Westernport Water
Annual Drinking Water Quality Report 2015-16

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Authorisation

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General Manager Corporate & People

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1. Introduction

1.1 Westernport Water - Overview

Westernport Region Water Corporation (WPW) provides water, wastewater and gas services in an economically, environmentally and socially sound manner to customers within its service area.

WPW services Phillip Island and an area of the mainland from The Gurdies to Archies Creek. Individual towns that are provided with drinking water include Bass, Grantville, Corinella, Kilcunda (including Dalyston), San Remo, Cape Woolamai, Rhyll, Cowes and Ventnor. A map of the service area is included in this report as figure 1-1

1.2 Aims and Objectives of this Report

Under section 26 of the *Safe Drinking Water Act 2003* (SDWA), WPW is required to provide the Department of Health and Human Services (DHHS) with an annual report on the quality of drinking water supplied to its customers.

The aim of this report is to provide all stakeholders, including the community, with water quality information compliant with Section 26 of the SDWA. The report covers issues relating to the quality of drinking water and the management of regulated water.

The report covers the period of 1 July 2015 to 30 June 2016. The *Safe Drinking Water Regulations, 2015 (SDWR 2015)* commenced on 18 July 2015. For the period of 1 July to 17 July, the sunset *Safe Drinking Water Regulations, 2005* were in effect. Therefore drinking water quality standards from 1 July to 17 July are based on the 2005 Regulations. Performance against drinking water quality standards is presented in sections 5 and 6.

1.3 Westernport Water's Commitment to Drinking Water Quality

WPW is committed to a comprehensive risk assessment/ risk management approach to the safe provision of drinking water to its customers. This is achieved through the adoption of the framework for the management of drinking water quality outlined in the 2011 Australian Drinking Water Guidelines, (ADWG) and implemented through continual review/improvement of WPW Water Quality Risk Management Plan (WQRMP).

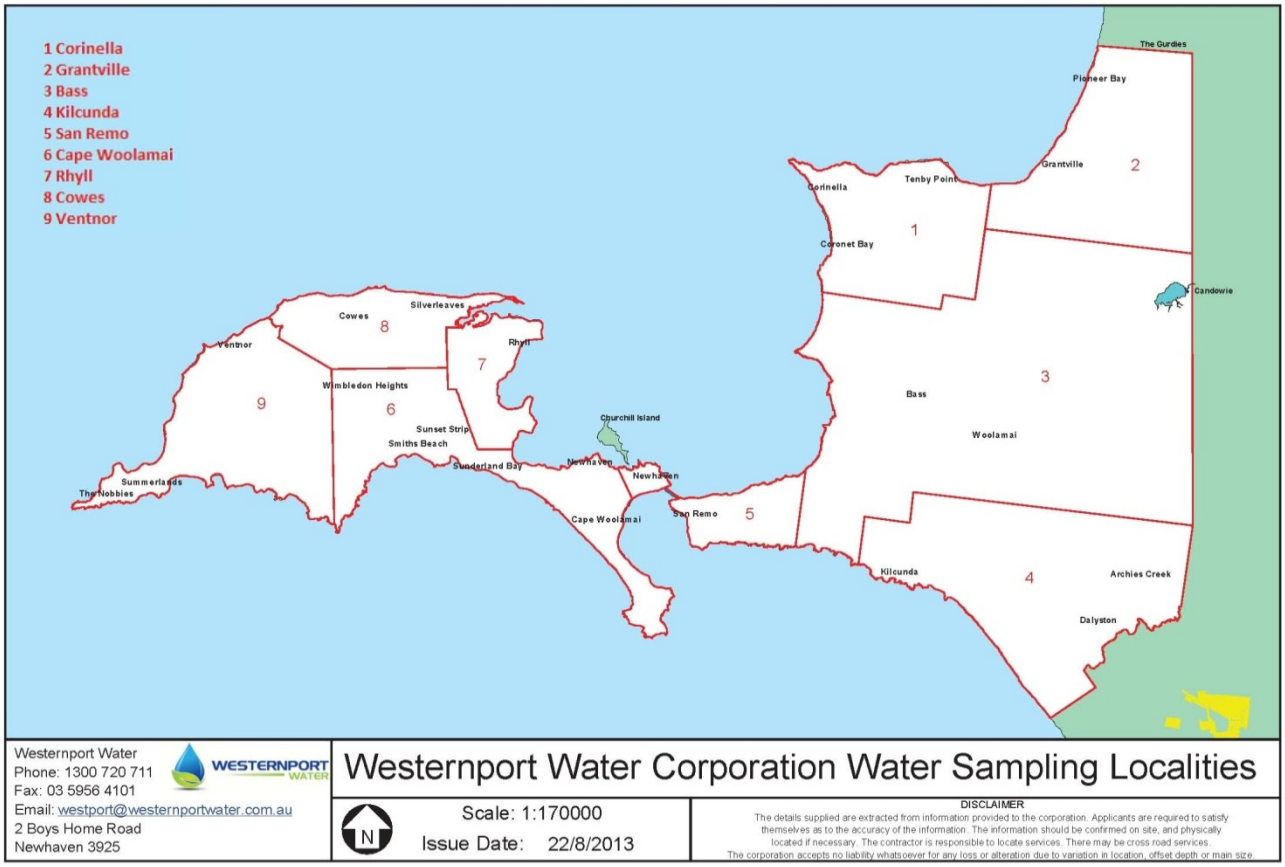
WPW's commitment to drinking water quality is highlighted in the foundation of its drinking water quality policy (endorsed by executive management and board). The policy demonstrates WPW's support and long-term commitment to the development and implementation of an effective system for drinking water quality management.

1.4 2015-16 performance

WPW provided its customers with high quality, safe drinking in 2015-16. WPW met all its obligations to provide safe drinking water throughout 2015-16.

The report covers the period of 1 July 2015 to 30 June 2016. The *Safe Drinking Water Regulations, 2015 (SDWR 2015)* commenced on 18 July 2015. For the period of 1 July to 17 July, the sunset *Safe Drinking Water Regulations, 2005* were in effect. Therefore drinking water quality standards from 1 July to 17 July are based on the 2005 Regulations and the period of 18 July 2015 to 30 June 2016 are based on the *SDWR 2015*. Performance against drinking water quality standards is presented in sections 5 and 6.

