



# Annual Drinking Water Quality Report

2015-16



## Document approval and issue notice

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## Amendments in this release:

Section title	Section number	Amendment summary
Sampling program	Appendix A	Corrections to the program
Measuring Performance	4	Removing incorrect operating targets for individual DBPs

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## Glossary/List of acronyms

Acronym/term	Meaning
µg	Microgram
ADWG	Australian Drinking Water Guidelines
BGA	Blue green algae
BWA	Boil water alert
DAFF	Dissolved air flotation and filtration
DHHS	Department of Health and Human Services
DNC	Do not consume
DPB	Disinfection by-product
DPIPWE	Department of Primary Industries, Parks, Water and Environment
DWQMP	Drinking water quality management plan
GAC	Granular activated carbon
Geosmin	Algal metabolite
KPI	Key performance indicators
L	Litre
MRL	Method limit of reporting – lowest reliably detectable level
M	Million
mg	Milligram
mg.min/L	Milligram minutes per litre
MIB	2-methylisoborneol (algal metabolite)
mL	Millilitre
MPN	Most probable number
N/A	Not applicable
ng	Nanogram
NTU	Nephelometric turbidity unit (measure of turbidity)
PAC	Powdered activated carbon
PBWA	Permanent boil water alert
Potable	Water classified fit for consumption by DHHS
PSP	Price and service plan
TDWQG	Tasmanian Drinking Water Quality Guidelines
SCADA	Supervisory Control and Data Acquisition
TBWA	Temporary boil water alert
THM	Trihalomethanes (disinfection by-products)
WHO	World Health Organization
WTP	Water treatment plant

## 1. Executive summary

### Introduction

We are pleased to submit our third Annual Drinking Water Quality Report (ADWQR) to the Department of Health and Human Services (DHHS).

This annual report fulfils the requirements of Section 13 and Appendix C of the Tasmanian Drinking Water Quality Guidelines (TDWQG) issued under the *Public Health Act (1997)*, by the Director of Public Health.

The Tasmanian Water and Sewerage Corporation Pty Ltd, trading as TasWater, was incorporated on 5 February 2013 under the *Water and Sewerage Corporation Act 2012 (Tas)* and commenced operation on 1 July 2013.

TasWater is owned by Tasmania's 29 municipal councils and is currently responsible for managing:

- ❖ 218, 085 water connections<sup>1</sup>
- ❖ 70 drinking water systems
- ❖ 6,231 km of water mains
- ❖ 185 water reservoirs, weirs and catchments.

### Our strategic framework

Our vision is to be 'A trusted and respected provider of essential services that is making a positive difference to Tasmania'.

Our vision reflects the organisation wide focus on what really matters to our owners, customers and the community, who are dependent on us for what are essential services in the community.

Our strategic framework provides a means to align our business activities to the expectations of our stakeholders and the community. By understanding where we provide the greatest value for our stakeholders (our value drivers), we are able to more effectively and efficiently focus our efforts in delivering the activities that really matter for the wider community.

In this way, the framework provides a tool for assessing our decision making and evaluative processes and for monitoring and controlling our performance.

The corporate value driver that is most relevant to drinking water quality is 'Water and environmental outcomes', which aims to 'Provide safe drinking water and environmentally friendly waste water solutions'. We also seek to build confidence and trust with our stakeholders by improving water quality around the state.

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<sup>1</sup> Connection data as at 30 June 2016.

**Figure 1–a Our Strategic Framework: What we are all about**

<b>OUR VISION</b> "We will become..."	<b>A trusted and respected provider of essential services that is making a positive difference to Tasmania</b>			
<b>VALUE DRIVER</b> "We will focus our efforts on..."	<b>Customer and community outcomes</b>	<b>Commercial and economic outcomes</b>	<b>Water and environmental outcomes</b>	<b>Our people and culture outcomes</b>
<b>STRATEGIC OBJECTIVES</b> "Our primary objective is to..."	Build key stakeholders' confidence and trust in us	Provide services that are affordable and positive for Tasmania and can be sustained	Provide safe drinking water and environmentally-friendly wastewater solutions	Build a culture and skill base that meets the long term needs of the business
<b>OUTCOMES</b> "By 2021..."	The majority of the negative commentary in our space will be gone	Significant progress will have been made towards transforming the state's water and sewerage infrastructure	Our drinking water systems will be resilient and fully compliant	We will have built a culture that reflects our values and desire to be innovative, customer centric and focused on excellence
<b>OUTCOMES</b> "By 2026..."	We will be the most trusted and respected government owned business in Tasmania	We will have addressed Tasmania's key water and sewerage infrastructure challenges	Our environmental discharges and by-products will consistently meet modern day environmental expectations	We will be an employer of choice at the national level with a high performing and sustainable workforce

In order to achieve our vision, we need to balance competing priorities for investment with a limited amount of available funding for new infrastructure, renewing existing infrastructure and to optimise the performance of existing systems where required.

### Approach to drinking water management

To ensure consistent management of drinking water systems from catchment to customer taps, we employ the best practice risk management principles described in the Australian Drinking Water Guidelines (ADWG).

We are committed to consistently providing drinking water to the standard set out in the ADWG. As one of our core products it is important that our customers have confidence in our ability to consistently deliver quality drinking water.

In many locations we cannot reliably supply water that meets the ADWG standard but we are rolling out new programs and projects to enable us to provide good, clean, safe water to these locations.

In 2015–16 we finalised our first drinking water quality management plan (DWQMP) which aligns with the 12 element approach detailed in the ADWG. The DWQMP is based on a comprehensive multi criteria risk assessment and this annual report provides underlying data to risk based decisions.

The two documents are closely related and are used to identify key actions and projects to maintain and improve Tasmania's drinking water systems.



## Performance for the 2015–16 year

A key component of the ADWG risk management framework is the verification of drinking water quality. This verification process provides an assessment of the overall performance of the system and the ultimate quality of drinking water being supplied to consumers.

To measure our water quality performance a comprehensive sampling program was conducted throughout 2015–16 to monitor multiple key aspects of water quality. This sampling program addresses the requirements of the TDWQG.

Key results of the 2015–16 sampling program indicate that:

- ❖ A total of 97.8 per cent (45 of 46) of potable systems achieved microbiological compliance
- ❖ A total of 71.4 percent (50 of 70) of systems met microbiological compliance (this includes systems under health alerts)
- ❖ One potable system’s microbial performance was recorded as *unknown* due to inadequate sample numbers
- ❖ A total of 18 systems were operated under a permanent boil water alert (BWA)
- ❖ Five systems were operated under a permanent do not consume notice (DNC)
- ❖ Seven temporary BWAs were implemented due to microbiological risk
- ❖ A total of 27 *E. coli* detections in compliance samples occurred in potable systems<sup>2</sup>
- ❖ Nine public health non-compliances rated serious occurred including seven temporary BWAs and one permanent BWA (see Table 5–c on page 25)
- ❖ Eight systems recorded disinfection by-products (DBPs) above ADWG health limits
- ❖ Six systems experienced issues with metal concentrations above the ADWG health limits
- ❖ All systems were free of pesticide detections above ADWG health limits
- ❖ A total of 78.6 per cent (55 of 70) of systems achieved chemical compliance measured against the requirements of the ADWG
- ❖ A total of 74.4 per cent (29 of 39) of fluoride dosing stations operated within the target range (0.8 – 1.2 milligrams per Litre (mg/L) greater than 90 per cent of the time
- ❖ 100 per cent (39 of 39) of fluoride dosing systems operated with a mean annual dose between 0.8 – 1.2 mg/L
- ❖ There were no detections of fluoride above 1.5 mg/L.

All water quality data used to develop this annual report is provided in Appendix C: Supporting data.

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<sup>2</sup> A total of 31 detections for the year however only 27 were from compliance monitoring points.

Performance during the 2015–16 reporting period, measured against our corporate key performance indicators (KPIs) in Table 1–a indicates that:

- ❖ The percentage of potable systems compliant with the ADWG microbiological guidelines met the target of 97 per cent, achieving 97.8 per cent
- ❖ The number of towns on long term BWAs or DNCs failed to meet the target of 11, however four BWAs were removed reducing the number to 23
- ❖ The percentage of stations compliant with the average fluoride concentration within target range 0.8–1.2 mg/L exceeded the forecasted performance, achieving 100 per cent.

**Table 1–a Performance of key indicators against targets detailed in our corporate plan 2016–18**

Key performance indicators	2015–16 Actual	Regulator’s long-term goal	2015–16 Target	2016–17 Target	2017–18 Target
Percentage of potable systems compliant with ADWG microbiological guidelines (%)	97.8%	100%	97%	98%	98%
Number of towns on permanent BWAs or DNCs	23	0	11	9	8
Percentage of systems compliant with average fluoride concentration within target range 0.8–1.2 mg/L (%)	100%	100%	96%	99%	99%
Towns with regular summer water restrictions	1	N/A	1	1	0
Number of public health non-compliances rated serious	9	0	0	0	0

TasWater regularly reviews the corporate plan and updates the key performance indicators. Table 1–b below details these changes for the 2017–19 period.

