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Westernport Water Annual Drinking Water Quality Report 2012-13

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

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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 practicable 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 SDWA, WPW is required to provide the Department of Health (DH) 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 *Safe Drinking Water Act 2003* (SDWA). The report covers issues relating to the quality of drinking water and the management of regulated water.

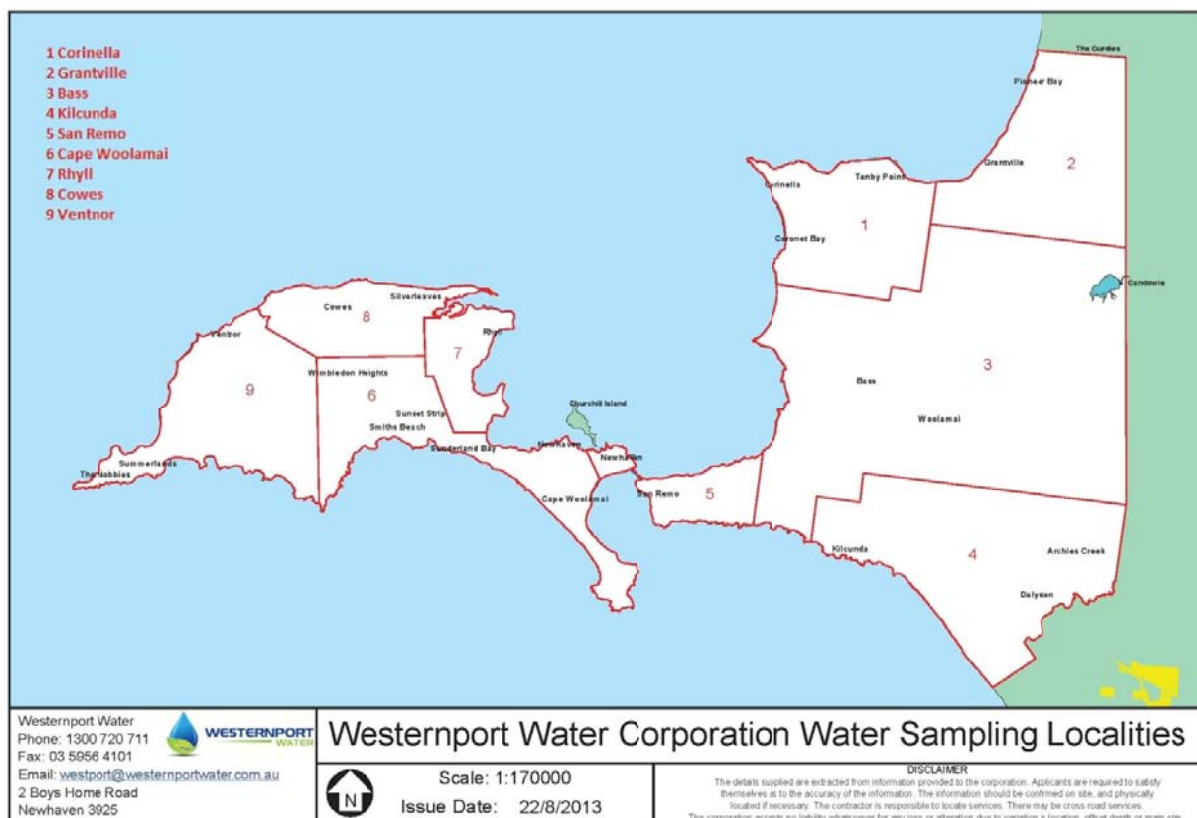
1.3 Westernport Water's Commitment to Drinking Water Quality

WPW is committed to a comprehensive risk assessment/ risk management approach to the safe provision 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 senior management and WPW's board). The policy demonstrates WPW support and long-term commitment to the development and implementation of an effective system for drinking water quality management.



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 has periodically shown to be high in iron and manganese. Raw water quality is typical of water that is sourced from an unprotected catchment. Following treatment, the water complies with the ADWG and standards outlined in Schedule 2 of the Safe Drinking Water Regulations, 2005 (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 and during the 2012-13 reporting period the total extraction was 30 ML.

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. A total of 201 ML was transferred during the 2012-13 reporting period.



3. Water treatment and quality management systems

WPW operates a comprehensive water quality management system that complies with the SDWA and SDWR. 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 has periodically been high in iron and manganese. However, this 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.