Figure 1-1 WPW region including water sampling localities



2. Characterisation of Westernport Water's Supply System

2.1 System Overview

WPW has a single water supply storage (Candowie Reservoir), which is an on-stream storage on Tennent Creek, located in the Bass Hills near Glen Forbes.

Water is treated at the Ian Bartlett Water Purification Plant (IBWPP) and then reticulated to communities through a single main supply line, with a number of smaller off takes servicing each of the residential communities within WPW area of supply. A plan of the distribution system is included in this report as figure 2-1.

Raw water quality in Candowie Reservoir is generally considered poor for human consumption due to intensive farming activities and runoff from cleared land within the catchment area. Before treatment, the raw water is high in nutrients and organics and quality is typical of water that is sourced from an unprotected catchment. Following treatment, the water complies with the ADWG and standards outlined in regulation 10 of the Safe Drinking Water Regulations, (SDWR 2005) and in it complies with standards regulation 12 SDWR 2015.

Localities and population supplied in WPW region, water sources and the treatment process are outlined in table 3-1 under section 3.

2.2 Water Sources

Other sources of water are available to supplement Candowie Reservoir during low rainfall periods. These alternative sources are: groundwater from bores constructed in the Corinella Groundwater Management Unit (GMU) and surface water from the Bass River. Water from these alternative sources is pumped via a pipeline to Candowie Reservoir for centralised storage and treatment at the IBWPP. Table 3-1 lists where raw water is sourced and the treatment processes used to produce potable water to customers

2.2.1 Groundwater

WPW have four bores licenced to take and use groundwater within the Corinella GMU. WPW has an entitlement of 490 ML/year. No groundwater was extracted during 2015-16 reporting period.

2.2.2 Bass River

Westernport Water's pump station, located along the banks of the Bass River, is used to transfer water into Candowie Reservoir. This is licenced under the Bass River Bulk Entitlement. No water was extracted from the river during the 2015-16 reporting period.

2.3 Source water protection

Section 1.3 details WPW's commitment to drinking water quality. Aligned with the framework for the management of drinking water quality is the catchment to tap approach. To demonstrate the approach, WPW understands its source water risks by in four ways:

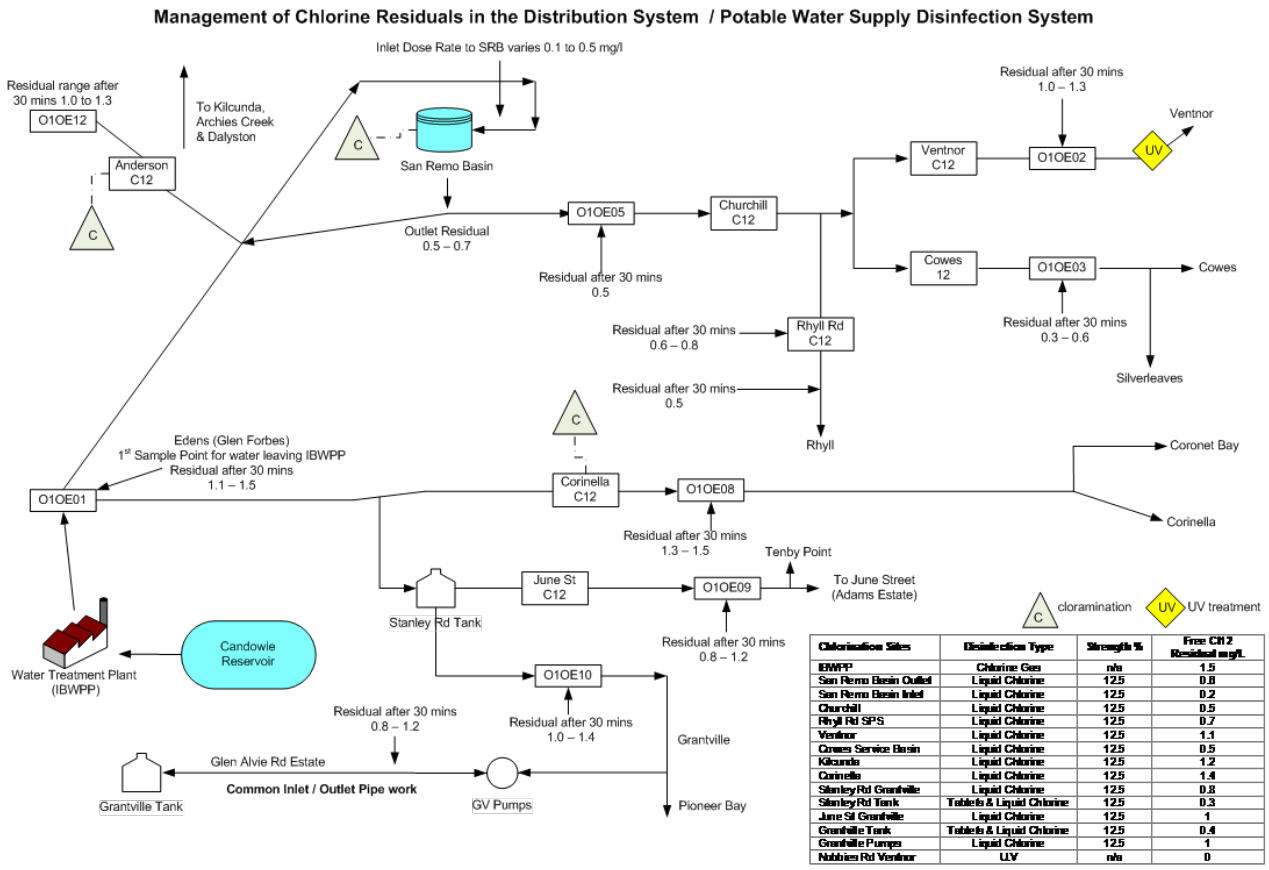
I. Undertaking a sanitary survey of the catchment

II. A comprehensive raw water monitoring program for pathogens, blue green algae, organic chemicals and radiological parameters

