WESTERNPORT WATER

ANNUAL DRINKING WATER QUALITY REPORT 2009/10

September 2010

CERTIFICATE OF APPROVAL FOR ISSUE OF DOCUMENTS

Report Title: Annual Drinking Water Quality Report 2009/10

Document Status: Final

Document No: CV212087

Date of Issue: 29/10/2010

Project Title: Annual Drinking Water Quality Report

Client: Westernport Water

	Position	Name	Signature	Date
Prepared by:	Environmental Scientist	Bronwyn Puttyfoot	*B. Puttyfoot*	9/8/2010
Internal Review by:	Senior Consultant	James Gourley	*J. Gourley*	10/8/2010
Peer Review by:	Water Quality Officer	Dean Chambers	*D. Chambers*	16/8/2010
Approved by:	Senior Consultant	James Gourley	*J. Gourley*	29/10/2010

The Primary Contact for this report is:
Dean Chambers, Westernport Water, Phone 1300 720 711

For further information on this report regarding ALS's contribution, contact:

Name: Bronwyn Puttyfoot
Title: Environmental Scientist
Address: Caribbean Business Park
22 Dalmore Drive, Scoresby VIC 3179
Phone: (03) 8756 8000
E-mail: bronwyn.puttyfoot@alsglobal.com

Document Revision Control

Version	Description of Revision	Person Making Issue	Date	Approval
1	Draft version	Bronwyn Puttyfoot	10/8/2010	
2	Draft w/ feedback from Westernport Water	Bronwyn Puttyfoot	7/9/2010	
3	Final w/ feedback from DOH	James Gourley	29/10/2010	

TABLE OF CONTENTS

Table of Figures

List of Tables

1 Introduction

1.1 Westernport Water - Overview

Westernport Water provides water, wastewater and gas services in an economically, environmentally and socially practicable manner to its customers within its service area.

Westernport Water services approximately 15,000 properties on Phillip Island and an area of the mainland from The Gurdies to Archies Creek. Individual towns that are provided with potable water include Bass, Grantville, Corinella, Kilcunda (including Dalyston), San Remo, Woolamai Waters, 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

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* (Victoria). The report covers issues relating to the quality of potable drinking water and the management of regulated water.

Westernport Water is required to provide the Department of Health (DOH) with an annual report on the quality of drinking water supplied to its customers.

1.3 Westernport Water's Water Supply System

Westernport Water has a single water supply storage – Candowie Reservoir - 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 Westernport Water's district. A plan of the distribution system is included in this report as Figure 1-2.

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 manganese and iron. Raw water quality is typical of water that is sourced from an unprotected catchment. Following treatment, the potable water largely complies with the *Australian Drinking Water Quality Guidelines* (NHMRC, 2004).

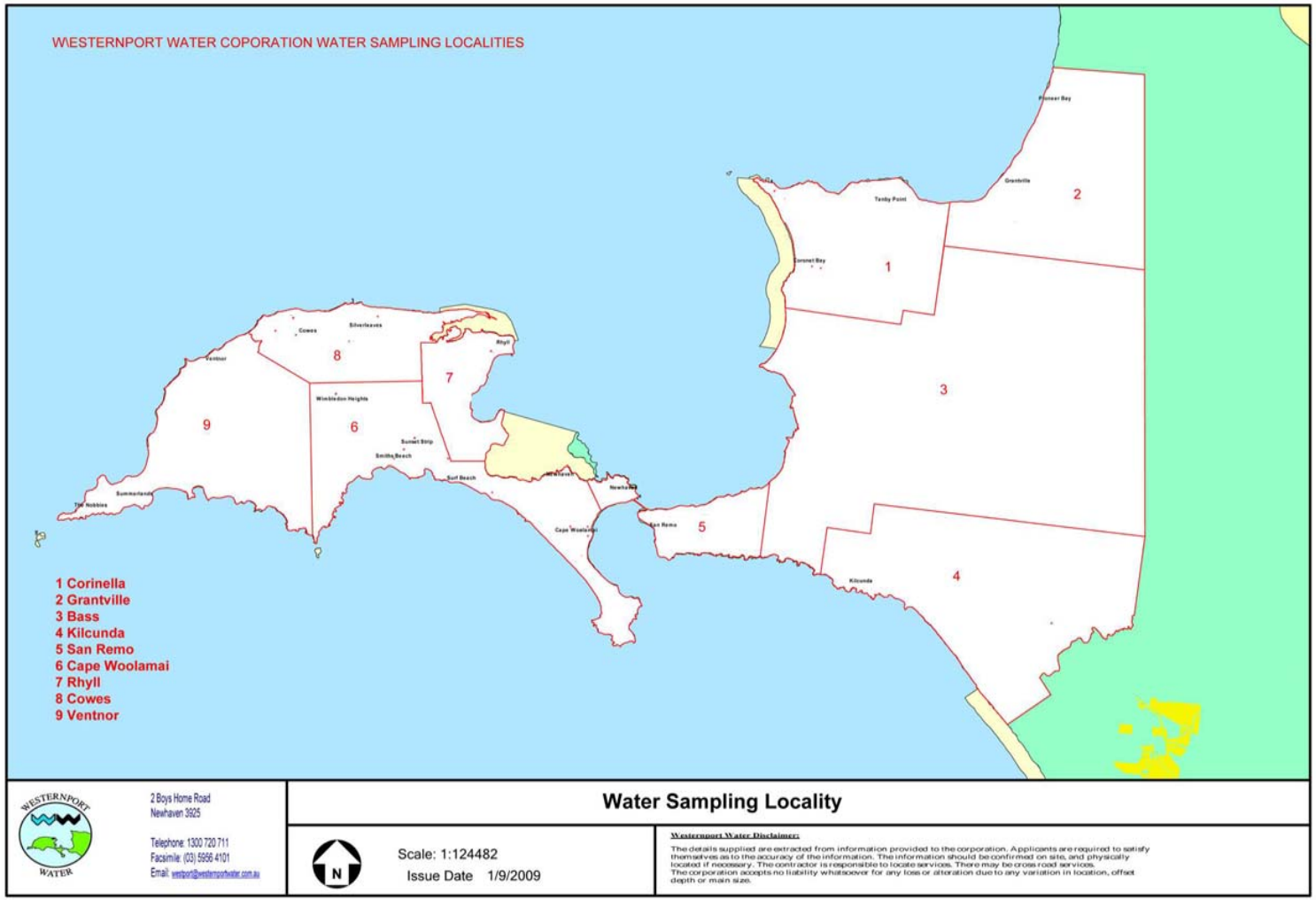


Figure 1-1 Westernport Water service area

1.4 Other Water Sources

Low rainfall in recent years has lead to reduced water yield from the Tennent Creek catchment flowing into Candowie Reservoir. As such, other sources of water have been utilised to supplement the supply. Water from these alternative sources is pumped to Candowie Reservoir for centralised storage and treatment at the IBWPP. These alternative sources include bores, the Bass River and Lance Creek reservoir.

1.4.1 Bores

A number of groundwater bores are available to Westernport Water located throughout the Corinella Aquifer. Pumping of bores to augment water supply was undertaken from 14 August 2009 to 28 September 2009 in accordance with Groundwater Licence No 9030682 as issued by Southern Rural Water. The bore depth and application of the bores are listed in Table 1-1. A total of 69.95 ML of water was pumped from the Corinella bores (8.41 ML from the KRSB2, 33.9 ML from CMSB1 and 27.65 ML from the KRDB1) to the Candowie Reservoir via the Corinella and Grantville Pipeline. All other production bores were not in use during 2009/10.

Table 1-1 Corinella bores

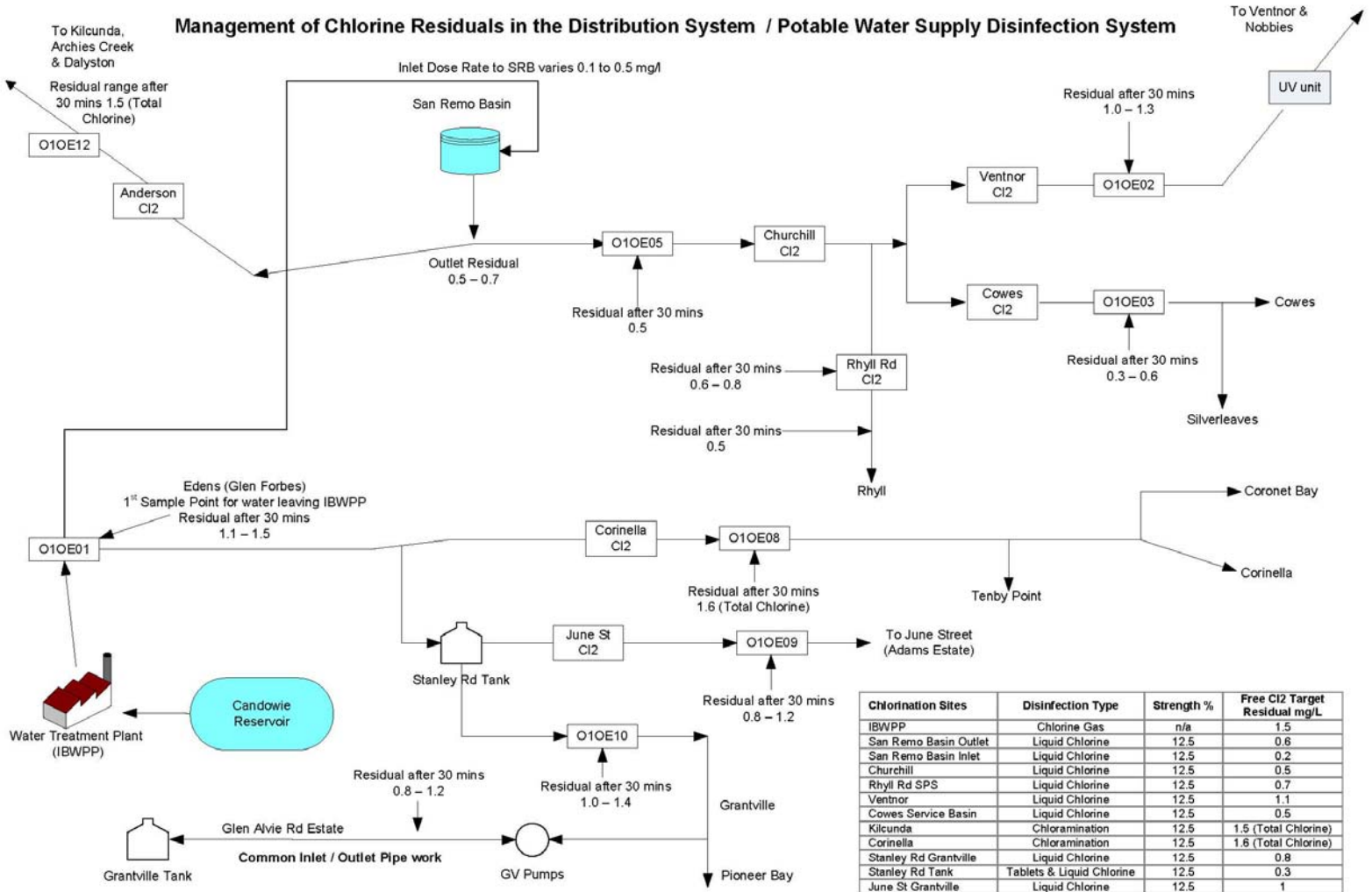
Asset	Location	Bore Depth	Application
KRDB1	King Rd Wastewater Treatment Plant (WWTP)	117 m	Production bore
KRSB2	King Rd 500 m from WWTP	26.6 m	Production bore
KRSB3	Cnr King Rd and Bass Hwy	52.1 m	Production bore
CMSB1	Cemetery Rd	36 m	Production bore

1.4.2 Bass River

Westernport Water's pump station located along the banks of the Bass River can transfer water via the Bass River Pipeline to Candowie Reservoir. The two variable speed, centrifugal pumps began pumping on the 5 July 2009 and ceased on 28 September 2009. During this period, 622 ML was pumped into the Candowie Reservoir. Pumping also occurred from 9 May to 30 June 2010, during this period 318.6 ML was pumped into the Candowie Reservoir. The total volume pumped into the Candowie Reservoir for the 2009/10 reporting period was 941 ML.

1.4.3 Lance Creek Reservoir

Westernport Water is able to share the resources from South Gippsland Water's Lance Creek Reservoir located within the neighbouring Powlett River catchment. However, this resource was not utilised during the 2009/10 reporting period.



Chlorination Sites	Disinfection Type	Strength %	Free Cl2 Target Residual mg/L
IBWPP	Chlorine Gas	n/a	1.5
San Remo Basin Outlet	Liquid Chlorine	12.5	0.6
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	Chloramination	12.5	1.5 (Total Chlorine)
Corinella	Chloramination	12.5	1.6 (Total Chlorine)
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	U.V	n/a	0

Figure 1-2 Potable water supply disinfection & distribution system schematic diagram

2 Water Treatment and Quality Management System

Westernport Water operates a comprehensive water quality management system that complies with the *Safe Drinking Water Act*. This system is designed to ensure that customers receive drinking water of acceptable quality at all times, and that public health is protected.

2.1 Water Treatment

Raw water from Candowie Reservoir is treated using a combination of flocculation, coagulation, dissolved air flotation, filtration and chemical dosing at the IBWPP. The source water is predominantly high in nutrients, organics and has periodically been high in manganese and iron by *Australian Drinking Water Guidelines* (ADWG) standards. However, this is typical of water that is sourced from an open and unprotected catchment.

The IBWPP is located in the Bass Hills near Glen Forbes and was constructed in 1990 to improve drinking water quality. This plant uses physical and chemical treatment to remove contaminants and improve the aesthetic quality of the water so that it complies with the ADWG, and is acceptable to consumers. A summary of the processes used at IBWPP and within the reticulation system are shown in Table 2-1.

Table 2-1 Water treatment processes at Westernport Water

Locality	Treatment Process	Added Substances	Comments
Ian Bartlett Water Purification Plant (IBWPP)	Oxidation	Potassium permanganate	As required
	Taste and odour removal	Powdered activated carbon	Continuous
	Coagulation / flocculation	Aluminium sulphate	For removal of colour and turbidity
	Dissolved air flotation / filtration	Nil	Removes flocculated particles
	pH correction	Caustic soda (sodium hydroxide)	Required to raise pH to ~7.4
	Fluoridation *	Sodium Fluoride	Required to raise fluoride levels to 0.9 mg/L in treated water
	Disinfection	Chlorine gas	Required to get chlorine residual to desired set point
Various locations throughout the water supply system	Disinfection	Sodium hypochlorite	Booster chlorination stations used throughout the water supply system to retain an appropriate chlorine residual
	Disinfection	Sodium hypochlorite & aqua ammonia	Booster chloramination stations used at the Kilcunda & Corinella to retain the appropriate total chlorine residual
	Ultra Violet Disinfection	Nil	The UV system services a distinct water supply area on Phillip Island

* Fluoridation officially commenced on 13th April 2010.

Disinfection of the water is achieved by the addition of chlorine gas after treatment at the IBWPP, with sufficient contact time to ensure appropriate disinfection. Chlorine residual is maintained throughout the supply system via a network of booster chlorination and chloramination stations.

The exception is the water supply to the Penguin Parade and Nobbies area of Phillip Island which uses UV disinfection. Westernport Water commissioned a UV disinfection unit to service this distinct area of Phillip Island in January 2001.

The unit is an Australian Ultra Violet Services Pty Ltd model CA-848-NS. The unit has 8 ultra violet lamps that operate at the germicidal waveband of 245 nm. The maximum flow rate of the unit is 13 L/s.

The UV unit was installed as an alternative to chlorine at this extremity of Westernport Water's water distribution system. It was intended to address the taste and odour

issues that are sometimes associated with chlorination throughout the reticulation system.

2.1.1 Improvements

Westernport Water strives to provide their customers with the best quality water possible by maintaining and improving the water supply infrastructure and water source. The following are the significant changes and upgrades that have occurred during the 2009/10 period:

- Installation and commissioning of a fluoride plant;
- Trial chloramination sites at Kilcunda and Corinella;
- Replacement of filter media and structural lining of filter cells at IBWPP;
- Relocation of chemical dosing pumps (alum and caustic) and new pipe work installed;
- Cleaning and painting of flocculator tanks and repairs to damaged board/paddles (flocculation stage);
- Trials to install blowers on each filter at the IBWPP, and installed power points for the blowers; (this will help with sludge blanket removal, and decrease water usage of cutter sprays);
- New aerators installed (4) and hoses replaced around the off take tower of the Candowie Reservoir for improved aeration;
- SCADA access to all chlorination sites / San Remo basin / tanks and Bass River site for figures, set points and various trends to be monitored; enabling management to increase or decrease chlorine residuals, tanks levels or pumps speeds;
- Variable speed drives were installed on IBWPP high lift pumps, to assist with matching inflow and outflow from the treatment plant. This in turn allows for better management of free chlorine residual levels in the reticulation water; and
- Modification to in-line valves along the transfer main from IBWPP to Anderson. In total 5 butterfly valves were replaced with sluice valves as a precursory action prior to cleaning the transfer main in 2010/2011.