**Table 1–b Performance of key indicators against targets detailed in our corporate plan 2017–19**

Key performance indicators	2016–17 Target	2017–18 Target	2018–19 Target
Percentage of compliant potable systems	98%	98%	98%
Towns on permanent BWAs or DNCs	13	11	TBD <sup>#</sup>
Percentage of compliant fluoride systems	96%	96%	99%
Number of systems from which we receive more than 10 taste and odour water supply complaints per annum	5	3	2
Number of <i>E. coli</i> detections	30	20	5
Temporary BWAs put in place by DHHS	2	1	0

<sup>#</sup> Further reductions have been identified but are subject to business cases and funding approval, targets are expected to be updated in the FY2018–20 Corporate Plan

## Completion of major works and ongoing initiatives

During the 2015–16 reporting period we completed several major projects, including:

- ❖ **Fingal** – BWA was removed in July 2015 following the completion of a new water treatment plant (WTP) and verification of performance
- ❖ **Tunbridge** – BWA was removed in July 2015 following the completion of a new WTP
- ❖ **Huon Valley WTP** – BWA was removed in November 2015 for Franklin (Jacksons Rd) and Cygnet (Nicolls Rivulet) following connection to the Huon Valley Regional Scheme. This project also connected the Donnelly’s Road and Kermandie systems to the scheme which has improved the quality of water supplied
- ❖ Construction commenced on five new WTPs which provide safe drinking water to nine towns, eight of which currently operate under some form of public health alert (see Table 2–a)
- ❖ **Ouse/Hamilton** – a new WTP at Ouse and pipeline to Hamilton were completed, which allows for safer operations and reduces the microbial risk and potential for formation of DBPs.

In addition to the construction and commissioning of new treatment assets, we have also made significant progress in understanding and managing risk from catchment to tap. During 2015–16 we completed a number of strategic projects, including:

- ❖ **Drinking Water Quality Management Plan 2015–18** – This plan identifies and manages risk from catchment to tap, in line with the best practice approach outlined in the ADWG
- ❖ **Compliance monitoring** – the drinking water quality compliance monitoring program was reviewed and updated to ensure compliance with the ADWG
- ❖ **Catchment surveys** – we conducted catchment risk assessments for the 11 towns included in the small towns’ water supply strategy. This work will help identify solutions to the water quality problems in these communities.

## 2. Future planning and works

Through the implementation of the DWQMP TasWater conducts risk assessments on all of our drinking water systems. These risk assessments identify inherent risks in the drinking water systems and allow us to develop improvement plans, including capital and operational projects.

To assist with development of initiatives to improve water quality, the DHHS has provided a list of priority systems and identified several strategic goals that should be considered in planning improvements. These include:

- ❖ Undertake WTP performance optimisation including critical control point identification and implementation
- ❖ Improve disinfection residual performance
- ❖ Continue catchment risk assessments
- ❖ Reduce the occurrence of DBPs
- ❖ Improve fluoride performance.

## Improving microbiological performance

Systems that have demonstrated poor microbiological performance, or are on a public health alert (BWA/DNC) are being progressively addressed. The completion of these projects should realise significant improvement in water quality and are outlined in Table 2–a below.

**Table 2–a Summary of microbiological improvements**

System	Status	Performance 2014–15 (%)	Project description and delivery	Estimated spend
Branxholm	BWA	0	Provision of potable water via the new Ringarooma Valley system. Pipeline construction is in progress and WTP to be commissioned in early 2017.	\$4.6M
Derby	BWA	75		
Legerwood	BWA	100		
Ringarooma	BWA	0		
Winnaleah	DNC	50		
Avoca	DNC	100	Provision of potable water from Fingal WTP via a pipeline. Undergoing preliminary design and stakeholder review. Anticipated delivery 2016–17.	\$4.7M
Colebrook	Potable	94	Reservoir roofing under construction to manage chlorine improvement. Anticipated delivery 2016–17.	\$238,000
Gretna	BWA	2	New WTP design complete and project to be put to tender. Anticipated delivery 2016–17.	\$3.9M
Lady Barron	BWA	91.6	New WTP is in commissioning phase. Lifting the BWA is anticipated in 2017.	\$6.4M
Mole Creek	BWA	14	New WTP is under construction with completion expected late 2016. Lifting the BWA is anticipated early 2017.	\$4.1M
Mountain River	BWA	23	Service replacement with rainwater tanks is in progress.	\$270,000
Pioneer	DNC	33	Service replacement with rainwater tanks is in progress.	\$936,000
Scamander	BWA	100	The installation of a clarifier is complete. Network improvements are in progress and due for completion late 2016. Lifting the BWA is anticipated in 2017.	\$1.3M
Whitemark	DNC	50	Whitemark WTP commissioning is expected late 2016 with the DNC expected to be lifted in 2017.	\$6.4M
Conara	BWA	100	Investigating options to improve water quality supplied under the Small Towns Water Supply Strategy. Anticipated delivery 2018.	To be determined
Cornwall	BWA	67		
Epping	BWA	96		
Gladstone	BWA	33		
Gormanston	BWA	48.9		
Herrick	BWA	67		
Judbury	BWA	26		
Mathinna	BWA	33		
Rossarden	DNC	90		
Wayatinah	BWA	100		



### 3. Overview of TasWater's drinking water systems

For the period of 2015–16 we managed 70 drinking water systems that serviced 87 monitoring zones and 218, 085 connections<sup>3</sup>. The catchments relating to these systems vary from largely protected catchments through to highly impacted and compromised catchments. Treatment facilities for these drinking water systems vary in sophistication, from raw water supplies to disinfection only and comprehensive multi barrier treatment. Table 3–a below summarises these drinking water systems, including their catchments, numbers of connections, extraction licences and key treatment processes. Further information and detailed performance for each system and list of towns serviced can be found in section 6: System Reports and Appendix B: List of towns serviced.

**Table 3–a System summaries**

System /Monitoring Zone	Status	Connections	Catchment name/water source	Treatment process	Fluoridated supply
Adventure Bay	Potable	1	Bore	Disinfection only	No
Avoca	DNC	125	South Esk River	Disinfection only	No
Bicheno	Potable	957	Aspley River	Full treatment	Yes
Bothwell	Potable	274	Clyde River	Full treatment	No
Bracknell	Potable	199	Liffey River	Full treatment	No
Branxholm	BWA	206	Ringarooma River	Untreated	No
Bridport	Potable	1154	Brid River	Full treatment	Yes
Cam River	Potable	4355	Cam River	Full treatment	Yes
Campbell Town	Potable	868	Elizabeth River	Full treatment	Yes
Colebrook	Potable	86	Strainers Creek	Disinfection only	No
Coles Bay	Potable	293	Saltwater Creek	Full treatment	No
Conara	BWA	59	South Esk River	Disinfection only	No
Cornwall	BWA	50	Fanshaft spring	Untreated	No
Currie	Potable	522	Bore	Disinfection only	No
Deep Creek	Potable	2394	Deep Creek	Full treatment	Yes
Deloraine	Potable	1327	Meander River	Full treatment	Yes
Derby	BWA	165	Irrigation scheme	Untreated	No
Distillery Creek	Potable	17743	Distillery Creek / St Patricks River	Full treatment	Yes
Dover	Potable	744	Esperance River	Full treatment	Yes
Dowlings Creek	Potable	111	Dowlings Creek	Full treatment	No
Ellendale	Potable	88	Jones River	Full treatment	No
Epping	BWA	33	South Esk River	Disinfection only	No
Fingal	Potable	308	South Esk River	Full treatment	No
Forth River	Potable	18300	Forth River	Full treatment	Yes
Gawler River	Potable	5212	Gawler River	Full treatment	Yes
Gladstone	BWA	88	Ringarooma River	Untreated	No
Gormanston	BWA	35	Unnamed basin	Untreated	No
Grassy	Potable	169	Grassy River	Full treatment	No
Greater Brighton	Potable	7077	Derwent River	Bryn Estyn – full	Yes