III. Continuous performance monitoring at the treatment plant

IV. Ongoing contractual partnership with Bass Coast Landcare and Melbourne Water on improving catchment health

Figure 2-1 WPW distribution system



Chlorination Sites	Disinfection Type	Strength %	Free Cl2 Residual mg/L
IBWPP	Chlorine Gas	n/a	1.5
San Remo Basin Outlet	Liquid Chlorine	12.5	0.8
San Remo Basin Inlet	Liquid Chlorine	12.5	0.2
Churchill	Liquid Chlorine	12.5	0.5
Rhyll Rd SPS	Liquid Chlorine	12.5	0.7
Ventnor	Liquid Chlorine	12.5	1.1
Cowes Service Basin	Liquid Chlorine	12.5	0.5
Kilcunda	Liquid Chlorine	12.5	1.2
Corinella	Liquid Chlorine	12.5	1.4
Stanley Rd Grantville	Liquid Chlorine	12.5	0.8
Stanley Rd Tank	Tablets & Liquid Chlorine	12.5	0.3
June St Grantville	Liquid Chlorine	12.5	1
Grantville Tank	Tablets & Liquid Chlorine	12.5	0.4
Grantville Pumps	Liquid Chlorine	12.5	1
Nobbies Rd Ventnor	UV	n/a	0

3. Water treatment and quality management systems

WPW operates a comprehensive water quality management system that complies with the SDWA 2005 and SDWR 2015. The system is designed to ensure that customers receive drinking water of acceptable quality at all times, and that public health is protected.

3.1 Water treatment

Raw water from Candowie Reservoir is treated using a combination of oxidation, adsorption, flocculation, coagulation, dissolved air flotation, filtration, pH correction, fluoridation and disinfection at the IBWPP. The source water is predominantly high in nutrients and organics, and quality is typical of water that is sourced from an open, unprotected catchment. The following sections and Table 3-1 highlight the treatment process used at IBWPP.

3.1.1 Oxidation

Oxidation is used to remove iron and manganese from the water. Potassium permanganate is added to aid the removal process.

3.1.2 Adsorption

Adsorption is a process where a solid is used to remove a soluble substance from the water. WPW uses Powdered Activated Carbon (PAC) as the solid in water. Water is pumped through PAC and accumulates the soluble substances in the filter, subsequently removing the substance from the water. Adsorption is used to control potential taste and odour issues, and to remove algal toxins from the water.

3.1.3 Coagulation/flocculation

Coagulation is the process to remove fine suspended particles to aid the removal of colour and turbidity. The particles have a negative charge allowing them to remain suspended in water. Coagulation involves the addition of a coagulant (aluminium sulphate) to water with a positive charge that neutralises the negative charge enabling the fine particles to merge to create larger particles. Flocculation involves gentle mixing of the water which increases the particle size to visible suspended solids. The visible particles are called a ‘floc’.

3.1.4 Dissolved air floatation and filtration (DAFF)

DAFF is a process of injecting air particles into water causing the floc to float to the surface. The floc is then removed to waste and the clear water is filtered through graded filter media. The purpose of DAFF is to produce water low in turbidity.

Over time filters become blocked with particles from the floc. To overcome the blockage, the filters are backwashed periodically to allow optimum production in the filters to produce consistently low turbidity results.

3.1.5 Fluoridation

Fluoride is added to treated water to protect against teeth decay and to promote general oral health. Fluoridated water is delivered to all nine localities in WPW distribution system.

3.1.6 pH correction

To ensure treated water is within the ADWG desired range, caustic soda is added to raise pH.

3.1.7 Disinfection

(a) Chlorine

The final stage of treatment at IBWPP is chlorine disinfection. Disinfection is required to prevent the spread of waterborne pathogens and to retain an appropriate chlorine residual throughout the system.

(b) Chloramination

WPW adopt the method of chloramination to address taste & odour issues and total chlorine residuals to the extremities of the distribution system. Chloramination is the process of adding chlorine to a small amount of ammonia. All localities (except Bass) receive chloraminated water.

Table 3-1 Source water and treatment process

Water Sampling Locality	Population supplied[1]	Source water[2]	Storage	Treatment plant	Treatment Process													Added substance(s)							Comments
					Coagulation and flocculation	Clarification		Filtration		Disinfection					Other			Sludge-handling (mechanical with chemical addition	Lime/soda ash/Caustic soda/Carbon dioxide/sulphuric acid	Aluminium-based coagulants	Iron-based coagulants	Polymers	Chlorine	Ammonia[3]	Fluoride	
						Sedimentation/clarification	Dissolved air flotation	Granular Media Filter	Membrane	Chlorine gas	Sodium hypochlorite	Chlorine dioxide	Ultraviolet (UV)[4]	Ozone	Activated carbon (PAC/GAC)	Ion exchange	Reverse osmosis									
Bass (including Woolamai)	600	Bass River, Tennent Creek, and Corinella Bores	Candowie Reservoir	IBWPP	✓		✓	✓		✓	✓				✓			✓	✓	✓		✓	✓	✓	Potassium permanganate is an added substance used during oxidation at IBWPP to remove iron and manganese. Flouridated water was received by all localities in 2015-16.
Cape Woolamai (incorporating Smiths Beach, Sunderland Bay, Sunset Strip and Wimbledon Heights)	3200																								
Corinella (incorporating Coronet Bay)	1710																								
Cowes (incorporating Silverleaves)	4050																								
Grantville (incorporating Pioneer Bay)	1070																								
Kilcunda (incorporating Dalyston and Archies Creek)	930																								
Rhyll	670																								
San Remo (incorporating Newhaven)	1470																								
Ventnor	830																								

[1] Population sourced from current census data
[2] Water sources listed are used to augment supply to Candowie and subsequently supply all localities
[3] Ammonia as aqua ammonia used with sodium hypochlorite for chloramination disinfection.
[4] UV disinfection is only used for water supplied to The Penguin Parade and Nobbies area. A UV unit was constructed in the district in 2001. The unit was constructed due to low chlorine residuals at the extremity of WPW distribution pipe network.