2.2 Issues

2.2.1 Algae in Candowie Reservoir

Candowie Reservoir occasionally experiences high algal counts with a wide range of species present. Physicochemical and biological conditions of the storage are therefore monitored regularly. This assists Westernport Water to detect and manage any potential algal blooms before they lessen the quality of the raw water.

Constant oxygenation of the bottom waters of Candowie Reservoir assisted in limiting the development of conditions favourable to algal growth. During the 2009/10 financial year, destratification of the reservoir was undertaken using two processes: the WEARS (Water Engineering and Research Solutions) unit (the main aerator used) and the bubble aerator being used when required. Nevertheless, blooms of taste and odour causing *Ceratium*, a large dinoflagellate, were detected throughout the reporting

period. The behaviour of this *Ceratium* bloom was totally unpredictable even though the nitrogen to phosphorus ratio was not ideal for its growth. However, the *Ceratium* bloom may have helped suppress Anabaena growth over the summer period.

A significant increase in potentially toxic blue-green *Anabaena circinalis* occurred in December and the reservoir was treated with Cupricide on the 20th December 2009. Sampling on the 23rd of December, 2009 showed that the treatment was successful.

2.2.2 Water Security

Similar to 2008/09, a steady decline from August / September in water level over the 2009/10 financial year can be seen in Candowie Reservoir (Figure 2-1). Levels were slightly higher in 2009/10 compared to 2008/09 and there was a noticeable increase in level during May and June 2010 due to rainfall in the area.

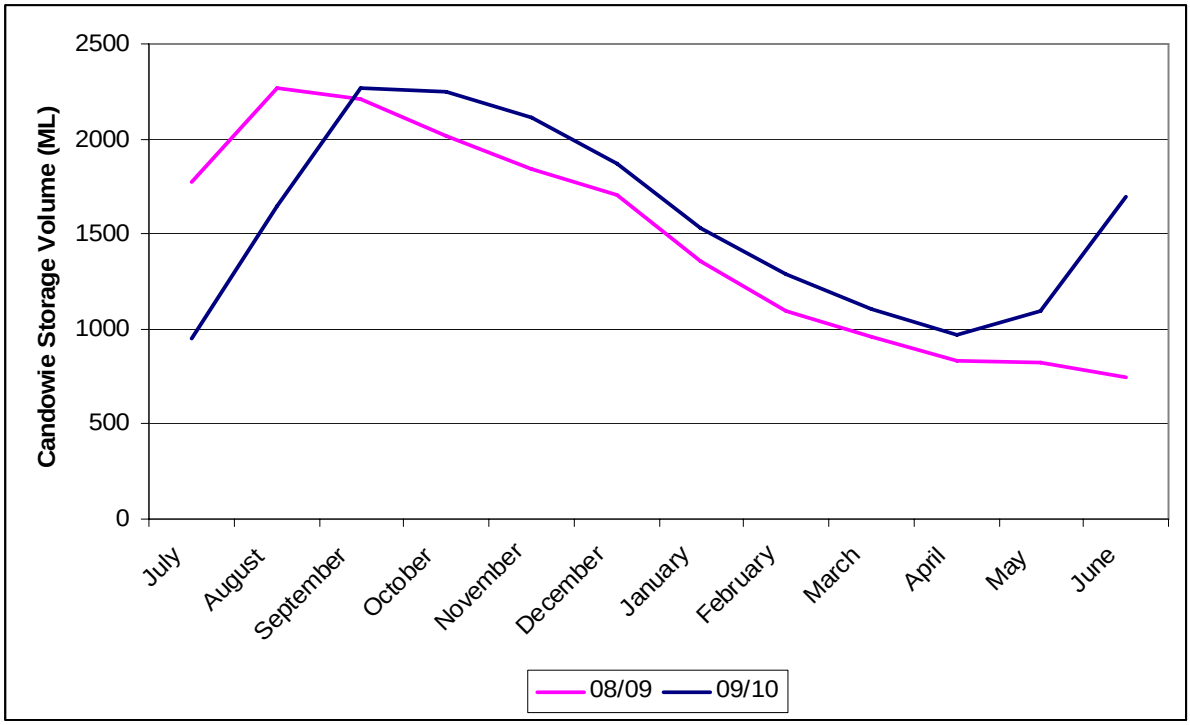


Figure 2-1 Candowie Reservoir storage volumes (1/7/2008 to 30/6/2010)

Westernport Water recognises that any decrease in the yield from Candowie catchment poses a significant business risk in supplying customers with acceptable water quality and quantity, given on-going growth in the region and recent trends in rainfall reduction.

Westernport Water has budgeted for a major augmentation project within its 2008 – 2013 Water Plan. The option being developed is:

- Raise the Candowie Dam wall – which will increase the full supply level by up to 3 m and increase the stored volume to 4,497 ML resulting in an estimated reliable annual yield of 3,654 ML.

This project requires significant government and environmental requirements to be approved prior to commencement. The level of water supply security provided by the

'Candowie raising' option will depend on future rainfall patterns, but should impose minimal additional operational costs.

In September 2009 Westernport Water submitted its application for 1,000ML of water from the Metropolitan Pool (i.e. water sourced from the Desalination Plant located near Wonthaggi). In addition, a draft licence for groundwater extraction from the Corinella Aquifer was issued by Southern Rural water in April 2010. As at the end of June 2010 both of these matters were still being progressed for potential future implementation.

In total Westernport Water has, or is seeking to secure, access to sources and volumes of water as set out in Table 2-2.

Table 2-2 Water Sources and Volumes for Westernport Water

Water Source	Volume (ML)
Tennent Creek	2,911
Bass River	3,000
Corinella Aquifer	491
Metropolitan Pool	1,000
Total	7,402

3 Quality of Drinking Water for 2009/10

The *Safe Drinking Water Regulations 2005* (Victoria) stipulate that evidence must be given to indicate the water supplier's compliance or non-compliance with the regulations. These regulations have been in force for the 2009/10 reporting period. Results for each locality are benchmarked against the standards provided in Table 3-1, which are based on the ADWG.

Table 3-1 Water quality reporting standards

Parameter	Benchmark Standard
Safe Drinking Water Regulations 2005: Schedule 2	
Escherichia Coli	At least 98% of all samples of drinking water collected in any 12 months period to contain no *Escherichia coli* per 100 mL
Chloroacetic acid	Must not exceed 0.15 mg/L
Dichloroacetic acid	Must not exceed 0.1 mg/L
Trichloroacetic acid	Must not exceed 0.1 mg/L
Trihalomethanes	Must not exceed 0.25 mg/L
Aluminium	Must not exceed 0.2 mg/L
Turbidity	95% upper confidence limit of mean of drinking water samples collected in the preceding 12 months must be ≤ 5.0 NTU.
Bromate	Must not exceed 0.02 mg/L
Formaldehyde	Must not exceed 0.5 mg/L
Australian Drinking Water Guidelines	
Antimony	Must not exceed 0.003 mg/L
Cadmium	Must not exceed 0.002 mg/L
Copper	Must not exceed 2 mg/L - health guideline value, the aesthetic guideline is 1 mg/L
Iron	Must not exceed 0.3 mg/L (aesthetic guideline value)
Lead	Must not exceed 0.01 mg/L
Nickel	Must not exceed 0.02 mg/L
Zinc	Must not exceed 3 mg/L (aesthetic guideline value)
pH	Range of 6.5 – 8.5 (aesthetic guideline range)
Manganese	Must not exceed 0.5 mg/L - health guideline value, aesthetic guideline value is 0.1 mg/L.

The ozone-based disinfection by-products (bromate and formaldehyde) were not monitored in 2009/10 as Westernport Water did not use ozone based disinfectants or water treatment chemicals. Bromate and formaldehyde are not deemed to be a significant risk in drinking water supplied by Westernport Water.

The following nine water sampling localities were gazetted for Westernport Water on 16 January 2007:

- Bass;
- Cape Woolamai;
- Corinella;
- Cowes;
- Grantville;
- Kilcunda;
- Rhyll
- San Remo and
- Ventnor.

Prior to 2007, the Dalyston area was previously separately reported. It was incorporated in the Kilcunda locality of Westernport Water's water sampling localities as gazetted in January 2007. Westernport Water has adopted a conservative approach and continued monitoring the Dalyston area. This is reflective of the length of water main servicing this area and recognition that the area is a non-looped extremity of the reticulation system.

The water quality statistics for Kilcunda have therefore been calculated based on data from both Kilcunda and Dalyston and the frequency of sampling will be double that of the other localities.

3.1 Escherichia coli

3.1.1 Results

The *Safe Drinking Water Regulations* and ADWG stipulate that at least 98% of all samples of drinking water collected in any 12 months period contain no *Escherichia coli* (*E. coli)* per 100 mL. The water quality with respect to *E. coli* was compliant with this standard (see Table 3-2). For details relating to a Section 22 notification of an E. coli detection at Rhyll, refer to section 5 (page 50).

Table 3-2 *E. coli*

Water Sampling Locality	Frequency of Sampling	No. of Samples	Samples Containing *E. coli*	Max Result (orgs/ 100 mL)	% Samples with no *E. coli*	Complying (Yes/No)
Bass	weekly	52	0	0	100	Yes
Cape Woolamai	weekly	52	0	0	100	Yes
Corinella	weekly	52	0	0	100	Yes
Cowes	weekly	57	0	0	100	Yes
Grantville	weekly	52	0	0	100	Yes
Kilcunda	twice weekly*	104	0	0	100	Yes
Rhyll	weekly	52	1	1	98.1	Yes
San Remo	weekly	52	0	0	100	Yes
Ventnor	weekly	52	0	0	100	Yes

Note: the number of samples collected exceeded the requirement as additional *E. coli* sampling was performed at Cowes over the summer period in response to increases in population. * Kilcunda data includes Dalyston area data, both these locations were sampled weekly

3.2 Chlorine Based Disinfection By-product Chemicals

3.2.1 Free Chlorine Results

There is no mandated standard for free chlorine in the *Safe Drinking Water Regulations*. The ADWG however has a maximum guideline value for chlorine of 5 mg/L. Table 3-3 shows all locations were below the ADWG value for free chlorine during the reporting period.

Table 3-3 Free chlorine

Water Sampling Locality	Frequency of Sampling	No. of samples	Non-complying samples	Max Result (mg/L)	Complying (Yes/No)
Bass	weekly	52	0	0.15	Yes
Cape Woolamai	weekly	52	0	0.68	Yes
Corinella	weekly	52	0	0.48	Yes
Cowes	weekly	57	0	0.58	Yes
Grantville	weekly	52	0	2.20	Yes
Kilcunda	twice weekly*	104	0	0.30	Yes
Rhyll	weekly	52	0	1.04	Yes
San Remo	weekly	52	0	0.56	Yes
Ventnor	weekly	52	0	0.45	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled weekly.

3.2.2 Monochloroacetic Acid

The *Safe Drinking Water Regulations* stipulate a maximum value of 0.15 mg/L for monochloroacetic acid. All localities were compliant with the water quality standard.

Table 3-4 Monochloroacetic acid

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	<0.005	Yes
Cape Woolamai	monthly	12	0	<0.005	Yes
Corinella	monthly	12	0	<0.005	Yes
Cowes	monthly	14	0	<0.005	Yes
Grantville	monthly	12	0	0.005	Yes
Kilcunda	twice monthly*	24	0	<0.005	Yes
Rhyll	monthly	12	0	<0.005	Yes
San Remo	monthly	12	0	<0.005	Yes
Ventnor	monthly	12	0	<0.005	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.2.3 Dichloroacetic Acid

The *Safe Drinking Water Regulations* stipulate a maximum value of 0.1 mg/L for dichloroacetic acid. All localities were compliant with the water quality standard.

Table 3-5 Dichloroacetic acid

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	<0.005	Yes
Cape Woolamai	monthly	12	0	0.007	Yes
Corinella	monthly	12	0	0.010	Yes
Cowes	monthly	14	0	0.007	Yes
Grantville	monthly	12	0	0.063	Yes
Kilcunda	twice monthly*	24	0	0.010	Yes
Rhyll	monthly	12	0	0.011	Yes
San Remo	monthly	12	0	0.006	Yes
Ventnor	monthly	12	0	0.007	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.2.4 Trichloroacetic Acid

The *Safe Drinking Water Regulations* stipulate a maximum value of 0.1 mg/L for trichloroacetic acid. All localities were compliant with the water quality standard.

Table 3-6 Trichloroacetic acid

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	<0.005	Yes
Cape Woolamai	monthly	12	0	0.010	Yes
Corinella	monthly	12	0	0.007	Yes
Cowes	monthly	14	0	0.010	Yes
Grantville	monthly	12	0	0.045	Yes
Kilcunda	twice monthly*	24	0	0.007	Yes
Rhyll	monthly	12	0	0.012	Yes
San Remo	monthly	12	0	0.008	Yes
Ventnor	monthly	12	0	0.008	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.3 Trihalomethanes (THMs)

The following section discusses the forms of trihalomethanes (THMs) that were tested during the 2009/10 reporting period.

3.3.1 Trihalomethanes (Total)

THM is the group of disinfection by-products that may be found in water treated with chlorine. These compounds include chloroform, bromodichloromethane, bromoform and dibromochloromethane. The *Safe Drinking Water Regulations* and ADWG stipulate a maximum value for this group of chemicals of 0.25 mg/L (Total THMs) in potable water. The water quality, with respect to THMs, was non compliant on one occasion at Grantville. A non compliance report was submitted to Dept of Health as a Section 18 notification, refer to section 5 (page 50).

Table 3-7 Total THMs

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L) #	Complying (Yes/No)
Bass	monthly	12	0	0.11	Yes
Cape Woolamai	monthly	12	0	0.18	Yes
Corinella	monthly	12	0	0.20	Yes
Cowes	monthly	14	0	0.21	Yes
Grantville	monthly	12	1	0.26	No
Kilcunda	twice monthly*	24	0	0.15	Yes
Rhyll	monthly	12	0	0.21	Yes
San Remo	monthly	12	0	0.18	Yes
Ventnor	monthly	12	0	0.23	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. It is a requirement that resampled data is not included for total THMs. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly. # ALS Laboratory reports total THMs to two significant figures only.

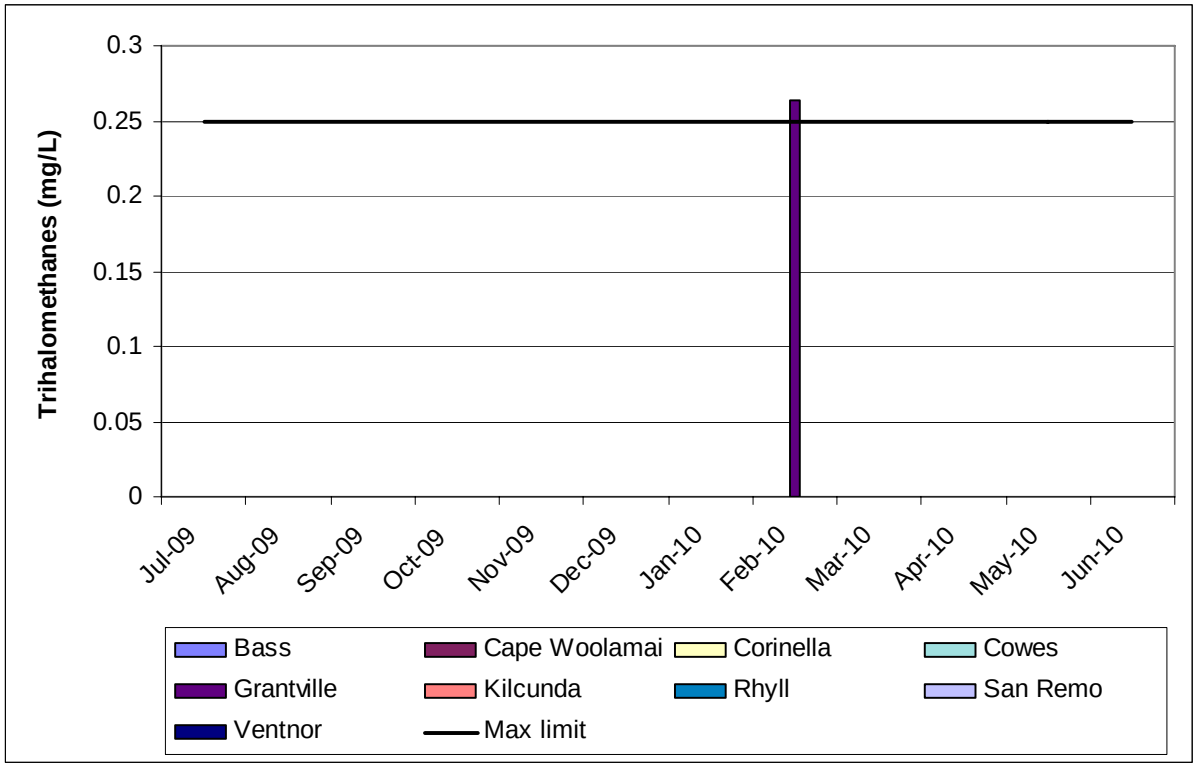


Figure 3-1 Non conforming maximum total THMs for the period July 2009 to June 2010

3.3.1.1 Actions in relation to non-compliance

Westernport Water exceeded the guideline value of 0.25 mg/L for THM at Grantville on 9th February 2010. The non-compliance was minor and the pipe network in the area

was flushed. Another water sample was then taken, which complied with the guidelines.