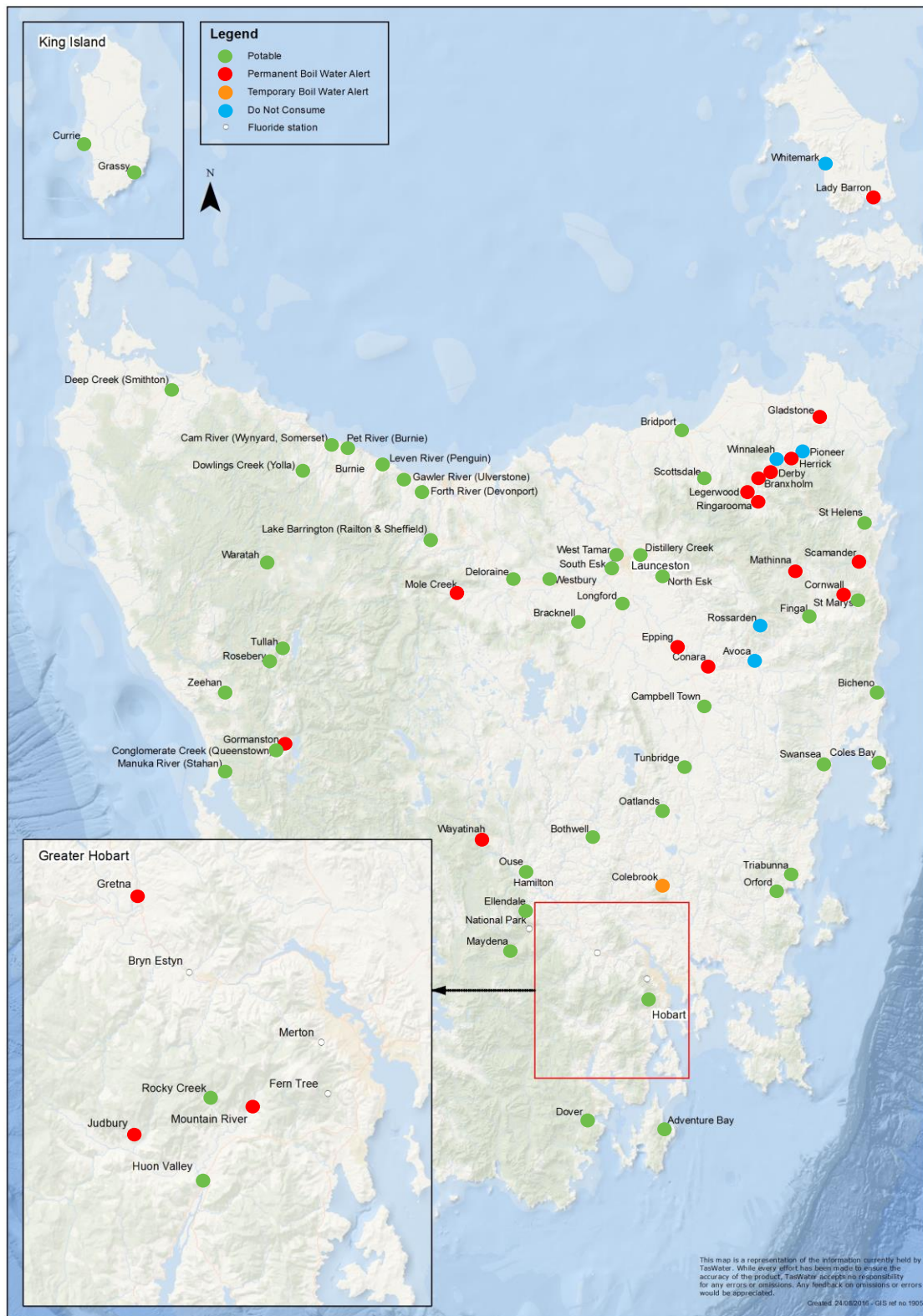
<sup>3</sup> Connection data as at 30 June 2016.

System /Monitoring Zone		Status	Connections	Catchment name/water source	Treatment process	Fluoridated supply
Hobart	Clarence		21661	North West Bay River	treatment	
	Coal Valley		774			
	Glenorchy		21138	Merton Weir	Fern Tree – disinfection only	
	Hobart		26818			
	Kingborough		11958	Lady Barron Creek	Merton – disinfection only	
	National Park		407			
	New Norfolk		3386			
	Sorell		2880			
	Southern Midlands		661			
Gretna		BWA	74	Derwent River	Untreated	No
Herrick		BWA	27	Irrigation scheme	Untreated	No
Huon Valley	Castle Forbes Bay	Potable	378	Huon River	Full treatment	Yes
	Cygnnet		856			
	Cygnnet Nicholls		88			
	Franklin		295			
	Geeveston		528			
	Geeveston Donnelly		240			
	Geeveston Kermandie		Captured in Geeveston			
	Huonville		1591			
	Jacksons Road		27			
Judbury		BWA	105	Dora Creek	Untreated	No
Lady Barron		BWA	168	Bore	Untreated	No
Lake Barrington		Potable	1223	Lake Barrington	Full treatment	Yes
Legerwood		BWA	95	Bore	Untreated	No
Leven River		Potable	2160	Leven River	Full treatment	Yes
Longford		Potable	4515	Macquarie River	Full treatment	Yes
Manuka River		Potable	634	Manuka River	Full treatment	Yes
Mathinna		BWA	86	South Esk River	Untreated	No
Maydena		Potable	169	Unnamed tributary	Disinfection only	No
Mole Creek		BWA	270	Mole Creek	Untreated	No
Mountain River		BWA	2	Stephenson’s Creek	Untreated	No
North Esk		Potable	15537	North Esk	Full treatment	Yes
Oatlands		Potable	487	Blackman River	Full treatment	Yes
Orford		Potable	1120	Prosser River	Full treatment	Yes
Ouse and Hamilton		Potable	137	Derwent River	Full treatment	No
Pet River		Potable	7961	Pet River	Full treatment	Yes
Pioneer		DNC	11	Unnamed creek and Ringarooma River	Untreated	No

System /Monitoring Zone	Status	Connections	Catchment name/water source	Treatment process	Fluoridated supply
Queenstown	Potable	1614	Conglomerate Creek	Full treatment	Yes
Ringarooma	BWA	184	Vineys Creek Dam / Dunns Creek Dam	Untreated	No
Rocky Creek	Potable	188	Rocky Creek	Disinfection only	Yes
Rosebery	Potable	680	Mountain Creek / Stitt River	Full treatment / Disinfection only	Yes
Rossarden	DNC	99	Aberfoyle Creek	Untreated	No
Scamander	BWA	626	Scamander River	Full treatment	Yes
Scottsdale	Potable	1347	Great Forester River / Brid River	Full treatment	Yes
South Esk	Potable	5136	Lake Trevallyn	Full treatment	Yes
St Helens	Potable	2160	Georges River	Full treatment	Yes
St Marys	Potable	448	Bore	Full treatment	Yes
Swansea	Potable	804	Swan River / Meredith River	Full treatment	Yes
Triabunna	Potable	511	Maclaines Creek / Brady's Creek	Full treatment	Yes
Tullah	Potable	237	Lake Rosebery	Full treatment	No
Tunbridge	Potable	111	Blackman River	Full treatment	No
Waratah	Potable	182	Waratah River	Full treatment	Yes
Wayatinah	BWA	77	Lake Liapootah	Disinfection only	No
West Tamar	Potable	10007	Lake Trevallyn	Full treatment	Yes
Westbury	Potable	1137	Meander River	Full treatment	Yes
Whitemark	DNC	222	Pats River	Untreated	No
Winnaleah	DNC	108	Bore	Untreated	No
Zeehan	Potable	797	Parting Creek	Full treatment	Yes

Figure 3—a below indicates the location of the drinking water systems and their status as at 30 June 2016.

**Figure 3—a Location of all drinking water systems**





## 4. Measuring performance

We measure the performance against ADWG health guideline limits, and operational targets. ADWG aesthetic guideline limits are also considered when assessing the quality of drinking water. Table 4–a summarises these limits and references the corresponding limits or targets.

**Table 4–a Summary of health and aesthetic limits**

Parameter	Operational target	ADWG health	ADWG aesthetic	Comment
<b>Microbiological</b>				
Total coliforms	No Significant Change	–	–	Refer to NHMRC (2003) review of Coliforms
<i>Escherichia coli</i> ( <i>E. coli</i> )	<1 MPN/100mL	<1 MPN/100mL	–	TDWQG guideline for microbial quality <1 MPN/100mL
<b>Metals ADWG health regulated</b>				
Antimony total (mg/L)	–	0.003	–	ADWG Health
Arsenic inorganic (mg/L)	–	0.01	–	ADWG Health
Barium total (mg/L)	–	2	–	ADWG Health
Boron (mg/L)	–	4	–	ADWG Health
Cadmium total (mg/L)	–	0.002	–	ADWG Health
Chromium (mg/L)	–	0.05	–	ADWG Health
Copper total (mg/L)	–	2	1	ADWG Health
Lead total (mg/L)	–	0.01	–	ADWG Health
Manganese total (mg/L)	–	0.5	0.1	ADWG Health
Mercury total (mg/L)	–	0.001	–	ADWG Health
Molybdenum total (mg/L)	–	0.05	–	ADWG Health
Nickel total (mg/L)	–	0.02	–	ADWG Health
Selenium total (mg/L)	–	0.01	–	ADWG Health
Aluminium acid soluble (mg/L)	0.1	–	0.2	ADWG Aesthetic
Iron total (mg/L)	0.3	–	0.3	ADWG Aesthetic
Zinc total (mg/L)	3	–	3	ADWG Aesthetic
<b>Disinfection by-products</b>				
Chloroacetic acid	–	150 µg/L	–	ADWG Health
Dichloroacetic acid	–	100 µg/L	–	ADWG Health
Trichloroacetic acid	–	100 µg/L	–	ADWG Health
Total trihalomethanes	–	250 µg/L	–	ADWG Health
<b>Pesticides</b>				
Chlorpyrifos	No detection	10 µg/L	–	ADWG Health
Clopyralid	No detection	2000 µg/L	–	ADWG Health
Cyanazine	No detection	70 µg/L	–	Associated ADWG Health
Dicamba	No detection	100µg/L	–	Associated ADWG Health
Dimethoate	No detection	7 µg/L	–	ADWG Health
Glyphosate	No detection	1000 µg/L	–	ADWG Health
Haloxfobmethyl	No detection	–	–	
Hexazinone	No detection	400 µg/L	–	ADWG Health