3.2 Major changes to the arrangements for water supply

There were no major changes to the arrangements for water supply in 2015-16:

3.3 Issues

3.3.1 Candowie Reservoir

Candowie Reservoir experienced a seasonal blue algal bloom throughout 2015-16. Algae species reaching bloom levels were identified in January and persistent until May 2016. While there is operational pressure on the treatment plant during seasonal algal blooms, safe and aesthetically drinking water was produced during the bloom period and throughout the entirety of 2015-16.

3.3.2 Distribution system

There were two section 22 notifications required under the SDWA in 2015-16. Notifications were in relation to the detection of *Escherichia coli (E.coli)* in the localities of Cowes and Coronet Bay. The detections were found to be false positive and safe drinking water was assured during both detects and throughout the entirety of 2015-16. Information regarding the section 22 notification is detailed in section 4.

4. Emergency, incident and event management

As discussed in section 3.3.2, WPW submitted two section 22 notifications to DHHS. This was due to suspected contamination of the distribution network in the Water Sampling localities of Cowes and Corinella respectively. The suspected contamination, in the form of *E.coli*, were investigated and concluded to be false positive samples. Both localities met the drinking water quality standard for *E.coli*. The following sections detail the two events

4.1 *E.coli* – Cowes

WPW were notified of an *E.coli* detection of a routine sample by its consultant laboratory on March 3, 2016. The result was >200 orgs/100mL taken on March 1, 2016. All other *E.coli* samples taken in the locality were clear. Turbidity and total chlorine were also sampled at the same time and location of the detect with results of 0.99 mg/L and <0.1 NTU respectively. An investigation, in line with DHHS requirements, included a site inspection, re sampling at the site and sampling in vicinity, assessment of operational data and assessment of network and asset condition.

DHHS confirmed WPW has demonstrated that the water sample taken on 1 March, 2016 in the Cowes locality has met the drinking water quality standard for *E.coli*. The investigation has been conducted and reported in accordance with Schedule 2(c) of *SDWR, 2015* and associated guidelines and agrees with WPW's investigation conclusion that the initial sample was false positive sample.

4.2 *E.coli* – Corinella

WPW were notified of an *E.coli* detection of a routine sample by its consultant laboratory on June 30, 2016. The result was 2 orgs/100mL taken on June 28, 2016. All other *E.coli* samples taken in the locality were clear. Turbidity and total chlorine were also sampled at the same time and location of the detect with results of 0.98 mg/L and 0.1 NTU respectively. An investigation, in line with DHHS requirements, included a site inspection, re sampling at the site and sampling in vicinity, assessment of operational data and assessment of network and asset condition.

DHHS confirmed WPW has demonstrated that the water sample taken on June 28, 2016 in the locality of Corinella has met the drinking water quality standard for *E.coli*. The investigation has been conducted and reported in accordance with Schedule 2(c) of *SDWR, 2015* and associated guidelines and agrees with WPW's investigation conclusion that the initial sample was false positive sample.

5. Quality of drinking water for the period of 1 July to 17 July 2015

For the period of 1 July to 17 July, 2015 the water quality standards specified under the *SDWR 2005* were in effect.

All parameters sampled by WPW for the period of 1 July to 17 July 2015 under regulations 10 of the *SDWR* 2005 and under regulation 12 of the *SDWR* 2015 from 18 July onwards 2015-16 were compliant with Regulation 10 of the *SDWR 2005* and health related guideline values in the ADWG. The following tables depict the performance for 1 to 17 July, 2015.

E.coli and turbidity are the only parameters displayed between July 1 and July 17, 2015. This is due to the requirement of Schedule 2 to sample weekly. Chlorine and aluminium based chemicals listed in Schedule 2 of *SDWR* 2005 are required monthly however these parameters were not reported between July 1 and July 17 as WPW's monthly scheduled sample day is after the 17th of each month. As discussed above, post 17 July 2015 the *SDWR 2015* came into effect and under the *SDWR 2015* chlorine and aluminium based chemicals are longer required in *SDWR 2015*.

5.1 E.coli

The *SDWR 2005* stipulates that at least 98 % of all samples of drinking water collected in any 12 months period contain no *E. coli* per 100mL. The water quality with respect to *E. coli* was compliant with this standard as per table 5-1 below:

Table 5-1 *E.coli*

Locality	Frequency	Samples	No of samples containing *E.coli*	Max result	% samples with no *E.coli*	Complying
Bass	Weekly	2	0	0	100	Yes
Cape Woolamai	Weekly	2	0	0	100	Yes
Corinella	Weekly	2	0	0	100	Yes
Cowes	Weekly	2	0	0	100	Yes
Grantville	Weekly	2	0	0	100	Yes
Kilcunda	Weekly	2	0	0	100	Yes
Rhyll	Weekly	2	0	0	100	Yes
San Remo	Weekly	2	0	0	100	Yes
Ventnor	Weekly	2	0	0	100	Yes

5.2 Turbidity

The SDWR stipulate that the 95% upper confidence limit (UCL) of the mean of drinking water samples collected in the preceding 12 months must be ≤ 5.0 NTU. All localities were compliant with the water quality standard as per table 5-2 below

Table 5-1 Turbidity

Locality	Frequency	Samples	Max result	95% UCL of mean	Complying
Bass	Weekly	2	0.1	0.3	Yes
Cape Woolamai	Weekly	2	0.1	0.1	Yes
Corinella	Weekly	2	0.2	0.6	Yes
Cowes	Weekly	2	0.2	0.2	Yes
Grantville	Weekly	2	0.2	0.2	Yes
Kilcunda	Weekly	2	0.1	0.3	Yes
Rhyll	Weekly	2	0.2	0.2	Yes
San Remo	Weekly	2	0.2	0.2	Yes
Ventnor	Weekly	2	0.1	0.2	Yes

6. Quality of drinking water for the period of 18 July to 30 June 2016

For the period of 18 July, 2015 to 30 June, 2016 the water quality standards specified under the *SDWR 2015* were in effect.