3.3.2 Dibromochloromethane

Dibromochloromethane is a THM that is tested by Westernport Water. There is no mandated standard for dibromochloromethane in the Safe Drinking Water Regulations or in the ADWG. The World Health Organisation (WHO, 2004) sets a maximum guideline value of 0.1 mg/L for potable water. The water quality with respect to dibromochloromethane was compliant with the WHO guideline value at all localities.

Table 3-8 Dibromochloromethane

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.047	Yes
Cape Woolamai	monthly	12	0	0.073	Yes
Corinella	monthly	12	0	0.057	Yes
Cowes	monthly	14	0	0.079	Yes
Grantville	monthly	13	0	0.061	Yes
Kilcunda	twice monthly*	24	0	0.055	Yes
Rhyll	monthly	12	0	0.079	Yes
San Remo	monthly	12	0	0.071	Yes
Ventnor	monthly	12	0	0.089	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. Grantville includes resample following total THM non compliance in February 2010. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.3.3 Bromoform

Bromoform is a THM tested by Westernport Water. There is no mandated standard for bromoform the *Safe Drinking Water Regulations* or in the ADWG. The WHO sets a maximum guideline limit of 0.1 mg/L. The water quality at all localities with respect to bromoform was compliant with the WHO guideline value.

Table 3-9 Bromoform

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.021	Yes
Cape Woolamai	monthly	12	0	0.031	Yes
Corinella	monthly	12	0	0.023	Yes
Cowes	monthly	14	0	0.032	Yes
Grantville	monthly	13	0	0.024	Yes
Kilcunda	twice monthly*	24	0	0.024	Yes
Rhyll	monthly	12	0	0.033	Yes
San Remo	monthly	12	0	0.030	Yes
Ventnor	monthly	12	0	0.036	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. Grantville includes resample following total THM non compliance in February 2010. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.3.4 Bromodichloromethane

Bromodichloromethane is another THM tested by Westernport Water. There is no mandated standard for bromodichloromethane in the *Safe Drinking Water Regulations* or in the ADWG. The WHO sets a maximum guideline value of 0.06 mg/L. The water quality with respect to bromodichloromethane showed that five locations exceeded the WHO guideline value in a few instances (see Table 3-10).

Table 3-10 Bromodichloromethane

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.041	Yes
Cape Woolamai	monthly	12	0	0.063**	Yes
Corinella	monthly	12	1	0.073	No
Cowes	monthly	14	2	0.074	No
Grantville	monthly	13	1	0.082	No
Kilcunda	twice monthly*	24	0	0.049	Yes
Rhyll	monthly	12	2	0.072	No
San Remo	monthly	12	0	0.061**	Yes
Ventnor	monthly	12	2	0.078	No

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. Grantville includes resample following total THM non compliance in February 2010. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly. **Upon rounding to two decimal places, these results are WHO compliant (WHO has the guideline value specified to two decimal places only).

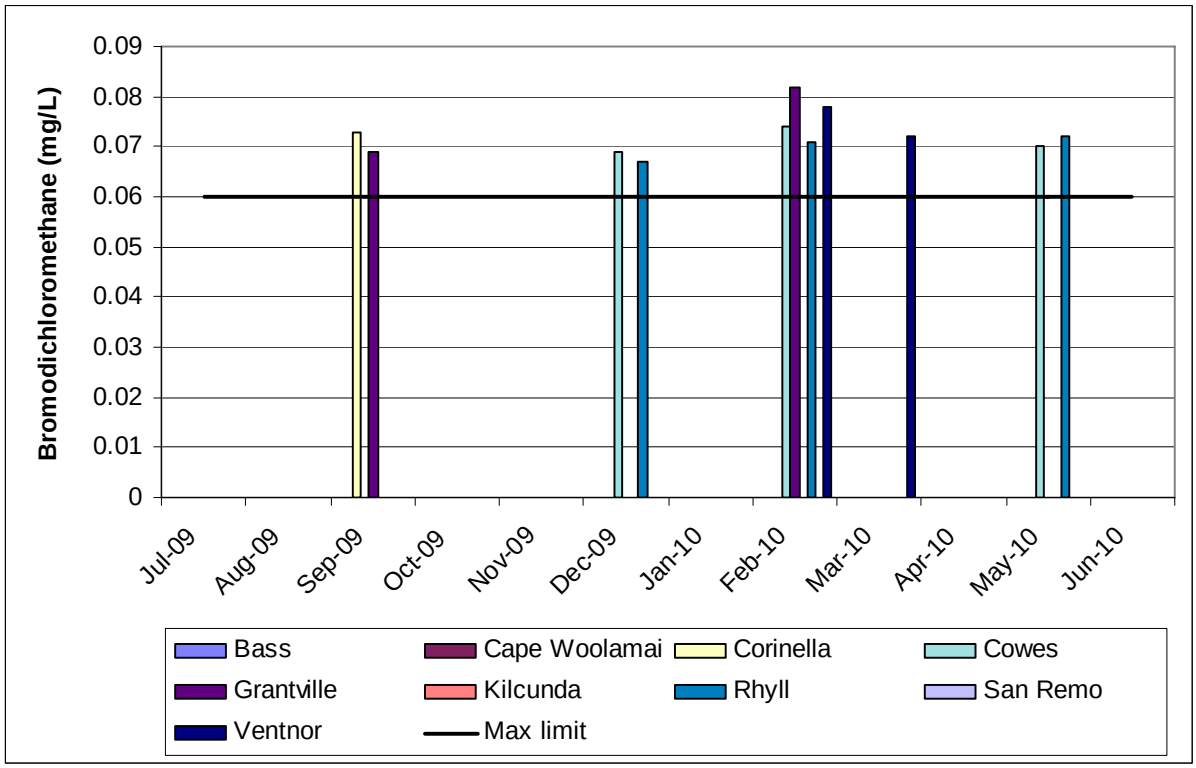


Figure 3-2 Non-conforming maximum bromodichloromethane results for the period July 2009 to June 2010

3.3.4.1 Actions in Relation to Guideline Non-compliance

Although Westernport Water exceeded the WHO guideline value of 0.06 mg/L for bromodichloromethane in five water sampling localities, no actions were taken as the total THM did not exceed *Safe Drinking Water Regulations* water quality standard of 0.25 mg/L.

3.3.5 Chloroform

Chloroform is a THM tested by Westernport Water. There is no mandated standard for chloroform in the *Safe Drinking Water Regulations* or in the ADWG. The WHO sets a maximum guideline value of 0.3 mg/L. The water quality with respect to chloroform was compliant with the WHO guideline value.

Table 3-11 Chloroform

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.020	Yes
Cape Woolamai	monthly	12	0	0.045	Yes
Corinella	monthly	12	0	0.058	Yes
Cowes	monthly	14	0	0.062	Yes
Grantville	monthly	13	0	0.060	Yes
Kilcunda	twice monthly*	24	0	0.031	Yes
Rhyll	monthly	12	0	0.054	Yes
San Remo	monthly	12	0	0.035	Yes
Ventnor	monthly	12	0	0.058	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. Grantville includes resample following total THM non compliance in February 2010. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.4 Ozone Based Disinfection By-product Chemicals

Disinfection with ozone may produce by-products such as bromate and formaldehyde. Westernport Water does not use ozone for disinfection, therefore bromate and formaldehyde were not tested for in 2009/10.

3.5 Aluminium

According to both the *Safe Drinking Water Regulations* and ADWG, the concentration of acid-soluble aluminium should not exceed 0.2 mg/L. No health-based guideline is set at present. Water quality with respect to aluminium was compliant during the reporting period.

Table 3-12 Aluminium

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.15	Yes
Cape Woolamai	monthly	12	0	0.03	Yes
Corinella	monthly	12	0	0.05	Yes
Cowes	monthly	14	0	0.03	Yes
Grantville	monthly	12	0	0.07	Yes
Kilcunda	twice monthly*	24	0	0.05	Yes
Rhyll	monthly	12	0	0.03	Yes
San Remo	monthly	12	0	0.03	Yes
Ventnor	monthly	12	0	0.03	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.6 Turbidity

Schedule 2 in the *Safe Drinking Water Regulations* stipulates that the 95% upper confidence limit (UCL) of the mean of drinking water samples must be ≤ 5.0 NTU. Based on aesthetic considerations in the ADWG, turbidity should not exceed 5 NTU. It is desirable to have a turbidity result of less than 1 NTU at the time of disinfection. Turbidity at all locations was compliant during the reporting period.

Table 3-13 Turbidity

Locality	Frequency of Sampling	No. of Samples	Max NTU	95% UCL of Mean (NTU)**	Complying (Yes/No)
Bass	weekly	52	4.2	0.6	Yes
Cape Woolamai	weekly	52	0.4	0.2	Yes
Corinella	weekly	52	2.2	0.3	Yes
Cowes	weekly	57	0.5	0.2	Yes
Grantville	weekly	52	1.2	0.4	Yes
Kilcunda	twice weekly*	104	1.4	0.2	Yes
Rhyll	weekly	52	0.7	0.2	Yes
San Remo	weekly	52	1.1	0.3	Yes
Ventnor	weekly	52	1.3	0.3	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled weekly. ** Note the '95% UCL of Mean' statistic was calculated using Excel, and any 'detection limit 'data was converted to half of its detection value for the purpose of statistical analysis.

3.7 Fluoride

The *Health (Fluoridation) Act 1973* states that the annual average for fluoride in drinking water must not exceed 1 mg/L. In addition, any single sample must not exceed a fluoride concentration of 1.5 mg/L. Fluoride at all locations was compliant during the reporting period. Fluoridation and monitoring commenced on 13th April 2010, hence the reduced number of samples for the monitoring period.

Table 3-14 Fluoride

Locality	Frequency of Sampling	No. of Samples	Max mg/L	Min mg/L	Average mg/L	Complying (Yes/No)
Bass	fortnightly	7	0.54	0.09	0.18	Yes
Cape Woolamai	fortnightly	7	0.34	0.09	0.17	Yes
Corinella	fortnightly	7	0.42	0.09	0.16	Yes
Cowes	fortnightly	7	0.3	0.09	0.17	Yes
Grantville	fortnightly	7	0.2	0.08	0.12	Yes
Kilcunda	fortnightly*	14	0.5	0.09	0.17	Yes
Rhyll	fortnightly	7	0.3	0.09	0.17	Yes
San Remo	fortnightly	7	0.34	0.09	0.16	Yes
Ventnor	fortnightly	7	0.23	0.09	0.15	Yes

* Kilcunda data includes Dalyston area data, both these locations were sampled fortnightly.

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

Westernport Water regularly tests for metals in the drinking water they supply to customers. The following sections detail the results for the 2009/10 reporting period.

3.8.1 Antimony

Based on health consideration, the ADWG guideline value is set at 0.003 mg/L for antimony.

Table 3-15 shows that no sample exceeded this guideline value.

Table 3-15 Antimony

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	quarterly	4	0	<0.001	Yes
Cape Woolamai	quarterly	4	0	<0.001	Yes
Corinella	quarterly	4	0	<0.001	Yes
Cowes	quarterly	4	0	<0.001	Yes
Grantville	quarterly	4	0	<0.001	Yes
Kilcunda	twice quarterly*	8	0	<0.001	Yes
Rhyll	quarterly	4	0	<0.001	Yes
San Remo	quarterly	4	0	<0.001	Yes
Ventnor	quarterly	4	0	<0.001	Yes

*Kilcunda data includes Dalyston area data, both these locations were sampled quarterly.

3.8.2 Cadmium

Based on health considerations, the ADWG guideline value is set at 0.002 mg/L. The cadmium concentration complied with this guideline value at all locations during the reporting period.

Table 3-16 Cadmium

Water Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	quarterly	4	0	<0.0002	Yes
Cape Woolamai	quarterly	4	0	<0.0002	Yes
Corinella	quarterly	4	0	<0.0002	Yes
Cowes	quarterly	4	0	<0.0002	Yes
Grantville	quarterly	4	0	<0.0002	Yes
Kilcunda	twice quarterly*	8	0	<0.0002	Yes
Rhyll	quarterly	4	0	<0.0002	Yes
San Remo	quarterly	4	0	<0.0002	Yes
Ventnor	quarterly	4	0	<0.0002	Yes

*Kilcunda data includes Dalyston area data, both these locations were sampled quarterly.

3.8.3 Copper

Based on health considerations, the ADWG guideline value is set at 2 mg/L for health considerations and 1 mg/L for aesthetics. The copper concentration complied with both guideline values at all locations during the reporting period.

Table 3-17 Copper

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.10	Yes
Cape Woolamai	monthly	12	0	0.03	Yes
Corinella	monthly	12	0	0.07	Yes
Cowes	monthly	14	0	0.07	Yes
Grantville	monthly	12	0	0.10	Yes
Kilcunda	twice monthly*	24	0	0.21	Yes
Rhyll	monthly	12	0	0.11	Yes
San Remo	monthly	12	0	0.15	Yes
Ventnor	monthly	12	0	0.24	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

The samples taken for analysis were taken from the reticulation mains. Copper or iron levels may be higher at customer's internal taps, as a consequence of utilising copper plumbing. If a customer is experiencing copper staining or discolouration of their water, please contact the Customer Service Centre on 1300 720 711.

3.8.4 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 locations during the reporting period.

Table 3-18 Lead

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.004	Yes
Cape Woolamai	monthly	12	0	0.002	Yes
Corinella	monthly	12	0	0.002	Yes
Cowes	monthly	14	0	0.002	Yes
Grantville	monthly	12	0	0.001	Yes
Kilcunda	twice monthly*	24	0	0.001	Yes
Rhyll	monthly	12	0	0.002	Yes
San Remo	monthly	12	0	0.004	Yes
Ventnor	monthly	12	0	0.005	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.8.5 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 locations.

Table 3-19 Nickel

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	quarterly	4	0	<0.001	Yes
Cape Woolamai	quarterly	4	0	<0.001	Yes
Corinella	quarterly	4	0	<0.001	Yes
Cowes	quarterly	4	0	<0.001	Yes
Grantville	quarterly	4	0	<0.001	Yes
Kilcunda	twice quarterly*	8	0	<0.001	Yes
Rhyll	quarterly	4	0	<0.001	Yes
San Remo	quarterly	4	0	<0.001	Yes
Ventnor	quarterly	4	0	<0.001	Yes

*Kilcunda data includes Dalyston area data, both these locations were sampled quarterly.

3.8.6 Zinc

Based on aesthetic considerations, the ADWG guideline value is set at 3 mg/L. The zinc concentration complies with this guideline value at all locations.

Table 3-20 Zinc

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.02	Yes
Cape Woolamai	monthly	12	0	0.03	Yes
Corinella	monthly	12	0	0.05	Yes
Cowes	monthly	14	0	0.22	Yes
Grantville	monthly	12	0	0.02	Yes
Kilcunda	twice monthly*	24	0	0.01	Yes
Rhyll	monthly	12	0	0.08	Yes
San Remo	monthly	12	0	0.10	Yes
Ventnor	monthly	12	0	0.04	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.8.7 Manganese

The ADWG guideline value is set at 0.5 mg/L for health considerations and 0.1 mg/L for aesthetics. The manganese results met both ADWG guideline values (for health and aesthetics) in all sampling localities.

Table 3-21 Manganese

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	fortnightly	26	0	0.024	Yes
Cape Woolamai	fortnightly	26	0	0.009	Yes
Corinella	fortnightly	26	0	0.007	Yes
Cowes	fortnightly	26	0	0.013	Yes
Grantville	fortnightly*	52	0	0.022	Yes
Kilcunda	fortnightly	26	0	0.018	Yes
Rhyll	fortnightly	26	0	0.010	Yes
San Remo	fortnightly	26	0	0.011	Yes
Ventnor	fortnightly	26	0	0.011	Yes

Note: *Two sites within Grantville were sampled fortnightly, hence the doubled number of samples compared to other locations.

3.8.8 Raw Water Monitoring

Raw water is monitored all year round - the main reason for monitoring the raw water supply (Candowie Reservoir) is to detect change in water quality, allowing for pro-active management of water treatment processes. The schedule is shown in Table 3-22.

The quality of water in Candowie storage is affected by land-use practices, septic tanks etc, in the catchment. It is important to monitor the waterways that supply Candowie Reservoir for chemicals and pathogens that may affect human health, because they are likely to be of higher concentration, compared to the storage. Other water sources that are monitored are bore water, Bass River and Lance Creek Reservoir. These sources are monitored as regularly as Candowie storage, when in use.

At certain times of the year, algal blooms are likely, and frequency of monitoring and testing is increased in relation to the increased risk to water quality. Similarly, if chemicals such as manganese, iron or levels of Geosmin Methylisoborneol (MIB) are detected, an increase in sampling frequency would follow.

