Westernport Water
Annual Drinking Water Quality Report 2016-17

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Authorisation

I authorise the use of this report in the Department of Health and Human Services Annual Report and made freely available on Westernport Water's website – www.westernportwater.com.au

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General Manager Assets & Operations

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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 the period of 1 July 2016 to June 30 2017 and covers issues relating to the quality of drinking water and the management of regulated water.

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).

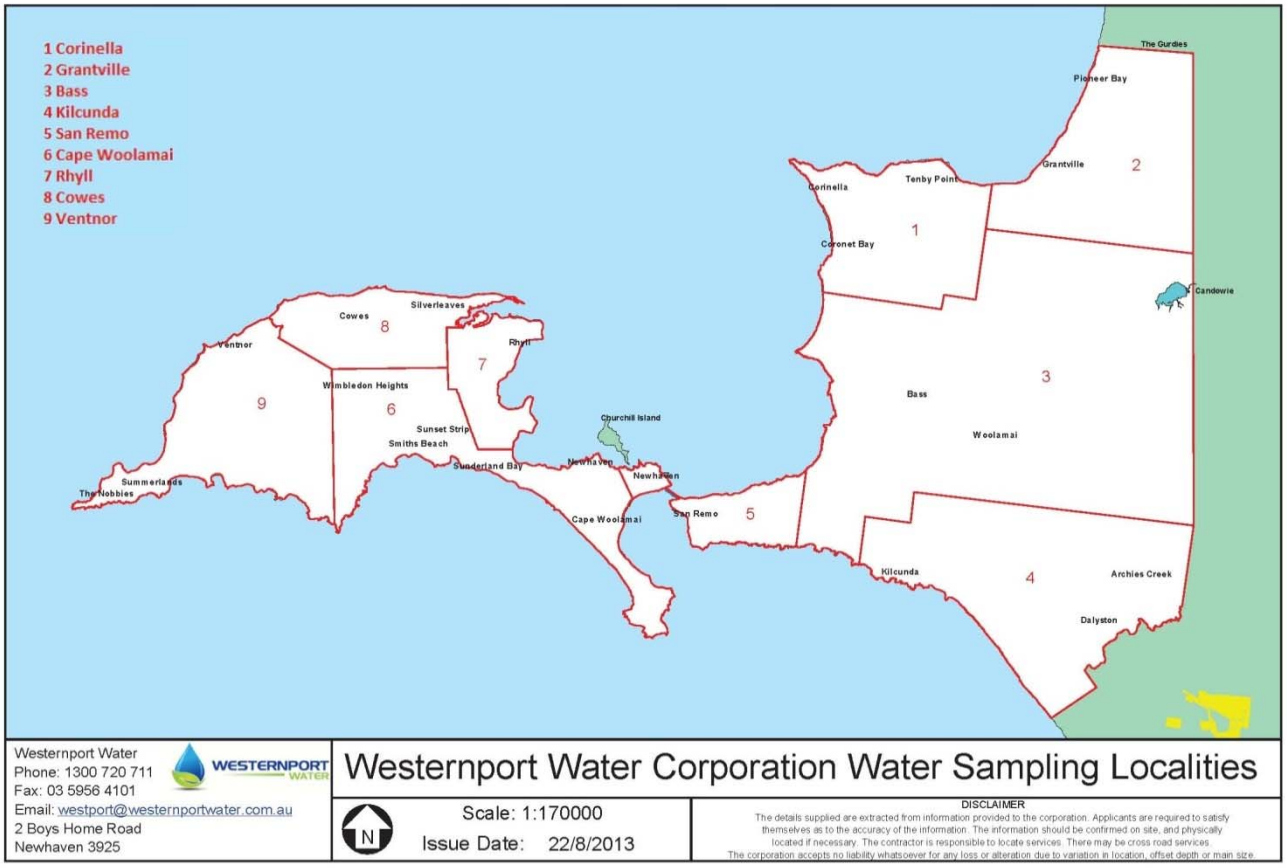
WPW's commitment to drinking water quality is highlighted in the foundation of its drinking water quality policy (endorsed by executive management and board). The policy demonstrates WPW's support and long-term commitment to the development and implementation of an effective system for drinking water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

1.4 2016-17 performance

WPW provided its customers with high quality, safe drinking in 2016-17. WPW met all its obligations to provide safe drinking water throughout 2016-17.

