WESTERNPORT WATER

DHS ANNUAL DRINKING WATER QUALITY REPORT 2006/07

Prepared by
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REVISION LIST

Issue	Revision Number	Revision Date	Description of Revision	Prepared By (date)	Reviewed by (date)
A	0	27.08.2007	Ecowise internal review	P. Chier 24.08.2007	S. Longmuir 27.08.2007
A	1	27.08.2007	Draft report issued to Westernport Water	P. Chier 24.08.2007	Westernport Water 5.09.2007
B	0	6.09.2007	Final report issued to Westernport Water	P. Chier 6.09.2007	DHS 23.10.2007
B	1	29.10.2007	Amended report incorporating DHS comments and issued to Westernport Water for comment	P. Chier 30.10.2007	Westernport Water 1.11.2007
B	2	7.11.2007	Final amended report issued to Westernport Water	P. Chier 7.11.2007	Westernport Water 8.11.2007

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1.1 Westernport Water Overview

The function of Westernport Water is to provide water, wastewater and gas services wherever economically, environmentally and socially practicable to properties and communities throughout its district.

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, Dalyston, San Remo, Woolamai Waters, Rhyll, Cowes and Ventnor.

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 Human Services (DHS) with an annual report on the quality of drinking water supplied.

1.3 Westernport Water Supply

Westernport Water has a single water supply and a single water supply system.

Water is primarily sourced from the Candowie Reservoir in the Bass Hills near Glen Forbes and treated at the Ian Bartlett Water Purification Plant (IBWPP).

The treated water is then distributed to communities through a single major supply line with a number of smaller offtakes servicing each of the residential communities within Westernport Water's district. A plan of the distribution system is included in this report as Figure 1-1.

The raw water quality in Candowie Reservoir is poor 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* (ADWG, 2004).

1.4 Other Water Sources

Poor rainfall in recent years and reduced water availability in the Tennant Creek catchment has meant that other sources of water have been utilised. All of these water sources are transferred to Candowie Reservoir for centralised storage and treatment at the IBWPP.

1.4.1 Bores

A number of shallow and deep bores have been or are proposed to be drilled at Grantville and Corinella. Continuous pumping at the Grantville bore began on the 9th of April 2007. By the 30th of July 2007, 265 ML had been pumped from this bore to the Candowie Reservoir via the newly constructed ***Grantville Pipeline*** (5 km, 300 mm PVC pipeline running from Grantville to the ***Bass River Pipeline***). Pumping from Grantville ceased at the end of July 2007 and the site has been de-commissioned. The site can however be re-activated for emergency drought relief.

Smaller bores at Corinella are listed in Table 1-1. Deep bores are expected to provide approximately 1 ML/d and the shallow bores are expected to provide approximately 1 to 1.5 ML/d. The ***Corinella Pipeline*** 8km, 300 mm PVC pipeline) is currently being constructed to link the bores in Corinella to the Grantville Pipeline.

Table 1-1 Corinella bores

Location	Bore Type	Status
King Rd Wastewater Treatment Plant (WWTP)	1 x shallow	Drilled
	1 x deep	Drilled
King Rd 500 m from WWTP	1 x shallow	Drilled
Cnr King Rd and Bass Hwy	1 x shallow	Drilled
Cemetery Rd	1 x shallow	Drilled
King Rd 1 km from WWTP	1 x deep	in process
Corinella Primary School	2 x shallow	Proposed

1.4.2 Bass River

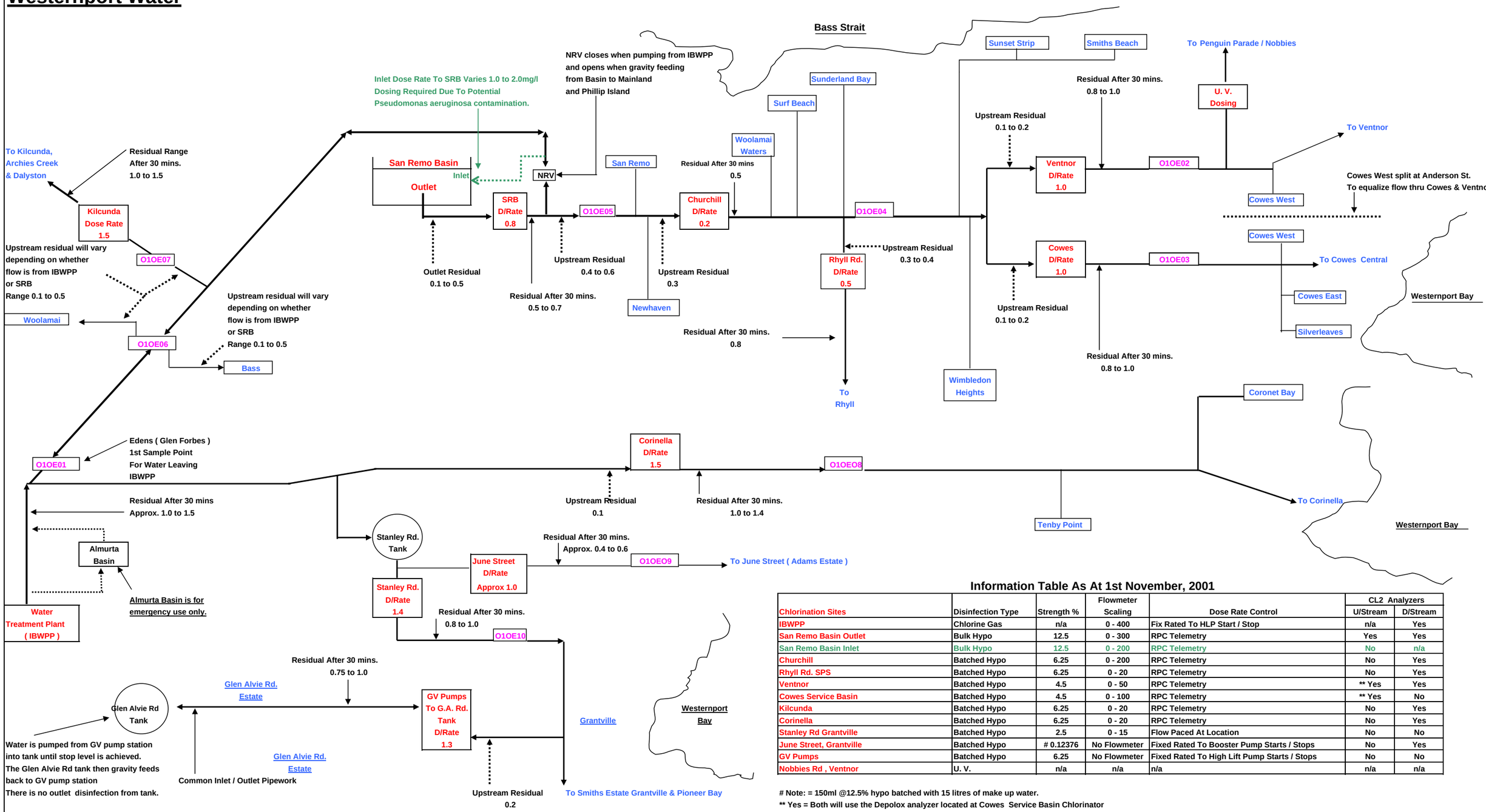
A water pump station was built on the banks of the Bass River during 2006/2007. The pump station transfers water via the ***Bass River Pipeline*** (3km, 300 mm PVC pipeline) to Candowie Reservoir. The two variable speed, centrifugal pumps began pumping on the 5th of July, 2007 and

have been delivering an average of 120 L/s of water to the IBWPP. A control system is in place to extract the optimum flow according to the river level and a pump cut off point has been set at an environmental river flow of 46 ML/d.

1.4.3 Lance Creek Reservoir

Westernport Water is able to share the resources from the Lance Creek Reservoir in the South Gippsland region. The pump station at Lance Creek Reservoir allows Westernport Water to pump 4 ML/d. Pumping began on the 30th August, 2006 and a total of 520 ML was intermittently pumped to Candowie Reservoir for the 06/07 reporting period.

Westernport Water



Information Table As At 1st November, 2001

Chlorination Sites	Disinfection Type	Strength %	Flowmeter Scaling	Dose Rate Control	CL2 Analyzers U/Stream	CL2 Analyzers D/Stream
IBWPP	Chlorine Gas	n/a	0 - 400	Fix Rated To HLP Start / Stop	n/a	Yes
San Remo Basin Outlet	Bulk Hypo	12.5	0 - 300	RPC Telemetry	Yes	Yes
San Remo Basin Inlet	Bulk Hypo	12.5	0 - 200	RPC Telemetry	No	n/a
Churchill	Batched Hypo	6.25	0 - 200	RPC Telemetry	No	Yes
Rhyll Rd. SPS	Batched Hypo	6.25	0 - 20	RPC Telemetry	No	Yes
Ventnor	Batched Hypo	4.5	0 - 50	RPC Telemetry	** Yes	Yes
Cowes Service Basin	Batched Hypo	4.5	0 - 100	RPC Telemetry	** Yes	No
Kilcunda	Batched Hypo	6.25	0 - 20	RPC Telemetry	No	Yes
Corinella	Batched Hypo	6.25	0 - 20	RPC Telemetry	No	Yes
Stanley Rd Grantville	Batched Hypo	2.5	0 - 15	Flow Paced At Location	No	No
June Street, Grantville	Batched Hypo	# 0.12376	No Flowmeter	Fixed Rated To Booster Pump Starts / Stops	No	Yes
GV Pumps	Batched Hypo	6.25	No Flowmeter	Fixed Rated To High Lift Pump Starts / Stops	No	No
Nobbies Rd , Ventnor	U. V.	n/a	n/a	n/a	n/a	n/a

Note: = 150ml @12.5% hypo batched with 15 litres of make up water.
** Yes = Both will use the Depolox analyzer located at Cowes Service Basin Chlorinator

Figure 1-1 Potable Water Supply Disinfection & Distribution System Schematic

2 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 an acceptable drinking water quality at all times, and that public health is protected.

2.1 Water Treatment

The raw water in Candowie Reservoir is treated using a combination of flocculation, coagulation, dissolved air flotation, filtration, and chemical dosing at the IBWPP. The raw water supply is predominantly high in nutrients, organics and has periodically been high in manganese and iron. Raw water quality 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. A summary of the processes used is shown in Table 2-1.

Table 2-1 Water treatment processes

Locality	Treatment Process	Added Substances	Comments
Ian Bartlett Water Purification Plant (IBWPP)	Oxidation	potassium permanganate	As required
	Taste and odour removal	powdered activated carbon	As required
	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
	Disinfection	chlorine gas	Required to get chlorine residual to desired setpoint
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
	Ultra Violet Disinfection	Nil	The UV system services a distinct water supply area on Phillip Island

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. A chlorine residual is generally maintained throughout the supply system via a network of booster chlorination 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 flowrate of the unit is 13 litres/sec.

The UV unit was installed as an alternative trial to establishing a rechlorination facility at this extremity of Westernport Water's water distribution system. The intent of the trial was to address the taste and odour issues associated with rechlorination throughout the water distribution system

2.1.1 IBWPP Upgrade

Historically, the IBWPP has been operated as a labour intensive site, with many switches, valves and pumps manually controlled. An upgrade to the automation (SCADA) system was completed in July 2007. Chemical dose rates are controlled accurately and moderated to accommodate changes in raw water quality and flow rates. Water quality trends and graphs are available so that the process can be adjusted to optimise the treatment of the water. The installation of the SCADA system has also meant that remote access to the plant's controls is now available so that the plant can be monitored and faults detected at all times. Certain operational changes can also be made remotely, which will save time and allow prompt response to any issues.

Turbidity meters have been installed on all of the individual filters and at the combined water (overall treated water). A turbidity meter was also installed at the raw water inlet so that raw water turbidity changes can be detected.

Variable speed drives were put on two of the low lift pump and this allows the operators the freedom to change the flows to suit supply requirements, water quality and process operation requirements.

The obvious benefit of the improvements in the treatment process and associated procedural documentation is illustrated in Figure 2-1. During the period October 2006 to May 2007 the raw water manganese levels

increased as the water storage levels dropped. However, manganese levels in the treated water provided out of IBWPP steadily declined as the treatment process was continually refined.

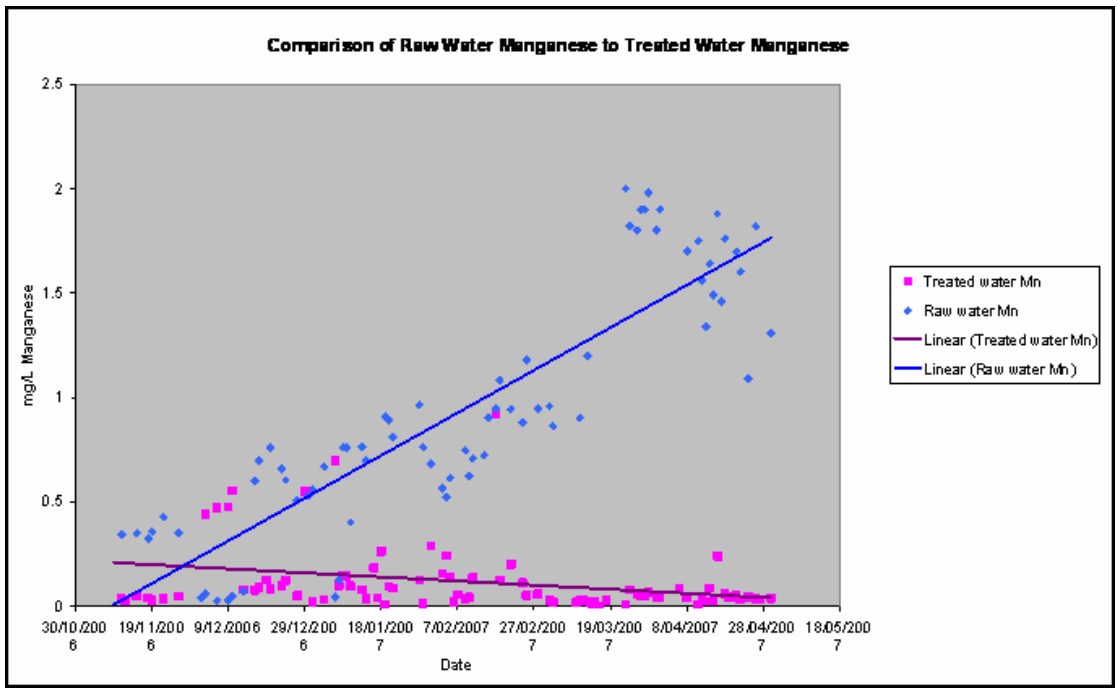


Figure 2-1 **Comparison of raw water manganese to treated water manganese**

2.2 Issues

2.2.1 Candowie Reservoir

The Candowie Reservoir occasionally experiences algal issues and therefore, physicochemical and biological conditions of the storage are monitored regularly. This assists Westernport Water to detect and control any potential algal blooms that may lessen the quality of the raw water.