Parameter	Operational target	ADWG health	ADWG aesthetic	Comment
MCPA	No detection	40 µg/L	–	ADWG Health
Metsulfuron methyl	No detection	40 µg/L	–	ADWG Health
Pendimethalin	No detection	400 µg/L	–	ADWG Health
Permethrin	No detection	200µg/L	–	ADWG Health
Picloram	No detection	300 µg/L	–	ADWG Health
Simazine	No detection	20 µg/L	–	ADWG Health
Sulfometuron methyl	No detection	40 µg/L	–	Associated ADWG Health
Turbacil	No detection	–	–	
<b>Fluoride</b>				
Fluoride (mg/L)	>0.8 – <1.2	<1.5	–	DHHS regulations
<b>General data</b>				
Total dissolved solids (mg/L)	600	–	600	ADWG Aesthetic
Colour true (HU)	15	No Limit	15	ADWG Aesthetic
Sodium (mg/L)	180	No Limit	180	ADWG Aesthetic
Chloride (mg/L)	250	No Limit	250	ADWG Aesthetic
Sulphate (mg/L)	250	500	250	ADWG Health
Total hardness CaCO <sub>3</sub> (mg/L)	200	No Limit	200	ADWG Aesthetic
Hydrogen sulfide (mg/L)	0.05	No Limit	0.05	ADWG Aesthetic
Ammonia as N (mg/L)	0.5	No Limit	0.5	ADWG Aesthetic
Nitrite (mg/L)	–	3	–	ADWG Health
Nitrate (mg/L)	–	50	–	ADWG Health
Cyanide as CN total (mg/L)	–	0.08	–	ADWG Health

In addition to measuring compliance against the ADWG health limits, we have assessed physico-chemical parameters against a number of internal operational targets. While these are not strictly compliance parameters, the physico-chemical results provide indications of the overall performance of the system and are useful process control indicators. Table 4–b summarises these indicators below.

**Table 4–b General physico-chemical parameters internal and operational targets**

General physico-chemical parameters	Operational target	ADWG Aesthetic limit	ADWG Health limit
Chlorine residual (mg/L)	> 0.1	0.6	< 5
pH	6.5 – 8.5	NA	N/A
Turbidity (NTU)	<1	< 5	N/A

## 5. Performance analysis

### Microbiological indicators

Contamination of reticulated drinking water supplies by pathogenic microorganisms represents the most acute risk to the consumer. Microbiological performance is measured to demonstrate that our drinking water systems are free from harmful pathogens and therefore safe for human consumption.

Monitoring for all possible pathogens is neither cost effective nor practical. The industry has widely adopted the approach of measuring *E. coli* as the primary indicator of contamination, as *E. coli* is a reliable measure of faecal contamination.

To be compliant with the requirements of the ADWG microbiological samples must not contain *E. coli*.

We implement a comprehensive sampling program to evaluate the microbiological performance of our drinking water systems. All potable drinking water systems were tested in accordance with the sampling frequency outlined as best practice in table 9.4 of the ADWG 2011. Note, this sampling frequency is not applied to systems on a BWA or DNC.

Through an agreement with DHHS we are only required to test systems covered by a permanent BWA or DNC on a monthly basis.

We sample over 390 locations across Tasmania and during this reporting period over 15,900 microbiological samples were collected.

A drinking water system is deemed compliant against the requirement of the TDWQG if *E. coli* is absent in greater than 98 per cent of all microbiological compliance samples taken.

We have a corporate target of 97 per cent of all potable systems meeting microbiological compliance. We exceeded this target with 97.8 per cent of our systems meeting the target.

There were 27<sup>4</sup> *E. coli* detections in compliance samples across potable systems, of which 21 were within fully treated systems and six in disinfection only systems. The individual system reports outline in more detail the investigation and root cause analysis of these detections.

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<sup>4</sup> A total of 31 strikes were detected for the year however only 27 were from compliance monitoring points.

**Table 5—a Summary of *E. coli* events in potable systems for 2015–16**

System	Treatment process	<i>E. coli</i> detections	Detection date	Mitigating actions	Comments
Cam River	Full treatment	2	29/12/2015	A TBWA was issued for Wynyard in consultation with DHHS on 31 December 2015. The cause of the failure was bird ingress into a reservoir. The reservoir was repaired to stop bird ingress, the reservoir was cleaned and the distribution system were then flushed and re-tested. TBWA was removed on 11/1/2016.	Towns affected: Wynyard
Colebrook	Disinfection only	3	14/06/2016	Chlorine disinfection was impaired by high turbidity levels. Turbidity reached 70 NTU due to colloidal clay in the raw water dam. BWA initiated and remains in place.	Towns affected: Colebrook
			21/06/2016		
			28/06/2016		
Deep Creek	Full treatment	6	15/09/2015	The system was scoured to ensure adequate chlorine residuals. Resample result was clear.	Towns affected: Irishtown
			17/11/2015	The system was drained, flushed and manually dosed and the re-test sample was clear	
			19/01/2016	The township of Irishtown was place on a BWA after the resample confirmed the presence of <i>E. coli</i> within the system. Manual chlorine dosing of the reservoir was conducted and flushing initiated to ensure turnover of water within the system. All connections in the Irishtown reticulation were inspected and a meter replacement program was bought forward to assist this process. There were several connections detected without adequate backflow protection.	
			21/01/2016		
			15/03/2016	Manual chlorine dosing of the reservoir was conducted and flushing initiated to ensure turnover of water within the system.	
12/04/2016					
Dowlings Creek	Full treatment	1	23/02/2016	Immediate resampling was free from contamination and an investigation determined the possible cause was contamination during sampling/analysis.	Re-sample clear
Gawler River	Full treatment	1	9/06/2016	Immediate resampling was free from contamination and an investigation determined the possible cause was contamination during sampling/analysis.	Re-sample clear
Huon Valley – Jacksons Rd	Full treatment	1	16/12/2015	Following localised scouring to improve residual chlorine levels the subsequent resample was clear.	Re-sample clear
Leven River	Full treatment	1	16/02/2016	Manual chlorine dosing of the reservoir was conducted and flushing initiated to ensure turnover of water within the system. Immediate resampling was free from contamination and an investigation determined the possible cause was contamination during sampling/analysis.	Re-sample clear
Manuka River	Full treatment	2	23/2/2016	A BWA was initiated and an intensive resampling program was initiated prior to the removal of the alert. The two uncovered reservoirs were taken offline.	Towns affected: Strahan



System	Treatment process	<i>E. coli</i> detections	Detection date	Mitigating actions	Comments
			21/06/2016	Contact time calculations being >50 mg.min/L and the plant operation being well in control as far as turbidity. All reticulation samples were negative from the same sample run. The immediate resample was negative. May have been a sampling/analysis issue.	
Maydena	Disinfection only	1	10/09/2015	Detection attributed to a failure of dosing equipment.	Re-sample clear
North Esk	Full treatment	1	10/02/2016	Reservoir was isolated, drained and cleaned by divers	Re-sample clear
Pet River	Full treatment	1	5/01/2016	Following localised scouring to improve residual chlorine levels the subsequent resample was clear.	Re-sample clear
Rocky Creek	Disinfection only	1	23/3/2016	Disinfection system operation checked, reticulation flushed	Re-sample clear
Rosebery	Disinfection only	2	22/09/2015	Scouring of system to ensure adequate chlorine residuals within the township	Re-sample clear
			30/12/2015		
Scottsdale	Full treatment	1	22/12/2015	Operations had a main break close to the sampling location 4 days prior to the sample collection	Re-sample clear
West Tamar	Full treatment	1	8/2/2016	Immediate resampling was free from contamination and an investigation determined the possible cause was contamination during sampling/analysis.	Re-sample clear
Zeehan	Full treatment	2	27/01/2016	The system was manually dosed, flushing of the system was conducted to pull through chlorinated water. Uncovered reservoirs are contributing factor	Re-sample clear
			02/02/2016		

Table 5–b summarises the microbiological performance across all systems (both potable and non-potable). A more detailed analysis of microbiological performance is provided in the individual system reports.