Table 3-22 Raw water monitoring schedule 2009/10

Location of Sample	Frequency of Sampling	Test (Parameter)
Off take- Raw Water into lab at Water Treatment Plant	Quarterly	Herbicide & Pesticides*
Off take- Raw Water into lab at Water Treatment Plant	Quarterly	Radiation**
Off take- Raw Water into lab at Water Treatment Plant	Quarterly	Cryptosporidium & Giardia
Reservoir- Surface, 1, 3, 7 & 9 meter samples	Fortnightly (or as required)	Algae (Cyanobacteria)
Raw Water into lab at Water Treatment Plant	Fortnightly (or as required)	MIB & Geosmin
Raw Water into lab at Water Treatment Plant	Weekly	Colilert (200) *E.coli*, Coliforms, Standard Plate Count DOC, EC
Raw Water into lab at Water Treatment Plant	Weekly	Fluoride
Raw Water into lab at Water Treatment Plant	Daily	Iron and manganese
Raw Water into lab at Water Treatment Plant	Daily	Turbidity, pH
Surface, 1,2,3,4,5,6,7,8,9,10 meter intervals	Fortnightly	Temperature, Dissolved Oxygen, Dissolved Oxygen, Saturation, pH & Electrical Conductivity @ 25c
Reservoir- Surface, 1, 3, 7 & 9 meter samples	Fortnightly	Nitrate, Nitrite, Ammonia Phosphorus, Silica, Iron and Manganese

*For pesticides and herbicides, all analyses results were below laboratory detection limit. Results and comparison to ADWG guideline values (where available) are presented in Table 3-23.

**For radiation, all analyses results were at or below detection limits, results are presented in Table 3-24.

Table 3-23 Herbicides and pesticides results and comparison to ADWG guidelines

Herbicide / Pesticide	Result	ADWG Guideline Value*	ADWG Health Value
	mg/L	mg/L	mg/L
Azinphos-methyl	<0.001	0.002	0.003
Bifenthrin	<0.001	-	-
Bromophos Ethyl	<0.001	-	0.01
Carbophenthion	<0.001	-	0.0005
Chlorfenvinfos E	<0.001	-	0.005
Chlorfenvinfos Z	<0.001	-	0.005
Chloropyrifos	<0.001	-	0.01
Chlorpyrifos-methyl	<0.001	-	-
cis-Isosafrole	<0.001	-	-
Cyfluthrin	<0.001	-	-
Cypermethrin	<0.001	-	-
Deltamethrin	<0.001	-	-
Diazinon	<0.001	0.001	0.003
Dichlorvos	<0.001	0.001	0.001
Dimethoate	<0.001	-	0.05
Ethion	<0.001	-	0.003
Fenamiphos	<0.001	-	0.0003
Fenthion	<0.001	-	-
Fenvalerate	<0.001	-	0.05
Malathion	<0.001	-	-
Methanesulfron Ethyl	<0.001	-	-
Methanesulfron Methyl	<0.001	-	0.03
Methyl Parathion	<0.001	-	-
Monocrotophos	<0.001	-	0.001
Parathion	<0.001	-	0.01
Permethrin	<0.001	0.001	0.1
Primophos-ethyl	<0.001	-	0.0005
Prothiofos	<0.001	-	-
Safrol	<0.001	-	-
trans-Isosafrole	<0.001	-	-

*These are generally based on the analytical limit of determination (the level at which the pesticide can be reliably detected using practicable, readily available and validated analytical methods). If a pesticide is detected at or above this value the source should be identified and action taken to prevent further contamination.

Table 3-24 Radiation results and comparison to ADWG guidelines

Radiation	Maximum Result	Guideline value
	Bq/L	Bq/L
Gross Alpha	0.03	0.5
Gross Beta	<0.08	0.5

3.9 Aesthetics

3.9.1 pH

3.9.1.1 Results

The ADWG (aesthetic) guideline value for pH is between 6.5 and 8.5. The pH of water supplied was within this range for all localities except for Cowes and Ventnor.

Table 3-25 pH

Locality	Frequency of Sampling	No. of Samples	Min	Max	Mean	Complying (Yes/No)
Bass	weekly	52	6.7	7.4	7.2	Yes
Cape Woolamai	weekly	52	7.0	7.5	7.3	Yes
Corinella	weekly	52	7.0	8.0	7.4	Yes
Cowes	weekly	57	7.3	8.7	7.6	No**
Grantville	weekly	52	7.1	8.1	7.4	Yes
Kilcunda	twice weekly*	104	6.9	8.0	7.5	Yes
Rhyll	weekly	52	7.1	7.7	7.4	Yes
San Remo	weekly	52	7.0	7.6	7.3	Yes
Ventnor	weekly	52	7.2	8.9	7.8	No**

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled weekly. **Cement mortar lined pips can significantly increase pH and a value up to 9.2 may be tolerated provided monitoring indicates no deterioration in microbial quality (Source: ADWG).

3.9.1.2 Actions in Relation to Guideline Non-compliance

Westernport Water exceeded the ADWG guideline value of between 6.5 and 8.5 for pH at two localities in the 2009/10 reporting period as seen in Figure 3-3. No actions were taken as there was no notification from ALS (Westernport Water's laboratory service provider) of the non-complying samples. The exceedance alert feature within ALS's laboratory information management system was linked to the incorrect program and therefore did not bring the exceedance alert to the attention of ALS's data manager. This has since been rectified.

Quarterly flushing programs have also been developed for the Cowes and Ventnor areas in response to the elevated pH readings. These programs will be implemented in 2010/2011.

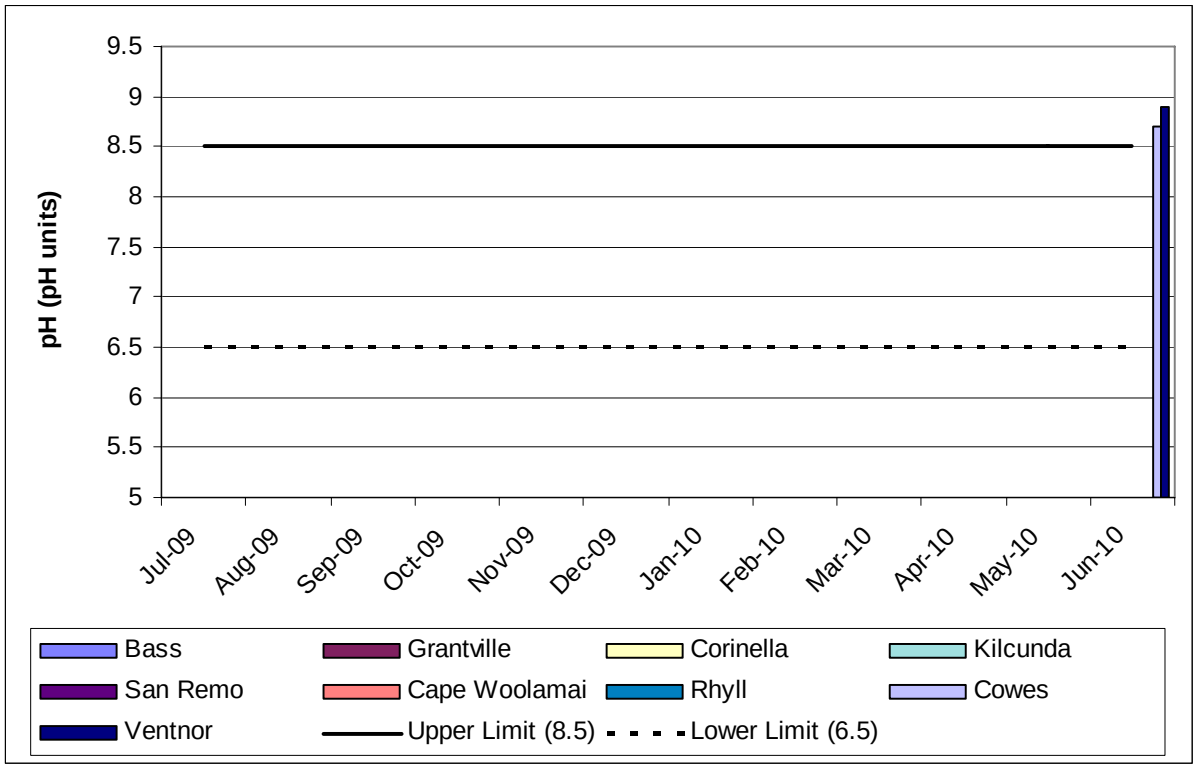


Figure 3-3 Non-conforming maximum pH results for the period July 2009 to June 2010 (where more than one non-compliance within a month has occurred, only the highest value is displayed)

3.9.2 Iron

Based on aesthetic considerations, the ADWG guideline value is set at 0.3 mg/L. No health-based guideline value has been set. The water quality with respect to iron concentrations showed an exceedance at Ventnor in April 2010.

Table 3-26 Iron

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	fortnightly	27	0	0.04	Yes
Cape Woolamai	fortnightly	27	0	0.05	Yes
Corinella	fortnightly	27	0	0.03	Yes
Cowes	fortnightly	27	0	0.06	Yes
Grantville	fortnightly	27	0	0.10	Yes
Kilcunda	twice fortnightly*	54	0	0.04	Yes
Rhyll	fortnightly	27	0	0.06	Yes
San Remo	fortnightly	27	0	0.05	Yes
Ventnor	fortnightly	27	1	0.36	No

*Kilcunda data includes Dalyston area data, both these locations were sampled fortnightly.

The samples taken for analysis were taken from the reticulation mains. Copper or iron levels may be higher at customer's internal taps, as a consequence of utilising copper plumbing. If a customer is experiencing copper staining or discolouration of their water, please contact the Customer Service Centre on 1300 720 711.

3.9.2.1 Actions in Relation to Guideline Non-compliance

Westernport Water exceeded the ADWG guideline value for iron at Ventnor on 13th April 2010. No actions were taken as there was no notification from ALS (Westernport Water's laboratory service provider) of the non-complying samples. The exceedance alert feature within ALS's laboratory information management system was linked to the incorrect program and therefore did not bring the exceedance alert to the attention of ALS's data manager. This has since been rectified.

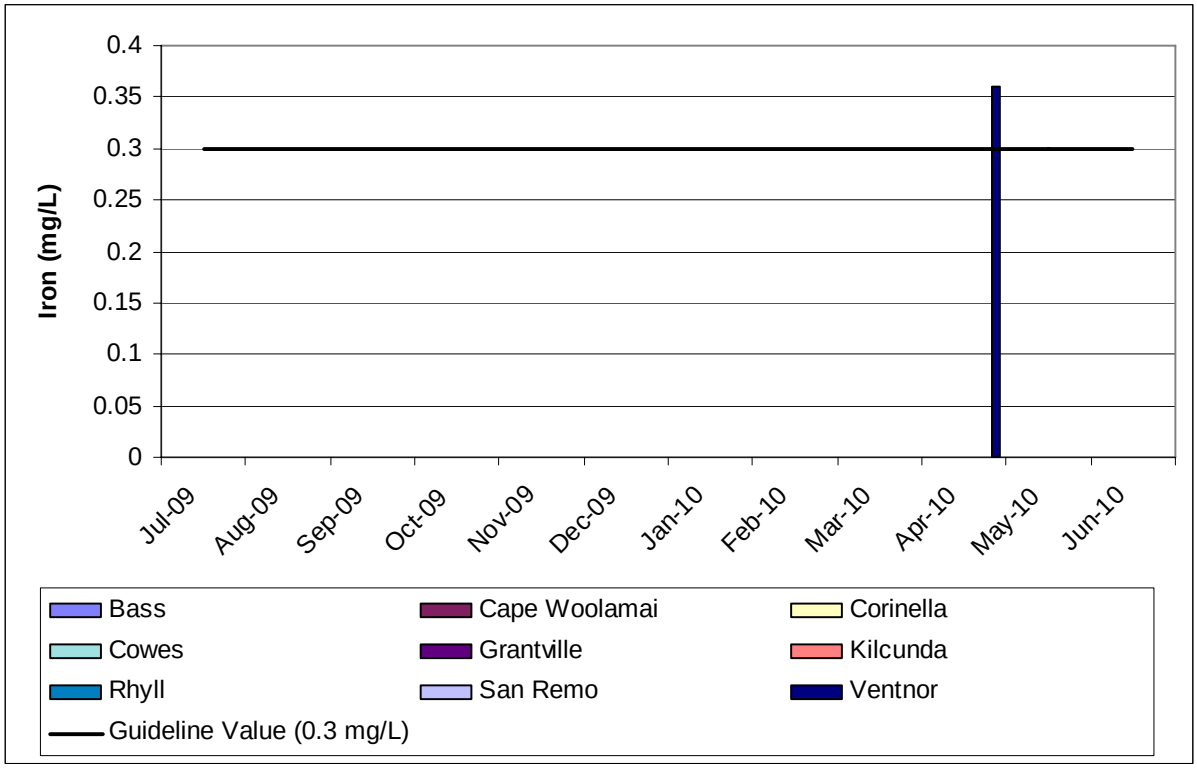


Figure 3-4 Non-conforming maximum Iron results for the period July 2009 to June 2010

4 Analysis of Results

Westernport Water's compliance with the *Safe Drinking Water Act and Regulation* over the last four reporting periods are summarised in the following section.

4.1 Drinking Water Quality Standards

4.1.1 E. coli

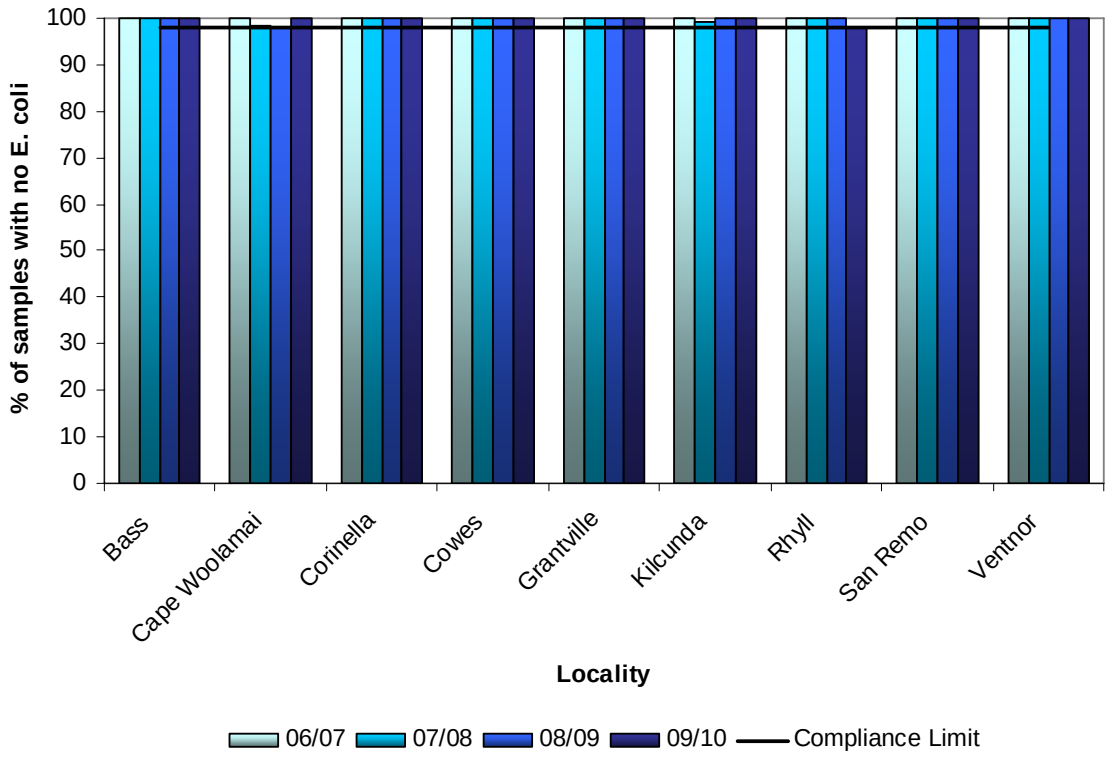


Figure 4-1 Percentage of samples with no *E. coli* from July 2006 to June 2010

Results for the 2009-10 period show that all test results were above the compliance limit, and that this trend has continued since 2006-07.

4.1.2 Monochloroacetic Acid

A graph is not presented as the results have been less than the detection limit for the last four years.