Performance against drinking water quality standards outlined in *The Safe Drinking Water Regulations, 2015 (SDWR)* is presented in sections 5.

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's 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 12 of SDWR.

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 2016-17 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. 129 Mega Litres (ML) of water was extracted from the river during the 2016-17 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:

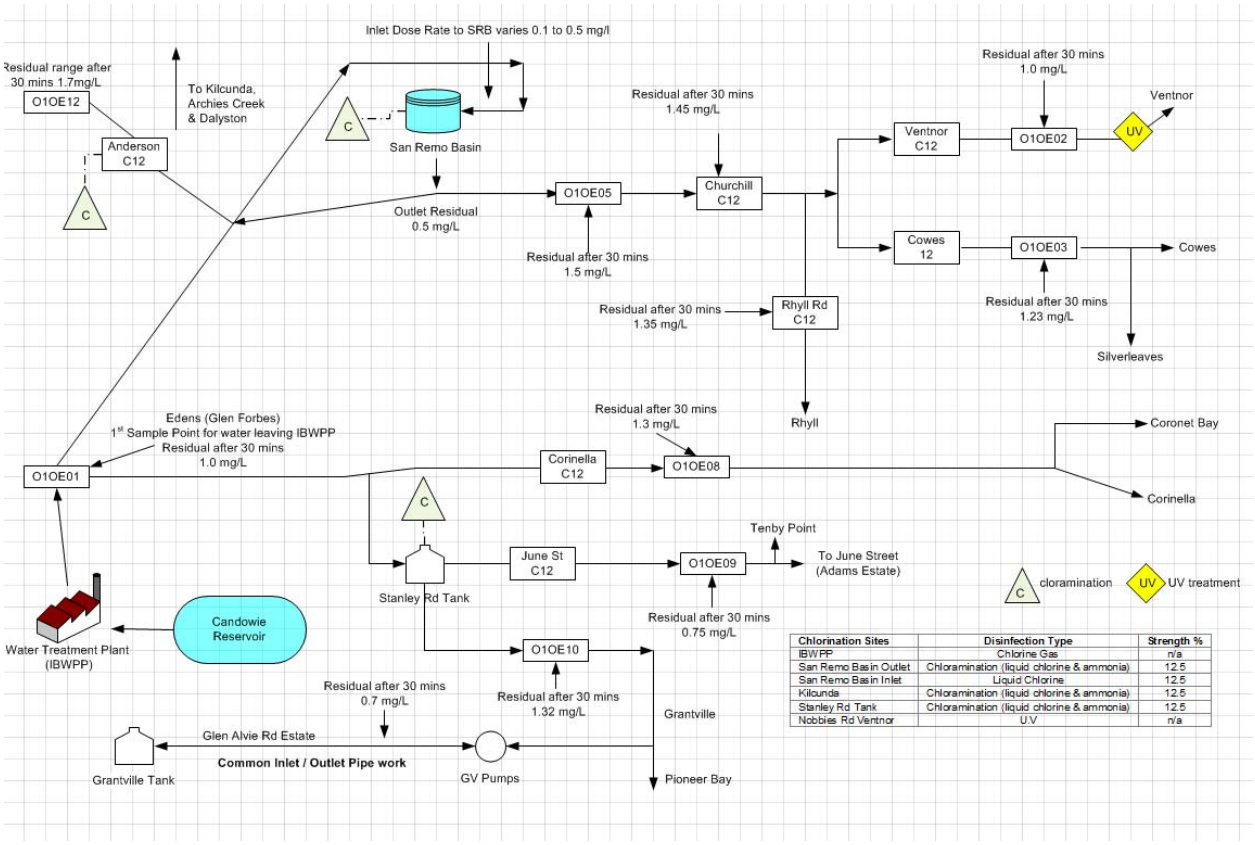
I. Undertaking a sanitary survey of the catchment