(c) Ultra Violet

WPW constructed an ultra violet disinfection system for the Penguin Parade and Nobbies area. The unit was constructed due to low chlorine residuals at the extremities of WPW distribution system and continues to function well to service the many tourists who visit the region.

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	1259	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 2012-13.			
Cape Woolamai	3106				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Corinella	1398				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Cowes	3868				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Grantville	822				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Kilcunda	539				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Rhyll	506				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
San Remo	1018				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Ventnor	666				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓

¹ Population sourced from 2006 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 two changes to the arrangements for water supply in 2012-13:

- The extension of chloramination disinfection in the distribution system to include the locality of Grantville (resulting in 99% of WPW customers supplied with chloraminated water), and
- Construction commenced on the Candowie Upgrade Project (CUP). The CUP raises full supply level by three metres, increasing storage volume from 2,263 ML to 4,463 ML. The CUP is due to be completed in early 2013-14.

3.3 Issues

3.3.1 Candowie Reservoir

Candowie Reservoir has a history of blue-green algal blooms due to the nature of the catchment (open and unprotected) which is intensively grazed. Nutrient enrichment of the storage due to catchment characteristics can result in algal blooms. 2012-13 was no exception, and an algal bloom was identified on Wednesday 19th December 2012, which contained toxic species *Anabaena circinalis* and *Microcystis spp.* Advice from our consultant indicated that dosing with Cupricide would be effective to treat the bloom before increasing to a size that could affect treatment of raw water and ultimately compromise public health. The reservoir was dosed on Friday the 21st December 2012 and results from Monday 24th December 2012 indicated the dosing was effective. Notification of the bloom was made to the relevant authorities and there was no interruption to supply of safe drinking water to customers.

3.3.2 Distribution system

There were five exceedances of the aesthetic guideline values in the ADWG in the distribution system from three separate sample sites.

- **10/07/2012** – a pH exceedance of 8.6 was recorded at 3 Kenwood Court Cowes. Site was flushed and sampled *in situ* until results were within ADWG range pH 6.5 to 8.5.
- **17/07/2012** - a pH reading of 8.6 was recorded at 107 Red Rocks Rd, Cowes. Site was flushed and sampled *in situ* until results were within ADWG range
- **31/07/2012** – two pH exceedances were recorded. pH 8.9 at 4 Red Rocks Rd, Cowes and pH 8.6 at 2 Ventnor Beach Rd, Ventnor. Sites were flushed and sampled *in situ* until results were within the ADWG range
- **19/02/2013** - An iron (0.57 mg/L) and turbidity (7.6 NTU) exceedance was registered from samples taken at lot 5-7 Jansson Rd Rhyll. This was due to a burst on the main supply line on the same day a few hundred metres away. The site was flushed and re-sampled. Follow up samples were below ADWG guideline values and no further action was required. DH were notified via email and acknowledged WPW's response.

Due to the trend of high pH and low chlorine residuals at the sites listed above, these areas have been designated as a priority for the annual air scouring works that are undertaken as a preventative maintenance measure in the distribution system. For further information on air scouring - see section 4.2 Water quality improvements throughout Water Plan 2.



4. Quality of drinking water for 2012-13

The SDWR requires evidence of compliance or non-compliance with the drinking water quality standards listed in Schedule 2. The regulations also refer to ensuring that water is free of other toxins, pathogens, substances or chemicals that may pose a risk to human health. Compliance with Schedule 2 drinking water quality standards and other parameters sampled are presented in tables throughout this section.

All parameters sampled by WPW throughout 2012-13 were compliant with Schedule 2 of the SDWR and health-based values in the ADWG. There were five exceedances of ADWG guideline values discussed in section 3.3.2. Four of these were aesthetic related values that didn't require notification but were investigated and closed out accordingly. The fifth was a turbidity reading that didn't breach the upper confidence limit (UCL) of 95% mean samples for a 12 month period and therefore didn't warrant formal notification to DH.

For further information on water quality in WPW region please contact the Water Quality Officer via:

Email: jweir@westernportwater.com.au,

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

Phone (03) 5956 4189.