An increase from about 240 cells/mL in early July 2006 to 4,000 cells/ml in early August of *Anabaena solitaria*, a potentially toxic blue-green algae, was detected and a bloom was predicted. Approximately 1.5 kL of Cupricide was dosed into the reservoir on the 25th of August. Algicide was not used for the rest of the 06/07 reporting period. Over the drought period, Westernport Water primarily used the compressed air unit for de-stratification. The WEARS de-stratification unit was recently serviced and is now in conjunction with the compressed air unit as required for de-stratification.

Little algal growth was detected over the summer period (December to February). Low levels (<30 cells/mL) of the potentially toxic blue-green *Microcystis aeruginosa* were present at all storage depths in January 2007. However, constant oxygenation of the bottom waters has prevented the development of conditions favourable to algal growth.

Taste and odour issues due to chemicals, such as 2-methylisoborneol (MIB) and geosmin, occur occasionally. Powdered activated carbon is dosed into the raw water if high levels are detected.

A limited number of odour complaints were made during the 06/07 reporting period, therefore suggesting that the algae growth within the reservoir did not cause many issues and that the treatment process was adequate.

2.2.2 Water Supply

High concentrations of iron and manganese in drinking water are an aesthetic issue that can cause staining of sanitary fittings and laundry. Potassium permanganate is used at the IBWPP to oxidise iron and manganese and allow its removal in the flocculation and filtration processes. In an effort to improve water quality, a standard procedure for the batching of potassium permanganate stock solution has been developed to ensure a consistent concentration. Additional sampling is often done within storage tanks and at the 30 mins detention time post treatment location when iron and/or manganese levels are high. This assists Westernport Water in locating the problem areas within the reticulation system. Air scouring of the reticulation system, especially in the problem areas, was performed where possible under drought conditions to rectify this exceedance issue.

Although it is not evident from the information in Section 3.6, high turbidity is an issue in the reticulation system due to low flows and dead end mains. With drought conditions, this problem was difficult to overcome as water for flushing was not often available.

Westernport Water entered into Stage 2 restrictions in September 2006 and Stage 4 in November 2006. All discretionary use of water by Westernport Water was reduced with the introduction of Stage 4 restrictions and then ceased as the water storage reached critical levels. Stage 4 restrictions were in place for the remainder of the reporting period.

2.2.3 Water Security

Westernport Water has experienced the worst drought in over 100 years of rainfall record keeping. Figure 2-2 shows the steady decline over the last two years and recent recovery in reservoir storage volumes.

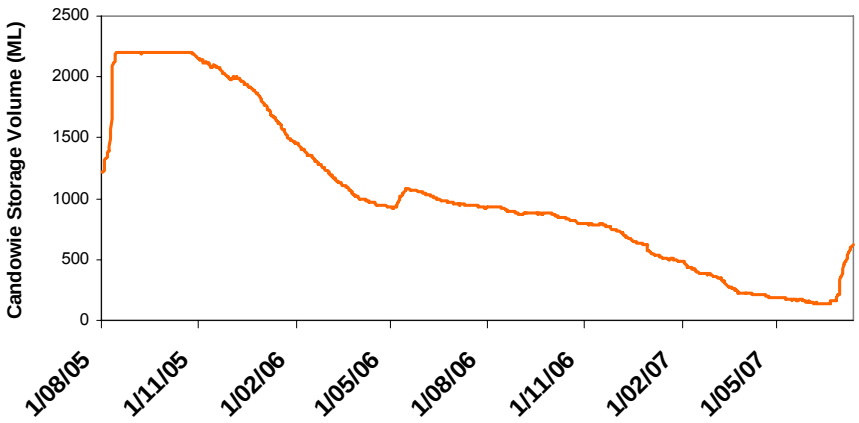


Figure 2-2 Candowie Reservoir storage volumes (1/8/2005 to 13/7/2007)

The graph clearly emphasises the limitations of a single water supply source (Tennent Creek) and Westernport Water's historical dependence on a regular rainfall pattern to support the annual cycle of fill/empty/fill.

The relationship between Candowie's capacity (2,207 ML) and the average unrestricted yearly demand (between 1,900 ML and 2,100 ML) has long been recognised as borderline and a risk to the business. Candowie must receive adequate rainfall every year.

Extensive studies over a number of years have been undertaken on Westernport Water's level of water security. These include updates for the Central Region Sustainable Water Strategy[1] (CRSWS) and associated Water Supply Demand Strategy[2] (WSDS). The CRSWS identified that under current restriction triggers Westernport Water's reliability (% of years without restriction) was 64%. The WSDS identified that by 2015 there will be a water shortfall (supply v demand) of 400 ML under a medium climate change scenario.

Most recently a combined Candowie/Lance Creek Reservoir model with short and long term outlook reports[3][4] were developed by SKM with the support of Westernport Water, South Gippsland and the Department of Sustainability and Environment (DSE).

1 Central Region Sustainable Water Strategy – Update of inputs to the Westernport REALM SKM 2006
2 Report for Westernport Water – Water Supply Demand Strategy, Strategy Report GHD March 2007
3 Lance Creek and Candowie REALM water Supply Model Short Term Outlook SKM June 2007
4 Lance Creek and Candowie REALM Water Supply Model Long Term Outlook SKM June 2007

Until recently Westernport Water's preferred option, included in the 2005 – 2008 Water Plan, was to address long-term water supply security via a connection to Melbourne Water. This option has been complicated by issues around availability, additional fees for a source entitlement and restrictions on access. An increase in Candowie's storage capacity combined with a connection to the proposed Melbourne Water de-salination plant appears to offer more promise at this time.

The raising of Candowie Reservoir has been included in the draft Water Plan 2008 – 2013.

3 Water Quality for 2006/07

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 06/07 reporting period with DHS requesting that the results be 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	
E. Coli	At least 98% of all samples of drinking water collected in any 12 months period to contain no *E. coli* per 100 mL
Monochloroacetic 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.
Australian Drinking Water Guidelines	
Antimony	Must not exceed 0.003 mg/L
Cadmium	Must not exceed 0.002 mg/L
Copper	Must not exceed 1 mg/L
Iron	Must not exceed 0.3 mg/L
Lead	Must not exceed 0.01 mg/L
Nickel	Must not exceed 0.02 mg/L
Zinc	Must not exceed 3 mg/L

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

- Corinella;
- Grantville;
- Bass;
- Kilcunda;
- San Remo;

- Cape Woolamai;
- Rhyll;
- Cowes; and
- Ventor.

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

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 the standard and ADWG (see Table 3-2).

Table 3-2 *E. coli* (orgs/100mL)

Water Sampling Locality	No. of Samples	Frequency of Sampling	No. Non complying samples	Max Results (orgs/ 100 mL)	% Samples with no E. coli	Complying (Yes/No)
Bass	52	weekly	0	0	100	Yes
Grantville	53	weekly	0	0	100	Yes
Corinella	52	weekly	0	0	100	Yes
Kilcunda	104	weekly	0	0	100	Yes
San Remo	52	weekly	0	0	100	Yes
Cape Woolamai	52	weekly	0	0	100	Yes
Rhyll	52	weekly	0	0	100	Yes
Cowes	55	weekly	0	0	100	Yes
Ventnor	54	weekly	0	0	100	Yes

3.2 Chlorine Based 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 limit 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 (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	weekly	52	0.13	0.01	2.0	Yes
Grantville	weekly	54	0.87	0.03	2.1	Yes
Corinella	weekly	51	0.26	0.01	1.0	Yes
Kilcunda	weekly	106	0.34	0.01	1.6	Yes
San Remo	weekly	52	0.32	0.01	1.3	Yes
Cape Woolamai	weekly	52	0.17	0.01	1.1	Yes
Rhyll	weekly	52	0.07	0	0.9	Yes
Cowes	weekly	57	0.14	0	1.1	Yes
Ventnor	weekly	55	0.06	0	0.5	Yes

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 (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	monthly	12	<0.005	<0.005	<0.005	Yes
Grantville	monthly	12	<0.005	<0.005	<0.005	Yes
Corinella	monthly	12	<0.005	<0.005	<0.005	Yes
Kilcunda	monthly	24	<0.005	<0.005	<0.005	Yes
San Remo	monthly	12	<0.005	<0.005	<0.005	Yes
Cape Woolamai	monthly	12	<0.005	<0.005	<0.005	Yes
Rhyll	monthly	12	<0.005	<0.005	0.005	Yes
Cowes	monthly	13	<0.005	<0.005	<0.005	Yes
Ventnor	monthly	13	<0.005	<0.005	<0.005	Yes

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 (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	monthly	12	0.004	0.003	0.008	Yes
Grantville	monthly	12	0.022	0.005	0.049	Yes
Corinella	monthly	12	0.006	0.002	0.015	Yes
Kilcunda	monthly	24	0.008	0.001	0.021	Yes
San Remo	monthly	12	0.013	0.003	0.026	Yes
Cape Woolamai	monthly	12	0.009	0.003	0.020	Yes
Rhyll	monthly	12	0.007	0.002	0.042	Yes
Cowes	monthly	13	0.012	0.001	0.045	Yes
Ventnor	monthly	13	0.003	0.001	0.010	Yes

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 (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	monthly	12	0.002	0.001	0.004	Yes
Grantville	monthly	12	0.015	0.003	0.031	Yes
Corinella	monthly	12	0.004	0.001	0.013	Yes
Kilcunda	monthly	24	0.006	0.001	0.016	Yes
San Remo	monthly	12	0.009	0.003	0.019	Yes
Cape Woolamai	monthly	12	0.008	0.003	0.017	Yes
Rhyll	monthly	12	0.006	0.001	0.041	Yes
Cowes	monthly	13	0.008	0.001	0.023	Yes
Ventnor	monthly	13	0.003	0.001	0.007	Yes

3.3 Trihalomethanes (THMs)

The following section discusses the specific trihalomethanes (THMs) that were tested during the 06/07 reporting period. At all locations, the chlorination by-products showed considerable variation throughout the year. This is most likely due to the variation in THM precursors in the raw water.

3.3.1 Trihalomethanes (Total)

THM is the name given to the group of chlorination by-products that may be found in treated water. 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 compliant only for Bass and Corinella.

Table 3-7 Total THMs (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	monthly	12	0.104	0.006	0.180	Yes
Grantville	monthly	13	0.202	0.130	0.340	No
Corinella	monthly	13	0.138	0.005	0.230	Yes
Kilcunda	monthly	26	0.173	0.007	0.260	No
San Remo	monthly	14	0.205	0.120	0.270	No
Cape Woolamai	monthly	14	0.218	0.140	0.280	No
Rhyll	monthly	13	0.209	0.140	0.280	No
Cowes	monthly	15	0.238	0.097	0.310	No
Ventnor	monthly	13	0.158	<0.001	0.310	No

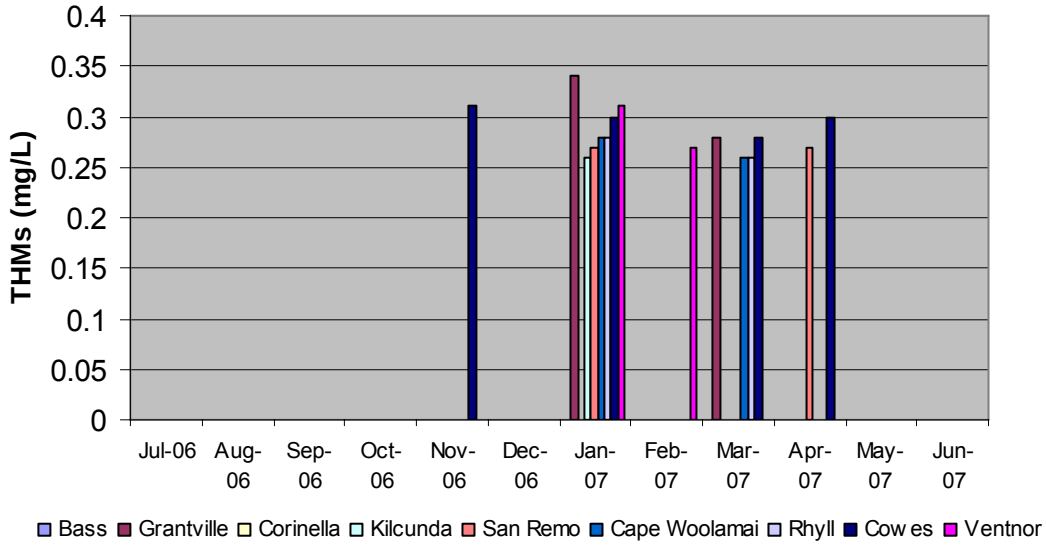


Figure 3-1 **Non-conforming maximum THM results for the period July 06 to June 07 (where more than one exceedance within a month has occurred, only the highest value is displayed)**

3.3.1.1 *Actions in Relation to Non-Compliance*

Westernport Water exceeded the guideline value of 0.25 mg/L for Total THMs in 7 of the 9 water sampling localities in the 06/07 reporting period as seen in Figure 3-1. Widespread exceedances were recorded in January, although most were minor exceedances and problem areas were flushed when possible and no further actions were taken. Results returned to below the guideline value with the next sampling event except for Ventnor. However, further exceedances occurred in Grantville, San Remo, Cape Woolamai, Rhyll and Cowes in March and April. Again, the problem areas were flushed and no further actions were taken. Results returned to below the guideline value for all localities.

The number of THM exceedances is most likely due to the limitations at the IBWPP to accurately control chlorine dosage due to the highly variable raw water quality over the 2006/2007 period. With the recent upgrade of the IBWPP, as discussed in section 2.1.1, it is expected that the THM exceedances will decrease in the future as plant operators will be able to better control the chlorine dosing. Considerable work has also been done on reviewing and updating the procedures for testing at the plant. This has provided a higher level of certainty in selecting and modifying chlorine and other chemical dose rates.

3.3.2 Dibromochloromethane

Dibromochloromethane is one 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 limit of 0.1 mg/L for potable water. The water quality with respect to dibromochloromethane was only compliant with the WHO guideline limit at Bass and Corinella.