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



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 2016-17.
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 2016-17:

3.3 Issues

3.3.1 IBWPP

Coagulation pH and filtered water turbidity increased just before Christmas (23/12/2016). Visual inspection of tanks concluded that no flocculation was visible and pump tests confirmed correct dosing. Investigations found a leak on the alum injection line. It was a split on the weld. Corrective action resulted in a replacement duty/standby arrangement for injection spear with the older injection line blank ended. Critical Control Points (CCP's) were triggered for filter water turbidity and the plant shut down. At no time was unsafe water delivered to customers.

3.3.2 Distribution system

a) Section 22 notifications

There were two section 22 notifications required under the SDWA in 2016-17. Notifications were in relation to the detection of *Escherichia coli (E.coli)* in the localities of San Remo and Grantville. The detections were found to be false positive samples for the purposes of the *E.coli* drinking water quality standard in the SDWR. Safe drinking water was assured during both detects and throughout the entirety of 2016-17. Information regarding the section 22 notification is detailed in section 4.

b) Sampling errors

WPW did not meet the sample frequency requirement for Turbidity and Trihalomethanes (THM's) as required under the SDWR for the months of August (2016) and May (2017).

A monthly THM sample in August 2016 was not undertaken in the locality of Rhyll. This was due to an error in site code and the locality of Ventnor was sampled instead of Rhyll.

Sampling was not undertaken in the localities of Grantville and Bass in May 2017 for Turbidity and THM's. The samples were not taken due to an error with the contracted laboratory's scheduling system. Corrective actions have taken place. There was no public health risk due to missed samples. Due to the nature of WPW's supply (one drinking water treatment plant with 3 secondary disinfection points throughout the reticulation system) samples for each locality are based purely on geographic boundaries and not those of different supply. Therefore representative samples of the quality of water delivered to customers can be over multiple localities. Long term compliance with SDWA and SDWR is also evident within the localities of missed samples.

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 San Remo and Grantville 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* – San Remo

WPW were notified of an *E.coli* detection of a routine sample by its consultant laboratory on October 26, 2016. The result was 1 orgs/100mL taken on October 25, 2016. The sample was taken from the hatch of treated water basin. All other *E.coli* samples taken in the locality were clear including the outlet of the basin. Total chlorine was also sampled at the same time and location of the detection, with a result of 0.46 mg/L. An investigation, in line with DHHS's Secretary guideline requirements, included a site inspection, re sampling at the site and sampling in the vicinity of the result, assessment of operational data and assessment of network and asset condition. Corrective action was to remove the sample site at the hatch and sample from the outlet as the outlet sample point is most representative of water supplied to the locality of San Remo.

DHHS confirmed WPW has demonstrated that the water sample taken on 25 October, 2016 in the San Remo 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 a false positive sample.

4.2 *E.coli* – Grantville

WPW were notified of an *E.coli* detection of a routine sample by its consultant laboratory on March 23, 2017. The result was 2 orgs/100mL taken on March 22, 2017. All other *E.coli* samples taken in the locality were clear. The sample was taken from the outlet of a treated water tank. Total chlorine was also sampled at the same time and location of the detection, with results of 1.72mg/L. 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 March 22, 2017 in the locality of Grantville 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 a false positive sample.

5. Quality of drinking water for the period of 1 July 2016 to 30 June 2017

All parameters sampled by WPW throughout 2016-17 and from the previous two financial years (2014-15 and 2015-16) were compliant with Regulation 12(b) and schedule 2 of the *SDWR 2015* and health related guideline values in the ADWG. For more information on the previous two financial years please visit our publications page on our website.

However, Regulation 13 of SDWR was not met during the 2016-17 year due to sampling errors discussed in section 3.3.2 (b).

The following tables depict the performance for 1 July, 2016 to 30 June, 2017.