**Table 5–b Microbiological performance 2015–16**

System name	Monitoring zone name	Status	Connections	No. sites tested	No. samples (*)	<i>E. coli</i> detections	Compliance (%)	
<b>Potable systems</b>								
Adventure Bay		Potable	1	1	53	0	100	●
Bicheno		Potable	957	2	53	0	100	●
Bothwell		Potable	274	1	52	0	100	●
Bracknell		Potable	199	1	53	0	100	●
Bridport		Potable	1,154	2	109	0	100	●
Cam River		Potable	4,355	8	311	2	99.4	●
Campbell Town		Potable	868	2	107	0	100	●
Colebrook		Potable	86	1	52	3	94.2	●
Coles Bay		Potable	293	1	53	0	100	●
Currie		Potable	522	3	156	0	100	●
Deep Creek		Potable	2,394	11	572	6	99	●
Deloraine		Potable	1,327	2	110	0	100	●
Distillery Creek		Potable	17,743	15	357	0	100	●
Dover		Potable	744	2	53	0	100	●
Dowlings Creek		Potable	111	3	156	1	99.3	●
Ellendale		Potable	88	1	51	0	100	●
Fingal		Potable	308	1	52	0	100	●
Forth River		Potable	18,300	14	630	0	100	●
Gawler River		Potable	5,212	11	420	1	99.8	●
Grassy		Potable	169	3	156	0	100	●
Greater Hobart	Brighton	Potable	7,077	6	312	0	100	●
	Clarence		21,661	14	467	0	100	●
	Coal Valley		774	3	154	0	100	●
	Glenorchy		21,138	13	676	0	100	●
	Hobart		26,818	13	606	0	100	●
	Kingborough		11,958	13	475	0	100	●
	National Park		407	2	158	0	100	●
	New Norfolk		3,386	1	52	0	100	●
	Sorell		2,880	4	208	0	100	●
Southern Midlands	661	4	208	0	100	●		
Huron Valley	Castle Forbes Bay	Potable	378	1	5	0	100	●
	Cygnets		856	1	53	0	100	●
	Cygnets Nicholls		88	1	53	0	100	●

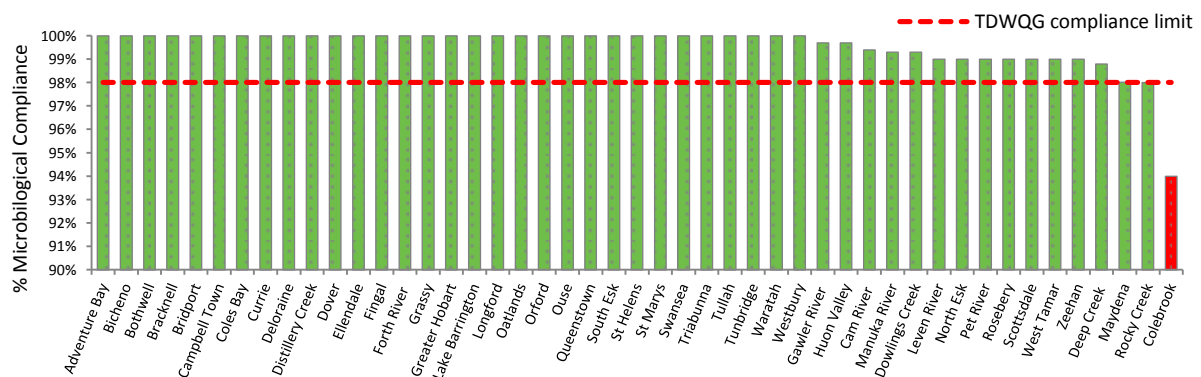
System name	Monitoring zone name	Status	Connections	No. sites tested	No. samples (*)	<i>E. coli</i> detections	Compliance (%)	
	Franklin		295	1	53	0	100	●
	Geeveston		528	1	53	0	100	●
	Geeveston Donnelly		240	1	47	0	100	●
	Geeveston Kermandie			1	25	0	100	●
	Huonville		1,591	1	53	0	100	●
	Jacksons Road		27	1	35	1	97.1	●
Lake Barrington	Potable	1,223	10	267	0	100	●	
Leven River	Potable	2,160	6	264	1	99.6	●	
Longford	Potable	4,515	4	211	0	100	●	
Manuka River	Potable	634	7	269	2	99.3	●	
Maydena	Potable	169	1	51	1	98	Unknown <sup>#</sup>	
North Esk	Potable	15,537	21	416	1	99	●	
Oatlands	Potable	487	2	52	0	100	●	
Orford	Potable	1,120	2	53	0	100	●	
Ouse	Potable	137	2	104	0	100	●	
Pet River	Potable	7,961	11	468	1	99.8	●	
Queenstown	Potable	1,614	4	208	0	100	●	
Rocky Creek	Potable	188	2	53	1	98.1	●	
Rosebery	Potable	680	6	211	2	99	●	
Scottsdale	Potable	1,347	2	105	1	99	●	
South Esk	Potable	5,136	7	383	0	100	●	
St Helens	Potable	2,160	2	104	0	100	●	
St Marys	Potable	448	2	75	0	100	●	
Swansea	Potable	804	2	61	0	100	●	
Triabunna	Potable	511	2	53	0	100	●	
Tullah	Potable	237	4	203	0	100	●	
Tunbridge	Potable	111	1	53	0	100	●	
Waratah	Potable	182	3	109	0	100	●	
West Tamar	Potable	10,007	12	299	1	99.7	●	
Westbury	Potable	1,137	2	110	0	100	●	
Zeehan	Potable	797	3	158	2	98.7	●	
<b>Non-potable systems</b>								
Avoca	DNC		125	1	45	0	100	●
Branxholm	BWA		206	2	12	12	0	●
Conara	BWA		59	1	52	0	100	●
Cornwall	BWA		50	1	11	4	63.6	●
Derby	BWA		165	1	12	3	75	●
Epping	BWA		33	1	52	2	96.2	●
Gladstone	BWA		88	1	12	8	33.3	●

System name	Monitoring zone name	Status	Connections	No. sites tested	No. samples (*)	<i>E. coli</i> detections	Compliance (%)
Gormanston	BWA		35	1	45	23	48.9 ●
Gretna	BWA		74	1	48	47	2.1 ●
Herrick	BWA		27	1	12	4	66.7 ●
Judbury	BWA		105	1	47	35	25.5 ●
Lady Barron	BWA		168	1	12	1	91.7 ●
Legerwood	BWA		95	1	12	0	100 ●
Mathinna	BWA		86	1	12	8	27.3 ●
Mole Creek	BWA		270	1	46	38	17.4 ●
Mountain River	BWA		2	1	47	36	23.4 ●
Pioneer	DNC		11	1	12	8	33.3 ●
Ringarooma	BWA		184	2	15	15	0 ●
Rossarden	DNC		99	1	42	4	90.2 ●
Scamander	BWA		626	2	53	0	100 ●
Wayatinah	BWA		77	1	52	0	100 ●
Whitemark	DNC		222	1	16	8	50 ●
Winnaleah	DNC		108	1	12	6	50 ●

**Key** – (●) > 98 per cent, (●) <98% – Repeat samples excluded. Compliance assessed against the TDWQG requirement of >98 per cent samples having *E. coli* < 1 MPN/100 mL. \*excludes resamples or investigative samples. #Samples were not taken as required to calculate compliance against TDWQG.

Figure 5—a Microbiological performance of potable systems compares the microbiological performance of all potable systems. This figure provides a useful tool in the development of strategic planning by highlighting microbiological risk and establishing a clear picture of where to focus our attention.

**Figure 5—a Microbiological performance of potable systems**



Note – Samples at Maydena were not taken as per sampling program, therefore compliance cannot be calculated. While performance is recorded as 98 per cent, the compliance is recorded as 'unknown'.

Where a system demonstrates a high microbiological risk, a BWA may be issued in agreement with DHHS to mitigate this risk while we investigate and perform remediation activities. In 2015–16 seven temporary BWAs were implemented due to a variety of events. Table 5–c outlines the systems affected and the actions taken to remove the risk.

**Table 5–c Public health non-compliances rated serious including boil water alerts**

System	Monitoring zone	Date on	Date off	Comments
Queenstown	Two properties	N/A	N/A	On 18 December 2015 it was discovered that two properties were receiving raw untreated water. Residents were advised to boil their water. These properties were subsequently connected to the Queenstown system.
Cam River	Wynyard	31/12/2015	11/01/2016	Routine sampling detected the presence of <i>E. coli</i> at a reservoir. This contamination was attributed to bird activity. The reservoir was bird proofed, cleaned and resampled. The temporary BWA was removed on 11 January 2016 following clear sampling results.
Deep Creek	Irish Town	22/01/2016	27/01/2016	A temporary BWA was issued by the DHHS for Irishtown on 22 January after a second positive result for <i>E. coli</i> at Young’s Reservoir. The reservoir was cleaned and refilled with fresh water. The BWA was removed on the 27 January 2016.
Manuka River	Strahan	28/02/2016	2/03/2016	A temporary BWA was issued for Strahan on 25 February 2016 after <i>E. coli</i> was found in routine sampling. In response to the detection, an open–roofed reservoir was isolated from the system, chlorine residuals were increased and the plant and network were scoured. The BWA was lifted on 2 March 2016 following clear sampling results.
Epping	All zones	24/03/2016	N/A	A TasWater risk assessment of the Epping Forest system identified potential unmitigated risks. Therefore a permanent BWA was issued. The long–term management of the supply will be addressed as part of the Small Towns Water Supply Strategy.
Rocky Creek	All zones	6/06/2016	15/06/2016	Heavy rainfall and flooding caused elevated levels of turbidity in the drinking water systems which impacted the effectiveness of chlorine disinfection. Temporary BWAs were issued for all towns.
Greater Hobart	National Park, Westerway, Fentonbury	6/06/2016	1/07/2016	
Colebrook	All zones	6/06/2016	Ongoing	Heavy rainfall and flooding caused elevated levels of turbidity in the drinking water systems which impacted the effectiveness of chlorine disinfection. A TasWater risk assessment of the Colebrook system indicates this may be an ongoing risk. Therefore a temporary BWA was issued until the risk can be mitigated.
Greater Hobart	Lawitta, Dromedary, Boyer	8/06/2016	15/06/2016	Flood water entered the potable water supply due to record rainfalls in early June. The extent of ingress was quickly isolated and contaminated water flushed from the lines and storages. A temporary BWA was issued until the risk to water quality was mitigated.