Table 3-8 Dibromochloromethane (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No) ADWG	Complying (Yes/No) WHO
Bass	monthly	13	0.045	0.002	0.073	N/A	Yes
Grantville	monthly	13	0.074	0.044	0.107	N/A	No
Corinella	monthly	13	0.058	0.003	0.095	N/A	Yes
Kilcunda	monthly	26	0.069	0.004	0.110	N/A	No
San Remo	monthly	14	0.082	0.046	0.114	N/A	No
Cape Woolamai	monthly	13	0.086	0.052	0.115	N/A	No
Rhyll	monthly	13	0.082	0.047	0.115	N/A	No
Cowes	monthly	15	0.090	0.022	0.123	N/A	No
Ventnor	monthly	14	0.052	0.001	0.127	N/A	No

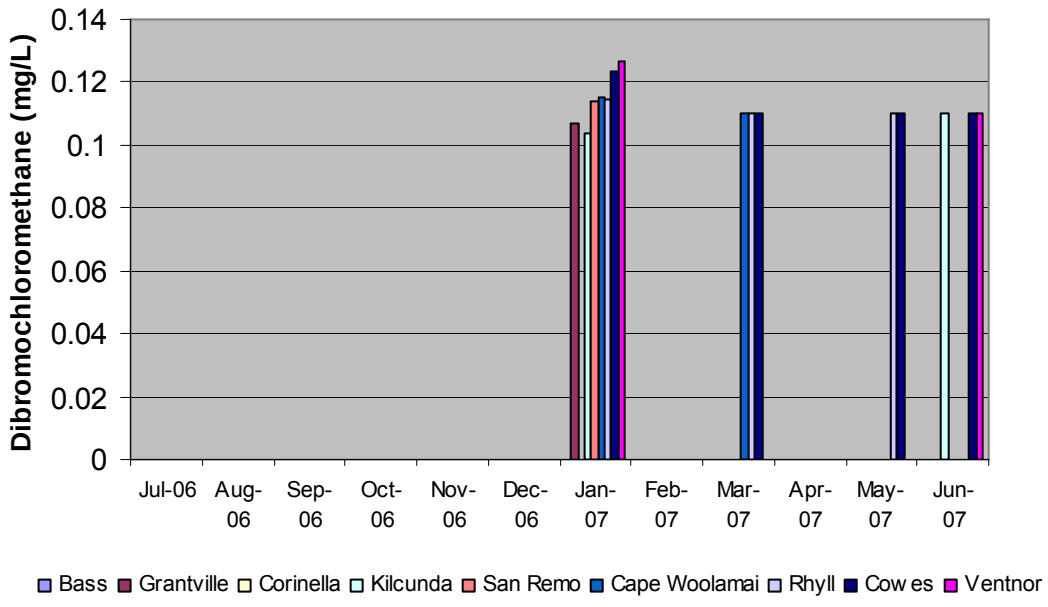


Figure 3-2 Non-conforming Maximum dibromochloromethane results for the period July 06 to June 07 (where more than one exceedance within a month has occurred, only the highest value is displayed)

3.3.2.1 Actions in Relation to Guideline Exceedance

Westernport Water exceeded the WHO guideline value of 0.1 mg/L for dibromochloromethane at in 7 of the 9 water sampling localities. As the ADWG only refers to the Total THM value, Westernport Water is still operating in accordance with the relevant regulations and guidelines. Therefore, no action was required other than the comments contained in Section 3.3.1.1.

3.3.3 Bromoform

Bromoform is another 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 with respect to bromoform was compliant with the WHO guideline limit.

Table 3-9 Bromoform (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No) ADWG	Complying (Yes/No) WHO
Bass	monthly	13	0.019	0.001	0.036	N/A	Yes
Grantville	monthly	13	0.029	0.008	0.060	N/A	Yes
Corinella	monthly	13	0.024	0.001	0.062	N/A	Yes
Kilcunda	monthly	26	0.026	0.001	0.064	N/A	Yes
San Remo	monthly	14	0.031	0.010	0.068	N/A	Yes
Cape Woolamai	monthly	13	0.033	0.011	0.068	N/A	Yes
Rhyll	monthly	13	0.030	0.011	0.055	N/A	Yes
Cowes	monthly	15	0.033	0.006	0.080	N/A	Yes
Ventnor	monthly	14	0.019	0.001	0.065	N/A	Yes

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 limit of 0.06 mg/L. The water quality with respect to bromodichloromethane showed most locations exceeded the WHO guideline limit (see Table 3-10).

Table 3-10 Bromodichloromethane (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No) ADWG	Complying (Yes/No) WHO
Bass	monthly	13	0.030	0.001	0.059	N/A	Yes
Grantville	monthly	13	0.058	0.027	0.100	N/A	No
Corinella	monthly	13	0.040	0.001	0.073	N/A	No
Kilcunda	monthly	26	0.051	0.002	0.078	N/A	No
San Remo	monthly	14	0.062	0.041	0.086	N/A	No
Cape Woolamai	monthly	13	0.065	0.041	0.083	N/A	No
Rhyll	monthly	13	0.064	0.043	0.084	N/A	No
Cowes	monthly	15	0.073	0.032	0.100	N/A	No
Ventnor	monthly	14	0.042	0.001	0.092	N/A	No

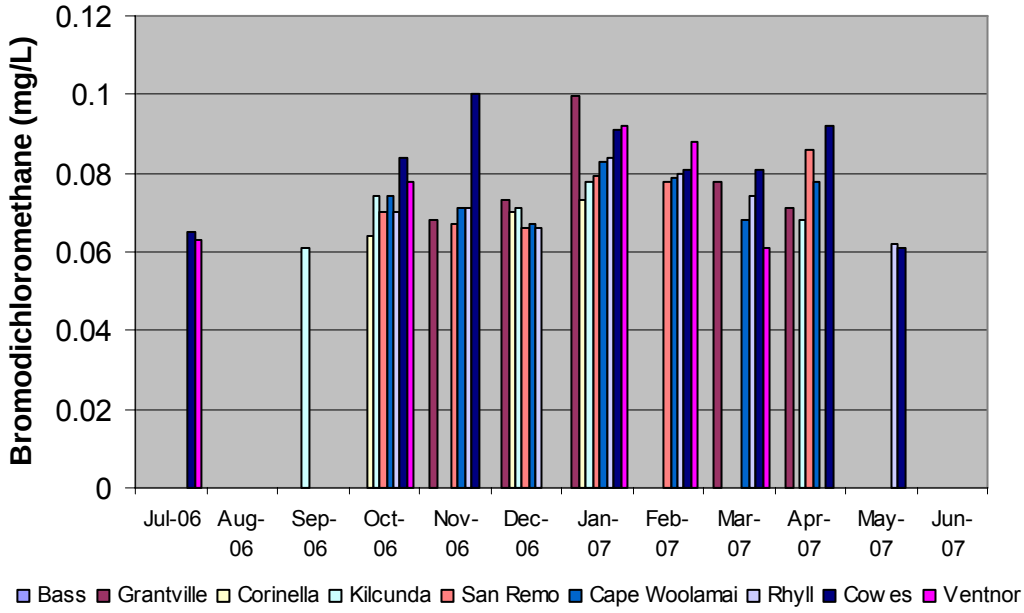


Figure 3-3 Non-conforming Maximum bromodichloromethane results for the period July 06 to June 07 (where more than one exceedance within a month has occurred, only the highest value is displayed)

3.3.4.1 Actions in Relation to Guideline Exceedance

Westernport Water exceeded the WHO guideline value of 0.06 mg/L for bromodichloromethane in eight of the nine water sampling localities. As the ADWG only refers to the Total THM value, Westernport Water is still operating in accordance with the relevant regulations and guidelines. Therefore, no action was required other than that noted in Section 3.3.1.1.

3.3.5 Chloroform

Chloroform, is another 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 limit of 0.3 mg/L (an increase of 0.1 mg/L from the last edition of the guideline). The water quality with respect to chloroform was compliant with the WHO limit.

Table 3-11 Chloroform (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No) ADWG	Complying (Yes/No) WHO
Bass	monthly	13	0.011	0.001	0.025	N/A	Yes
Grantville	monthly	13	0.042	0.006	0.098	N/A	Yes
Corinella	monthly	13	0.018	0.001	0.037	N/A	Yes
Kilcunda	monthly	26	0.026	0.001	0.049	N/A	Yes
San Remo	monthly	14	0.030	0.008	0.057	N/A	Yes
Cape Woolamai	monthly	13	0.031	0.008	0.043	N/A	Yes
Rhyll	monthly	13	0.034	0.011	0.047	N/A	Yes
Cowes	monthly	15	0.040	0.010	0.069	N/A	Yes
Ventnor	monthly	14	0.038	0.001	0.067	N/A	Yes

3.4 Ozone Based Disinfection

Disinfection with ozone produces by-products such as bromate and formaldehyde. Westernport Water does not use ozone for disinfection therefore, bromate and formaldehyde were not tested for in 2006/07.

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. The water quality with respect to aluminium was compliant during the reporting period.

Table 3-12 Aluminium (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	Monthly	12	0.05	0.02	0.18	Yes
Grantville	Monthly	12	0.04	0.02	0.09	Yes
Corinella	monthly	12	0.03	0.02	0.07	Yes
Kilcunda	monthly	25	0.05	0.01	0.24*	Yes
San Remo	monthly	12	0.05	0.03	0.13	Yes
Cape Woolamai	monthly	12	0.03	0.02	0.06	Yes
Rhyll	monthly	12	0.02	0.01	0.03	Yes
Cowes	monthly	13	0.05	0.02	0.13	Yes
Ventnor	monthly	13	0.02	0.01	0.04	Yes

* According to the 2006/2007 Annual report format (DHS, 2007), this value is considered to be compliant.

3.6 Turbidity

Schedule 2 in the *Safe Drinking Water Regulations* stipulates that the 95% upper confidence limit (UCL) of 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 (NTU)

Locality	Frequency of Sampling	No. of Samples	Min	Max	95% UCL of Mean (NTU)	Complying (Yes/No)
Bass	weekly	52	0.2	12	1.8	Yes
Grantville	weekly	52	0.2	1.1	0.5	Yes
Corinella	weekly	52	0.2	1.3	0.5	Yes
Kilcunda	weekly	105	0.2	3.6	0.6	Yes
San Remo	weekly	52	0.2	5.1	0.8	Yes
Cape Woolamai	weekly	52	0.2	1.3	0.4	Yes
Rhyll	weekly	52	0.2	5.4	1.0	Yes
Cowes	weekly	56	0.2	6.1	1.0	Yes
Ventnor	weekly	55	0.2	1.7	0.5	Yes

3.7 Fluoride

Fluoride is not added to Westernport Water's drinking water and was therefore not monitored.

3.8 pH

3.8.1 Results

The ADWG limit for pH is between 6.5 and 8.5. The pH of water supplied was within this range.

Table 3-14 pH (pH units)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	weekly	51	7.2	6.5	7.8	Yes
Grantville	weekly	52	7.4	6.6	8.1	Yes
Corinella	weekly	52	7.3	6.6	8.2	Yes
Kilcunda	weekly	105	7.4	6.5	8.0	Yes
San Remo	weekly	52	7.3	6.6	8.2	Yes
Cape Woolamai	weekly	52	7.4	6.6	8.0	Yes
Rhyll	weekly	52	7.3	6.6	7.9	Yes
Cowes	weekly	56	7.6	6.8	8.2	Yes
Ventnor	weekly	55	7.6	6.8	8.5	Yes

3.9 Heavy Metals

Westernport Water regularly tests for heavy metals in the drinking water they supply. The following sections detail the results for the 06/07 reporting period.

3.9.1 Antimony

Based on health consideration, the ADWG limit is set at 0.003 mg/L. No aesthetic guideline has been set. As can be seen from Table 3-15, no sample exceeded this limit.

Table 3-15 Antimony (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	quarterly	3	<0.001	<0.001	<0.001	Yes
Grantville	quarterly	3	<0.001	<0.001	<0.001	Yes
Corinella	quarterly	3	<0.001	<0.001	<0.001	Yes
Kilcunda	quarterly	6	<0.001	<0.001	<0.001	Yes
San Remo	quarterly	3	<0.001	<0.001	<0.001	Yes
Cape Woolamai	quarterly	3	<0.001	<0.001	<0.001	Yes
Rhyll	quarterly	3	<0.001	<0.001	<0.001	Yes
Cowes	quarterly	3	<0.001	<0.001	<0.001	Yes
Ventnor	quarterly	3	<0.001	<0.001	<0.001	Yes

3.9.2 Cadmium

Based on health considerations, the ADWG limit is set at 0.002 mg/L. No aesthetic guideline is identified. The cadmium concentration complied with this limit at all locations during the reporting period.

Table 3-16 Cadmium (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	quarterly	3	<0.0002	<0.0002	<0.0002	Yes
Grantville	quarterly	3	<0.0002	<0.0002	<0.0002	Yes
Corinella	quarterly	3	<0.0002	<0.0002	<0.0002	Yes
Kilcunda	quarterly	6	<0.0002	<0.0002	<0.0002	Yes
San Remo	quarterly	3	<0.0002	<0.0002	<0.0002	Yes
Cape Woolamai	quarterly	3	<0.0002	<0.0002	<0.0002	Yes
Rhyll	quarterly	3	<0.0002	<0.0002	<0.0002	Yes
Cowes	quarterly	3	<0.0002	<0.0002	<0.0002	Yes
Ventnor	quarterly	3	<0.0002	<0.0002	<0.0002	Yes

3.9.3 Copper

Based on health considerations, the ADWG limit is set at 2 mg/L and 1 mg/L for aesthetics. The copper concentration complied with both limits at all locations during the reporting period except for Ventnor where the aesthetic limit was exceeded.

Table 3-17 Copper (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No) Aesthetics	Complying (Yes/No) Health
Bass	monthly	12	0.07	<0.01	0.18	Yes	Yes
Grantville	monthly	12	0.03	<0.01	0.05	Yes	Yes
Corinella	monthly	12	0.04	<0.01	0.10	Yes	Yes
Kilcunda	monthly	24	0.05	<0.01	0.25	Yes	Yes
San Remo	monthly	12	0.04	<0.01	0.10	Yes	Yes
Cape Woolamai	monthly	12	0.03	<0.01	0.09	Yes	Yes
Rhyll	monthly	12	0.08	0.02	0.17	Yes	Yes
Cowes	monthly	13	0.05	<0.01	0.15	Yes	Yes
Ventnor	monthly	13	0.20	<0.01	1.6	No	Yes

3.9.3.1 Actions in Relation to Guideline Exceedance

A single exceedance occurred at Ventnor on the 16th of August, 2006. The flushing of the reticulation system in the problem area was performed but as it did not exceed the health limit according to the ADWG, retesting of the water was not conducted. The copper concentration at Ventnor from the next sampling event was 0.01 mg/L, which is below the guideline value and no further actions were taken.

3.9.4 Iron

Based on aesthetic considerations, the ADWG limit is set at 0.3 mg/L. No health-based guideline value has been set. The water quality with respect to iron concentrations showed all locations exceeded the guideline value on at least one occasion. Refer to Figure 3-4 for exceedance locations, dates and values.