5.1 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 5-1.1 below:

Table 5-1.1 *E.coli*

Locality	Frequency	Samples	Max result (orgs/100mL)	Number of detections and investigations conducted (s. 22)	Number of samples where standard was not met (s 18)	Standard met for 2015-16	Standard met for 2014-15
Bass	Weekly	100	0	0	0	Yes	Yes
Cape Woolamai	Weekly	104	0	0	0	Yes	Yes
Corinella	Weekly	104	0	0	0	Yes	Yes
Cowes	Weekly	108*	0	0	0	Yes	Yes
Grantville	Weekly	258[1]	2	1	0	Yes	Yes
Kilcunda	Weekly	105	0	0	0	Yes	Yes
Rhyll	Weekly	104	0	0	0	Yes	Yes
San Remo	Weekly	145[2]	1	1	0	Yes	Yes
Ventnor	Weekly	104	0	0	0	Yes	Yes

*extra samples taken in January due to population influx over the summer holiday period

[1]locality includes sampling from two treated storage tanks that supply Grantville and Corinella. Extra samples taken in due to *E.coli* detect in March 2017

[2]locality includes sampling from a treated storage basin that supplies the localities of San Remo, Cape Woolamai, Cowes, Rhyll and Ventnor. Extra samples taken due to *E.coli* detect in October 2016

5.2 Trihalomethanes (THM's)

The *SDWR 2015* stipulates that all samples of drinking water collected are to be 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 5-2 below:

Table 5-2THM's

Locality	Frequency	Samples	Drinking waterquality standard (mg/L)	Maximum (mg/L)	Average (mg/L)	No of samples where standard was not met (s. 18)	Standard met for 2015-16	Standard met for 2014-15
Bass	Monthly	12	0.25	0.120	0.099	0	Yes	Yes
Cape Woolamai	Monthly	12		0.160	0.128	0	Yes	Yes
Corinella	Monthly	12		0.120	0.094	0	Yes	Yes
Cowes	Monthly	13*		0.160	0.128	0	Yes	Yes
Grantville	Monthly	11[1]		0.110	0.090	0	Yes	Yes
Kilcunda	Monthly	12		0.140	0.103	0	Yes	Yes
Rhyll	Monthly	11[2]		0.160	0.128	0	Yes	Yes
San Remo	Monthly	12		0.160	0.126	0	Yes	Yes
Ventnor	Monthly	13[3]		0.160	0.115	0	Yes	Yes

* extra samples taken in January due to population influx over the summer holiday period

[1] sample missed due to laboratory scheduling error

[2] sample missed in locality due to site code error

[3] extra sample taken in locality as site code was due to a site code error

5.3 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 5-3 Turbidity

Locality	Frequency	Samples	Maximum turbidity in a sample (NTU)	Maximum 95th percentile of turbidity results in any 12 months (NTU)	Number of 95th percentile of results in any 12 months above standard (s 18)	Standard met for 2015-16	Standard met for 2014-15
Bass	Weekly	51[1]	0.3	0.2	0	Yes	Yes
Cape Woolamai	Weekly	52	1.5	0.3	0	Yes	Yes
Corinella	Weekly	52	0.3	0.2	0	Yes	Yes
Cowes	Weekly	56*	0.4	0.3	0	Yes	Yes
Grantville	Weekly	51[1]	1.3	0.8	0	Yes	Yes
Kilcunda	Weekly	53	0.3	0.2	0	Yes	Yes
Rhyll	Weekly	52	0.3	0.2	0	Yes	Yes
San Remo	Weekly	52	1.8	0.3	0	Yes	Yes
Ventnor	Weekly	52	1.2	0.4	0	Yes	Yes

*extra samples taken due to population increase over summer

[1] sample missed due to laboratory scheduling error

5.4 Regulation 12 (b) other water quality standards

WPW tests a range of water quality standards other than those specified in Schedule 2 of the SDWR. These are either regulated parameters (i.e. fluoride) or parameters defined the ADWG that WPW deem to pose a risk to the health of customers. WPW's sampling schedule is a comprehensive risk based schedule that has been refined over many years that allows WPW to indicate drinking water that is safe, aesthetically pleasing and representative of WPW's distribution network.