## Fluoride

TasWater adds fluoride to drinking water supplies as directed by the Minister for Health and regulated by DHHS as required by the *Fluoridation Act of Tasmania (1968)*, *Fluoridation (interim) Regulations 2009* and the *Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–2010)*. During 2015–16 TasWater managed 39 fluoride dosing stations across the state.

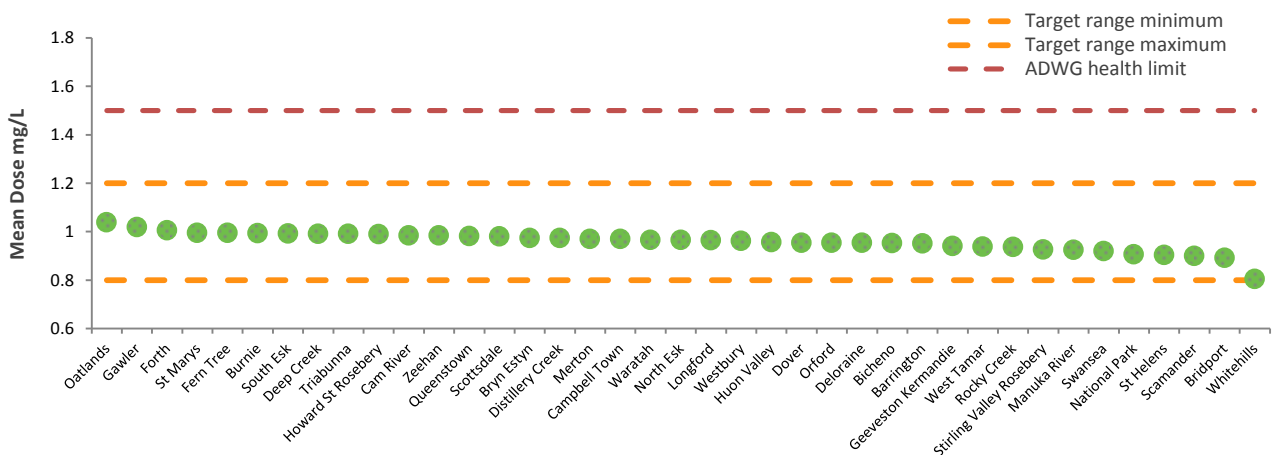
Compliance as defined by the code of practice is determined by achieving three metrics:

- ❖ No sample should exceed 1.5 mg/L
- ❖ Mean fluoride dose is between 0.8–1.2 mg/L
- ❖ Daily dosing is maintained within the range of 0.8–1.2 mg/L for >90 per cent of the time.

We are required to monitor and report on compliance against these key metrics both at the point of operational dosing, and at specific points within our distribution networks. For the 2015–16 period, all samples from operational dosing stations and within the distribution network were less than the ADWG health limit of 1.5 mg/L.

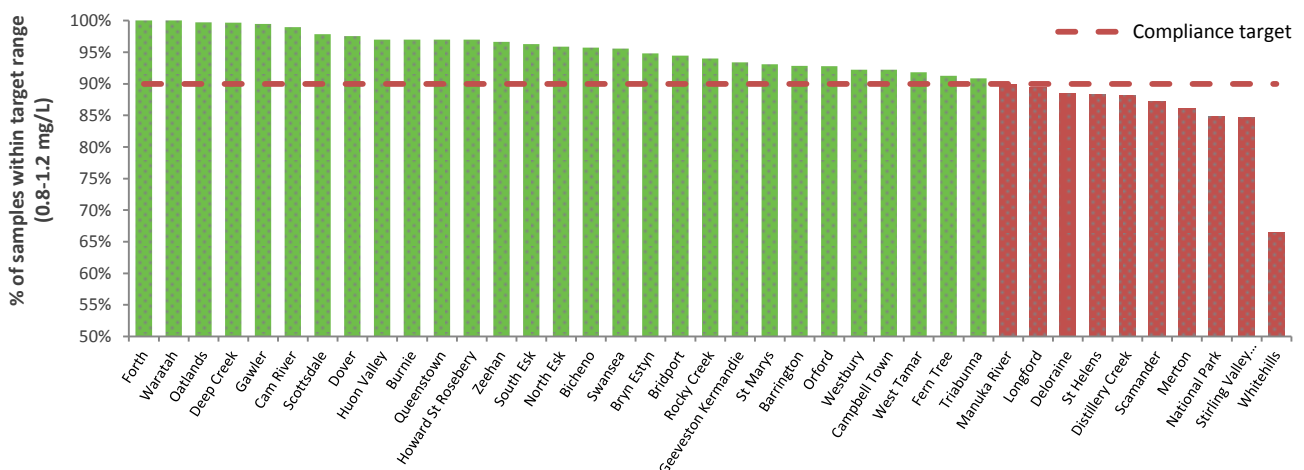
Figure 5–b shows all fluoride dosing stations achieved a mean dose between 0.8 – 1.2mg/L.

Figure 5–b Annual operational mean dose 2015–16



However Figure 5–c shows that 10 of the 39 dosing stations failed to achieve greater than 90 percent of samples within the target range.

Figure 5–c Percentage of operational samples within target dose range 2015–16



Further information on the 10 systems that did not achieve a daily dose between 0.8–1.2 mg/L for greater than 90 per cent of the time is provided in Table 5–d below.

**Table 5–d Fluoridated systems displaying poor performance during 2015–16**

System	Operational performance			System information	
	Mean dose mg/L		Per cent within range		
Manuka River	0.92	●	89.8%	●	Numerous maintenance issues during the first part of the reporting period resulted in low fluoride concentration. Improved dosing station operation led to greater reliability towards end of reporting period
Longford	0.96	●	89.4%	●	Protected industrial action impacted on the operation of fluoride dosing stations between September 2015 and February 2016 and contributed to this system not meeting the performance target
Deloraine	0.95	●	88.5%	●	Protected industrial action impacted on the operation of fluoride dosing stations between September 2015 and February 2016 and contributed to this system not meeting the performance target
St Helens	0.93	●	89.9%	●	Various maintenance issues resulted in poor performance during July, August and December 2015. Dosing station was also impacted by protected industrial action between September 2015 – February 2016
Distillery Creek	0.97	●	88%	●	Dosing station affected by protected industrial action between September 2015 and February 2016. Maintenance issues affected dosing after February 2016 and the system was shut down in April for repairs
Scamander	0.90	●	87.1%	●	New dosing system became operational after protected industrial action ended in February 2016. Initial problems with system optimisation contributed to low fluoride concentrations, reliability improved towards end of reporting period
Merton	0.97	●	86.1%	●	Sporadic plant operation following high turbidity shut downs coupled with low flow issues resulted in poor performance
National Park	0.91	●	84.8%	●	Fluoride dosing issues intermittently attributed to blocked dosing lines
Stirling Valley Rosebery	0.93	●	84.6%	●	Unreliable performance in this system occurred throughout the reporting period. The new WTP to service Rosebery will provide greater reliability in performance
Whitehills	0.80	●	66.4%	●	Sporadic plant operation resulted in variable fluoride concentration

Key – ● = > 90 per cent, ● = >80 per cent, ● = <80 per cent.

During the reporting period new fluoride dosing stations became operational at Bicheno and Scamander.

From September 2015 through to February 2016 10 northern systems were affected by protected industrial action which ceased the formal recording of daily fluoride readings at the dosing stations. With agreement from the DHHS fluoride dosing was stopped at these plants from 18 December 2015. Phased re–instatement meant fluoride levels were gradually increased to the target of 1.0 mg/L over a week. Subsequently, initial levels were below the target and are recorded as non–compliant, affecting performance statistics. It should be noted that maintenance issues affected re–instatement of dosing stations at Distillery Creek, St Helens, St Marys, Scamander and Longford. All affected systems were fully operational by 25 February 2016 with the exception of Distillery Creek, which resumed operation on 17 August 2016 after major infrastructure was replaced.

The systems affected by protected action were:

- ❖ West Tamar (Reatta Road)
- ❖ Distillery Creek
- ❖ North Esk (Chimney Saddle)



- ❖ Longford
- ❖ Westbury
- ❖ Campbell Town
- ❖ Deloraine
- ❖ St Helens
- ❖ St Marys
- ❖ Scamander.

## Metals

Monitoring for the presence of metals in our drinking water systems is undertaken in line with the risk based approach promoted by the ADWG. Individual system sampling plans evaluate the risks within each catchment and distribution network together with historical events.

Increased levels of metals in our water supplies can occasionally occur. Typically this occurs directly from the catchment, or as a result of leaching from materials in the distribution network. The quality of treatment chemicals is also closely monitored as a potential source of trace metal contamination. During the reporting there were 10,800 water samples analysed for the presence of metals. There were nine detections of metals greater than the ADWG health limits in the following six systems:

- ❖ Avoca
- ❖ Dowlings Creek
- ❖ Gormanston
- ❖ Lake Barrington
- ❖ Pioneer
- ❖ Rosebery.

In addition to these exceedances detected by routine monitoring, investigation sampling in the Rossarden distribution network identified six instances where lead exceeded the ADWG health limit. These investigation samples have not been included in the compliance statistics in line with DHHS requirements.