4.1 Water quality improvements in 2012-13

Water quality improvements through scheduled works programs and projects in 2012/13 include:

- All three filters in IBWPP were scraped and cleaned, resulting in longer filter runtimes and improved water quality;
- An independent review of the plant and processes at IBWPP was undertaken and recommendations for improvements implemented;
- Supervisory control and data acquisition system (SCADA) was refined and improved;
- Chloramination disinfection was implemented in the Grantville locality. Chloramination now supplies 99% of WPW customers; and
- Annual air scouring and quarterly flushing program continued as routine in 2012/13.

4.2 Water quality improvements throughout Water Plan 2 (2008-2013)

Major improvements to water quality were achieved within the Water Plan 2 period. A summary of the works that contributed to the improvements are listed below:

- Installed a fluoridation system
- Covered the filter enclosure
- Upgraded SCADA
- Replacement of filter media on all 3 filters
- Installed a new de-stratification system
- Installed flow-paced residual control regional chlorination systems
- Upgrade the high lift pumps
- Upgrade the PAC dosing system
- Installed an automated alum dosing system
- Installed chloramination systems for all localities except Bass
- Installed critical control point monitoring for the Reservoir and IBWPP
- Cleaned the branch main
- Implemented a yearly air scouring program
- Completed and updated the Water Quality Risk Management System
- Developed a 5 year Water Quality Strategy



4.3 *Escherichia coli*

The SDWR stipulate that at least 98 % of all samples of drinking water collected in any 12 months period contain no *Escherichia coli* (*E. coli*) per 100mL. The water quality with respect to *E. coli* was compliant with this standard as per table 4-3 below:

Table 4-3 *Escherichia coli*

Locality	Frequency	Samples	Max result	Samples with zero <i>E.coli</i> (%)	Complying
Bass	Weekly	52	0	100	Yes
Cape Woolamai	Weekly	52	0	100	Yes
Corinella	Weekly	52	0	100	Yes
Cowes	Weekly	52	0	100	Yes
Grantville	Weekly	52	0	100	Yes
Kilcunda	Twice Weekly*	104	0	100	Yes
Rhyll	Weekly	52	0	100	Yes
San Remo	Weekly	52	0	100	Yes
Ventnor	Weekly	52	0	100	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled weekly.



4.4 Chlorine based disinfection by-product chemicals

4.4.1 Chloroacetic acid

The SDWR stipulate a maximum value of 0.15 mg/L for Chloroacetic acid. All localities were compliant with the water quality standard as per table 4-4.1 below:

Table 4-4.1 Chloroacetic acid

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	<0.005 ¹	0	Yes
Cape Woolamai	Monthly	12	<0.005	0	Yes
Corinella	Monthly	12	<0.005	0	Yes
Cowes	Monthly	12	<0.005	0	Yes
Grantville	Monthly	12	<0.005	0	Yes
Kilcunda	Twice Monthly*	24	<0.005	0	Yes
Rhyll	Monthly	12	<0.005	0	Yes
San Remo	Monthly	12	<0.005	0	Yes
Ventnor	Monthly	12	<0.005	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled monthly.

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



4.4.2 Dichloroacetic acid

The SDWR stipulate a maximum value of 0.10 mg/L for Dichloroacetic acid. All localities were compliant with the water quality standard as per table 4-4.2 below:

Table 4-4.2 Dichloroacetic acid

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.009	0	Yes
Cape Woolamai	Monthly	12	0.012	0	Yes
Corinella	Monthly	12	0.011	0	Yes
Cowes	Monthly	12	0.014	0	Yes
Grantville	Monthly	12	0.037	0	Yes
Kilcunda	Twice Monthly*	24	0.018	0	Yes
Rhyll	Monthly	12	0.015	0	Yes
San Remo	Monthly	12	0.012	0	Yes
Ventnor	Monthly	12	0.017	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled monthly.