5.4.1 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 5-4.1 Fluoride

Locality	Frequency	Samples	Drinking water quality standard (mg/L)	Target optimum operating fluoride concentration (mg/L)	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met (s. 18)
Bass	Monthly	25	1.5	0.8	0.84		0
Cape Woolamai	Monthly	12			0.75		0
Corinella	Monthly	13			0.79		0
Cowes	Monthly	13			0.75		0
Grantville	Monthly	13			0.79		0
Kilcunda	Monthly	12			0.78		0
Rhyll	Monthly	13			0.79		0
San Remo	Monthly	12			0.78		0
Ventnor	Monthly	13			0.84		0

5.4.2 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 5-4.2 Copper

Locality	Frequency	Samples	Drinking water quality standard (mg/L)	Maximum (mg//L)	Average (mg/L)	Number of samples where standard was not met (s. 18)
Bass	Quarterly	5	1	0.076	0.027	0
Cape Woolamai	Quarterly	5		0.018	0.012	0
Corinella	Quarterly	5		0.073	0.035	0
Cowes	Quarterly	5		0.056	0.018	0
Grantville	Quarterly	4		0.069	0.026	0
Kilcunda	Quarterly	5		0.027	0.012	0
Rhyll	Quarterly	5		0.038	0.015	0
San Remo	Quarterly	5		0.029	0.011	0
Ventnor	Quarterly	5		0.073	0.018	0

* extra samples taken due to population increase over summer

5.4.3 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	Drinking water quality standard (mg/L)	Maximum (mg//L)	Average (mg/L)	Number of samples where standard was not met (s. 18)
Bass	Quarterly	5	0.01	<0.001	<0.001	0
Cape Woolamai	Quarterly	5		<0.001	<0.001	0
Corinella	Quarterly	5		<0.001	0.001	0
Cowes	Quarterly	5		<0.001	0.002	0
Grantville	Quarterly	4		<0.001	0.001	0
Kilcunda	Quarterly	5		<0.001	<0.001	0
Rhyll	Quarterly	5		<0.001	<0.001	0
San Remo	Quarterly	5		<0.001	<0.001	0
Ventnor	Quarterly	5		<0.001	<0.001	0

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

5.4.4 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 5-4.4 Zinc

Locality	Frequency	Samples	Drinking water quality standard (mg/L)	Maximum (mg//L)	Average (mg/L)	Number of samples where standard was not met (s. 18)
Bass	Quarterly	5	3	0.05	0.018	0
Cape Woolamai	Quarterly	5		0.019	0.010	0
Corinella	Quarterly	5		0.023	0.014	0
Cowes	Quarterly	5		0.014	0.005	0
Grantville	Quarterly	4		0.01	0.009	0
Kilcunda	Quarterly	5		0.007	0.006	0
Rhyll	Quarterly	5		0.046	0.012	0
San Remo	Quarterly	5		0.013	0.006	0
Ventnor	Quarterly	5		0.012	0.005	0

5.4.5 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	Drinking water quality standard (mg/L)	Maximum (mg//L)	Average (mg/L)	Number of samples where standard was not met (s. 18)
Cape Woolamai	Quarterly	5	0.5	0.015	0.007	0
Corinella	Quarterly	5		0.016	0.009	0
Cowes	Quarterly	5		0.014	0.008	0
Grantville	Quarterly	10[1]		0.018	0.007	0
Kilcunda	Quarterly	5		0.012	0.004	0
Rhyll	Quarterly	5		0.014	0.007	0
San Remo	Quarterly	5		0.014	0.007	0
Ventnor	Quarterly	5		0.013	0.006	0

[2]locality includes sampling from two treated storage tanks that supply Grantville and Corinella

5.4.6 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:

5-4.6 Other health related parameters sampled at water entering points and service basins

Parameter	Frequency	Samples	Drinking water quality standard (mg/L)[1]	Number of samples where standard was not met (s. 18)
Chromium (as Cr(VI)	Quarterly	49	<0.05	0
Cyanide	Annually	9	<0.08	0
Nitrate	Fortnightly	215	<50	0
Nitrite	Fortnightly	215	<3	0
Sulphate	Annually	3	<500	0

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

5.4.7 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.