All parameters sampled by WPW throughout 2015-16 were compliant with Regulation 12, 13 and Schedule 2 of the *SDWR 2015* and health related guideline values in the ADWG. The following tables depict the performance for 18 July, 2015 to 30 June, 2016

6.1 *E.coli*

The *SDWR 2015* stipulates that all samples of drinking water collected are found to contain no *E. coli* per 100mL of drinking water, with the exception of any false positive sample. Sample frequency in relation to *E.coli* is weekly in each defined locality The water quality with respect to *E. coli* was compliant with this standard as per table 6-1.1 below:

Table 6-1.1 *E.coli*

Locality	Frequency	Samples	No of samples containing *E.coli*	Max result	Complying
Bass	Weekly	52	0	0	Yes
Cape Woolamai	Weekly	52	0	0	Yes
Corinella	Weekly	55[1]	1	2	Yes
Cowes	Weekly	59*	1	>200	Yes
Grantville	Weekly	52	0	0	Yes
Kilcunda	Weekly	52	0	0	Yes
Rhyll	Weekly	52	0	0	Yes
San Remo	Weekly	52	0	0	Yes
Ventnor	Weekly	52	0	0	Yes

Table 6-1.2 *E.coli* detections

Locality	No. of investigations conducted (s. 22)	No. of confirmed false positives	No. of investigations where standard not met (s. 18)
Cowes[1]	1	1	0
Corinella[2]	1	1	0

[1]An *E.coli* sample taken on 3/03/2016 indicated a detection of >200 orgs/100mL. More information can be found in section 4.1.

[2]An *E.coli* sample taken on 30/06/2016 indicated a detection of 2 orgs/100mL. More information can be found in section 4.2.

6.2 Trihalomethanes (THM's)

The *SDWR 2015* stipulates that all samples of drinking water collected are less than or equal to 0.25 milligrams per litre of drinking water. Sample frequency in relation to THM's is monthly in each defined locality. The water quality with respect to THM's was compliant with this standard as per table 6-2 below:

Table 6-2 THM's

Locality	Frequency	Samples	Non-complying samples	Max result	Met the standard
Bass	Monthly	12	0	0.130	Yes
Cape Woolamai	Monthly	12	0	0.120	Yes
Corinella	Monthly	12	0	0.140	Yes
Cowes	Monthly	14*	0	0.160	Yes
Grantville	Monthly	12	0	0.120	Yes
Kilcunda	Monthly	12	0	0.140	Yes
Rhyll	Monthly	12	0	0.150	Yes
San Remo	Monthly	12	0	0.160	Yes
Ventnor	Monthly	12	0	0.150	Yes

*extra samples taken due to population increase over summer

6.3 Turbidity

The SDWR stipulate that the 95th percentile of drinking water samples collected in any 12 months period must be ≤ 5.0 NTU. All localities were compliant with the water quality standard as per table 6-3 below:

Table 6-3 Turbidity

Locality	Frequency	Samples	Max NTU	95th percentile	Met the standard
Bass	Weekly	52	0.3	0.2	Yes
Cape Woolamai	Weekly	52	0.3	0.2	Yes
Corinella	Weekly	52	0.3	0.2	Yes
Cowes	Weekly	57*	0.3	0.2	Yes
Grantville	Weekly	52	0.4	0.2	Yes
Kilcunda	Weekly	52	0.2	0.1	Yes
Rhyll	Weekly	52	0.3	0.2	Yes
San Remo	Weekly	52	0.2	0.2	Yes
Ventnor	Weekly	52	0.6	0.4	Yes

*extra samples taken due to population increase over summer

6.4 Other algae, pathogen, chemical or substance not specified above that may pose a risk to human health

WPW regularly tests for metals in the drinking water they supply to customers. The following sections detail the results for the 2015/16 reporting period

6.4.1 Fluoride

The heath-based guideline value for fluoride in the ADWG is 1.5mg/L. In conjunction with this value the *Health (Fluoridation) Act 1973* states that the annual average for fluoride in drinking water must not exceed 1 mg/L. Fluoride concentrations at all locations were compliant during the reporting period as presented in table 6-4.1 below:

Table 6-4.1 Fluoride

Locality	Frequency	Samples	Non-complying samples	Parameter Health guideline value mg/L	Max	Met the standard
Bass	Monthly	13	0	1.5	0.88	Yes
Cape Woolamai	Monthly	13	0	1.5	0.85	Yes
Corinella	Monthly	15	0	1.5	0.89	Yes
Cowes	Monthly	14	0	1.5	0.86	Yes
Grantville	Monthly	13	0	1.5	0.85	Yes
Kilcunda	Monthly	14	0	1.5	0.88	Yes
Rhyll	Monthly	13	0	1.5	0.84	Yes
San Remo	Monthly	13	0	1.5	0.84	Yes
Ventnor	Monthly	13	0	1.5	0.83	Yes

6.4.2 Antimony

Based on health considerations, the ADWG guideline value for Antimony is 0.003 mg/L. All localities were compliant with the ADWG as per table 6-4.2 below:

Table 6-4.2 Antimony

Locality	Frequency	Samples	Non-complying samples	Parameter Health guideline value mg/L	Max[1]	Met the standard
Bass	Annual	1	0	0.003	<0.001	Yes
Cape Woolamai	Annual	1	0	0.003	<0.001	Yes
Corinella	Annual	1	0	0.003	<0.001	Yes
Cowes	Annual	1	0	0.003	<0.001	Yes
Grantville	Annual	1	0	0.003	<0.001	Yes
Kilcunda	Annual	1	0	0.003	<0.001	Yes
Rhyll	Annual	1	0	0.003	<0.001	Yes
San Remo	Annual	1	0	0.003	<0.001	Yes
Ventnor	Annual	1	0	0.003	<0.001	Yes

[1] Results with a less than qualifier (<) are below the laboratory detection limit

6.4.3 Cadmium

Based on health considerations, the ADWG guideline value for Cadmium is 0.002 mg/L. All localities were compliant with the ADWG as per table 6-4.3 below:

Table 6-4.3 Cadmium

Locality	Frequency	Samples	Non-complying samples	Parameter Health guideline value mg/L	Max result[1]	Met the standard
Bass	Annually	1	0	0.002	<0.0002	Yes
Cape Woolamai	Annually	1	0	0.002	<0.0002	Yes
Corinella	Annually	1	0	0.002	<0.0002	Yes
Cowes	Annually	1	0	0.002	<0.0002	Yes
Grantville	Annually	1	0	0.002	<0.0002	Yes
Kilcunda	Annually	1	0	0.002	<0.0002	Yes
Rhyll	Annually	1	0	0.002	<0.0002	Yes
San Remo	Annually	1	0	0.002	<0.0002	Yes
Ventnor	Annually	1	0	0.002	<0.0002	Yes