4.4.3 Trichloroacetic acid

The SDWR stipulate a maximum value of 0.10 mg/L for Trichloroacetic acid. All localities were compliant with the water quality standard as per table 4-4.3 below:

Table 4-4.3 Trichloroacetic acid

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.01	0	Yes
Cape Woolamai	Monthly	12	0.012	0	Yes
Corinella	Monthly	12	0.009	0	Yes
Cowes	Monthly	12	0.014	0	Yes
Grantville	Monthly	12	0.042	0	Yes
Kilcunda	Twice Monthly*	24	0.011	0	Yes
Rhyll	Monthly	12	0.012	0	Yes
San Remo	Monthly	12	0.012	0	Yes
Ventnor	Monthly	12	0.012	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled monthly



4.4.4 Trihalomethanes

The SDWR stipulate a maximum value of 0.25 mg/L for Trihalomethanes (THM). All localities were compliant with the water quality standard as per table 4-4.4 below:

Table 4-4.4 – THM

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.120	0	Yes
Cape Woolamai	Monthly	12	0.140	0	Yes
Corinella	Monthly	12	0.150	0	Yes
Cowes	Monthly	12	0.150	0	Yes
Grantville	Monthly	12	0.210	0	Yes
Kilcunda	Twice Monthly*	24	0.130	0	Yes
Rhyll	Monthly	12	0.140	0	Yes
San Remo	Monthly	12	0.140	0	Yes
Ventnor	Monthly	12	0.150	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled monthly



4.5 Ozone-based disinfection by-product chemicals

WPW does not use ozone for disinfection treatment; therefore bromate and formaldehyde were not tested for in 2012/13.

4.6 Aluminium

The SDWR stipulate a maximum value of 0.2 mg/L for Aluminium. All localities were compliant with the water quality standard as per table 4-6 below:

Table 4-6 Aluminium

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.05	0	Yes
Cape Woolamai	Monthly	12	0.03	0	Yes
Corinella	Monthly	12	0.06	0	Yes
Cowes	Monthly	12	0.04	0	Yes
Grantville	Monthly	12	0.06	0	Yes
Kilcunda	Twice Monthly*	24	0.05	0	Yes
Rhyll	Monthly	12	0.03	0	Yes
San Remo	Monthly	12	0.04	0	Yes
Ventnor	Monthly	12	0.03	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled monthly



4.7 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 4-7 below:

Table 4-7 Turbidity

Locality	Frequency	Samples	Max result	95% UCL	Non-complying samples	Complying samples
Bass	Weekly	52	1.0	0.2	0	Yes
Cape Woolamai	Weekly	52	0.5	0.2	0	Yes
Corinella	Weekly	52	1.9	0.3	0	Yes
Cowes	Weekly	52	0.4	0.2	0	Yes
Grantville	Weekly	52	2.2	0.4	0	Yes
Kilcunda	Twice Weekly*	104	1.0	0.2	0	Yes
Rhyll	Weekly	52	7.6 ²	0.7	0	Yes
San Remo	Weekly	52	0.5	0.2	0	Yes
Ventnor	Weekly	52	1.3	0.3	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled weekly

² Although turbidity exceeded the ADWG limit of 5 NTU and addressed under section 3.3 Issues, the result is still compliant with SDWR as it sits within the 95% UCL of the mean samples collected in the preceding 12 months.



4.8 Fluoride

The health-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 4-8 below:

Table 4-8 Fluoride

Locality	Frequency	Samples [#]	Max	Min	Average	Non-complying samples	Complying	Meeting obligation [^]
Bass	Monthly	13	0.96	0.28	0.73	0	Yes	Yes
Cape Woolamai	Monthly	13	0.84	0.3	0.67	0	Yes	Yes
Corinella	Monthly	13	0.83	0.36	0.67	0	Yes	Yes
Cowes	Monthly	13	0.83	0.32	0.67	0	Yes	Yes
Grantville	Monthly	13	0.95	0.38	0.71	0	Yes	Yes
Kilcunda	Twice Monthly*	26	0.94	0.4	0.68	0	Yes	Yes
Rhyll	Monthly	13	0.86	0.29	0.67	0	Yes	Yes
San Remo	Monthly	13	0.86	0.29	0.67	0	Yes	Yes
Ventnor	Monthly	13	0.82	0.31	0.65	0	Yes	Yes

[#] Two samples were conducted in May at all localities and was due to a scheduling error and increased sampling frequency.