Table 5-4.7 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

5.4.8 Analysis of results

The quality of drinking water supplied to our customers was 100% compliant with requirements detailed in, *SDWR 2015* and WPW'S WQRMP in 2016-17.

5.4.9 Water quality improvements in 2016-17

Water quality improvements undertaken during 2016-17 were:

- SCADA control systems were refined and improved;
- All three filters at IBWPP were inspected, scraped and cleaned;
- Filter media was added in one filter at IBWTP. The other two filters are planned to be topped up with additional filter media in 2017-18;
- Annual Air scouring of water mains continued as an annual routine program;
- 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 2016-17 year;
- A Business case was approved for the addition of tertiary treatment at IBWPP for the construction of Ultraviolet Disinfection. This is to maintain compliance with industry standards, through assessment of quantifying microbial risk to meet Health Based Targets. Construction will be completed in 2017-18;
- A Business case was approved for the addition of Filter to Waste at IBWPP. Filter to Waste will add further control of filter operation and reduce the risk of off spec water being delivered to customers. Construction will be completed in 2017-18;
- Centralised chloramination dosing has occurred at a treated storage tank within the distribution network. While seasonal flows are evident, the tank is turned over almost daily. Residuals are maintained to the end of the network and has resulted in switching off an extra chemical dosing point, improving the aesthetic quality of drinking water delivered to customers; and
- Preventative maintenance activities were added to the Preventative Maintenance Plan to improve the performance of the Powdered Activated Carbon (PAC) dosing system. This has resulted in less procurement of carbon, a consistent dose rate, longer filter run times and improved filter performance.

5.5 Aesthetics

The 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 reactive flushing. 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.

5.5.1 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 5-5.1 Aluminium

Locality	Frequency	Samples	Drinking water quality standard (mg/L)	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met (s. 18)
Bass	Quarterly	5	0.2	0.02	0.01	0
Cape Woolamai	Quarterly	5		0.01	0.01	0
Corinella	Quarterly	5		0.02	0.01	0
Cowes	Quarterly	5		0.02	0.02	0
Grantville	Quarterly	4		0.02	0.02	0
Kilcunda	Quarterly	5		0.02	0.02	0
Rhyll	Quarterly	5		0.02	0.01	0
San Remo	Quarterly	5		0.02	0.01	0
Ventnor	Quarterly	5		0.03	0.02	0

5.5.2 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 5-5.2 True colour

Locality	Frequency	Samples	Drinking water quality standard (mg/L)	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met (s. 18)
Bass	Quarterly	4	15	4	2.5	0
Cape Woolamai	Quarterly	5		2	2	0
Corinella	Quarterly	5		4	2.4	0
Cowes	Quarterly	5		2	2	0
Grantville	Quarterly	10[1]		4	2.4	0
Kilcunda	Quarterly	5		4	2.4	0
Rhyll	Quarterly	5		2	2	0
San Remo	Quarterly	5		4	2.4	0
Ventnor	Quarterly	5		4	2.4	0

[1]locality includes sampling from two treated storage tanks that supply Grantville and Corinella

5.5.3 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 2016-17 reporting period as highlighted in table 5-5.3 below:

Table 5-5.3 Iron

Locality	Frequency	Samples	Drinking water quality standard (mg/L)	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met (s. 18)
Bass	Quarterly	12	0.3	0.05	0.01	0
Cape Woolamai	Quarterly	12		1.5	0.15	0
Corinella	Quarterly	12		0.04	0.02	0
Cowes	Quarterly	13*		0.05	0.03	0
Grantville	Quarterly	11		0.06	0.02	0
Kilcunda	Quarterly	12		0.07	0.02	0
Rhyll	Quarterly	12		0.06	0.02	0
San Remo	Quarterly	14[1]		0.55	0.07	0
Ventnor	Quarterly	12		0.04	0.02	0

*extra samples taken due to population increase over summer

[1]locality includes sampling from a treated storage basin that supplies the localities of San Remo, Cape Woolamai, Cowes, Rhyll and Ventnor

ADWG Exceedances

Cape Woolamai

The maximum result for iron of 1.5 mg/L was taken within the Cape Woolamai locality in June 2017. Exceedance reporting from the contracted laboratory notified WPW of the exceedance. The site was flushed and field resampling for iron was 0.01 mg/L. The sample was an anomaly, evidenced by the yearly average for iron across the network. Due to the corrective action, iron met the appropriate aesthetic guideline within ADWG.