[1] Results with a less than qualifier (<) are below the laboratory detection limit

6.4.4 Copper

Based on health considerations, the ADWG health-based guideline value is set at 1 mg/L, and at 2 mg/L for the aesthetic-based guideline. The copper concentration complied with both guideline values at all localities during the reporting period as per table 6-4.4 below:

Table 6-4.4 Copper

Locality	Frequency	Samples	Non-complying samples	Parameter Health guideline value mg/L	Max result	Met the standard
Bass	Monthly	12	0	1	0.055	Yes
Cape Woolamai	Monthly	12	0	1	0.019	Yes
Corinella	Monthly	12	0	1	0.058	Yes
Cowes	Monthly	14*	0	1	0.053	Yes
Grantville	Monthly	12	0	1	0.031	Yes
Kilcunda	Monthly	12	0	1	0.019	Yes
Rhyll	Monthly	12	0	1	0.100	Yes
San Remo	Monthly	12	0	1	0.059	Yes
Ventnor	Monthly	12	0	1	0.380	Yes

* extra samples taken due to population increase over summer

6.4.5 Lead

Based on health considerations, the ADWG guideline value is set at 0.01 mg/L. Lead concentrations complied with this guideline value at all localities during the reporting period as per table 6-4.5 below:

Table 6-4.5 Lead

Locality	Frequency	Samples	Non-complying samples	Parameter Health guideline value mg/L	Max result[1]	Met the standard
Bass	Monthly	12	0	0.01	<0.001	Yes
Cape Woolamai	Monthly	12	0	0.01	<0.001	Yes
Corinella	Monthly	12	0	0.01	0.001	Yes
Cowes	Monthly	14*	0	0.01	0.002	Yes
Grantville	Monthly	12	0	0.01	0.001	Yes
Kilcunda	Monthly	12	0	0.01	<0.001	Yes
Rhyll	Monthly	12	0	0.01	<0.001	Yes
San Remo	Monthly	12	0	0.01	0.002	Yes
Ventnor	Monthly	12	0	0.01	0.003	Yes

* extra samples taken due to population increase over summer

[1] Results with a less than qualifier (<) are below the laboratory detection limit

6.4.6 Nickel

Based on health considerations, the ADWG guideline value is set at 0.02 mg/L. The nickel concentration complied with this guideline value at all localities during the reporting period as per table 6-4.6 below:

Table 6-4.6 Nickel

Locality	Frequency	Samples	Non-complying samples	Parameter Health guideline value mg/L	Max result[1]	Met the standard
Bass	Annually	1	0	0.02	<0.001	Yes
Cape Woolamai	Annually	1	0	0.02	<0.001	Yes
Corinella	Annually	1	0	0.02	0.003	Yes
Cowes	Annually	1	0	0.02	<0.001	Yes
Grantville	Annually	1	0	0.02	<0.001	Yes
Kilcunda	Annually	1	0	0.02	<0.001	Yes
Rhyll	Annually	1	0	0.02	<0.001	Yes
San Remo	Annually	1	0	0.02	<0.001	Yes
Ventnor	Annually	1	0	0.02	<0.001	Yes

[1] Results with a less than qualifier (<) are below the laboratory detection limit

6.4.7 Zinc

Based on aesthetic considerations, the ADWG guideline value is set at 3 mg/L. The zinc concentration complied with this guideline value at all localities during the reporting period as per table 6-4.7 below:

Table 6-4.7 Zinc

Locality	Frequency	Samples	Non-complying samples	Parameter Health guideline value mg/L	Max result	Met the standard
Bass	Quarterly	4	0	3	0.024	Yes
Cape Woolamai	Quarterly	4	0	3	0.01	Yes
Corinella	Quarterly	4	0	3	0.023	Yes
Cowes	Quarterly	4	0	3	0.012	Yes
Grantville	Quarterly	4	0	3	0.008	Yes
Kilcunda	Quarterly	4	0	3	0.007	Yes
Rhyll	Quarterly	4	0	3	0.008	Yes
San Remo	Quarterly	4	0	3	0.011	Yes
Ventnor	Quarterly	4	0	3	0.06	Yes

6.4.8 Manganese

The ADWG health-based value is set at 0.5 mg/L, and at 0.1 mg/L for aesthetic-based value. The manganese results met both ADWG values (for aesthetics and health) in all sampling localities during the reporting period as per table 6-4.8 below:

All manganese samples are taken from water entering points not customer taps. The manganese samples at the Bass locality are collected from water entering points outside of the locality as Bass does not have a 30 minute contact point within the distribution system However, samples taken are representative of water supplied to the Bass water sampling locality as there are no further process treatment downstream of sampling point.

Table 6-4.8 Manganese

Locality	Frequency	Samples	Non-complying samples	Parameter Health guideline value mg/L	Max result[1]	Met the standard
Bass	Monthly	12	0	0.5	0.024	Yes
Cape Woolamai	Monthly	12	0	0.5	0.038	Yes
Corinella	Monthly	12	0	0.5	0.016	Yes
Cowes	Monthly	12	0	0.5	0.014	Yes
Grantville	Monthly	12	0	0.5	0.012	Yes
Kilcunda	Monthly	12	0	0.5	0.018	Yes
Rhyll	Monthly	12	0	0.5	0.015	Yes
San Remo	Monthly	12	0	0.5	0.074	Yes
Ventnor	Monthly	12	0	0.5	0.04	Yes

[1] Results with a less than qualifier (<) are below the laboratory detection limit

6.4.9 All other chemicals or monitored parameters

WPW also sample from water entering points and service basins that deliver water into each locality for health related aspects of drinking water. There are a number of sites that sample different parameters at varying frequencies. These are highlighted, along with compliance with ADWG, in table 6-4.9 below:

6-4.9 Other health related parameters sampled at water entering points and service basins

Parameter	Frequency	Samples	ADWG value (mg/L)	Complying samples
Chromium (as Cr(VI))	Quarterly	36	<0.05	All results from water entering points and service basins were compliant with ADWG health related values
Cyanide	Annually	10	<0.08	
Nitrate	Fortnightly	259	<50	
Nitrite	Fortnightly	103	<3	
Sulphate	Annually	4	<500	

6.4.10 Raw water monitoring

As described in section 2.1, the raw water quality in Candowie Reservoir is impacted by intensive farming throughout the open catchment. For this reason WPW monitors a number of parameters in the raw water storage to detect changes in water quality, allowing for proactive management of water treatment processes. Parameters, sampling frequency and location are tabulated below.