Table 3-18 Iron (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	fortnightly	25	0.17	0.05	0.43	No
Grantville	fortnightly	26	0.16	0.06	0.33	No
Corinella	fortnightly	25	0.19	0.06	0.73	No
Kilcunda	fortnightly	50	0.14	0.03	0.34	No
San Remo	fortnightly	25	0.13	0.07	0.38	No
Cape Woolamai	fortnightly	25	0.14	0.06	0.35	No
Rhyll	fortnightly	25	0.24	0.07	1.30	No
Cowes	fortnightly	27	0.19	0.07	0.52	No
Ventnor	fortnightly	26	0.22	0.07	0.59	No

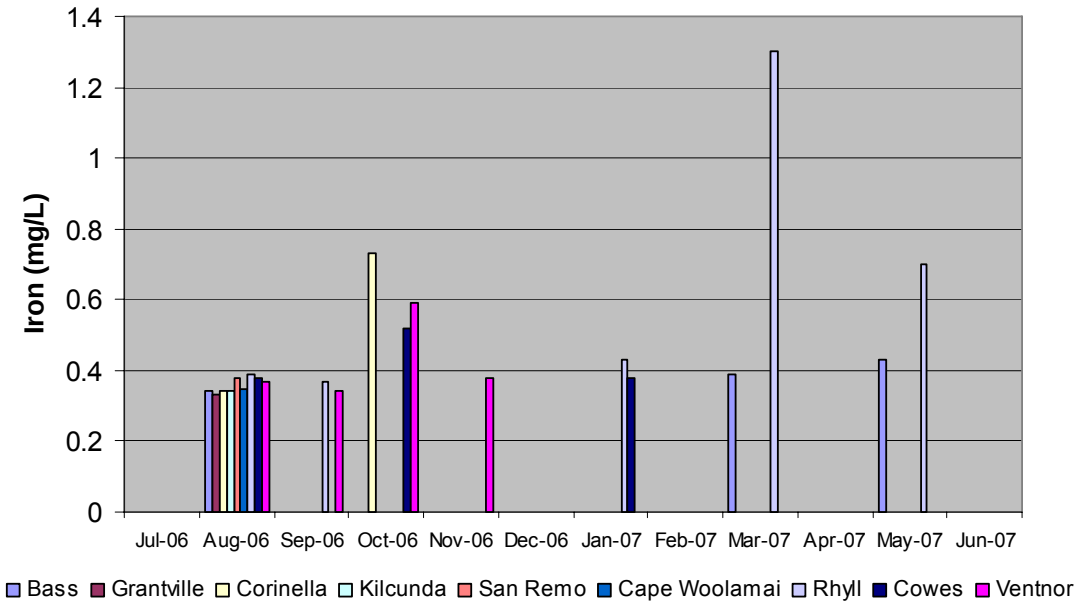


Figure 3-4 **Non-conforming iron results for the period July 06 to June 07 (where more than one exceedance within a month has occurred, only the highest value is displayed)**

3.9.4.1 *Actions in Relation to Guideline Exceedance*

The reticulation system was flushed to remove any residual iron. Internal re-testing after the flushing showed that the iron levels were below the guideline value. External analysis (fortnightly) showed that the levels were below the ADWG.

3.9.5 Lead

Based on health considerations, the ADWG limit is set at 0.01 mg/L. No aesthetic guideline is proposed. The lead concentrations complied with this limit at all locations during the reporting period except for Cowes and Corinella.

Table 3-19 Lead (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	monthly	12	<0.01	<0.01	<0.01	Yes
Grantville	monthly	12	<0.01	<0.01	<0.01	Yes
Corinella	monthly	12	<0.01	<0.01	0.03	No
Kilcunda	monthly	24	<0.01	<0.01	<0.01	Yes
San Remo	monthly	12	<0.01	<0.01	<0.01	Yes
Cape Woolamai	monthly	12	<0.01	<0.01	<0.01	Yes
Rhyll	monthly	12	<0.01	<0.01	<0.01	Yes
Cowes	monthly	13	0.02	<0.01	0.23	No
Ventnor	monthly	13	<0.01	<0.01	<0.01	Yes

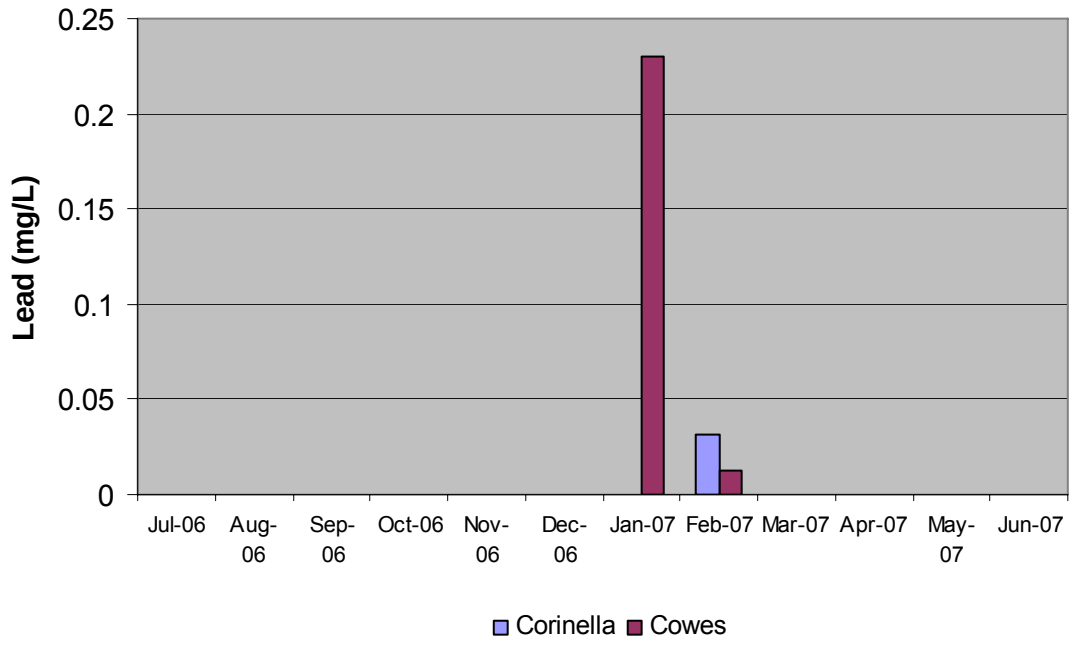


Figure 3-5 Non-conforming lead results for the period July 06 to June 07 (where more than one exceedance within a month has occurred, only the highest value is displayed)

3.9.5.1 Actions in Relation to Guideline Exceedance

The reticulation system in the problem areas was flushed to remove any residual lead. On the next sampling event, the water quality results had returned to just above the guideline limits. Again, the mains at the problem areas were flushed and the results from the next sampling event returned to below guideline value. No further actions were taken.

3.9.6 Nickel

Based on health considerations, the ADWG limit is set at 0.02 mg/L. No aesthetic guideline is proposed. The nickel concentration complied with this limit at all locations.

Table 3-20 Nickel (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	quarterly	3	0.002	<0.001	0.006	Yes
Grantville	quarterly	3	<0.001	<0.001	<0.001	Yes
Corinella	quarterly	3	<0.001	<0.001	<0.001	Yes
Kilcunda	quarterly	6	<0.001	<0.001	<0.001	Yes
San Remo	quarterly	3	<0.001	<0.001	<0.001	Yes
Cape Woolamai	quarterly	3	<0.001	<0.001	<0.001	Yes
Rhyll	quarterly	3	<0.001	<0.001	<0.001	Yes
Cowes	quarterly	3	<0.001	<0.001	0.001	Yes
Ventnor	quarterly	3	<0.001	<0.001	<0.001	Yes

3.9.7 Zinc

Based on aesthetic considerations, the ADWG limit is set at 3 mg/L. No health-based guideline value is proposed. The zinc concentration complies with this limit at all locations.

Table 3-21 Zinc (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No)
Bass	monthly	13	0.07	<0.01	0.82	Yes
Grantville	monthly	12	0.01	<0.01	0.02	Yes
Corinella	monthly	13	0.04	<0.01	0.37	Yes
Kilcunda	monthly	26	0.03	<0.01	0.27	Yes
San Remo	monthly	13	0.05	<0.01	0.30	Yes
Cape Woolamai	monthly	13	0.02	<0.01	0.20	Yes
Rhyll	monthly	13	0.07	<0.01	0.28	Yes
Cowes	monthly	14	0.11	<0.01	0.62	Yes
Ventnor	monthly	14	0.03	<0.01	0.26	Yes

3.9.8 Manganese

The ADWG limit is set at 0.5 mg/L for health considerations and 0.1 mg/L for aesthetics. The manganese results failed to meet the ADWG for aesthetics in three water sampling localities.

Table 3-22 Manganese (mg/L)

Locality	Frequency of Sampling	No. of Samples	Mean	Min	Max	Complying (Yes/No) Aesthetics	Complying (Yes/No) Health
Bass	fortnightly	33	0.06	<0.01	0.18	No	Yes
Grantville	fortnightly*	52	0.04	<0.01	0.13	No	Yes
Corinella	fortnightly	26	0.05	<0.01	0.28	No	Yes
Kilcunda	fortnightly	26	0.03	<0.01	0.10	Yes	Yes
San Remo	fortnightly	32	0.03	<0.01	0.08	Yes	Yes
Cape Woolamai	fortnightly	26	0.02	<0.01	0.07	Yes	Yes
Rhyll	fortnightly	26	0.02	<0.01	0.07	Yes	Yes
Cowes	fortnightly	26	0.02	<0.01	0.05	Yes	Yes
Ventnor	fortnightly	26	0.01	<0.01	0.04	Yes	Yes

* Two sites within Grantville were sampled fortnightly, hence the doubled number of samples.

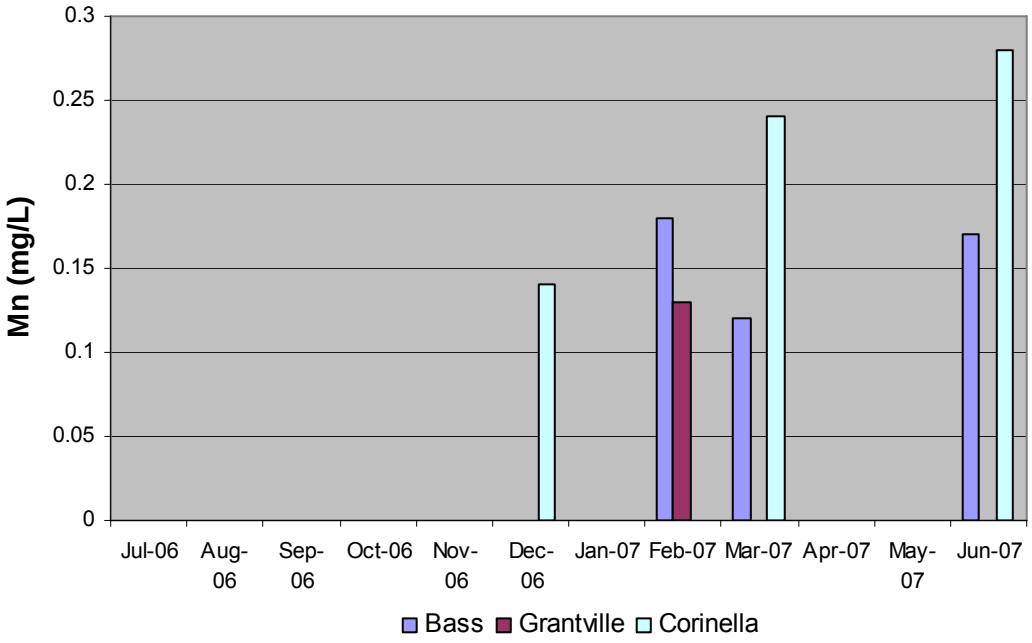


Figure 3-6 Non-conforming manganese results for the period July 06 to June 07 (where more than one exceedance within a month has occurred, only the highest value is displayed)

3.9.8.1 Actions in Relation to Guideline Exceedance

The reticulation system was flushed to remove any residual manganese. Internal re-testing after the flushing showed that the manganese levels were below the guideline value. External analysis (fortnightly) showed that the levels were below the ADWG.

4 Analysis of Results

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

4.1 Drinking Water Quality Standards

4.1.1 E. coli

In 2004/05, the Bass water sampling locality exceeded the limit for *E. coli* for a period of 3 months between November 2004 and January 2005. In 05/06 and 06/07, no *E.coli* was detected in samples analysed throughout the reticulation system.

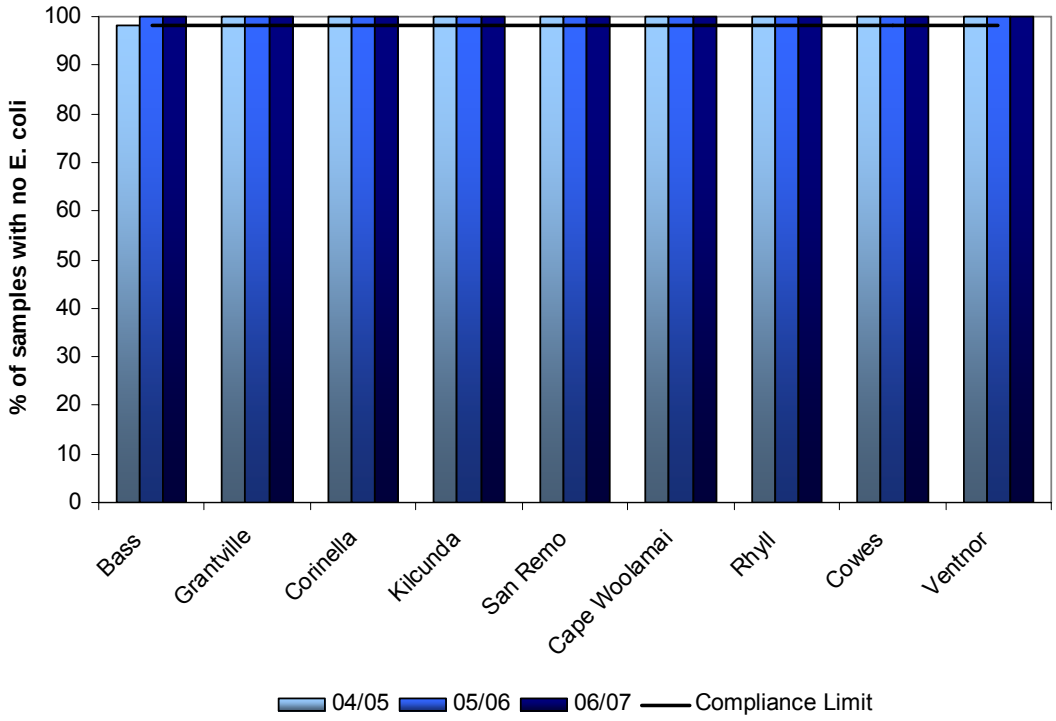


Figure 4-1 Percentage of samples with no *E. coli* from July 04 to June 07

4.1.2 Monochloroacetic Acid

Note that results that were less than the detection limit have been represented as zero in the graphs.