4.1.3 Dichloroacetic Acid

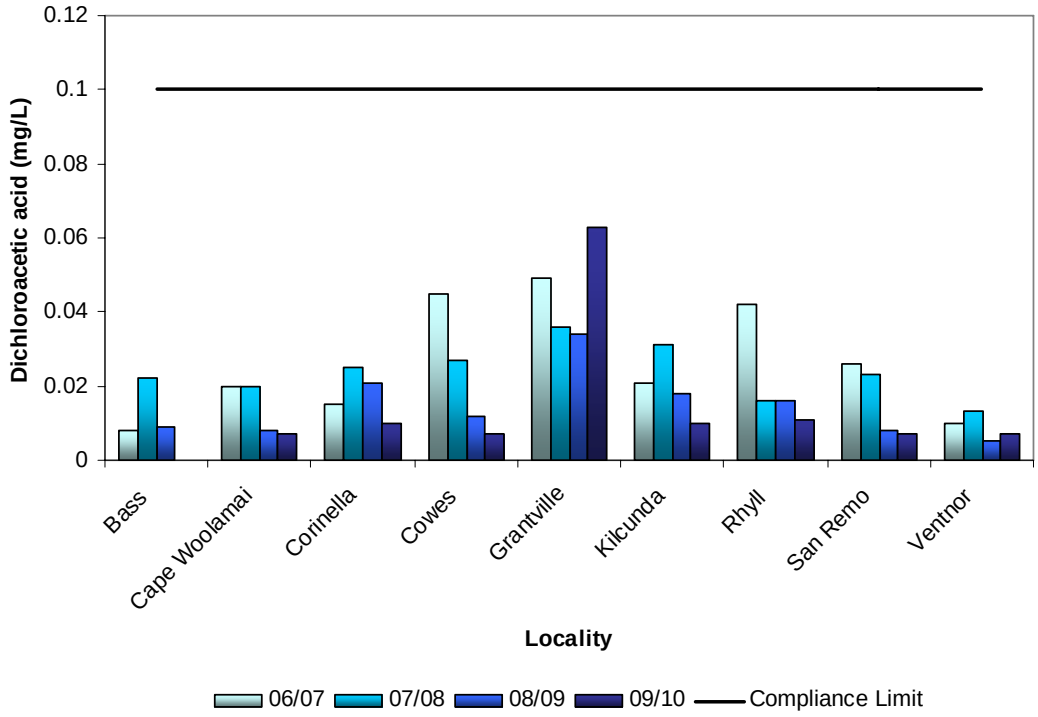


Figure 4-2 Maximum dichloroacetic acid concentration from July 2006 to June 2010

4.1.4 Trichloroacetic Acid

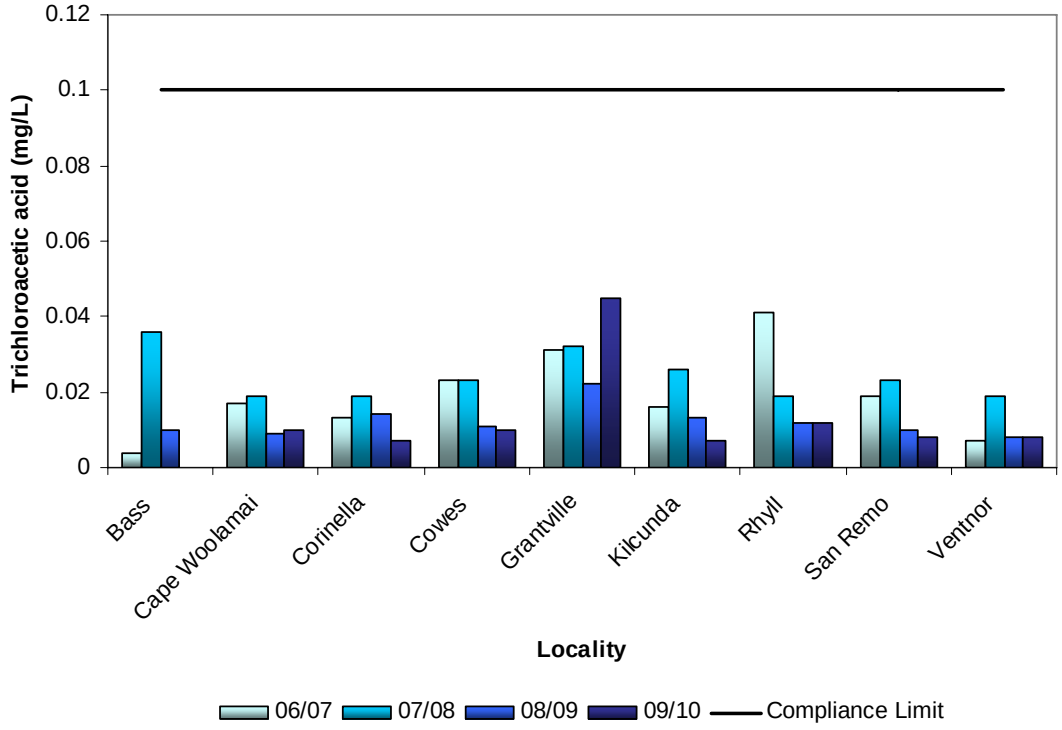


Figure 4-3 Maximum trichloroacetic acid concentration from July 2006 to June 2010

4.1.5 Trihalomethanes

The water quality standard of 0.25 mg/L for total THMs was exceeded at one location during 2009/10 (Grantville in February 2010). With an upgrade to the IBWPP's chemical dosing system in 2007, the total THM concentration decreased to below regulation guideline value as plant operators were able to control the chlorine dosing more efficiently (see Figure 4-4).

A THM reduction strategy, involving regular air scouring and flushing of the reticulation system and powder activated carbon dosing at the IBWPP delivers improved performance of the system and reduced THM levels. Powder activated carbon dosing at the IBWPP is now maintained all year round at approximately 1 ppm. This dose rate can deviate depending on the raw water quality. The effectiveness of these strategies can be seen in the improvement to water quality in 2008/09 and 2009/10.

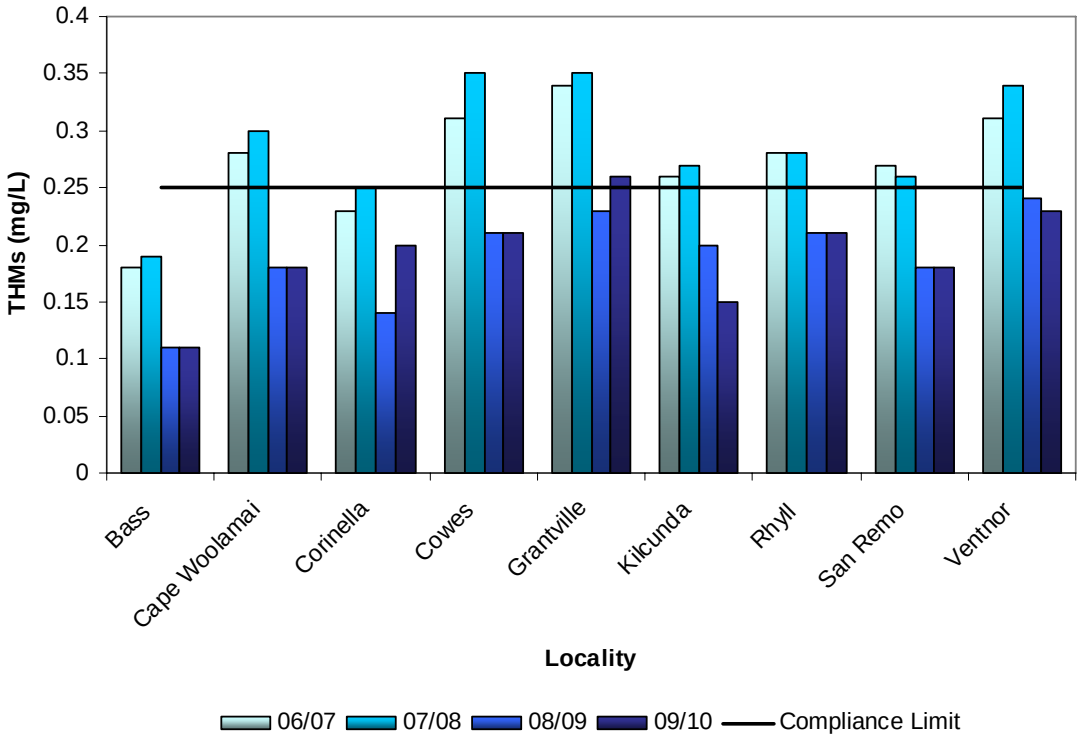


Figure 4-4 Maximum THM concentration from July 2006 to June 2010

4.1.6 Aluminium

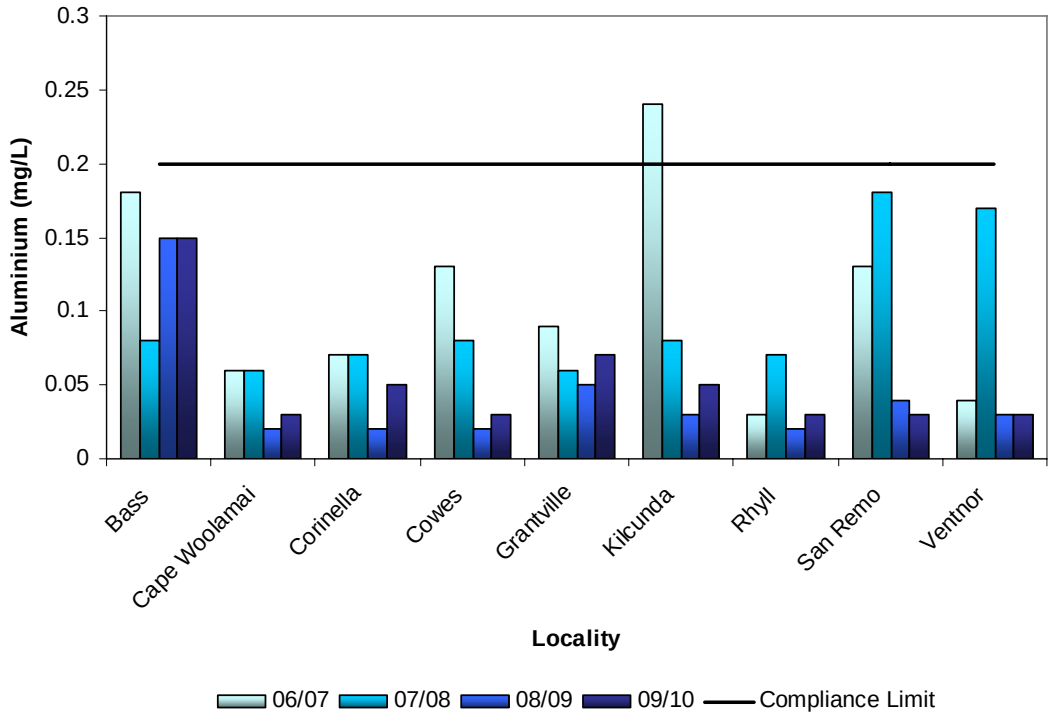


Figure 4-5 Maximum aluminium concentration from July 2006 to June 2010

Note: Kilcunda data for 2006/07 is graphically demonstrated above the limit but is considered compliant due to the Dept of Health data rounding.

4.1.7 Turbidity

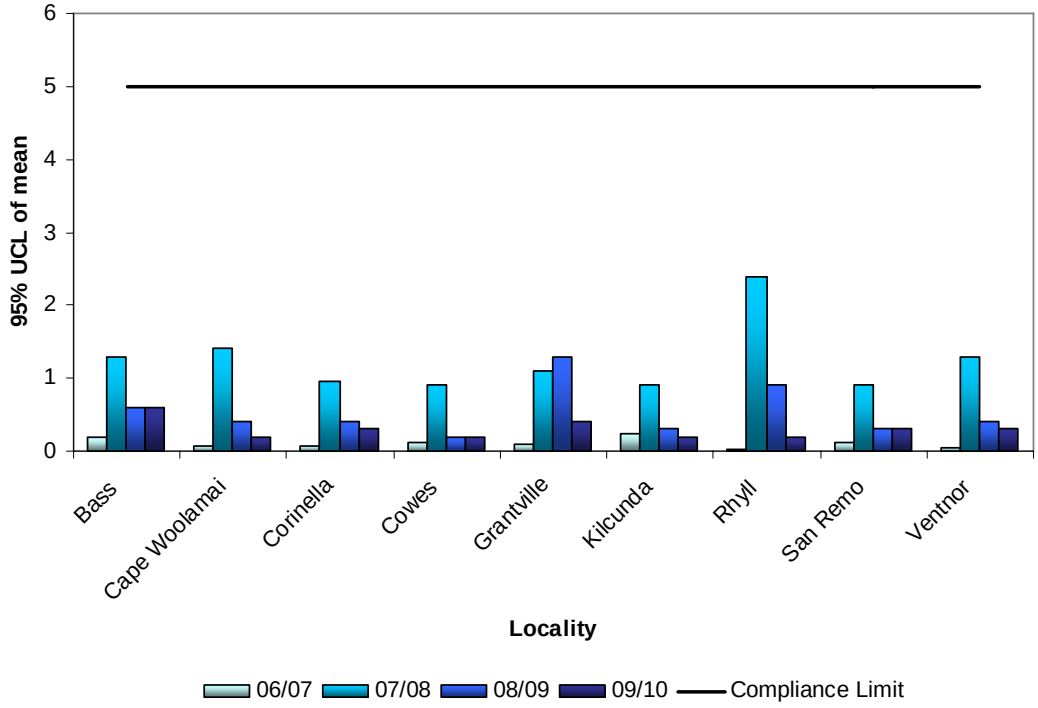


Figure 4-6 Turbidity 95% UCL (upper confidence limit) of mean - July 2006 to June 2010

4.1.8 Overall

Over the years, Westernport Water has achieved a high level of compliance with respect to all Schedule 2 parameters except for THMs (see Figure 4-7 and Figure 4-8). A THM reduction strategy was developed and trials undertaken to reduce the natural organic matter levels in the treated water has proven to be successful in contributing to the reduction in THMs.

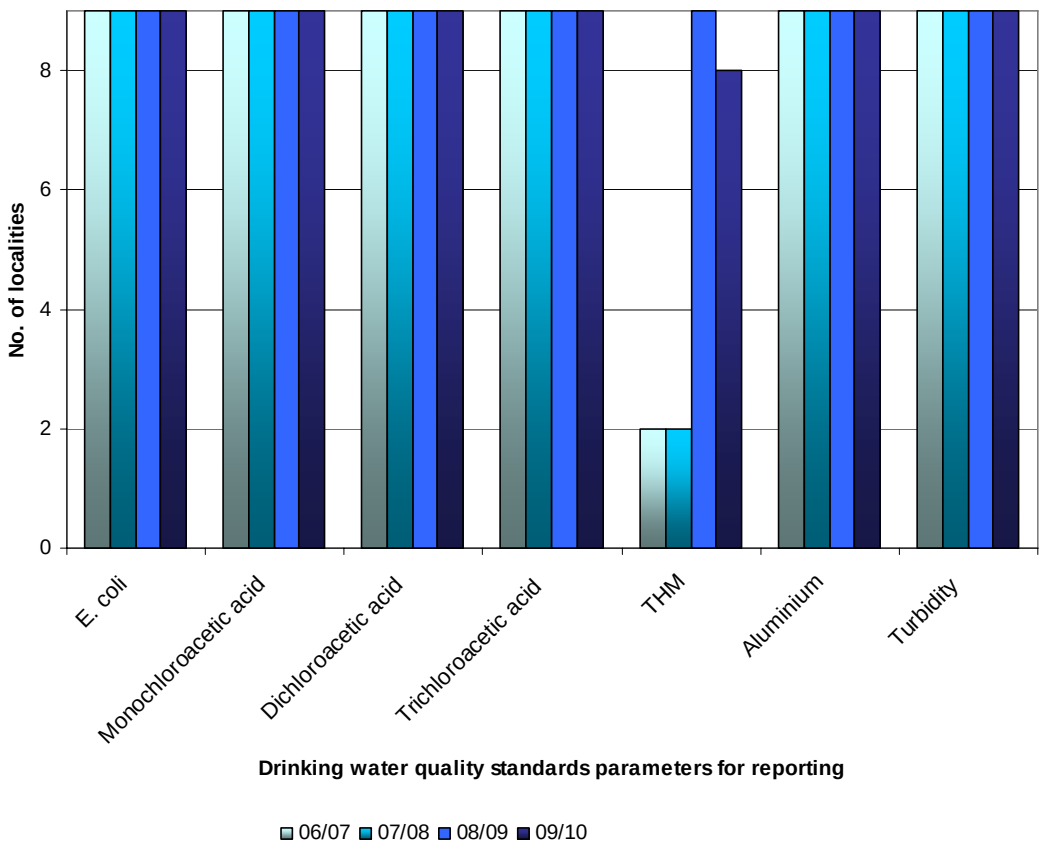


Figure 4-7 Number of localities (out of 9) that were compliant with the parameters in Schedule 2 of the Drinking Water Regulation

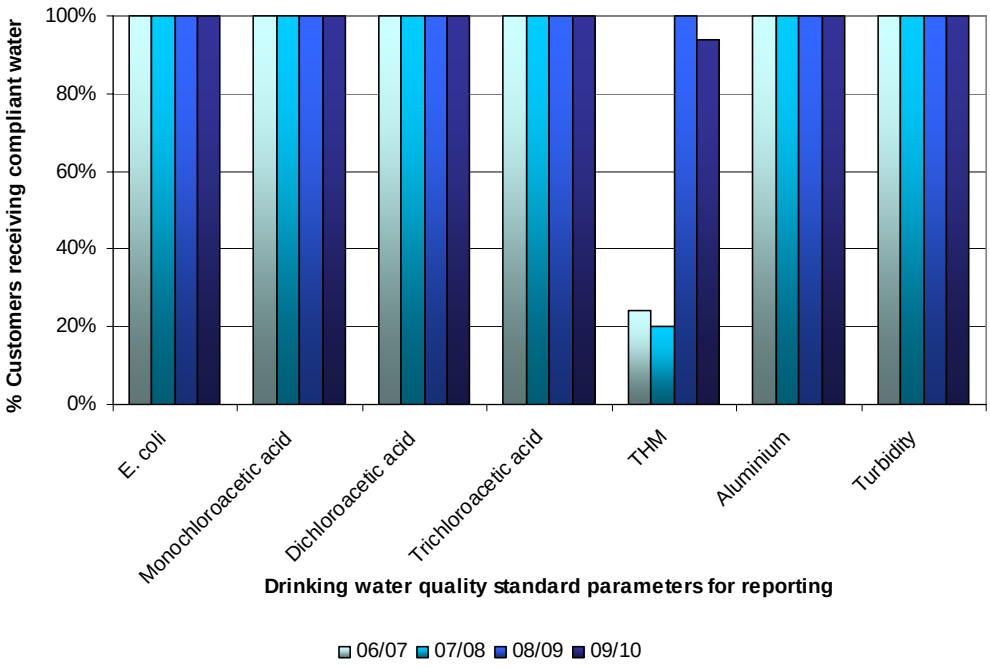


Figure 4-8 Percentage of customers supplied with drinking water that was compliant with the standard[1]

[1] Population statistics were based on 2004 and 2006 national regional profile data from the Australian Bureau of Statistics website www.abs.gov.au.