* Kilcunda data includes Dalyston data, both these areas were sampled monthly

[^] Obligation is achieved if annual average concentration was >0.6mg/L



4.9 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 2012/13 reporting period

4.9.1 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 4-9.1 below:

Table 4-9.1 Antimony

Locality	Frequency	Samples	Max result ¹	Non-complying samples	Complying
Bass	Quarterly	4	<0.001	0	Yes
Cape Woolamai	Quarterly	4	<0.001	0	Yes
Corinella	Quarterly	4	<0.001	0	Yes
Cowes	Quarterly	4	<0.001	0	Yes
Grantville	Quarterly	4	<0.001	0	Yes
Kilcunda	Twice Quarterly*	8	<0.001	0	Yes
Rhyll	Quarterly	4	<0.001	0	Yes
San Remo	Quarterly	4	<0.001	0	Yes
Ventnor	Quarterly	4	<0.001	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled quarterly

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



4.9.2 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 4-9.2 below:

Table 4-9.2 Cadmium

Locality	Frequency	Samples	Max result ¹	Non-complying samples	Complying
Bass	Quarterly	4	<0.0002	0	Yes
Cape Woolamai	Quarterly	4	<0.0002	0	Yes
Corinella	Quarterly	4	<0.0002	0	Yes
Cowes	Quarterly	4	<0.0002	0	Yes
Grantville	Quarterly	4	<0.0002	0	Yes
Kilcunda	Twice Quarterly*	8	<0.0002	0	Yes
Rhyll	Quarterly	4	<0.0002	0	Yes
San Remo	Quarterly	4	<0.0002	0	Yes
Ventnor	Quarterly	4	<0.0002	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled quarterly

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



4.9.3 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 4-9.3 below:

Table 4-9.3 Copper

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.21	0	Yes
Cape Woolamai	Monthly	12	0.01	0	Yes
Corinella	Monthly	12	0.071	0	Yes
Cowes	Monthly	12	0.075	0	Yes
Grantville	Monthly	12	0.03	0	Yes
Kilcunda	Twice Monthly*	24	0.062	0	Yes
Rhyll	Monthly	12	0.12	0	Yes
San Remo	Monthly	12	0.01	0	Yes
Ventnor	Monthly	12	0.01	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled monthly



4.9.4 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 4-9.4 below:

4-9.4 Lead

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.004	0	Yes
Cape Woolamai	Monthly	12	0.002	0	Yes
Corinella	Monthly	12	0.003	0	Yes
Cowes	Monthly	12	0.001	0	Yes
Grantville	Monthly	12	0.002	0	Yes
Kilcunda	Twice Monthly*	24	0.001	0	Yes
Rhyll	Monthly	12	0.001	0	Yes
San Remo	Monthly	12	0.002	0	Yes
Ventnor	Monthly	12	0.001	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled monthly



4.9.5 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 4-9.5 below:

Table 4-9.5 Nickel

Locality	Frequency	Samples	Max result ¹	Non-complying samples	Complying
Bass	Quarterly	4	<0.001	0	Yes
Cape Woolamai	Quarterly	4	<0.001	0	Yes
Corinella	Quarterly	4	0.002	0	Yes
Cowes	Quarterly	4	<0.001	0	Yes
Grantville	Quarterly	4	<0.001	0	Yes
Kilcunda	Twice Quarterly*	8	<0.001	0	Yes
Rhyll	Quarterly	4	<0.001	0	Yes
San Remo	Quarterly	4	<0.001	0	Yes
Ventnor	Quarterly	4	<0.001	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled quarterly

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



4.9.6 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 4-9.6 below:

Table 4-9.6 Zinc

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.087	0	Yes
Cape Woolamai	Monthly	12	0.01	0	Yes
Corinella	Monthly	12	0.01	0	Yes
Cowes	Monthly	12	0.022	0	Yes
Grantville	Monthly	12	0.01	0	Yes
Kilcunda	Twice monthly*	24	0.01	0	Yes
Rhyll	Monthly	12	0.01	0	Yes
San Remo	Monthly	12	0.01	0	Yes
Ventnor	Monthly	12	0.01	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled monthly



4.9.7 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 4-9.7 below:

The manganese samples at the Bass locality are collected from water entering points as Bass does not have a 30 minute contact point within the distribution system.

Table 4-9.7 Manganese

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Fortnightly	26	0.03	0	Yes
Cape Woolamai	Fortnightly	26	0.02	0	Yes
Corinella	Fortnightly	26	0.054	0	Yes
Cowes	Fortnightly	26	0.02	0	Yes
Grantville	Fortnightly	26	0.01	0	Yes
Kilcunda	Twice fortnightly*	52	0.02	0	Yes
Rhyll	Fortnightly [#]	27	0.02	0	Yes
San Remo	Fortnightly	26	0.045	0	Yes
Ventnor	Fortnightly	26	0.01	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled fortnightly

[#] An extra manganese sample was taken during the iron exceedance at Rhyll on 19/02/2013. See section 3.3.2 for further information on exceedance.