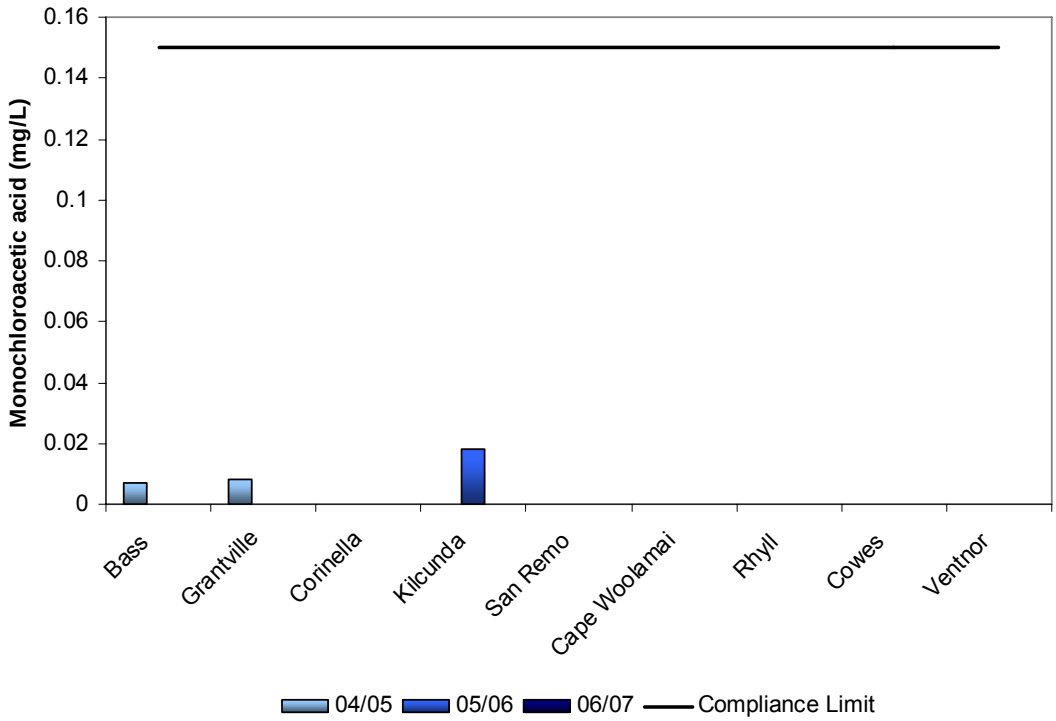


Figure 4-2 **Maximum monochloroacetic acid concentration from July 04 to June 07**

4.1.3 Dichloroacetic Acid

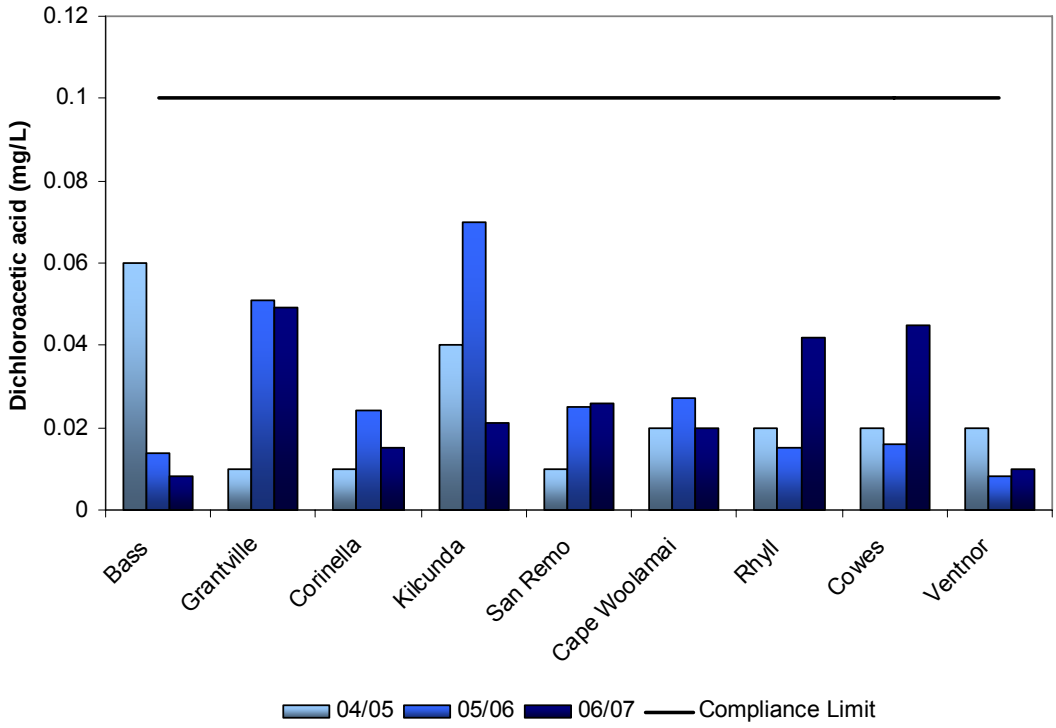


Figure 4-3 **Maximum dichloroacetic acid concentration from July 04 to June 07**

4.1.4 Trichloroacetic Acid

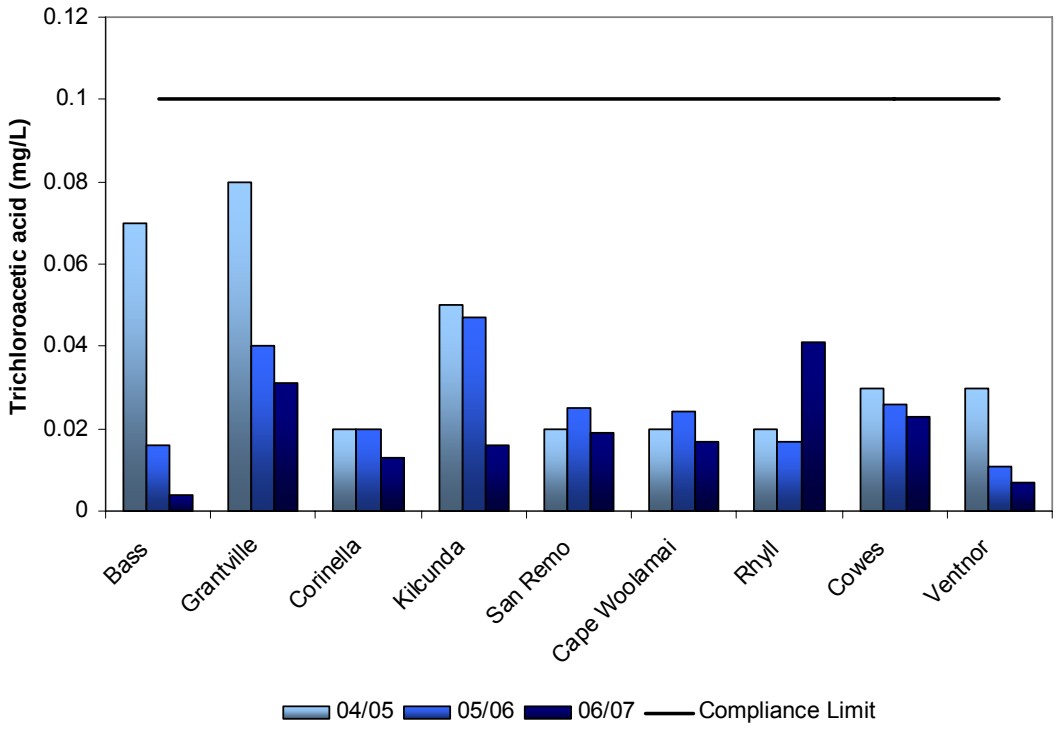


Figure 4-4 **Maximum trichloroacetic acid concentration from July 04 to June 07**

A previously reported trichloroacetic acid exceedance of 0.19 mg/L in April 2005 has been checked and identified as a reporting error. The actual reading should have been 0.019 mg/L which is within the compliance limit.

4.1.5 Trihalomethanes

Westernport Water exceeded the guideline value of 0.25 mg/L for Total THMs in 7 of the 9 water sampling localities in the 06/07 reporting period as seen in Figure 4-5. The number of exceedances for 06/07 is substantially higher than 04/05 and 05/06 which recorded zero and one exceedance respectively. This may be due to the highly variable raw water quality compared to other years caused by the record drought.

The levels of THM's declined from April 2007 with the upgrade of the monitoring and control system at the IBWPP, as mentioned in section 2.1.1, it is expected that the THM exceedances will decrease in the future as plant operators will be able to better control the chlorine dosing. Considerable work has also been done on reviewing and updating the procedures for testing at the plant. This has provided a higher level of certainty in selecting and modifying chemical dose rates.

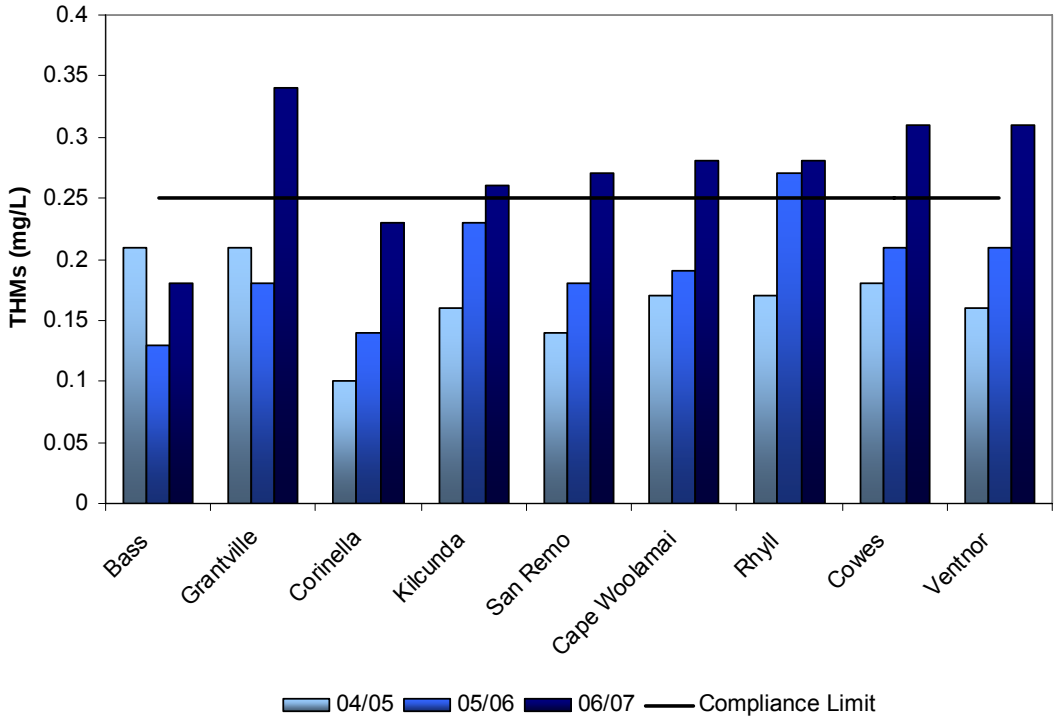


Figure 4-5 **Maximum THM concentration from July 04 to June 07**

4.1.6 Aluminium

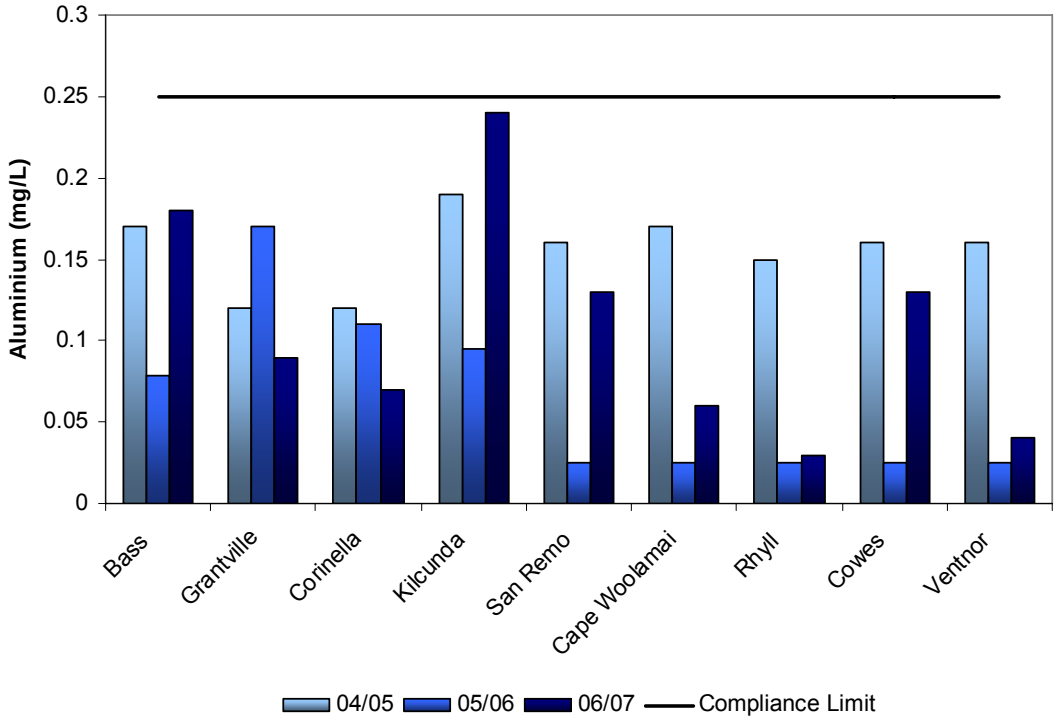


Figure 4-6 **Maximum aluminium concentration from July 04 to June 07**

4.1.7 Turbidity

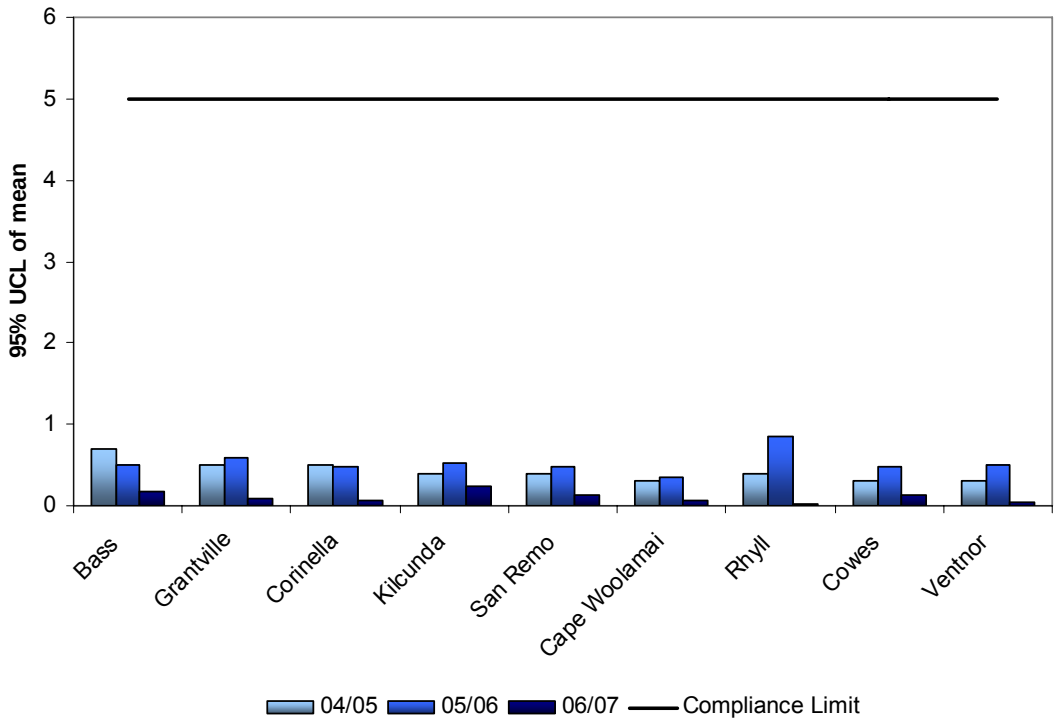


Figure 4-7 **95% UCL of mean from July 04 to June 07**

4.1.8 Overall

Westernport Water has achieved a high level of compliance with respect to all Schedule 2 parameters except for THMs (see Figure 4-8 and Figure 4-9). An increase in the variability of the raw water quality due to the drought and a manual treatment plant control system has meant that chlorine dosing while providing safe drinking water could be improved.

