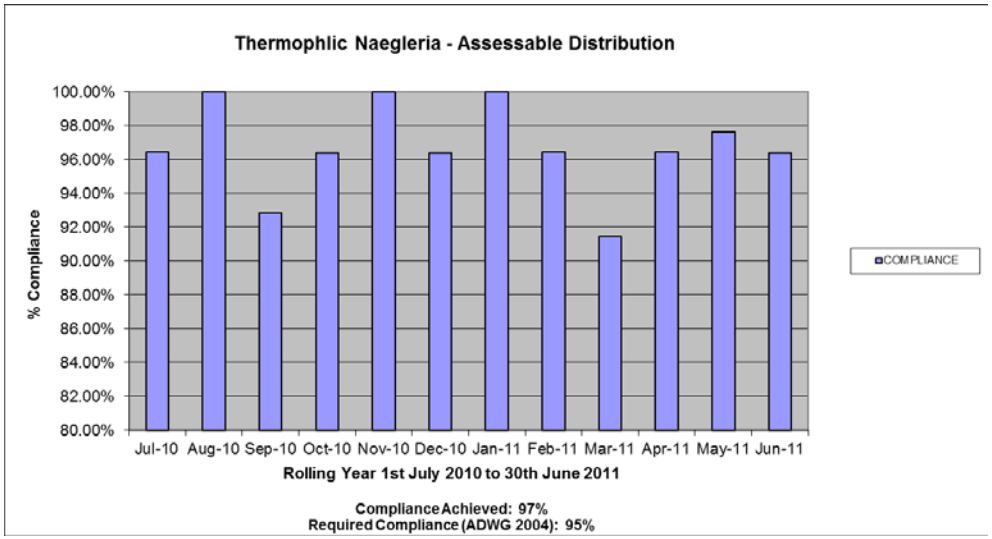
As Busselton has a protected water source and operates an enclosed treatment system, the risk of faecal contamination is extremely low.

MICROBIOLOGICAL WATER SAMPLING RESULTS – 2010/2011

Collection Point	Count of Samples Total Coliforms (C)	Count of Detected (C)	Count of Samples Thermotolerant Coliforms (TC)	Count of Detected (TC)	Count of Samples Escherichia coli (E Coli)	Count of Detected (E Coli)	Count of Samples Thermophilic Ameoba (TA)	Count of Detected (TA)	Count of Samples Thermophilic Naegleria (TN)	Count of Detected (TN)	Count of Detected Naegleria Fowleri (NF)
Anthony Street	52		52		52		52	2	52	2	
Apex Drive	52		52		52		52		52		
Hawker Approach	52		52		52		52	2	52	1	
Kookaburra Way	52		52		52		52	9	52	3	
Orlando Boulevard	52		52		52		52	1	52		
Vernon Track	52		52		52		52	7	52	3	
Currawong Drive	52		52		52		52	4	52	3	
Grand Total	364		364		364		364	25	364	12	
Result	***100%***		***100%***		***100%***		***93%***		***97%***		***100%***
Required Compliance (ADWG 2004)	-		-		*98%*		-		*95%*		***100%***
Required Compliance (NHMRC 1987)	*90%*		*95%*		*95%*						*95%*

Although Busselton Water operated under the NHMRC 1987 Guidelines until October 2011 when the Memorandum of Understanding with the Department of Health was signed, it had previously adopted (in April 2010) the Australian Drinking Water Guidelines 2004 (ADWG 2004) for its microbiological sampling.





CHEMICAL ANALYSIS 2010/11

Busselton Water provides a quarterly water chemical analysis to the Advisory Committee for the Purity of Water. An Annual Report is prepared by the Board's Hydrogeological Consultants, Rockwater Pty Ltd details from which are included hereunder. The full Rockwater report is also available on the website www.busseltonwater.wa.gov.au:

Chemical – Health Related

	Raw Water		Treated Water			Distribution Water		
	Number Assessed	Number Complying	Number Assessed	Number Complying	Compliance (%)	Number Assessed	Number Complying	Compliance (%)
Antimony						28	28	100%
Arsenic	31	31						
Barium	31	31						
Boron	31	31						
Cadmium						28	28	100%
Carbon Tetrachloride			20	20	100%			
Chromium						28	28	100%
Copper						84	84	100%
Fluoride	31	30	20	20	100%	28	28	100%
Lead						84	84	100%
Manganese						28	28	100%
Mercury	23	23						
Molybdenum	31	31						
Nickel	31	31				28	28	100%
Nitrate	31	31				84	84	100%
Nitrite						84	84	100%
Selenium	31	31						
Sulphate	31	31	20	20	100%			
Uranium	31	31						

Samples from all bores met health-related guideline limits for the year with the exception of fluoride, which was measured on one occasion above the maximum guideline limit of 1.5 mg/L at 2.3 mg/L in Busselton Water Bore BWB20. This bore was not supplying the community at the time. Fluoride levels in drinking water supplied to the community complied with the Guideline limit at all times.