4.9.8 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 4-9.8 below:

4-9.8 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	40	<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	225	<50	
Nitrite	Fortnightly	260	<3	
Sulphate	Quarterly	16	<500	



4.9.9 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:

Table 4-9.9 Raw water monitoring

Location	Frequency	Parameter
Raw water offtake	Daily	Fluoride, turbidity, pH, iron and manganese
	Weekly	Colilert (200) <i>E. coli</i> , coliforms, standard plate count, dissolved organic carbon and electrical conductivity
	Fortnightly (or increased as required)	Methylisoborneol (MIB) and geosmin
	Monthly	Alkalinity
	Quarterly	Metals (arsenic, barium, boron, mercury, molybdenum, selenium), herbicides and pesticides, cryptosporidium and giardia
	Annually	Metals (silver iodide, tin 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



4.10 Aesthetics

The SDWR 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. These characteristics are taste, odour, clarity and pH. The ADWG set the aesthetic based guideline values for these characteristics. Parameters sampled throughout the distribution system, indicating compliance, are presented in tables below.

4.10.1 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 4-10.1 below:

4-10.1 True colour

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	4	0	Yes
Cape Woolamai	Monthly	12	4	0	Yes
Corinella	Monthly	12	4	0	Yes
Cowes	Monthly	12	4	0	Yes
Grantville	Monthly	12	4	0	Yes
Kilcunda	Monthly	12	4	0	Yes
Rhyll	Monthly	12	4	0	Yes
San Remo	Monthly	12	4	0	Yes
Ventnor	Monthly	12	4	0	Yes



4.10.2 Iron

Based on aesthetic considerations, the ADWG guideline value is set at 0.3 mg/L. There was one exceedance of ADWG at Rhyll during 2012-13. The exceedance was described in section 3.3.2 and highlighted below:

Table 4-10.2

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Fortnightly	26	0.07	0	Yes
Cape Woolamai	Fortnightly	26	0.07	0	Yes
Corinella	Fortnightly	26	0.09	0	Yes
Cowes	Fortnightly	26	0.10	0	Yes
Grantville	Fortnightly	26	0.14	0	Yes
Kilcunda	Twice fortnightly*	52	0.07	0	Yes
Rhyll	Fortnightly [#]	26	0.57	0	No
San Remo	Fortnightly	27	0.04	0	Yes
Ventnor	Fortnightly	26	0.22	0	Yes

* Kilcunda data includes Dalyston data, both these areas were sampled fortnightly

[#] An extra iron sample was taken during the iron exceedance at Rhyll on 19/02/2013. See section 3.3.2 for further information on exceedance.

A sample taken from lot 5-7 Jansson Rd, Rhyll on 19//02/2013 indicated an exceedance in iron (0.57 mg/L) above that of the ADWG (0.3 mg/L). The exceedance was due to a burst on the main supply line on the same day a few hundred metres from the sample site. The site was flushed by WPW staff and re-sampled. The result of the re-sample was 0.03 mg/L, well under the ADWG. DH were notified and no further action was required.



4.10.3 pH

The ADWG aesthetic value for pH is between 6.5 and 8.5. There were four non-compliant results for pH throughout 2012-13. The exceedances are highlighted below

Table 4-10.3 pH

Locality	Frequency	Samples	Min	Max	Non-complying samples	Complying
Bass	Weekly	52	6.8	7.4	0	Yes
Cape Woolamai	Weekly	52	7.2	7.6	0	Yes
Corinella	Weekly	52	7.0	7.8	0	Yes
Cowes	Weekly	52	7.3	8.9	3	No
Grantville	Weekly	52	7.1	8.1	0	Yes
Kilcunda	Twice weekly*	104	7.1	8.0	0	Yes
Rhyll	Weekly	52	7.2	7.6	0	Yes
San Remo	Weekly	52	7.1	7.6	0	Yes
Ventnor	Weekly	52	7.2	8.6	1	No

* Kilcunda data includes Dalyston data, both these areas were sampled fortnightly

The four pH exceedances all occurred with a fortnight from mid to late July 2012. Exceedances were all within close proximity (4km radius). All sites were flushed and *in situ* field sampling was conducted until results were under ADWG.