WPW reviewed its water sampling program in line with regulation 13 of *SDWR 2015*. Regulation 13 requires samples of drinking water to be collected at a frequency detailed in the WQRMP. Changes from 2014-15 in the sampling program for raw water was the extension of metal sampling to be conducted annually. This was due to long term compliance with the ADWG water quality targets.

Table 6-4.10 Raw water monitoring

Location	Frequency	Parameter
Raw water offtake	Daily	Fluoride, turbidity, pH, iron and manganese
	Weekly	Colilert (200) *E. coli*, coliforms, , dissolved organic carbon and electrical conductivity
	Fortnightly (or increased as required)	Methyl Iso-Borneol (MIB) and geosmin
	Monthly	Alkalinity
	Quarterly	Herbicides and pesticides, cryptosporidium and giardia
	Annually	Metals (silver iodide, tin, barium, boron, mercury, molybdenum, selenium and beryllium) and radiation
Profile sampling at surface, 1, 3, 7 and 9 meter depths	Fortnightly (or increased as required)	Blue green algae, nitrate, nitrite, ammonia, phosphorus, silica, iron and manganese
Surface and every meter interval (up to 10m)	Fortnightly	Temperature, dissolved oxygen, pH and electrical conductivity @25°C

6.4.11 Analysis of results

The quality of drinking water supplied to our customers was 100% compliant with requirements detailed in *SDWR 2005, SDWR 2015* and WPW'S WQRMP in 2015-16.

WPW has also reached 100% compliance with these requirements for the two previous reporting periods, 2013-14 and 2014-15 respectively. For more information on the previous reporting periods please visit our publications page on our website:

http://www.westernportwater.com.au/learning-centre/resources-support/forms-publications/

6.4.12 Water quality improvements in 2015-16

Water quality improvements during 2015-16 were:

- Treated water pH was added as a Critical Control Point in the WQRMP and alarmed on Supervisory control and data acquisition system (SCADA)
- SCADA was refined and improved
- All three filters at IBWPP were inspected, scraped and cleaned
- Annual Air scouring of water mains continued as an annual routine program
- Powdered Activated Carbon (PAC) dosing system was improved resulting in less procurement of carbon, a consistent dose rate, longer filter run times and improved filter performance
- Turbidity filter performance met the Health Based Target guideline of <0.2 NTU 95% of the time and not >0.5 NTU for 15 consecutive minutes throughout the entire 2015-16 year.

6.5 Aesthetics

The SDWR 2005 and SDWR 2015 refers to aesthetic water quality and states the annual report must include the steps taken by a water supplier to manage aesthetic characteristics of drinking water supplied. Along with verification monitoring of colour and pH, WPW undertake jar testing for optimum coagulant dosing. Other steps taken to manage aesthetics are reactive maintenance programs: annual air scouring of the distribution pipe network and a quarterly flushing program. The ADWG set the aesthetic based guideline values for aluminium, true colour, iron and pH. Those parameters sampled throughout the distribution system, indicating compliance, are presented in tables below.

6.5.1 Aluminium (acid-soluble)

Based on aesthetic considerations, the ADWG guideline value is set at 0.2 mg/L. The aluminium concentration complied with this guideline value at all localities during the reporting period as per table 6-5.1 below:

Table 6-5.1 Aluminium

Locality	Frequency	Samples	Max result
Bass	Monthly	12	0.02
Cape Woolamai	Monthly	12	0.02
Corinella	Monthly	12	0.02
Cowes	Monthly	14	0.02
Grantville	Monthly	12	0.02
Kilcunda	Monthly	12	0.02
Rhyll	Monthly	12	0.03
San Remo	Monthly	12	0.03
Ventnor	Monthly	12	0.02

6.5.2 True colour

Sampling for true colour was undertaken at water entering points into the distribution system - not at customer taps. The table below presents the data from a locality perspective rather than for individual water sampling points. The ADWG value is set at 15 HU. True colour results met ADWG in all sampling localities during the reporting period as per table 6-5.2 below:

Table 6-5.2 True colour

Locality	Frequency	Samples	Max result
Bass	Monthly	12	4
Cape Woolamai	Monthly	12	2
Corinella	Monthly	12	2
Cowes	Monthly	12	4
Grantville	Monthly	12	4
Kilcunda	Monthly	12	2
Rhyll	Monthly	12	4
San Remo	Monthly	12	4
Ventnor	Monthly	12	4

6.5.3 Iron

Based on aesthetic considerations, the ADWG guideline value is set at 0.3 mg/L. All localities were compliant with the ADWG in the 2015-16 reporting period as highlighted in table 6-5.3 below:

Table 6-5.3 Iron

Locality	Frequency	Samples	Max result
Bass	Fortnightly	12	0.02
Cape Woolamai	Fortnightly	12	0.02
Corinella	Fortnightly	12	0.04
Cowes	Fortnightly	14*	0.05
Grantville	Fortnightly	12	0.04
Kilcunda	Fortnightly	12	0.04
Rhyll	Fortnightly	12	0.05
San Remo	Fortnightly	12	0.07
Ventnor	Fortnightly	12	0.14

*extra samples taken due to population increase over summer

6.5.4 pH

The ADWG aesthetic value for pH is between 6.5 and 8.5. There was one non-compliant result for pH in July 2015 in the Cowes locality. Exceedance is detailed below.