4.2 Other Parameters

4.2.1 Free Chlorine

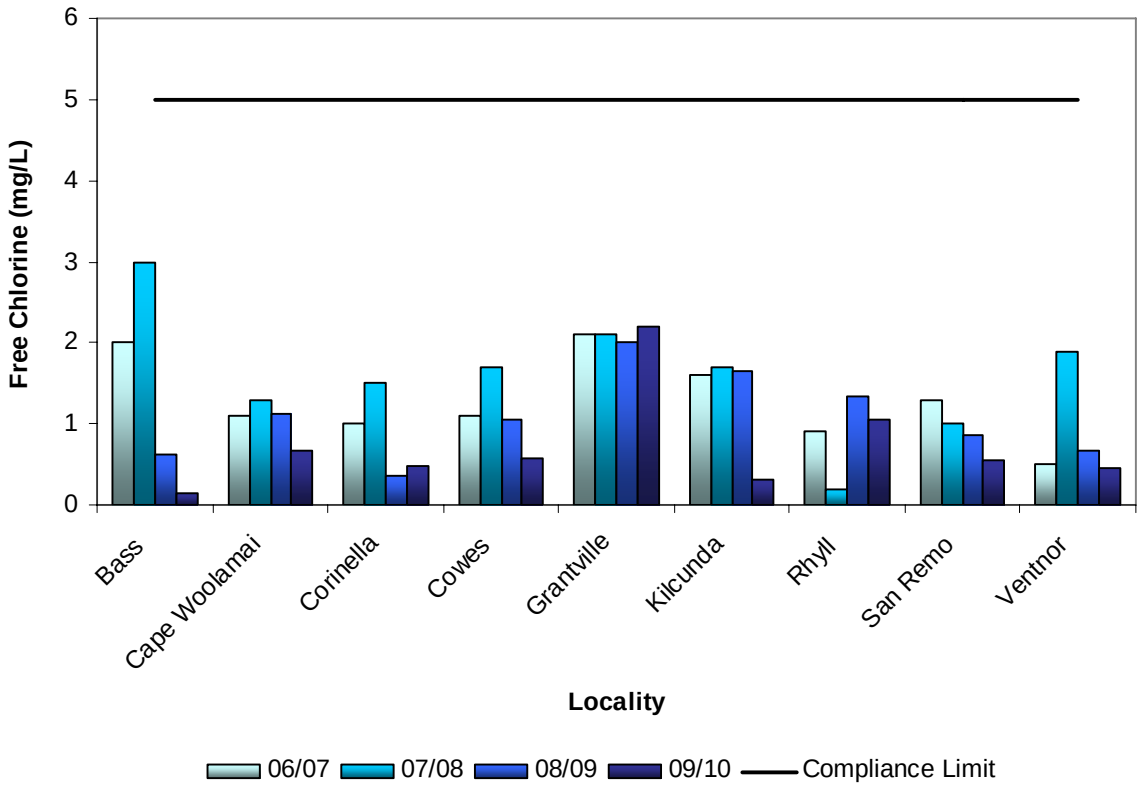


Figure 4-9 Maximum free chlorine concentration from July 2006 to June 2010

4.2.2 pH

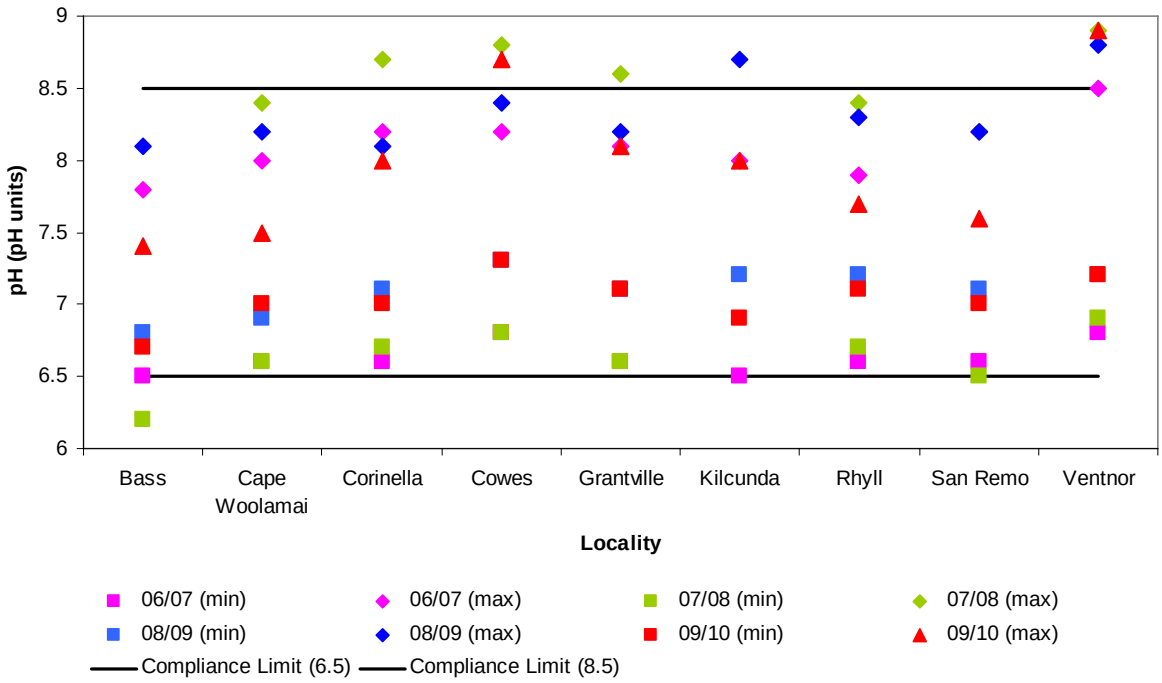


Figure 4-10 pH from July 2006 to June 2010

The pH results were outside the ADWG guideline values in 6 locations in 2007/08, the problem areas were flushed as a result of non-compliance and no further action was required, following satisfactory re-testing. In 2008/09, two localities exceeded the upper pH guideline value of 8.5. As these were minor, the problem areas were flushed and no further actions were required. Two localities: Cowes and Ventnor exceeded the upper pH guideline value during 2009/10. No actions were taken as there was no notification from ALS (Westernport Water's laboratory service provider) of the non-complying samples. The exceedance alert on ALS's laboratory information management system was linked to the incorrect program and therefore did not bring the exceedance alert to the attention of ALS's data manager. This has since been rectified.

Quarterly flushing programs have also been developed for the Cowes and Ventnor areas in response to the elevated pH readings. These programs will be implemented in 2010/2011.

4.2.3 THM Components

The reduced number of non-compliances in total THMs (see Figure 4-11 to Figure 4-14) was due to a number of reasons:

- upgrade of the IBWPP control system provided better control over chlorine dosing;
- the implementation of the THM reduction strategy (combination of regular air scouring and flushing in the reticulation system and powder activated carbon dosing at IBWPP); and
- relocation of secondary disinfection sites within the reticulation system.

In addition, two chloramination trials at Kilcunda and Corinella were successfully implemented. Customer feedback and improved water quality outcomes have encouraged the Corporation to implement a regional solution in 2010/11.

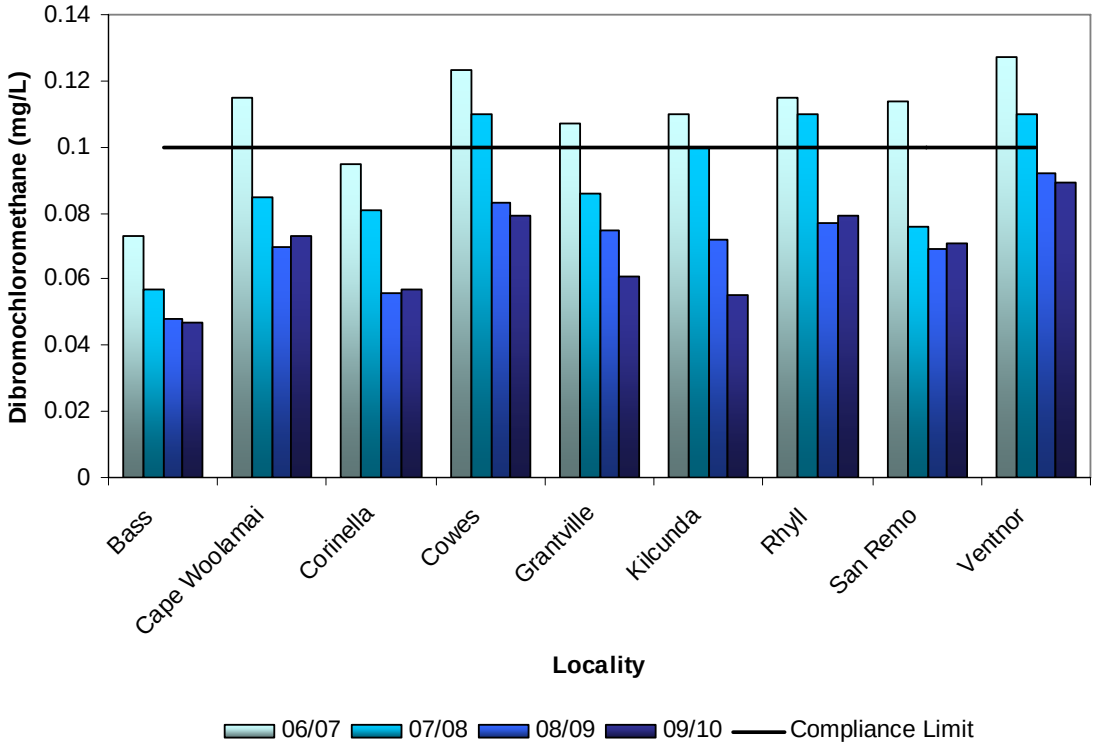


Figure 4-11 Maximum dibromochloromethane concentration from July 2006 to June 2010

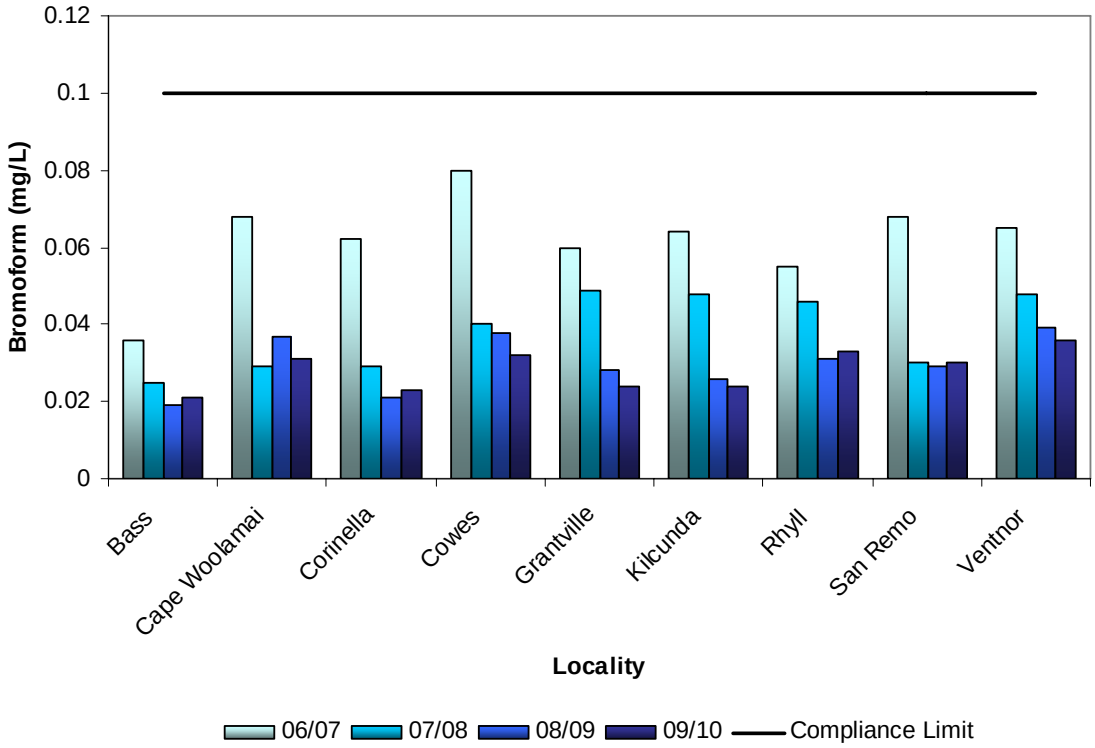


Figure 4-12 Maximum bromoform concentration from July 2006 to June 2010

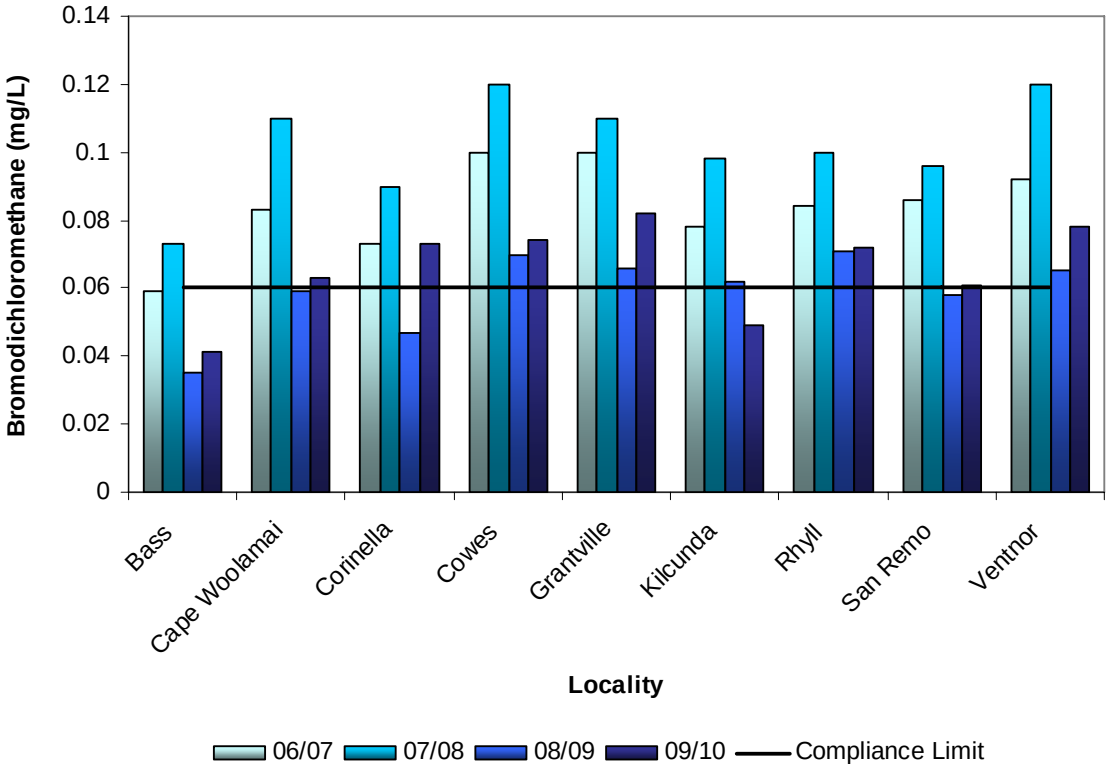


Figure 4-13 Maximum bromodichloromethane concentration from July 2006 to June 2010