At the conclusion of this reporting period, the following five drinking water systems remain on DNCs due to persistent levels of metals above the ADWG health limit:

- ❖ Avoca – since 8 December 2012
- ❖ Pioneer – since 8 November 2012
- ❖ Rossarden – since 24 December 2014
- ❖ Winnaleah – since 26 November 2014
- ❖ Whitemark – since May 2012.

**Table 5–e Summary of metal detections above the ADWG health limit**

System	Status	Sampling events	No. failures	Metal	System information	Improvement project during 2016–18 PSP
Avoca	DNC	4	1	Cadmium	Avoca is subject to metal contamination and identified as likely to originate from the raw water supply. There are no treatment barriers to mitigate metal contamination in this system.	Avoca Pipeline Project, due by 2016–17
Dowlings Creek	Potable	10	1	Lead	Single exceedance from compliance sample tap. Retest results below ADWG health limits.	N/A
Gormanston	PBWA	4	1	Lead	The single exceedance is attributed to works in the headwaters and high rainfall.	Gormanston supply options, due 2018
Lake Barrington	Potable	83	1	Lead	Single exceedance from compliance sample tap. Retest results below ADWG health limits.	N/A

System	Status	Sampling events	No. failures	Metal	System information	Improvement project during 2016–18 PSP
Pioneer	DNC	4	3	Lead	Historical lead levels persistent in the supply. Risk to customers mitigated through DNC notice.	Service replacement project to rainwater tanks, due by 2017
Rosebery	Potable	196	2	Lead	Weekly scouring is undertaken in the distribution network. An additional lead exceedance occurred from an investigation sampling point following ice pigging of the network.	New WTP to supply Rosebery, due 2016–17

## Disinfection by-products

Disinfection by-products (DBPs) form as a result of the reaction of free chlorine with organic material present in the water. The rate of this reaction and the quantity and type of chemicals formed are influenced by the chemistry and physical properties of the raw water. Influencing factors such as free chlorine level, pH, turbidity, colour and dissolved organic carbon are considered during performance reviews.

It is important to note that the ADWG advises that chlorination should not be compromised to minimise DBP formation, as the risk to public health from microbiological contamination is more acute. DBPs are tested in all chlorinated systems. During the reporting period 3,500 samples were analysed for DBPs. Of these, 56 detections greater than ADWG health limits were identified across the following eight systems:

- ❖ Avoca
- ❖ Colebrook
- ❖ Coles Bay
- ❖ Conara
- ❖ Ellendale
- ❖ Epping
- ❖ Rosebery
- ❖ Tullah

**Table 5–f Summary of DBP exceedances**

System	Status	Sampling events	No. failures	System information	Improvement project during 2016–18 PSP
Avoca	DNC	4	5	Disinfection only system with no treatment barriers to mitigate raw water turbidity and organic content fluctuations which promote DBP formation. Will be resolved with a pipeline from Fingal.	Connect Avoca to the Fingal system via a pipeline, due by 2016–17
Colebrook	Potable*	28	36	Disinfection only system with no treatment barriers to mitigate raw water turbidity and organic content fluctuations which promote DBP formation	Reservoir roofing & chlorine improvement project remains in progress
Coles Bay	Potable	4	1	Operational investigations underway and changes to pre-chlorination have been made to minimise DBP formation.	N/A
Conara	PBWA	4	3	Disinfection only system with no treatment barriers to mitigate raw water turbidity and organic content fluctuations which promote DBP formation. Chlorine disinfection has been reduced.	Conara supply options (Small Towns Project) due 2018
Ellendale	Potable	5	1	Optimisation of turbidity controls to reduce load onto membranes is currently underway at the WTP	N/A
Epping	PBWA**	4	2	Disinfection only system with no treatment barriers to mitigate raw water turbidity and organic content fluctuations which promote DBP formation. Chlorine disinfection has been reduced.	Epping supply options (Small Towns Project) due 2018
Rosebery	Potable	26	3	Insufficient treatment barriers to reduce turbidity and organic content in the raw water supply, resulting in periodical DBP formation. Will be addressed by the new WTP.	New WTP to supply Rosebery, due by 2016–17

System	Status	Sampling events	No. failures	System information	Improvement project during 2016–18 PSP
Tullah	Potable	34	5	Filtration media at the WTP replaced towards end of reporting period, this will reduce DBP formation	New Tullah WTP project scope, due beyond 2019

\* = Colebrook issued a temporary BWA by DHHS from 6 June 2016 which continued on through the end of the reporting period; \*\* = Epping was issued a Permanent BWA by DHHS on 14 April 2016.

## Pesticides

In line with the preventive risk management approach of the ADWG, we undertake a broad pesticide sampling program in all of our source water catchments to understand and manage the risk from agricultural chemical usage. For the purpose of this annual report the complex family of agrichemicals, including pesticides, herbicides, insecticides and fungicides, will be referred to as pesticides.

There are multiple pathways in which pesticides can infiltrate our source waters; these include direct run-off, erosion of contaminated soils and application overspray. Domestic usage may also be a contributor in some catchments.

Historic testing shows pesticide levels are typically well below the ADWG health limits. Testing is undertaken in all raw water supplies, and a detection of any pesticide above the analytical Method Reporting Limit (MRL) will trigger investigations and further monitoring in the distribution network.

In the 2015–16 reporting period pesticides were not detected at levels above the ADWG health limits.

The Department of Primary Industries, Parks, Water and Environment (DPIPWE) conducted the Agricultural, Silvicultural and Veterinary Chemicals Council's (ASCHEM) Pesticide Water Monitoring Program from 2005–14. It was implemented as a means to increase knowledge and understanding as to the nature and extent of pesticide contamination of rivers and streams in Tasmania. Results from this program have demonstrated that our waterways are generally either free of pesticides or may occasionally have chemical traces at levels significantly below the ADWG health guideline values. Consequently, DPIPWE has ceased the program, and will now take a risk and evidence based approach to monitoring agricultural chemical use issues that may impact on waterways.

Discussions with DPIPWE are now progressing towards a collaborative partnership to improve awareness and education among agricultural chemical users and to investigate and identify potential sources of contamination. In consultation with DPIPWE, and using the knowledge gained through the ASCHEM program, we will maintain the focus of pesticide monitoring programs in catchments with a greater underlying risk of pesticide contamination.

## Chlorine residuals

Free chlorine residuals have an important role to play in maintaining the microbiological quality of water while in transit from the WTP to the customer tap. Residuals safeguard against recontamination following unexpected service interruptions, breaks in supply or ingress through storage reservoirs.

Chlorine residual levels should ideally reach the consumer at a range of between 0.3 mg/L to 0.6 mg/L. This range will ensure adequate microbiological protection while minimising negative aesthetic impacts. TasWater has set a minimum target of 0.1 mg/L to inform strategic decisions.

In this reporting period a significant variability in chlorine performance was observed across our drinking water systems as shown in Figure 5–d. The systems exhibiting the lowest mean residuals typically have a poor performing or no filtration barrier. This results in elevated turbidity and/or dissolved organic carbon (DOC) levels, and subsequently increases the chlorine demand.

Figure 5–d Free chlorine residual performance during 2015–16

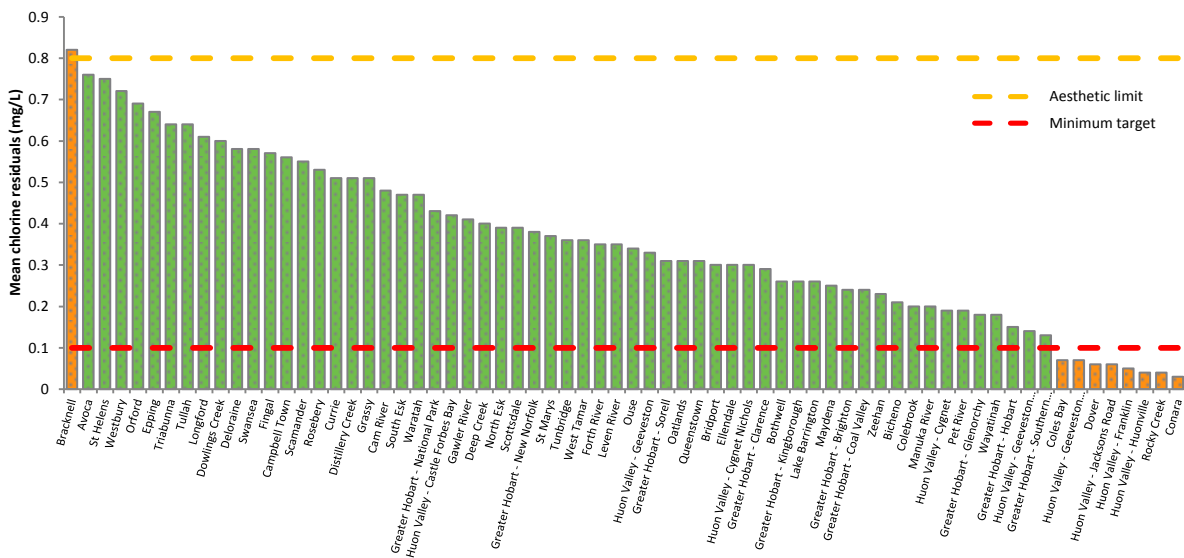


Table 5–g identifies the eight systems demonstrating the lowest mean chlorine residuals. This table will be used as a guide to identify improvement projects and programs through the implementation of the DWQMP.