4.11 Analysis of results

The SDWR Schedule 2 results have been analysed and expressed in the table below as a comparison of percentage of localities and percentage of customers where drinking water supplied was complying with schedule 2. The table plots the current and last two reporting periods.

WPW have reached 100% compliance with every standard in Schedule 2 for the current reporting period. This is an indication of improved performance as a result of water quality improvements demonstrated at the beginning of this section. The 96% and 86% results for Aluminium in 2010/11 and 2011/12 respectively were from 3 separate exceedances. 2010/11 had two results >0.25mg/L, one in Bass (0.37mg/L) and one in Kilcunda (0.64 mg/L). 2011/12 had one result in Kilcunda (0.9mg/L). The 70% THM result in 2010/11 has been improved (to 100%) since the introduction of chloramination disinfection during 2010/11.

Table 4-11 Percentage compliance with Schedule 2 of the SDWR

Parameter	Percentage by locality			Percentage by customer		
	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13
<i>Escherichia coli</i>	100	100	100	100	100	100
Chloroacetic acid	100	100	100	100	100	100
Dichloroacetic acid	100	100	100	100	100	100
Trichloroacetic acid	100	100	100	100	100	100
Trihalomethanes	89	100	100	70	100	100
Aluminium	78	89	100	86	96	100
Turbidity	100	100	100	100	100	100



5. Emergency and incident management

5.1 Reportable events under sections 22 and 18 of the SDWA

WPW did not have any incidents during the reporting period that constituted a section 22 or section 18 notification to DH

5.2 Other incidents issues or events not reportable under sections 22 and 18 of SDWA

As discussed under section 3.3 WPW had a blue green algal issue in Candowie Reservoir and five ADWG exceedances in the distribution system, one iron, one turbidity and three pH exceedances. For further information on these issues please refer to the section.



6. Complaints relating to water quality

6.1 Summary of complaints

The number of customer complaints to WPW regarding drinking water totalled 18. There was a >50% reduction in customer complaints from 2011/12 which is attributed to the ongoing water quality improvements outlined in section 4. Table 6-1 highlights the type of customer complaints

Table 6-1 Complaints relating to water quality

Type of complaint	No. of complaints	No of complaints per 100 customers supplied [^]
Discoloured water	9	0.06
Taste/odour	7	0.04
Blue water	0	0.00
Air in water	0	0.00
Other**	2	0.03

[^]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

**the category 'other' includes any calls related to alleged illness

50% of complaints for 2012/13 were for discoloured water, 40% for taste/odour issues and 10% for other. Note that all the 'other' issues were in relation to disinfection chemicals in the distribution system, namely the chloramination process rather than reporting of any alleged illnesses.

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 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.



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

DH did not require a regulatory audit during the 2012/13 reporting period. However a follow up audit was requested by DH due to non-compliance in 2011/12 regulatory audit. The follow up audit took place in November 2012. WPW was found to be compliant with the obligations imposed by section 7(1) of the SDWA during the audit period (see audit certificate in appendix 1). Seven opportunities for improvement (OFI) were identified and described in the table below:

Table 7 OFI's from most recent audit and actions taken

OFI	Actions taken to address OFI
<p>WPW has added to the <i>WQRMP</i> (Nov 2012) – Section 13 – Control Points statements about the corrective actions to be taken when the critical limit is reached. It is recommended that the SOP be referenced where one exists for the corrective actions to avoid full descriptions being necessary.</p>	<p><i>WQRMP</i> has been updated to reflect OFI</p>
<p>WPW has removed most of the inconsistencies in the <i>WQRMP</i> (Nov 2012) – Section 8 – Monitoring that were identified in Opportunity for Improvement #3 during the March 2012 audit. To further avoid confusion, it is recommended that Table 8-3 Raw Water Sampling be removed all together or removed from Section 8.3 – Verification Monitoring and be discussed in words in Section 8.1 – Monitoring Identified Hazards.</p>	<p><i>WQRMP</i> has been updated to reflect OFI</p>
<p>WPW has developed a SOP 'Control Point – SCADA Limits, Alarm Management WTP' to outline the management and standard required for SCADA alarms used at the IBWPP. The SOP includes procedures for notification of control point preset set point changes by Water Treatment Plant Operator (WTPO) to the Water Quality Officer (WQO) and Treatment Plant Supervisor. The auditor found that the notifications and responsibilities section of the SOP could be made clearer and that it contained a few typographical errors. It is recommended that it be spelt out who is to do what and when. It is also recommended that a trigger of one week be added for the WQO to follow up on the status of the alarm set point change.</p>	<p>SOP has been updated to reflect OFI and alarm set point change process has been implemented</p>
<p>It is recommended that the <i>WQRMP</i> Control Point #7 - Chlorine Disinfection include both the IBWPP 30min and 5min Chlorine critical limits.</p>	<p><i>WQRMP</i> has been updated to reflect OFI</p>
<p>The Inlet pH Analyser Low-Low Alarm (Warning only) was found to be 4.5, lower than the lower critical limit of '<5.5' for the <i>WQRMP</i> Control Point #2 – Coagulation and Flocculation. This couldn't be explained, since the plant does not run lower than about 5.5. The auditor recommends that Westernport Water documents the differences between the <i>WQRMP</i> and SCADA, and review the Inlet pH Analyser</p>	<p>The low-low pH alarm on SCADA has been updated to reflect what is referenced in the <i>WQRMP</i></p>



Low-Low Alarm value.

It is recommended that the relevant pipes, pits, vales, dosing points, sampling points and directions of flow inside the IBWPP building be clearly labelled. The auditor notes that this is a project in progress.

Project is in progress

WPW does not have a single register for training requirements showing what is required, what is completed, when refreshers are required and records of existing certificates held. This only exists in partial forms and does not include the training requirements detailed in Table 10-3 of the *WQRMP*. It is recommended that this be established. It is noted that WPW is in the process of establishing this

Project is in progress



8. Undertakings under section 30 of the Act

WPW currently has no section 30 undertakings.

9. Exemption under section 20 if the Act

WPW has no exemptions under section 20



10. Glossary of Terms

Term	Meaning
ADWG	<i>Australian Drinking Water Guidelines, 2011</i> prepared by the National Health and Medical Research Council
CRM	Customer Request Management system
CUP	Candowie Upgrade Project
DAFF	Dissolved Air Flootation and Filtration
DH	Department of Health
<i>E.coli</i>	<i>Escherichia coli</i>
GMU	Groundwater Management Unit
IBWPP	Ian Bartlett Water Purification Plant
mg/L	Milligram per litre
NTU	Nephelometric Turbidity Units
OFI	Opportunity for Improvement
PAC	Powdered Activated Carbon
SCADA	Supervisory Control and Data Acquisition
SDWA	<i>Safe Drinking Water Act, 2003 (Victoria)</i>
SDWR	<i>Safe Drinking Water Regulations, 2011</i>
THM	Trihalomethanes
UCL	Upper Confidence Limit
WPW	Westernport Water
WTPO	Water Treatment Plant Operator
WQO	Water Quality Officer
WQRMP	Water Quality Risk Management Plan



11. Appendix 1 – Audit certificate

The audit certificate from Parson Brinckerhoff is attached below

Date: 23 November 2012

Parsons Brinckerhoff Australia Pty Limited Level 15 28 Freshwater Place Southbank VIC 3006 ABN 80 078 004 798
Australia

Tel: +61 3 9861 1111 Fax: +61 3
9861 1144 Email:
melbourne@pb.com.au

www.pbworld.com

Certified to ISO 9001, ISO 14001, AS/NZS 4801
A+ GRI Rating: Sustainability Report 2010

Schedule 1

Regulation 8

Safe Drinking Water Regulations 2005

RISK MANAGEMENT PLAN AUDIT CERTIFICATE

Certificate Number: 78

Audit period: March 2012 to Date of the Audit (7 November 2012)

To: Mr Murray Jackson Managing
Director Westernport Region Water
Corporation 2 Boys Home Road
Newhaven, Vic, 3925

Australian Business Number (ABN): 63 759 106 755

I, Sheree Feaver, after conducting a risk management plan audit of the water supplied by Westernport Water, am of the opinion that Westernport Water has complied with the obligations imposed by section 7(1) of the **Safe Drinking Water Act 2003** during the audit period.

Signature of approved auditor:



Sheree Feaver

Parsons Brinckerhoff Australia Pty Limited
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