As mentioned previously, it is envisaged that the THM exceedances will decrease in the future with the upgrade of the IBWPP control system and improved procedural documentation.

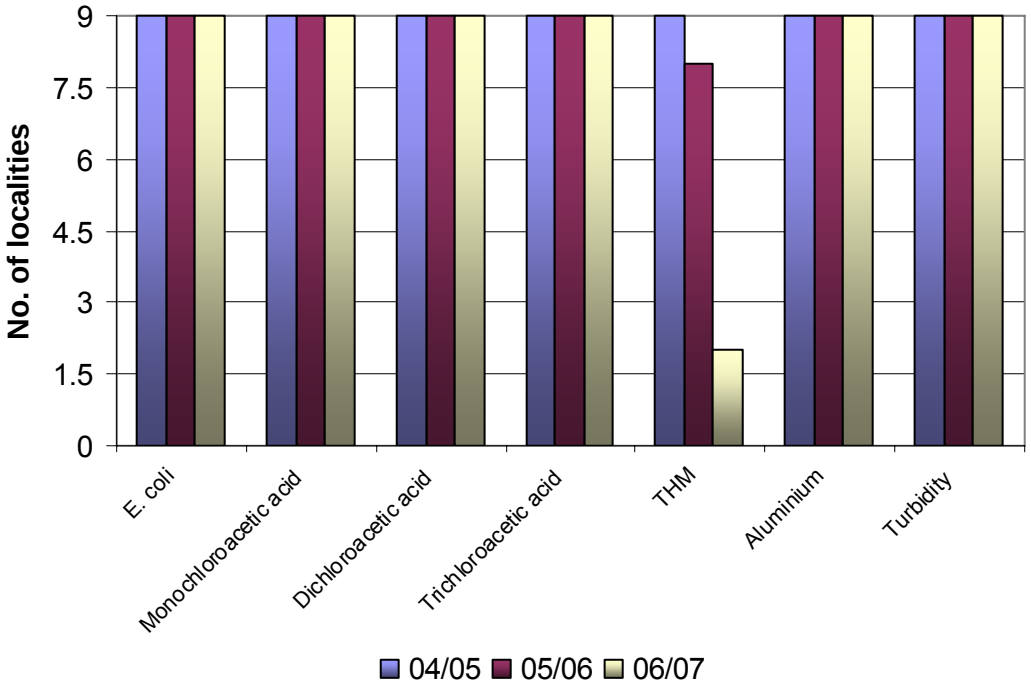


Figure 4-8 **Number of localities that were compliant with Schedule 2 parameters**

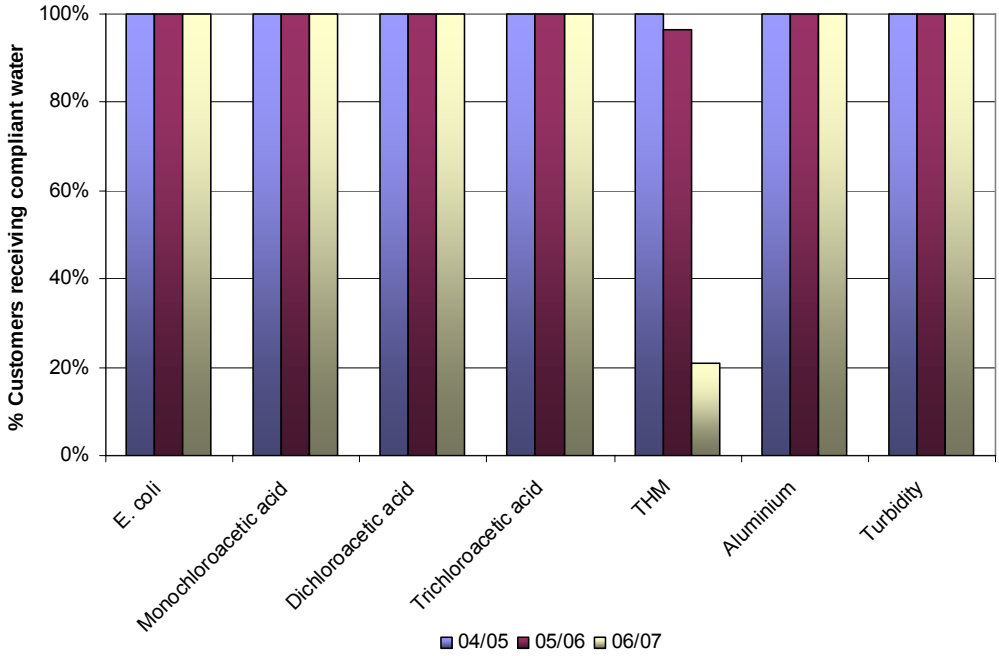


Figure 4-9 **Percentage of customers supplied with drinking water that was compliant with the standard[5]**

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

4.2 Other Parameters

4.2.1 Free Chlorine

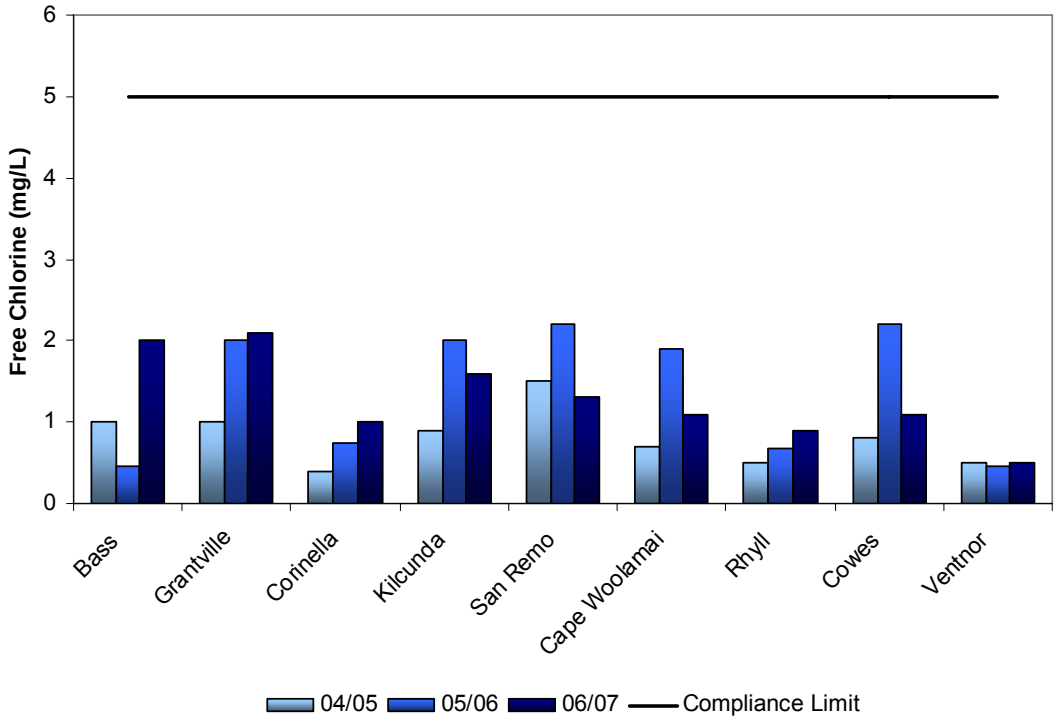


Figure 4-10 **Maximum free chlorine concentration from July 04 to June 07**

4.2.2 pH

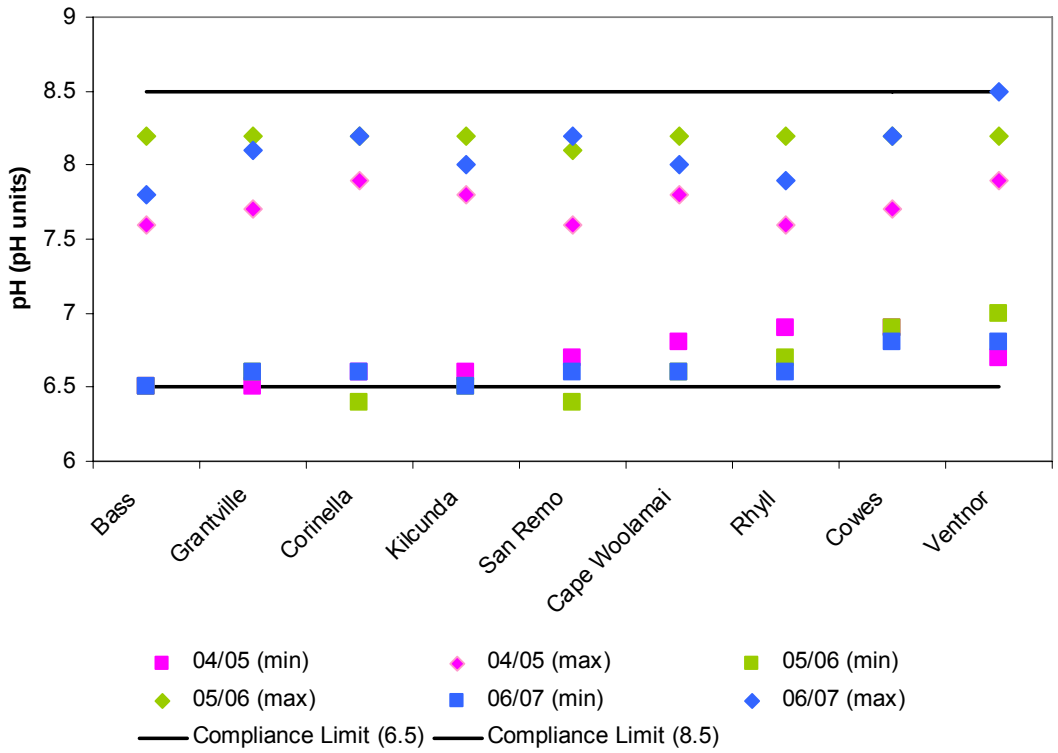


Figure 4-11 **pH from July 04 to June 07**

pH exceeded the ADWG limits in 2 locations in 2005. As these were isolated events at one out of over 50 locations, no action was taken. The next sampling event showed that the water quality results had returned to within the guideline limits. No further action was required.

4.2.3 THM Components

As the Act and ADWG only refers to Total THM value, no comment has been made on the THM components that exceed WHO guideline values. However, it is envisaged that, with the upgrade of the IBWPP control system and hence better control over chlorine dosing, exceedances in THM and its components will decrease in the future.

As part of the upgrade of the chlorination process a flow paced residual trim system was installed at IBWPP in September 2007. A chlorine residual analyser with a built-in pH meter was installed at the 5 min detention time location in order to detect any chlorination issues quickly. Another chlorine residual analyser with a built in pH meter was installed at the 30 min detention time location to better monitor the chlorine residual and pH of the water supplied to customers. Automatic shut down alarms on the 920 kg drums in case of a chlorine leak and an audible alarm that also pages an operator were also implemented.

Work is also programmed during 2007/2008 to upgrade the distribution system re-chlorination process. Improved monitoring of residual chlorine levels and upgraded chlorine dosing pumps will provide a greater level of disinfection control.