Chemical – Aesthetic Related

	Raw Water		Treated Water			Distribution Water		
	Number Assessed	Number Complying	Number Assessed	Number Complying	Compliance (%)	Number Assessed	Number Complying	Compliance (%)
Ammonia						84	84	100%
Chloride			20	20	100%			
Copper						84	84	100%
Dissolved Oxygen	31	0				84	34	40.48%
Hardness	31	31	20	20	100%			
Hydrogen Sulphide						84	84	100%
Manganese						28	28	100%
pH	31	31	212	212	100%	286	286	100%
Salinity	93	88						
Sodium	31	29	20	20	100%			
Soluble Aluminium	31	31						
Soluble Iron			161	161	100%	208	208	100%
Sulphate	31	31	20	20	100%			
Total Aluminium	31	31						
Total Iron	31	6	212	212	100%	286	286	100%
Turbidity	31	6				84	84	100%
Zinc						84	84	100%

Extraction from Busselton Water Bore BWB20 has ceased while it undergoes investigations into deteriorating groundwater quality. Sampling at this bore was last undertaken on 24 March 2011.

Most of the constituents analysed in the raw bore water, except for total iron, dissolved oxygen, turbidity and, on occasion, salinity and sodium meet the health and aesthetic guidelines for drinking water (NHMRC and NRMMC, 2004). Treatment of the bore water by aeration and filtration at Plants 1, 2 and 3 ensures that water distributed through the water supply system is 100% compliant with the drinking water guidelines.

GROUNDWATER SALINITY: FIELD (CALCULATED FROM CONDUCTIVITY) AND PH

Water samples were collected at monthly intervals from all extraction bores for measurements of electrical conductivity (EC) and pH. Groundwater salinity (as total dissolved solids, TDS) is then calculated from EC measurements. In late-2009 Busselton Water had its conductivity meter serviced and calibrated, which has resulted in higher salinity values across the borefield, which correspond with laboratory measurements.

Aquifer	Leederville				Yarragadee											
Bore No.	BWB12		BWB19		BWB14		BWB15		BWB 16		BWB17		BWB18		BWB20	
Date	Field	Lab.	Field	Lab.	Field	Lab.	Field	Lab.	Field	Lab.	Field	Lab.	Field	Lab.	Field	Lab.
Jul-10	254	200	276	220	364	300	301	250	284	230	258	210	220	160	365	300
Aug-10	258	260	274	270	366	380	299	310	270	290	263	280	210	210	361	380
Sep-10	261	260	281	260	366	360	293	300	284	280	272	260	220	200	573	350
Oct-10	250	250	250	250	350	350	280	280	270	270	240	240	200	200	450	450
Nov-10	250	250	260	260	340	340	290	290	280	280	260	250	200	200	560	550
Dec-10	240	240	290	290	380	380	310	310	300	300	280	280	220	220	960	960
Jan-11	250	250	270	270	350	350	290	290	280	280	260	260	210	200	730	730
Feb-11	230	230	260	260	350	350	280	280	270	270	250	250	190	190	890	890
Mar-11	250	250	270	270	360	360	290	290	280	280	260	260	210	210	1100	1100
Apr-11	250	250	280	280	360	360	290	290	280	280	260	260	200	200		
May-11	260	260	280	280	370	370	300	300	290	290	260	260	210	210		
Jun-11	260	260	280	280	370	370	300	300	300	300	270	270	220	220		
2009-10 Range	**188-441**	**-**	**200-286**	**-**	**249-381**	**-**	**217-312**	**-**	**206-292**	**-**	**194-277**	**-**	**154-219**	**-**	**267-588**	**-**
2010-11 Range	**230-261**	**200-260**	**250-290**	**220-290**	**340-380**	**300-380**	**310-380**	**250-310**	**270-300**	**230-300**	**240-280**	**210-280**	**190-220**	**160-220**	**361-1100**	**300-1100**

Salinity as mg/L TDS (milligrams per litre total dissolved solids calculated from electrical conductivity).