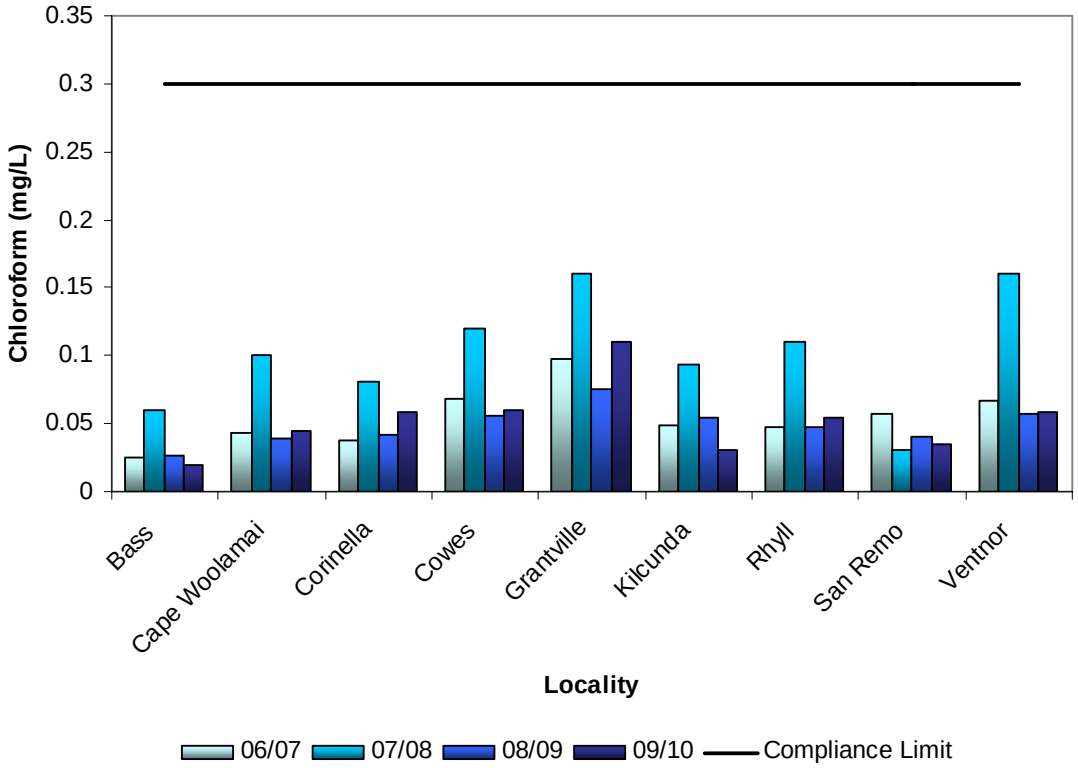


Figure 4-14 Maximum chloroform concentration from July 2006 to June 2010

4.2.4 Metals

All metal concentrations complied with ADWG health based guideline values except for and lead in Cowes in 2006/07 and Corinella in 2006/07 and 2008/09.

Other ADWG metal concentrations complied with the aesthetic guideline values except for copper in Ventnor in 2006/07, iron multiple locations in all reporting periods and manganese at Bass, Grantville and Corinella in 2006/07 and Bass and Kilcunda in 2007/08.

The iron exceedance was due to air scouring of the mains, however, the cause of the lead exceedance was difficult to determine. In both cases, the reticulation system was flushed in the appropriate areas where non-compliances were detected.

Results are shown in Figure 4-15 to Figure 4-20.