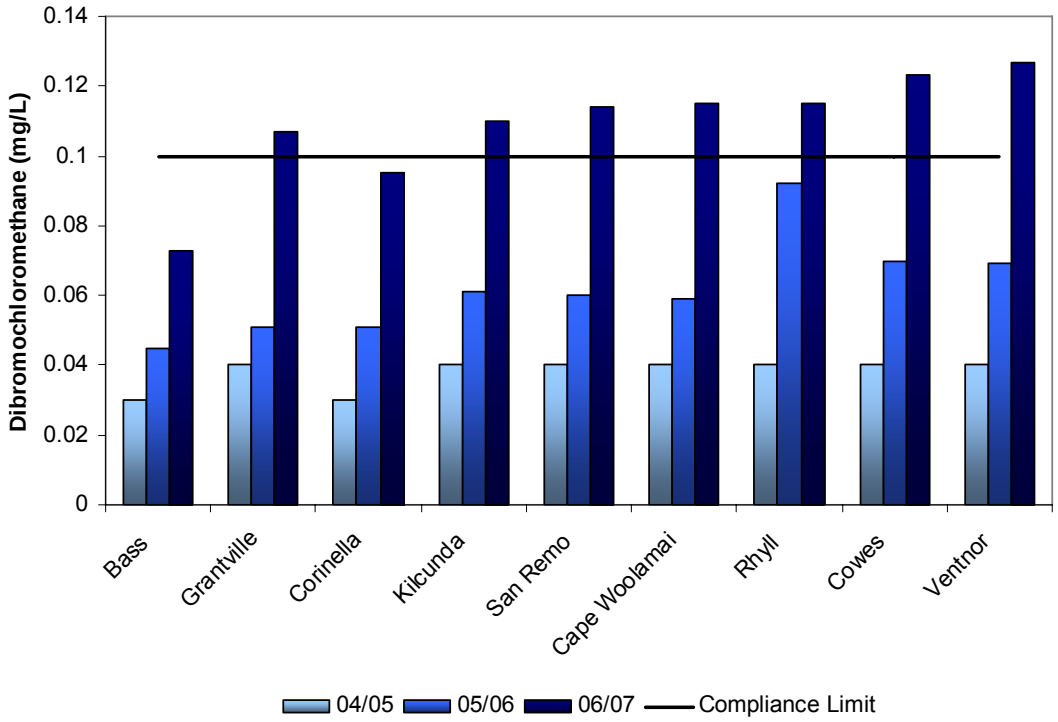


Figure 4-12 **Maximum dibromochloromethane concentration from July 04 to June 07**

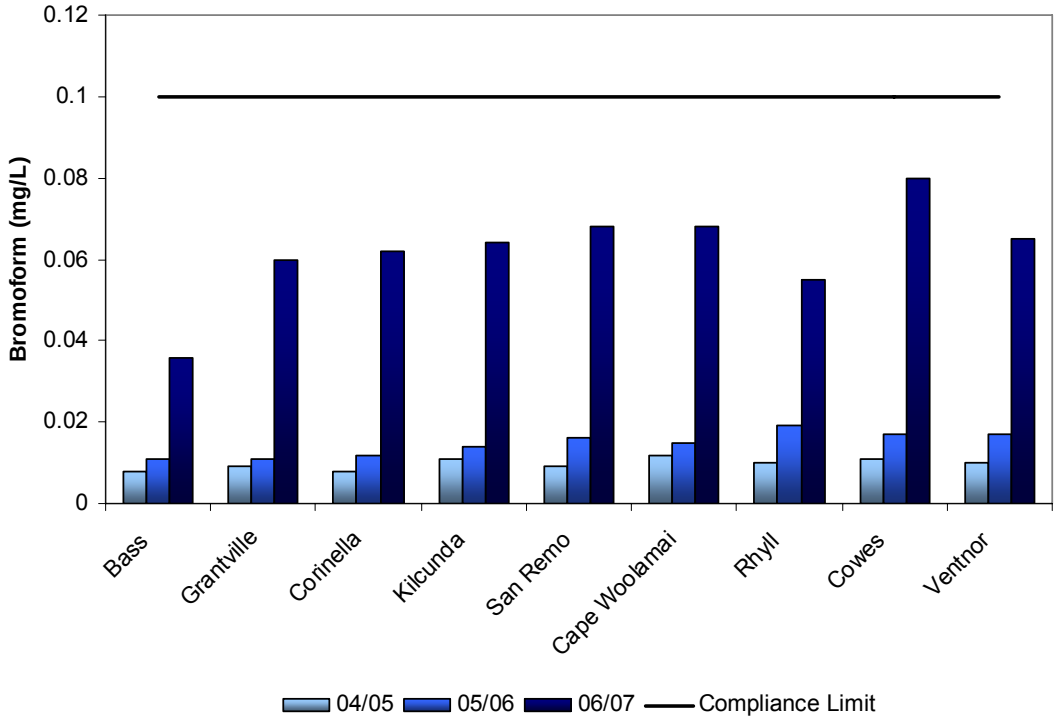


Figure 4-13 **Maximum bromoform concentration from July 04 to June 07**

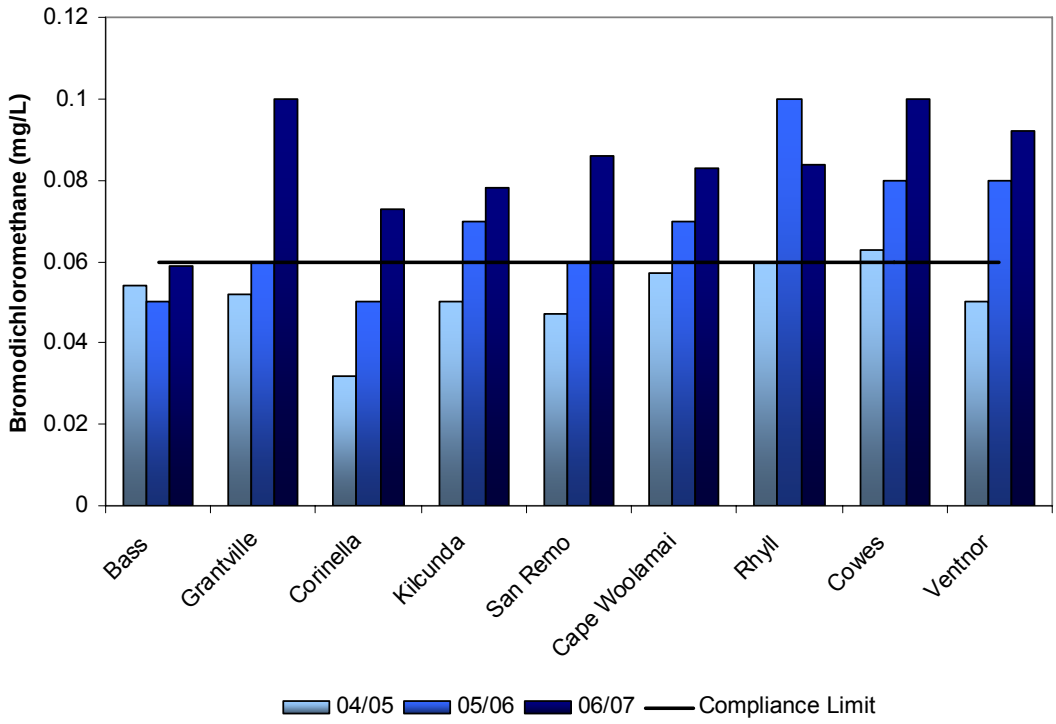


Figure 4-14 **Maximum bromodichloromethane concentration from July 04 to June 07**

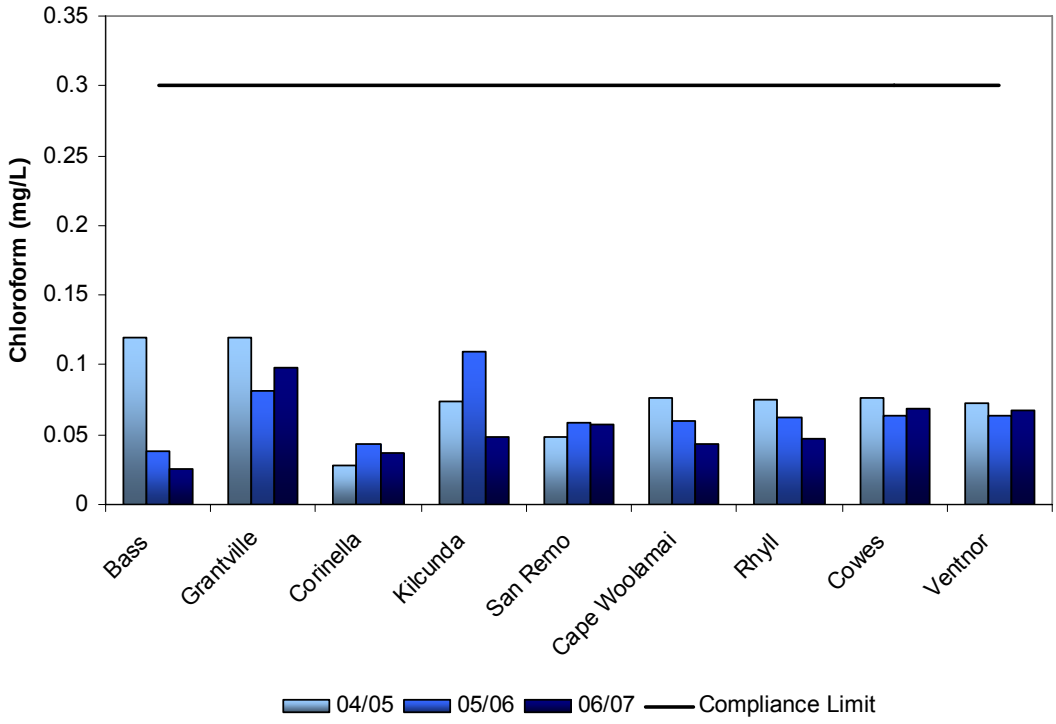


Figure 4-15 **Maximum chloroform concentration from July 04 to June 07**

4.2.4 Heavy Metals

With the exception of iron and manganese, heavy metals exceedances were isolated events and the causes of these exceedances were difficult to pinpoint. The reticulation system in the problem areas were flushed when exceedances were detected and the results of the samples taken afterwards all returned a value below the guideline limit.

The increase in iron and manganese levels may be caused by the increase in the variability of the raw water quality due to the drought. Potassium permanganate is used at the IBWPP to remove iron and manganese. In an effort to improve water quality, a standard procedure for the batching of potassium permanganate stock solution has been developed to ensure a consistent concentration. Additional sampling is often done within storage tanks and at the 30 mins detention time post treatment location when iron and/or manganese levels are high. This assists Westernport Water in locating the problem areas. Air scouring of the reticulation system, especially in the problem areas, was performed to rectify this exceedance issue.