The Australian Drinking Water Guidelines 2004 recommends drinking water levels under 600. As can be seen from the information in the above table, Busselton Water generally produces good water within these guidelines, with the exception of a couple of instances at Busselton Water Bore BWB20.

RADIOLOGICAL RESULTS 2010/2011

Since Busselton Water's new sampling regime was introduced in July 2010, samples collected for radiological analyses are only required from each of the Plants after aeration and filtration and instead of indicator species, gross alpha and gross beta species being analysed, Radium 226 and Radium 228 are analysed instead.

Water samples were collected from five storage tanks at the four Busselton Water plants in April 2011 and were submitted to Western Radiation Service via SGS laboratories for radiological analyses. The April 2011 results (provided in the table below) show that both Radium-226 and Radium-228 activities were below the 2004 guideline limit of 0.5 Bq/L.

Sample Point		**Radium 226**	**Radium 228**
		Bq/L	**Bq/L**
Plant 1		0.116±0.023	0.103±0.060
Plant 2	Tank 1	<0.1	<0.1
	Tank 2	<0.1	<0.1
Plant 3		<0.1	<0.1
Plant 4		<0.1	<0.1

CUSTOMER SERVICE / RESEARCH

At Busselton Water we see value in listening to customer complaints as they hold the key to successful customer services. We also believe that customer complaints are a major opportunity to build customer loyalty.

Water quality related complaints are recorded and monitored continuously to identify any trends and areas for improvement. They are also a vital part of our early warning systems where water quality is concerned.

In 2010/2011 Busselton Water received 15 complaints related to water quality (compared with nine in the previous year). Of these, three related to discoloured water.

There were no other restrictions imposed upon the use of domestic water.

A range of water quality related information and brochures is available on Busselton Water's website (www.busseltonwater.wa.gov.au), including:

- Busselton Water's quarterly water quality reports to the Department of Health;
- Annual Groundwater Aquifer Reviews prepared by Rockwater Pty Ltd;
- Busselton Water's Drinking Water Memorandum of Understanding with the Department of Health;
- Busselton Water's Drinking Water Quality Policy (Policy W030)
- Information on backflow prevention.

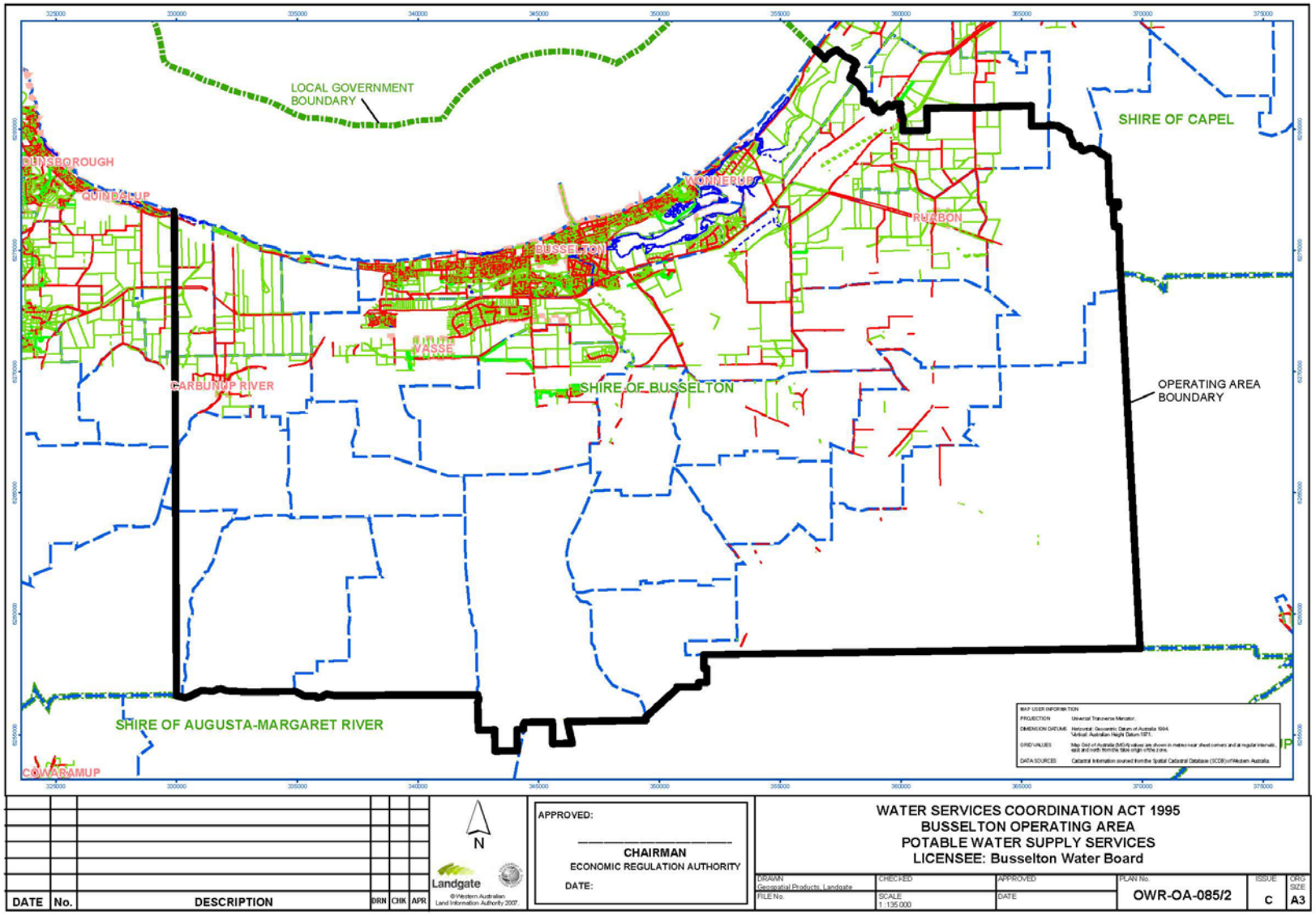
Further information in relation to any of the material contained on Busselton Water's website, or that contained in this report, may be obtained by contacting Busselton Water's Customer Service Centre (telephone: 08 9781 0500 / email: admin@busseltonwater.wa.gov.au).