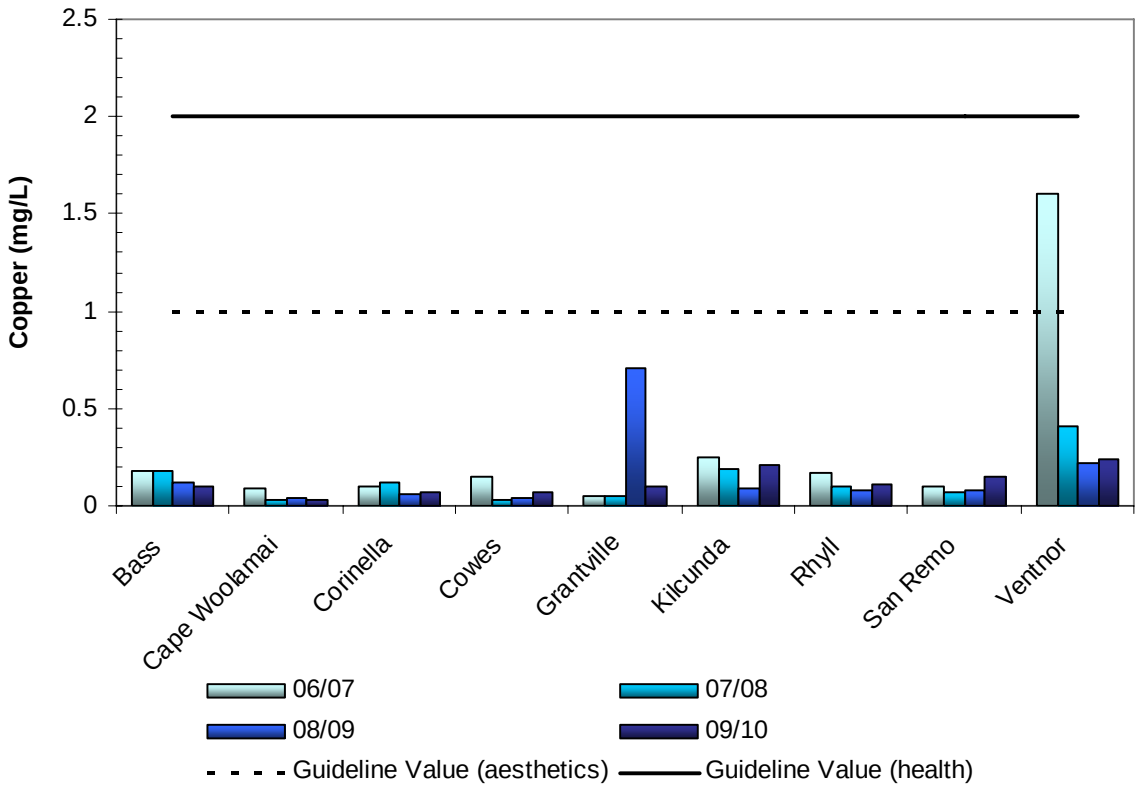


Figure 4-15 Maximum copper concentration from July 2006 to June 2010

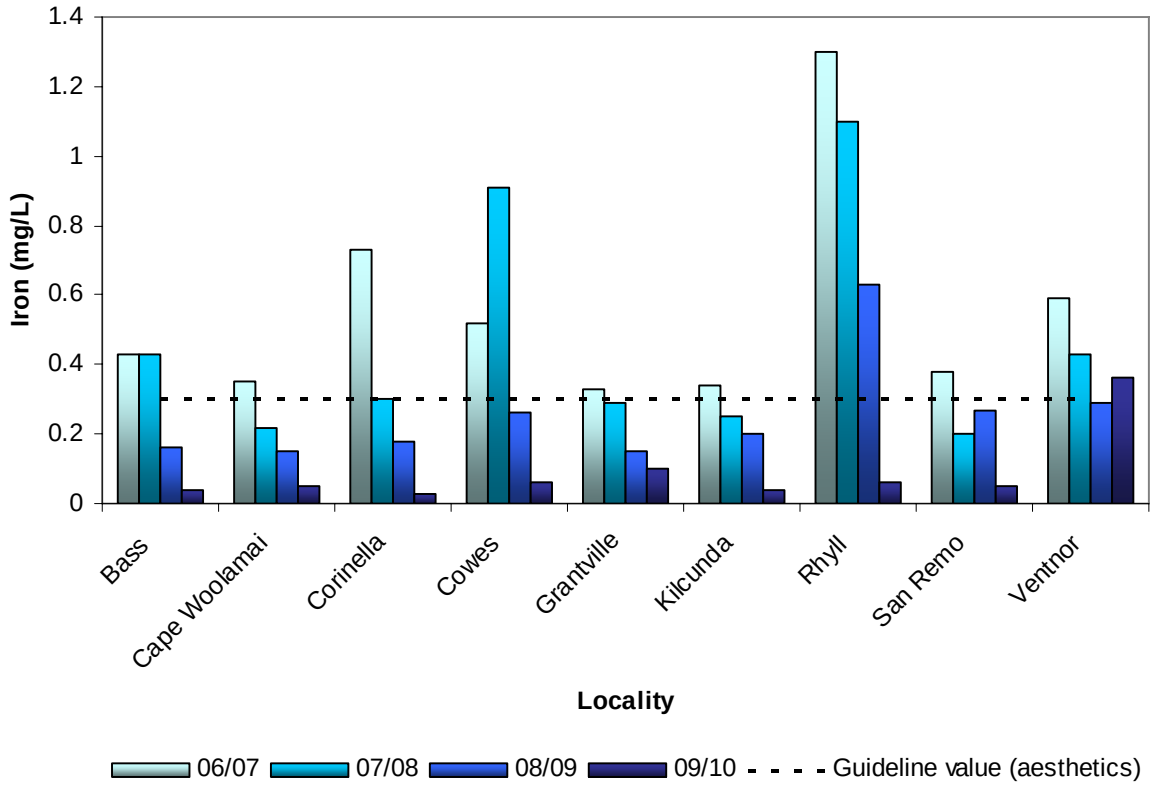


Figure 4-16 Maximum iron concentration from July 2006 to June 2010

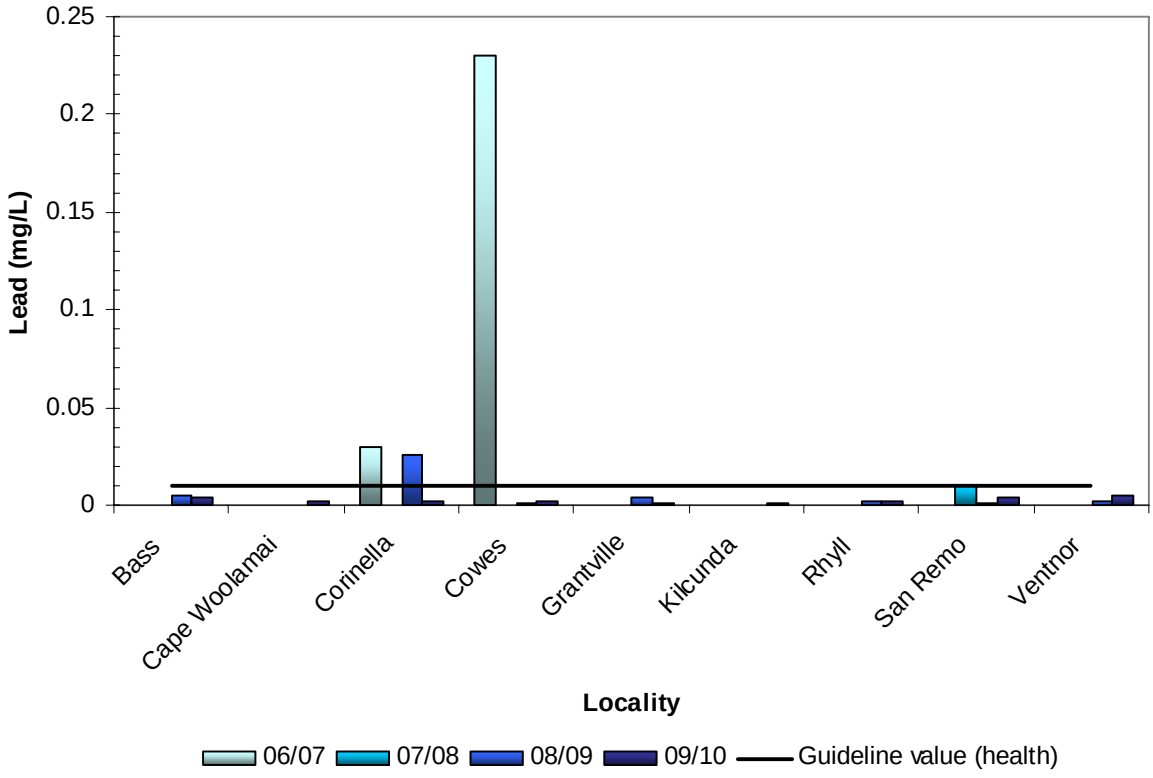


Figure 4-17 Maximum lead concentration from July 2006 to June 2010

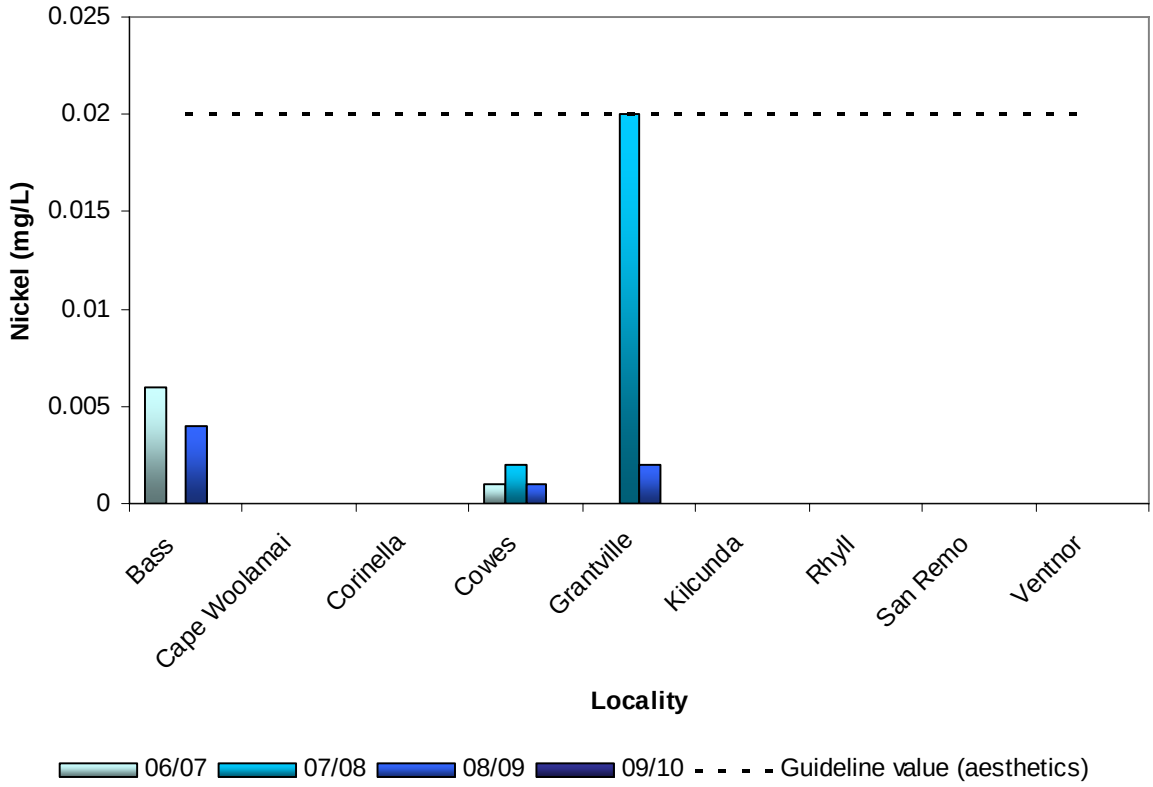


Figure 4-18 Maximum nickel concentration from July 2006 to June 2010

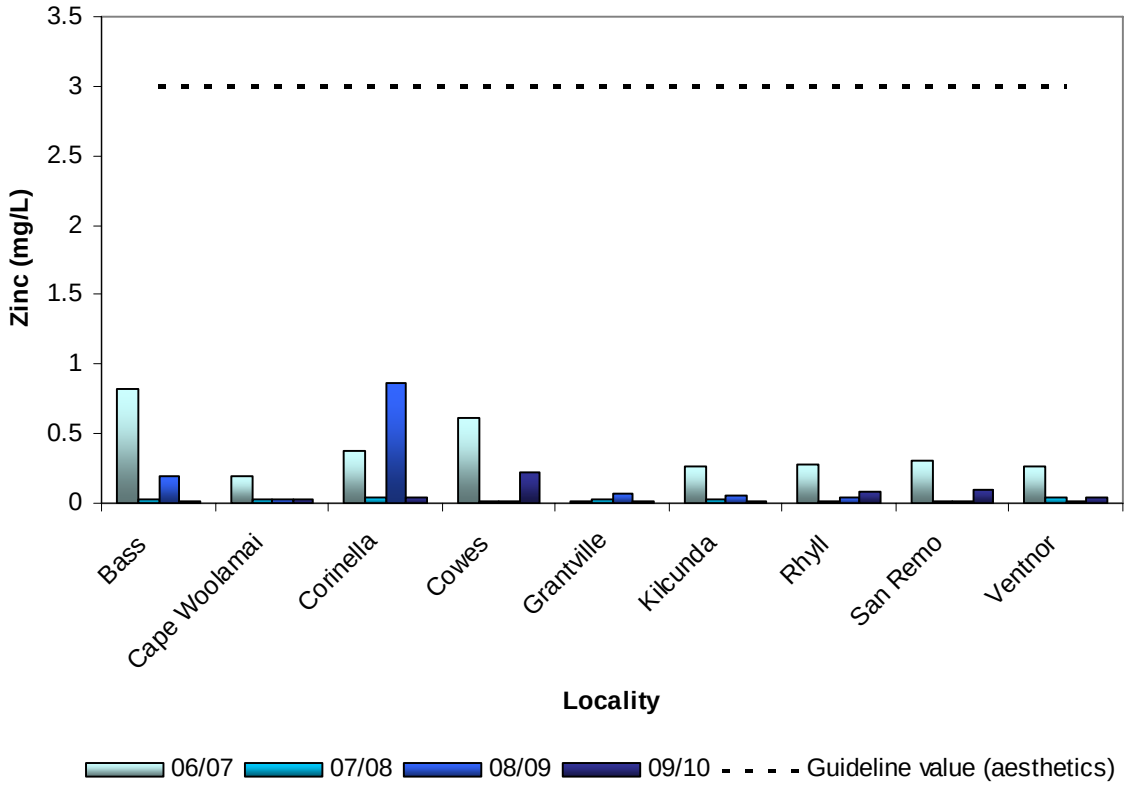


Figure 4-19 Maximum zinc concentration from July 2006 to June 2010

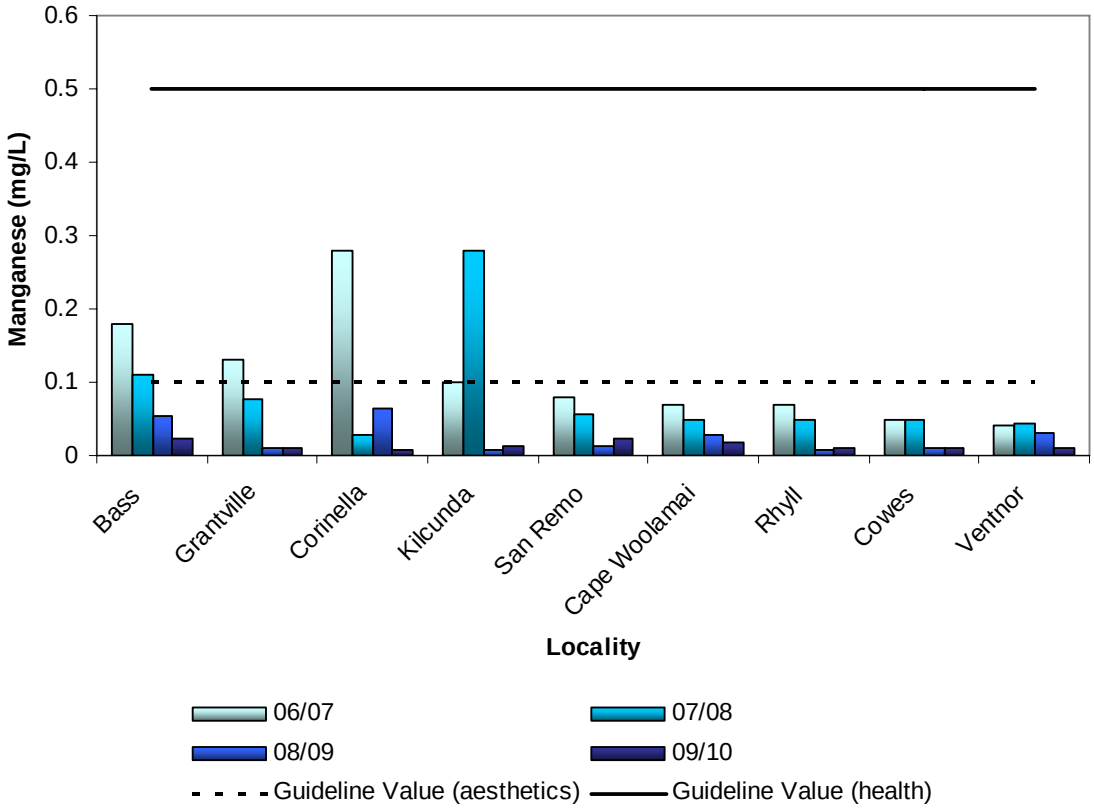


Figure 4-20 Maximum manganese concentration from July 2006 to June 2010

5 Emergency and Incident Management

The management of reportable incidents that occurred during 2009/10 (including water quality incidents at customer taps and Candowie Reservoir) are presented below in Section 5.1. Information on the Corporation's emergency preparedness is provided in Section 5.2.

5.1 Reportable Events under Section 22

A sample taken on 17 March 2010 from Beach Street, Rhyll had a positive *E. coli* reading of 1 org/100mL and DOH was notified under section 22 of the Safe Drinking Water Act. The pipe network in the vicinity of Beach Street was flushed with water having a free chlorine residual of 0.22 mg/L. The site was resampled on 18 March 2010 and the result showed zero *E. coli*.

5.1.1 Other events not reportable under Section 22 but had a potential impact on drinking water quality.

A water sample taken on 9th February 2010 from Lot 5 Glen Alvie Road, Grantville had a THM reading of 0.26 mg/L which was 0.01 mg/L above the limit of 0.25 mg/L. This incident was reported to the Department of Health under Section 18 of the Act. The non complying sample was resampled on 17th February 2010 and sent to ALS for analysis. Action taken to manage this non complying sample includes a SCADA level control of the tank was installed and as a consequence, the tank detention time has almost halved (i.e. the turn over time has increased within the tank), improving total THM results from water supplied in this sampling locality. The retested sample recorded 0.15 mg/L THM – well below the 0.25 mg/L limit.

A sample taken on 13th April 2010 from 1320 Ventnor Rd, Ventnor had an iron concentration of 0.36 mg/L. No actions were taken as there was no notification of this non-conforming sample from ALS (Westernport Water's laboratory service provider). ALS have since rectified these issues with notification of exceedance alerts by updating and improving their laboratory information management system. This issue regarding ALS's laboratory information system was also responsible for the following two incidents.

A sample taken on 1st June 2010 from 107 Red Rocks Road, Cowes had a pH reading of 8.7. No actions were taken as there was no notification of this non-conforming sample from ALS (Westernport Water's laboratory service provider). ALS have since rectified these issues with exceedance alerts from their laboratory information management system.

A sample taken on 8th June 2010 from 15-18 Beach St, Ventnor had a pH reading of 8.9. No actions were taken at the time as there was no notification of this non-conforming sample from ALS (Westernport Water's laboratory service provider). ALS have since rectified these issues with exceedance alerts from their laboratory information management system. A re-test of ALS's laboratory reporting system has confirmed these non-conformances are now reported properly.

5.2 Emergency Preparedness

As part of the Corporation's Incident and Emergency Management Plan, scenarios are regularly developed to test the organisation's capacity to respond to and manage various incidents.

In December 2009, a scenario involving a mock threat to the water supply network from a bushfire, caused by lightning strike at the Gurdies Nature Conservation Reserve during a spell of hot weather, was successfully tested by the Corporation. The exercise included Westernport Water staff, contractors and the following agencies: Country Fire Authority, Police, Department of Sustainability and Environment and Bass Coast Shire Council.

The objective of the exercise included:

1. To demonstrate appropriate response & actions in the event of a wild fire threat.

2. To demonstrate that WPW response and Incident Management organisation structure (for the scenario) is effective.

3. To demonstrate that WPW communicates effectively (for the scenario) to the appropriate staff.

4. To demonstrate that WPW communicates effectively (for the scenario) with external stakeholders, lead agencies & or other parties impacted.

5. To test the effectiveness of the WPW Incident & Emergency Management Plan.

6. To exercise our plans and Emergency Response training in a practical exercise.

Westernport Water is responsible for providing water and sewerage services to customers following an emergency. The primary objective in an emergency is to restore these essential services to affected communities as soon as practicable. Westernport Water would provide interim steps such as the provision of bottled water and removal of domestic wastewater through cartage until affected services are restored.

The exercise was successful and provided an opportunity to ensure WPW staff were up to date with protocols, and ensuring preparedness in emergencies.

6 Complaints relating to water quality

6.1 Summary of Complaints

The number of potable water quality complaints reported to Westernport Water during the 2009/10 annual reporting period slightly increased from last reporting period. There were a number of complaints due to works which enable Westernport Water to swab out the supply main. These works were completed over an 8-10 week period between 31 March and 24 June 2010. A summary of the complaints in 2008/09 and 2009/10 can be found in Table 6-1.

Table 6-1 Table of complaints

	Total No. of complaints in 2009/10	Rate per 100 customers* in 2009/10	Total No. of complaints in 2008/09	Rate per 100 customers* in 2008/09
Discoloured Water	17	0.12	16	0.12
Taste and Odour	19	0.13	14	0.11
Blue Water	0	0.00	1	0.01
Illness	0	0.00	0	0
Other	11	0.08	9	0.07
Total	47	0.33	40	0.3

* This is based on a permanent population serviced of 13,182 as determined by the 2006 Australian Census (www.abs.gov.au).

The majority of complaints were in the category of Taste and Odour totalling 19. In general, complaints were resolved through call-backs to the customer, site visits to discuss issues and maintenance (i.e. mains flushing).

The Corporation believes that the minor increase in discoloured water and taste and odour was related to the works undertaken on the transfer main. As previously reported in Section 2.1.1 a number of in-line valves were replaced during the year as a precursory action that now allows the Corporation to implement a regular cleaning program of the transfer main. It is anticipated that these works will contribute to further improvements in water quality and reductions in the number of complaints.

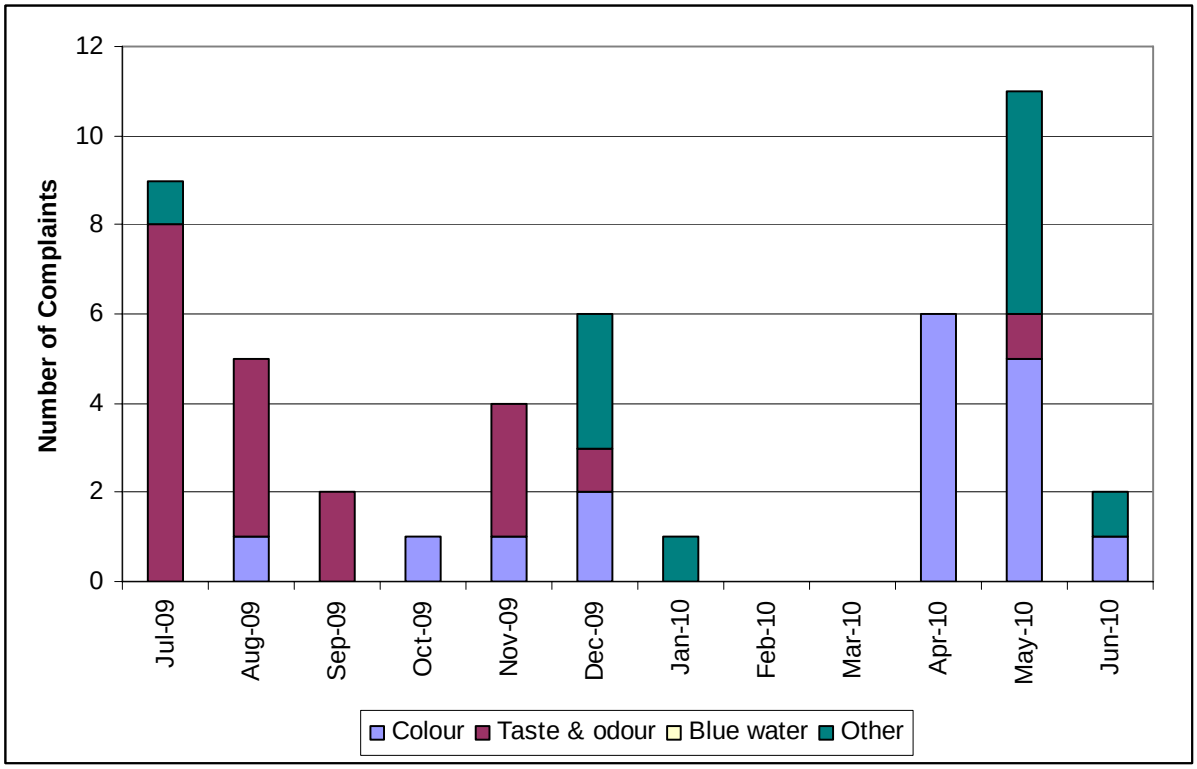


Figure 6-1 Customer complaints for 2009/10 reporting period

6.2 Complaints Response Procedure

Westernport Water is committed to providing their customers with ongoing quality water and services. A customer service division manages customer complaints and each complaint is lodged using a complaints form called the MERIT Request Form. Depending on the nature of the complaint, the details are electronically forwarded to the Assets and Operations group 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 compliant 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 Mn and/or Fe in raw water; and
- explain to the complainant the multiple barriers and rigorous sampling and testing regime employed to provide a safe and aesthetically acceptable water.

7 Risk Management Plan Audit Outcomes

Westernport Water is committed to supplying the best possible quality water to their customers. A detailed Water Quality Risk Management Plan (WQRMP) was developed in March 2008 to ensure that the risks are identified and managed to maintain a high water quality level. Parsons Brinckerhoff was engaged to conduct an external audit of the Westernport Water Drinking Water Risk Management Plan, related documents and practices to determine its compliance with the obligations imposed by section 7(1) of the *Safe Drinking Water Act*. The audit was performed during October 2009 covering the period from 1 January 2009. All auditable elements were deemed compliant.

Several opportunities for improvement were identified:

1. the annual risk profile review make use of historical water quality data to enable the identification of any trends in raw and drinking water quality that might not have resulted in an exceedance, but might be trending towards one
2. A response protocol be developed for the incidence of *Cryptosporidium* and *Giardia.*
3. Update some control point targets and limits in the WQRMP
4. Update control point summaries to include corrective actions
5. Separate reporting of *Cryptosporidium* and *Giardia* to increase turnaround time
6. Develop procedure for use of alternate offtakes in the event of a water quality incident
7. Update action plans in the WQRMP
8. Update WQRMP to reflect the ongoing review program
9. Develop procedure for formal acceptance and chemical check prior to chemical delivery
10. Review training requirements for Water Treatment Plant Operators and Distribution System Operators.

All recommendations listed above are due to be completed by the end of the 2010 calendar year (including the response to Cryptosporidium and Giardia protocol).

The auditor found that at the time of the audit, sufficient improvements were found to have been made to preventative controls with regards to the Cryptosporidium and Giardia protocol.

8 Undertakings under section 30 of the Act

A summary of current undertakings that Westernport Water has with the Department of Health under section 30 of the Act are presented here. For 2009/10 there were no undertakings to be reported.

9 Further Information

Section 23 of the *Safe Drinking Water Act* 2003 requires that Westernport Water make available for inspection by the public, the results of any water quality monitoring program that is conducted on any drinking water supplied by Westernport Water.

Customers and members of the public may access drinking water quality data and data for raw water quality, by contacting Westernport Water on the details provided below.

Customer Queries
We are pleased to help you – call us on **1300 720 711**

Email: westport@westernportwater.com.au

Fax: (03) 5956 4101

Newhaven Office
Our office is open Monday to Friday 8:30am to 5:00pm
Call us on **(03) 5956 4100** or,
Visit us at 2 Boys Home Road, Newhaven 3925

10 References

NHMRC/NRMMC, 2004. 'National Water Quality Management Strategy: Australian Drinking Water Guidelines'. National Health and Medical Research Council / National Resource Management Ministerial Council, Australia.

Parliament of Victoria, 2003. '*Safe Drinking Water Act* 2003 (Victoria)', Act No. 46/2003, The Parliament of Victoria, Australia

Parliament of Victoria, 2005. 'Safe Drinking Water Regulations 2005', S.R. No. 88/2005, Statutory Rules, Minister for Health, Australia

WHO, 2006. Guidelines for Drinking-water Quality: First Addendum to Third Edition, Vol 1, World Health Organization, Geneva.

11 Appendix A – Audit Certificate

Parsons Brinckerhoff Australia Pty Limited
ABN 80 078 004 798

Level 7
457 St Kilda Road
MELBOURNE VIC 3004
PO Box 7209
MELBOURNE VIC 8004
Australia
Telephone +61 3 9861 1111
Facsimile +61 3 9861 1144
Email melbourne@pb.com.au

Certified to ISO 9001; ISO 14001; AS/NZS 4801

Schedule 1

Regulation 8

Safe Drinking Water Regulations 2005

RISK MANAGEMENT PLAN AUDIT CERTIFICATE

Certificate Number: 39

Audit period: 1 January 2009 to Date of the Audit (5-6 October 2009)

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:

Date: 6 November 2009

Sheree Feaver

Parsons Brinckerhoff Australia Pty Limited
Tel: (03) 9861 2383
Email: sfeaver@pb.com.au

Over a Century of Engineering Excellence

\\AUMELF1\PROJ\W\WESTERNPORT_WATER\2114446A_WPW_RMP_AUDIT\05_WRKPAPERS\WP\AUDIT CERTIFICATE\WESTERNPORT WATER AUDIT CERTIFICATE 2009.DOC