Table 6-5.4 pH

Locality	Frequency	Samples	Min	Max
Bass	Fortnightly	26	6.9	7.6
Cape Woolamai	Fortnightly	26	7.1	7.7
Corinella	Fortnightly	26	7	7.9
Cowes	Fortnightly	28	7.1	8.7
Grantville	Fortnightly	26	7.1	7.6
Kilcunda	Fortnightly	26	7	7.9
Rhyll	Fortnightly	26	7.1	7.7
San Remo	Fortnightly	26	7	7.5
Ventnor	Fortnightly	27	6.8	8.1

On the 28/07/2015, pH exceedance of 8.7 was recorded in the locality of Cowes. The area was flushed and resamples showed pH was within the desired range of 6.5-8.5 quoted in the ADWG. There were no customer complaints received during the exceedance and at no stage was public health at risk from the exceedance.

7. Complaints relating to water quality

7.1 Summary of complaints

The number of customer complaints to WPW regarding drinking water totalled 40 for 2015/16. This was an increase of 28 from 2014/15. Table 7-1 highlights the type of customer complaints

Table 7-1 Complaints relating to water quality

Type of complaint	No. of complaints	No of complaints per 100 customers supplied^
Discoloured water	13	0.07
Taste/odour	18	0.09
Air in water	0	0.00
Other*	9	0.05

^for the purposes of this section, the term 'customer' has the same meaning as that used by the Essential Services Commission, that is, a customer = a connection
*this category includes any contact related to alleged illness

33% of complaints were for discoloured colour, 45% taste/odour and 22% for other.

The majority of complaints were due to reactive maintenance works where there was a burst or leak of the distribution network resulting in discoloured water. Flushing after works corrected any complaint received. There were no media releases or public announcements associated with water quality complaint.

Total customer complaints increased from 28 in 2014-15 to 40 in 2015-16. This was due to the dryer climatic conditions over the summer months than previously witnessed. The dryer, harder ground limited flexibility in mains pipe resulting in burst or leak.

7.2 Response to complaints

WPW is committed to providing its customers with ongoing quality water and services. Our customer service division manages customer complaints and each complaint is lodged using an entry form in WPW customer request management (CRM) system. Depending on the nature of the complaint, the details are electronically forwarded to the Water Quality Officer for water quality complaints; the Maintenance group for bursts and leaks; and the Communications Manager or Customer Service Manager for all other complaints.

After a complaint is lodged, depending on the nature of the complaint, one or a combination of the following actions may be performed:

- Proceed with remedial action such as water sample testing, mains flushing and sometimes water sampling testing after flushing;
- Contact the customer who lodged the complaint to determine the seriousness of the issue;
- Discuss with the complainant the possible causes of the poor water quality i.e. temporary changes to normal operation or high manganese and/or iron in raw water;

- Explain to the complainant the multiple barriers and rigorous sampling and testing regime employed to provide a safe and aesthetically acceptable water; and
- Give feedback to customer in terms of water quality information and links to further information regarding regulatory obligations.

8. Findings of the most recent risk-management plan audit

Written notice was provided by DHHS in December 2015 advising that an audit of Risk Management Plans (RMP) must occur within the period of 1 January 2016 to 30 June 2016.

WPW undertook an audit on 23-24th June 2016. The Auditor deemed WPW to be fully compliant with obligations under the *SDWA, SDWR 2005 and 2015* and Audit Guidelines. Three Opportunities for Improvement (OFI) were identified. Table 8-1 lists the OFI's and WPW's proposal for corrective action.

Table 8-1 OFI's and WPW's response

OFI	WPW response	Timeframe
One floating cover remains on what is a relatively modest sized basin. Whilst floating covers can and do achieve their objectives of protecting treated water, fixed roof covers or conventional water tanks are a more robust and reliable solution that are worthy of consideration over the longer term.	WPW acknowledge that floating covers can become weathered, leach and deteriorate water quality over a period of time. WPW are testing the deterioration of the floating cover in the short term and will consider a fixed roof cover in the next pricing submission	2016-17
A number of calibration practices were noted that departed somewhat from those observed elsewhere. One example included the decision not to conduct benchtop verification checks of very low filtered water turbidity readings given the limitations of the benchtop instruments. Another was the decision to permit operator discretion rather than setting formal tolerances in relation to when to respond to discrepancies between instruments when comparing readings. WPW was able to defend these practices, which were considered appropriate under the circumstances. However, these decisions were not explained and formalised. Whilst the evidence from reviewing the monitoring records indicated that good decisions were being made in these respects it is recommended that these practices be documented and justified within the RMP	WPW acknowledge the OFI and have updated the RMP to reflect the finding	Completed
Some of the potentially perishable fittings were stored outdoors and with access to sunlight. WPW should review the efficacy of storing fittings in situations that could result in sunlight damage and consider covering or moving any fittings that are not appropriately stabilised	WPW acknowledge the OFI. The Water Quality Officer will work with the Maintenance Supervisor Stores and Logistics Officer on appropriate storing of fittings	2016-17

9. Undertakings under section 30 of the Act

WPW currently has no section 30 undertakings.

10. Exemption under section 20 of the Act

WPW has no exemptions under section 20

11. Glossary of Terms

WPW must make this document and all water quality monitoring information available to public disclosure within 7 days of the request. For information pertaining to water quality in WPW's region please contact the Water Quality Officer via:

Email: jweir@westernportwater.com.au,

Website www.westernportwater.com.au/Services/Waterquality/

Phone (03) 5956 4189.

Term	Meaning
ADWG	*Australian Drinking Water Guidelines, 2011* prepared by the National Health and Medical Research Council
CRM	Customer Request Management system
DAFF	Dissolved Air Floatation and Filtration
DHHS	Department of Health and Human Services
E.coli	*Escherichia coli*
GMU	Groundwater Management Unit
IBWPP	Ian Bartlett Water Purification Plant
mg/L	Milligram per litre
NTU	Nephelometric Turbidity Units
PAC	Powdered Activated Carbon
SCADA	Supervisory Control and Data Acquisition
SDWA	*Safe Drinking Water Act, 2003 (Victoria)*
SDWR 2005	*Safe Drinking Water Regulations, 2005*
SDWR 2015	*Safe Drinking Water Regulations, 2015*
THM	Trihalomethanes
UCL	Upper Confidence Limit
WPW	Westernport Water
WTPO	Water Treatment Plant Operator
WQO	Water Quality Officer
RMP	Risk Management Plan