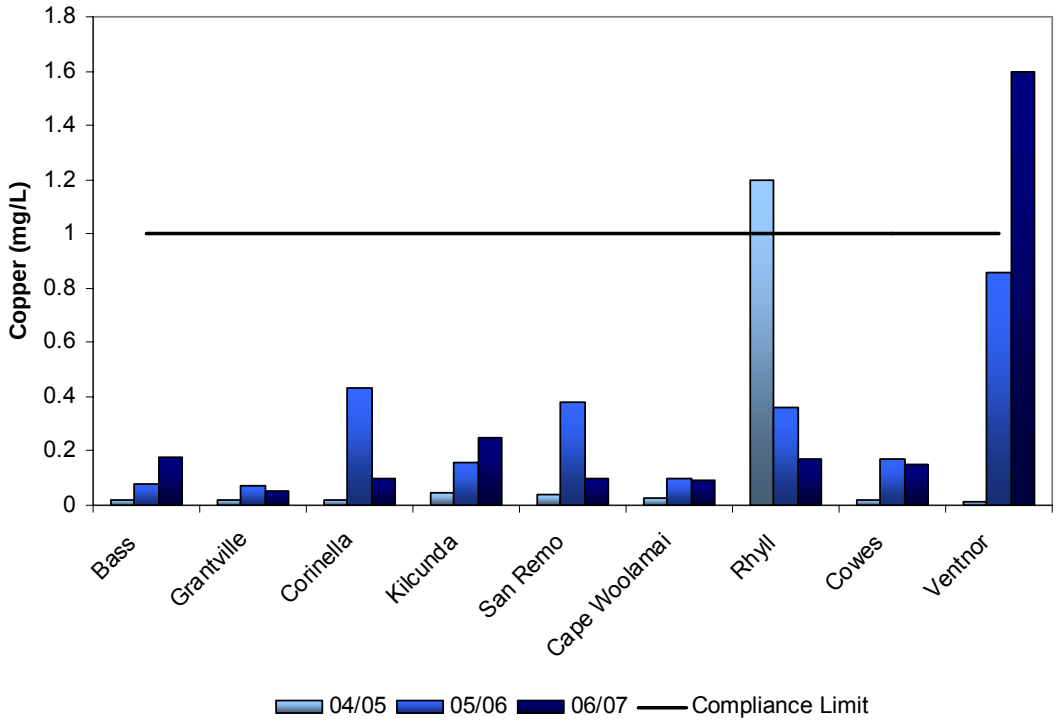


Figure 4-16 **Maximum copper concentration from July 04 to June 07**

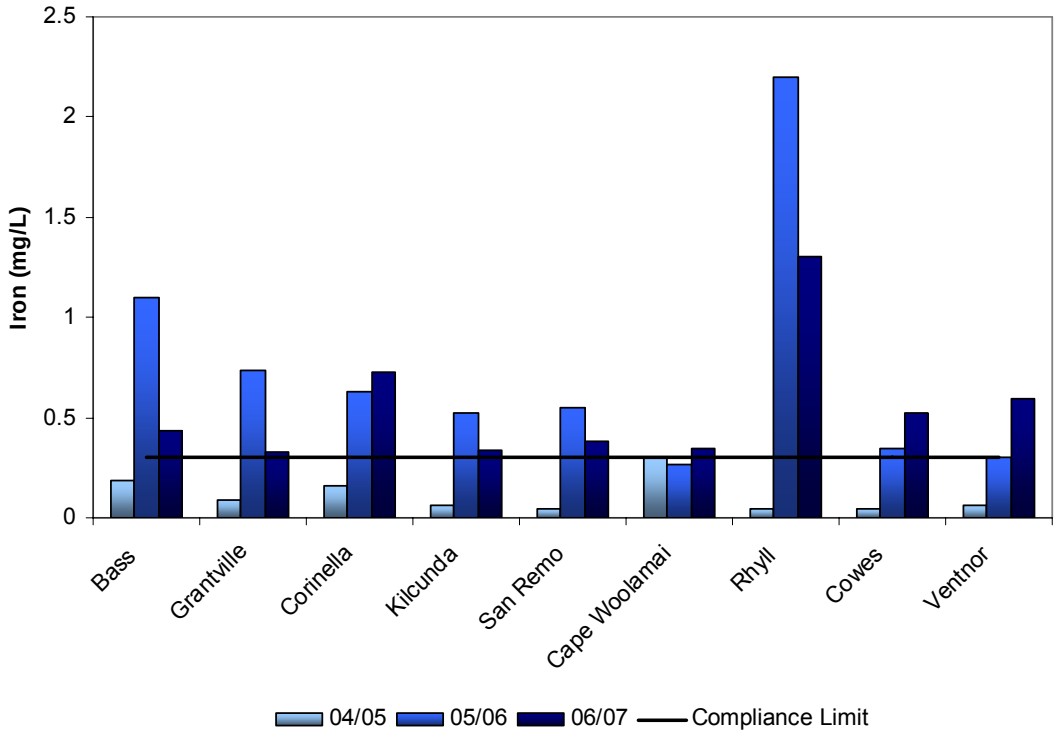


Figure 4-17 **Maximum iron concentration from July 04 to June 07**

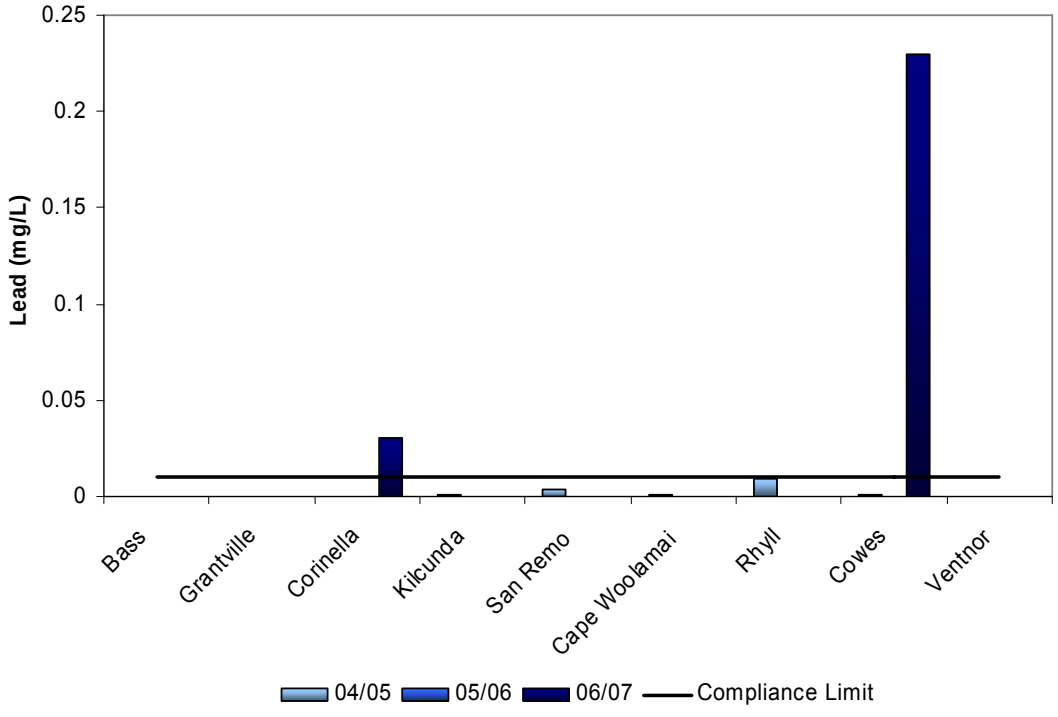


Figure 4-18 **Maximum lead concentration from July 04 to June 07**

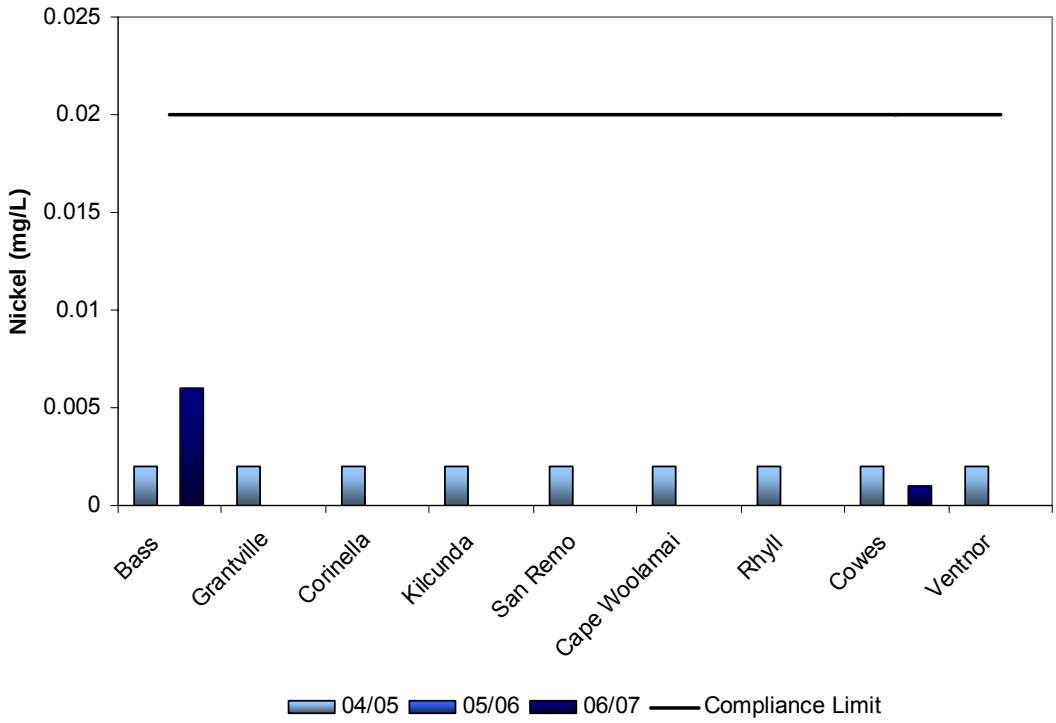


Figure 4-19 **Maximum nickel concentration from July 04 to June 07**

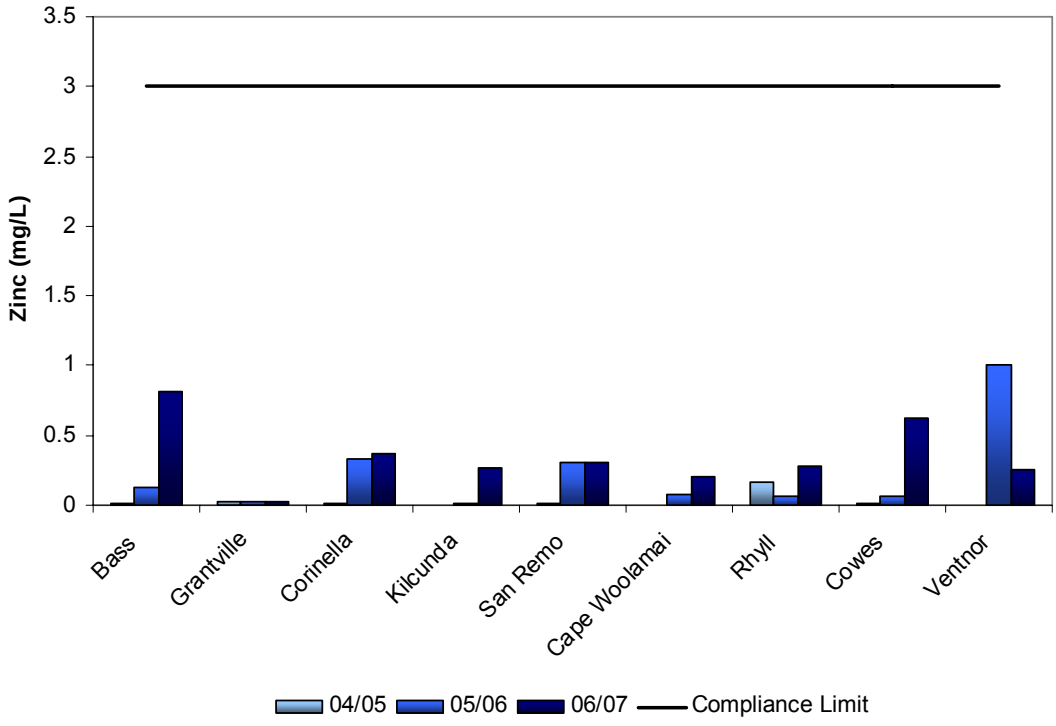


Figure 4-20 **Maximum zinc concentration from July 04 to June 07**

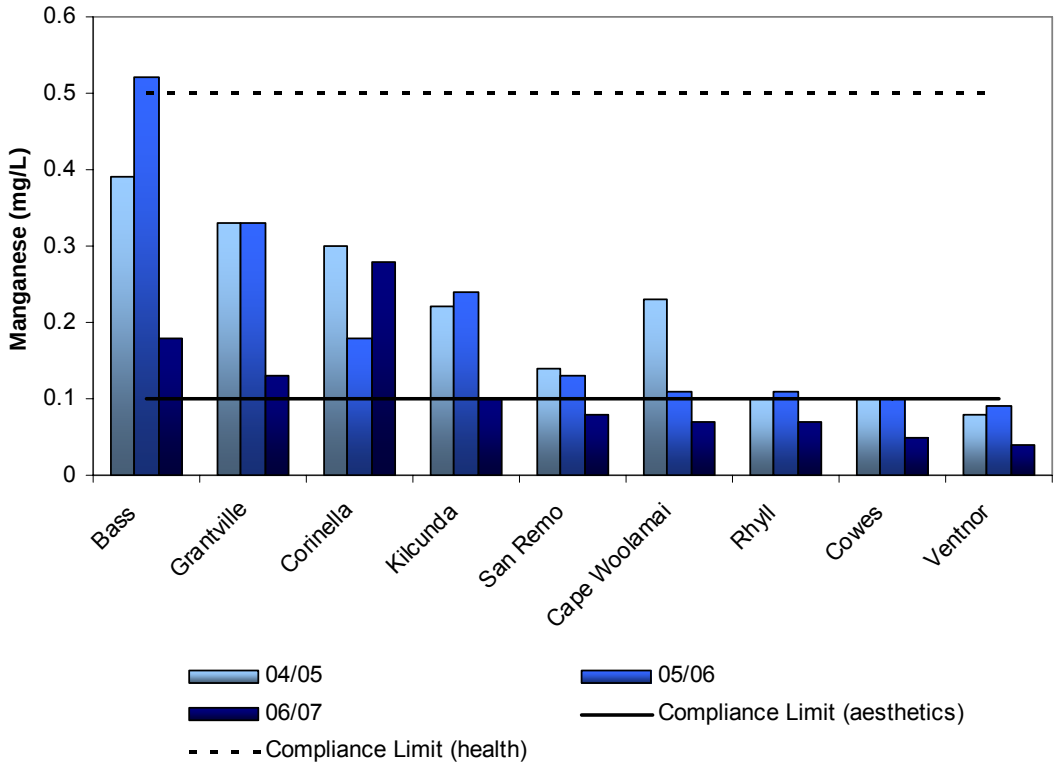


Figure 4-21 **Maximum manganese concentration from July 04 to June 07**

5 Emergency/Incident Management

The following information regarding any incidents that occurred during 06/07 includes any water quality incidents at customer taps as well as the Candowie Reservoir.

5.1 Reportable Events under Section 22

In accordance with regulation 15 (1) (c) of the *Safe Drinking Water Regulations*, any incidents that have been reported to DHS under section 22 of the *Safe Drinking Water Act* are summarised below.

Widespread elevated THM concentrations were reported in Grantville, Kilcunda, San Remo, Cape Woolamai, Rhyll, Cowes and Ventor. They were detected in samples collected on 17/01/2007. Due to the widespread nature of this exceedance it was reported as an incident under both sections 18 and 22 of the *Safe Drinking Water Act* . The problem areas were flushed and no further actions were taken as the results from the next sampling event returned to below guideline value except for Ventor. Again, the Ventor mains were flushed and the results from the next sampling event returned to below guideline value.

On 17/01/2007 an elevated lead level was detected in the Cowes water sampling locality. This was a significant exceedance of the ADWG health guideline, and reported to DHS as an incident under section 22 of the *Safe Drinking Water Act*. The mains at Cowes were flushed to remove any residual lead. Water quality results on the next sampling event showed that the lead concentration had decreased to just above guideline level. Again, the Cowes mains were flushed and the results from the next sampling event returned to below guideline value. No further actions were taken.

On 15/02/2007 an elevated lead level was detected in the Corinella and Cowes water sampling locality. Due to the recent previous detections of lead, these exceedances of the ADWG health guidelines were reported to DHS as an incident under section 22 of the *Safe Drinking Water Act*. The mains in the problem areas were flushed to remove any residual lead. Water quality results on the next sampling event showed that the lead concentration had decreased to below the guideline level. No further actions were taken.

5.2 Other Incidents

On 11/04/2007 elevated THM concentrations were recorded in the water sampling localities of San Remo and Cowes. These were reported to the Department as incident under section 18 of the *Safe Drinking Water Act*.

6 Complaints

6.1 Summary of Complaints

The number of potable water quality complaints reported to Westernport Water during the 06/07 annual reporting period decreased slightly from last reporting period (188 in 05/06). A summary of the complaints can be found in Table 6-1.

Table 6-1 Table of complaints

	Total No. of complaints	Rate per 100 customers*
Discoloured Water	74	0.5
Taste and Odour	30	0.2
Blue Water	0	0
Air in Water	0	0
Illness	9	0.1
Other	18	0.1
Total	131	0.9

* This is based on a permanent population serviced of 13,852.

The majority of aesthetic complaints occurred in February 2007 with 22 colour complaints followed by June 2007 with 17 complaints. These complaints were most likely due to the manganese and iron issues in the water supply.

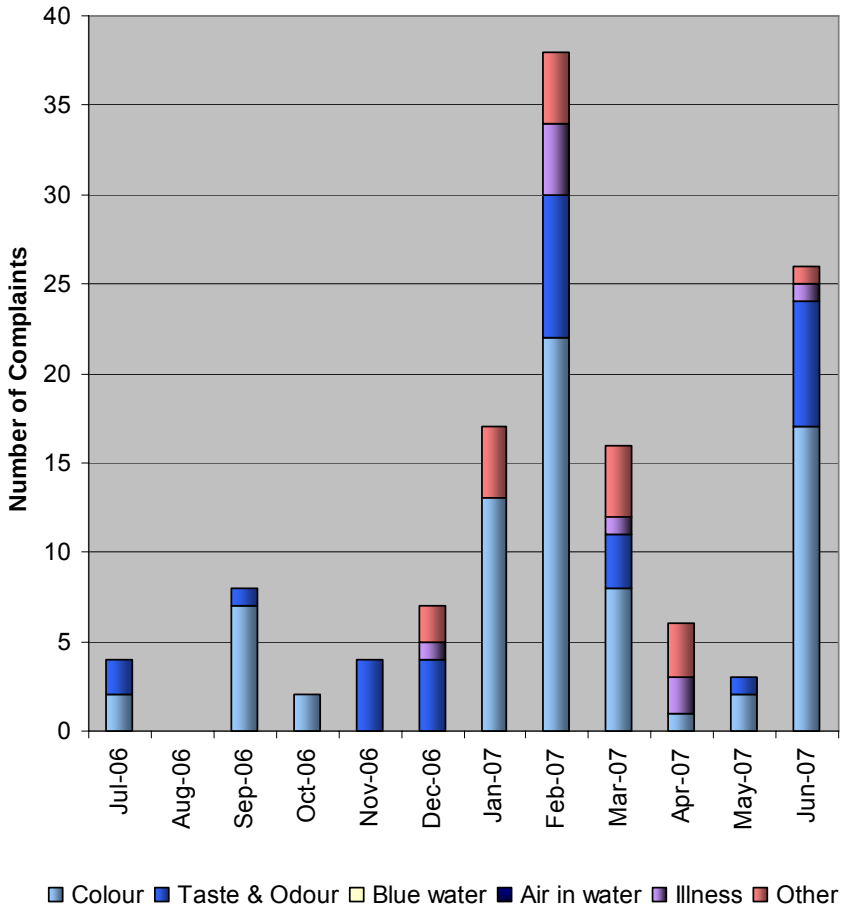


Figure 6-1 Customer complaints for 06/07 reporting period

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 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 ie 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 Undertakings Under Section 30 of the Act

Westernport Water did not have an Undertaking with DHS pursuant to Section 30 of the Act for the 06/07 reporting period.

8 Risk Management Plan

Westernport Water is committed to supplying the best possible quality water to their customers. The previous Water Quality Management Plan is under revision. A detailed Water Quality Risk Management Plan is being developed to ensure that the risks are identified and managed to maintain a high water quality level. Dr Peter Mosse, a water treatment specialist with significant experience across Australia, has been engaged to review, update and extend the risk management plans and as part of this process, the need for audits has been identified and will be implemented in the near future.

9 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.

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