ACKNOWLEDGMENT

Busselton Water acknowledges the cooperation and assistance provided throughout the year by:

- Rockwater Pty Ltd (Hydrogeological Consultants)
- Hunter Water Australia (Water Treatment Process Consultants)
- Department of Health
- Advisory Committee for the Purity of Water

APPENDIX 1


LOCAL GOVERNMENT BOUNDARY
SHIRE OF CAPEL
DUNSBOROUGH
QUINDALUP
WONNERUP
BUSSELTON
RUABON
YASSE
CARBUNUP RIVER
SHIRE OF BUSSELTON
OPERATING AREA BOUNDARY
SHIRE OF AUGUSTA-MARGARET RIVER
COWARAMUP
N
Landgate
APPROVED:
CHAIRMAN
ECONOMIC REGULATION AUTHORITY
DATE:
WATER SERVICES COORDINATION ACT 1995
BUSSELTON OPERATING AREA
POTABLE WATER SUPPLY SERVICES
LICENSEE: Busselton Water Board
DRAWN
Geospatial Products, Landgate
CHECKED
APPROVED
PLAN No.
OWR-OA-085/2
ISSUE
C
ORG SIZE
A3
FILE No.
SCALE
1:135 000
DATE
DATE
No.
DESCRIPTION
DRN
CHK
APR

Policy W030 – Drinking Water Quality

Busselton Water is responsible for providing drinking water to its diverse customer base – comprising industrial, business and residential customers – throughout its licence area.

Our management of the water supply system and water quality is given the highest priority to reflect public health considerations and community expectations.

Busselton Water's Board, staff and contractors are expected to recognise their responsibilities and required diligence in undertaking this most important and privileged role on behalf of the community.

Policy

Busselton Water is committed to supplying its customers with high quality drinking water. We will utilise effective, efficient and innovative management and operational practices to reliably deliver safe and acceptable drinking water. Our commitment to water quality will be maintained by:

(a) Complying with regulatory requirements on drinking water quality.

(b) Managing drinking water quality in a manner that gains the confidence and respect of customers, regulators and the water industry.

(c) Improving our awareness of customers' understanding and expectations regarding drinking water quality.

(d) Welcoming customer feedback on water quality issues and responding effectively to meet customers' concerns and needs.

(e) Providing publicly available information and reports on the quality of the drinking water supply and associated issues.

(f) Keeping at the forefront of drinking water quality, innovations and industry best practice.

(g) Taking part in research programs and studies aimed at better understanding and improving drinking water quality.

(h) Having an effective and continuously improving water quality management system that will continue to assure a safe and acceptable water supply.

(i) Maintaining good working relationships with public health, regulatory agencies and key stakeholders.

(j) Providing adequate training to all employees to ensure that they are aware of and committed to our drinking water policy.

HISTORY
BOARD RES: BWB.378
DATE: 18th October 2010