San Remo

The maximum result for iron of 0.55 mg/L was taken within the San Remo locality in February 2017. Exceedance reporting from the contracted laboratory notified WPW of the exceedance. The site was flushed and field resampling for iron 0.07 mg/L. The sample was an anomaly,

evidenced by the yearly average for iron across the network. Due to the corrective action, iron met the appropriate aesthetic guideline within ADWG.

5.5.4 pH

The ADWG aesthetic value for pH is between 6.5 and 8.5. All localities were compliant with the ADWG in the 2016-17 reporting period as highlighted in table 5-5.4 below:

Table 5-5.4 pH

Locality	Frequency	Samples	Drinking water quality standard (mg/L)	Minimum (mg/L)	Maximum (mg/L)	Number of samples where standard was not met (s. 18)
Bass	Fortnightly	34	6.5-8.5	6.9	7.8	0
Cape Woolamai	Fortnightly	36		7.1	7.9	0
Corinella	Fortnightly	36		7.2	8.0	0
Cowes	Fortnightly	38		7.3	8.3	0
Grantville	Fortnightly	34		7.0	7.9	0
Kilcunda	Fortnightly	37		7.1	8.0	0
Rhyll	Fortnightly	36		7.3	8.0	0
San Remo	Fortnightly	36		7.0	7.9	0
Ventnor	Fortnightly	36		7.5	8.2	0

6. Complaints relating to water quality

6.1 Summary of complaints

The number of customer complaints to WPW regarding drinking water totalled 20 for 2016/17. This was a 50 per cent decrease from 40 in 2015/16. Table 7-1 highlights the type of customer complaints

Table 6-1 Customer^ complaints relating to water quality

Type of complaint	Number of complaints 2016-17	2015-16	2014-15	Comparison with previous reporting periods	Comments
Discoloured water	10	13	18	Slight decreasing trend	25% reduction in burst/leaks in 2016-17 reducing the potential for discoloured water complaint.
Taste/odour	2	18	8	Significant decreasing trend	Ongoing water quality improvements as discussed in 5.4.9.
Other*	8	9	2	No significant change	Nil
Total	**20**	**40**	**28**	**50% decrease from 2015-16**	**Lowest complaints received in 2016-17 of the 3 reported years.**

Table 6-2 Complaints by water sampling locality

Locality	Type of complaint			Total
	Discoloured water	Taste/odour	Other	
Bass				0
Cape Woolamai	1		1	2
Corinella	1		1	2
Cowes	4		4	8
Grantville			1	1
Kilcunda	2	1		3
Rhyll	1			1
San Remo	1	1	1	3
Ventnor				0

^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

50% of complaints were for discoloured colour, 10% taste/odour and 40% 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 decreased from 40 in 2015-16 to 20 in 2016-17.The 50% reduction was due to ongoing preventative maintenance works improving water quality delivered to customers. WPW had 25% less bursts and leaks in 2016-17 compared to 2015-16 decreasing the requirement for reactive maintenance and reducing the number of potential discoloured water complaints.

6.2 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 & Sustainability 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 and or investigation 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 and particulars 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.

7. Findings of the most recent risk management plan audit

There were no regulatory risk management plan audits conducted in the reporting period. The most recent audit was held in June 2016 and WPW was fully compliant with obligations under the SDWA, SDWR and audit guidelines.

8. Undertakings under section 30 of the Act

WPW currently has no section 30 undertakings.

9. Exemption under section 20 of the Act

WPW has no exemptions under section 20

10. 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 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