**Table 5–g Analysis of chlorine performance below target range**

System	Mean residual (mg/L)	Comment
Coles Bay	0.07	Chlorine residuals have historically been variable and low in this system. In 2015–16 average results were again below the target of 0.1 mg/L. The reason for this poor performance is believed to be high chlorine demands driven by elevated turbidity and organic carbon levels. Improvements via pre chlorination were investigated but subsequently stopped due to unacceptable DBP formation.
Huon Valley–Kermandie	0.07	From July – October 2015 the average chlorine residuals were <0.1 mg/L. Readings below the target of 0.1 mg/L typically coincided with spikes in raw water turbidity. Connection to the Huon Valley regional scheme has resulted in improved residuals.
Dover	0.06	Chlorine residuals have historically been variable and low in this system. In 2015–16 average results were again below the target of 0.1 mg/L. The reason for this poor performance is believed to be high chlorine demand, combined with limited options to manage water age in the distribution network.
Huon Valley–Jacksons Road	0.06	The system was connected to the Huon Valley water scheme in 2015. Low turnover in the newly created hydraulic zone has led to a problem maintaining an adequate residual. Investigations are currently underway to improve residuals in this area.
Huon Valley–Franklin	0.05	Residuals in the Huonville and Franklin monitoring zones draw water directly from the treatment plant with no secondary chlorination. Disinfection residuals in these zones are more variable and generally below the minimum target of 0.1 mg/L. Dose control are limited by the aesthetic acceptability of supply to customers early in the distribution system.
Huon Valley–Huonville	0.04	
Rocky Creek	0.04	Chlorine residuals have historically been variable and low in this system. In 2015–16 average results were again significantly below the target of 0.1mg/L. The reason for this poor performance is believed to be high chlorine demand driven by elevated turbidity and organic carbon levels, long transit times and low demand.
Conara	0.03	A lack of treatment barriers mean the system is susceptible to elevated raw water turbidity and impairing effective chlorination. The system operates under a BWA to mitigate the microbial risk.



## Turbidity

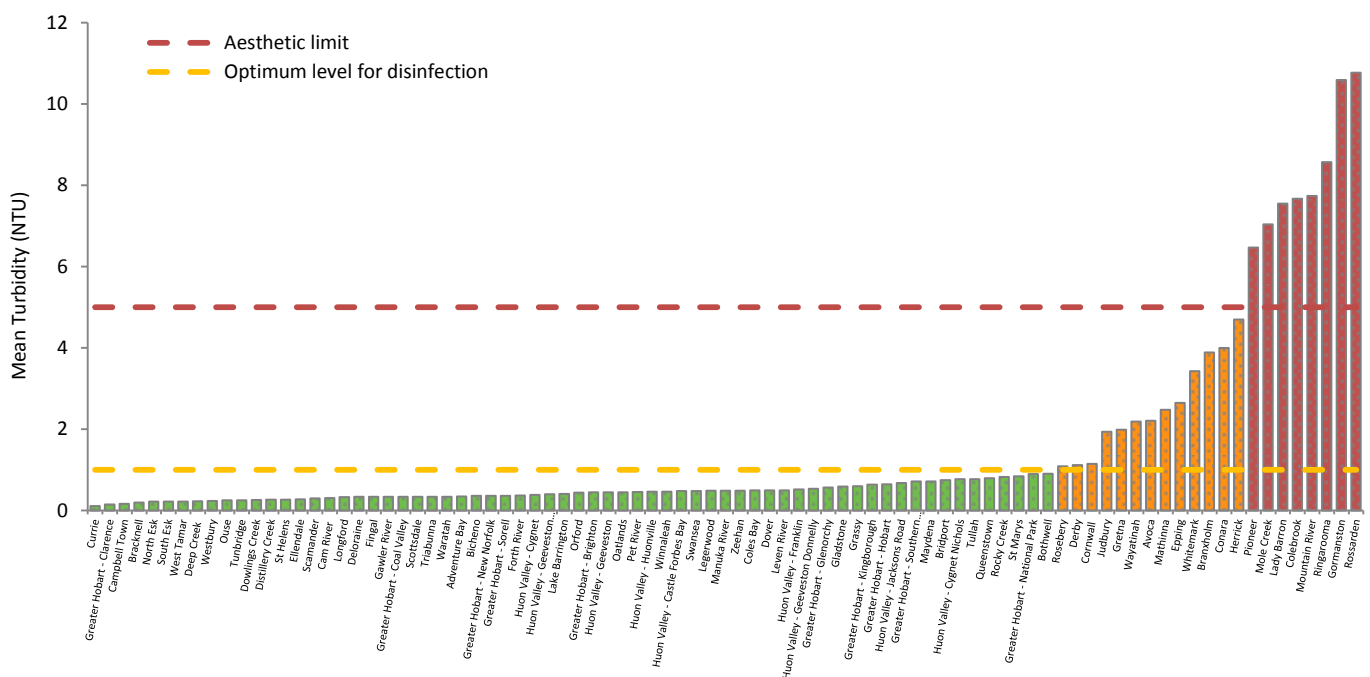
Turbidity is monitored routinely and regularly across our networks. As well as providing an indication of the overall aesthetic acceptability of an individual supply, turbidity provides us with a good indication of the general physical condition of our network. Turbidity at elevated levels has the potential to reduce the efficacy of chlorine disinfection.

Depending on the treatment employed, turbidity measured in distribution networks can either directly reflect the quality of the source water or the state of the distribution system.

Corrosion of our distribution assets is often accumulated as sediment within the mains. If these sediments are disturbed by increases or changes of flow, turbidity and discolouration can often be observed at the customer tap.

Figure 5–e shows the state-wide turbidity performance against the internal operational target range less than one Nephelometric turbidity unit (NTU). This analysis is a useful tool for strategic planning, and process optimisation. In this reporting period, 21 drinking water systems recorded average turbidity in excess of one NTU. Of these 21 systems, eight exceeded the ADWG aesthetic guideline limit of five NTU. As expected these eight systems were all either untreated or disinfection only systems and subject to health alerts.

Figure 5–e Turbidity performance for each system during 2015–16



Thirteen systems fall within the category of greater than one NTU, but less than the aesthetic level of five NTU. Table 5–h below summarises the systems that were within this range and possible causes of the elevated turbidity.

**Table 5–h Systems displaying elevated average turbidity performance**

System	Status	Average turbidity	Water source	Treatment	Comment
Rosebery	Potable	1.09	Mountain Creek / Stitt River	Full treatment / Disinfection only	The system has inadequate filtration to remove turbidity. A new WTP with filtration barriers is scheduled for completion in 2016–17.
Derby	BWA	1.12	Irrigation scheme	Untreated	With no filtration in place, these drinking water systems are susceptible to changes in turbidity in the raw water.
Cornwall	BWA	1.15	Fanshaft spring	Untreated	
Judbury	BWA	1.94	Dora Creek	Untreated	
Gretna	BWA	1.99	Derwent River	Untreated	
Wayatinah	BWA	2.19	Lake Liapootah	Disinfection only	
Avoca	DNC	2.21	South Esk River	Disinfection only	
Mathinna	BWA	2.48	South Esk River	Untreated	
Epping	BWA	2.65	South Esk River	Disinfection only	
Whitemark	DNC	3.43	Pats River	Untreated	
Branxholm	BWA	3.89	Ringarooma River	Untreated	
Conara	BWA	4	South Esk River	Disinfection only	
Herrick	BWA	4.7	Irrigation scheme	Untreated	

Table 5–i Systems displaying average turbidity performance exceeding the ADWG aesthetic limit below summarises the treatment currently in place for system, raw water source, and likely root causes of poor turbidity performance.

**Table 5–i Systems displaying average turbidity performance exceeding the ADWG aesthetic limit**

System	Status	Average turbidity	Water source	Treatment	Comment
Colebrook	Potable	7.67	Strainers Creek	Disinfection only	With no filtration in place, these drinking water systems are susceptible to changes in turbidity in the raw water.
Gormanston	BWA	10.59	Unnamed basin	Untreated	
Lady Barron	BWA	7.55	Bore	Untreated	
Mole Creek	BWA	7.04	Mole Creek	Untreated	
Mountain River	BWA	7.74	Stephenson’s Creek	Untreated	
Pioneer	DNC	6.47	Unnamed creek	Untreated	
Ringarooma	BWA	8.57	Vineys Creek Dam / Dunns Creek Dam	Untreated	
Rossarden	DNC	10.77	Aberfoyle Creek	Untreated	

## pH

The ADWG recommends that pH levels be maintained within a range of pH 6.5 – 8.5 across the distribution network. At levels above pH 8.5, chlorine disinfection has been proven to be less effective. At levels below pH 6.5, corrosion of assets can be accelerated. Ultimately this can lead to asset life reduction and potential leaching of metals.

The pH levels within our drinking water systems were typically within the range of pH 6.5 – 8.5, with very few systems demonstrating an average outside this range. Systems that recorded an average pH outside the optimal range are detailed in Table 5–j.

**Table 5–j Systems exhibiting pH average outside operational target range**

System	Average pH	Treatment	Comment
Avoca	6.45	Disinfection only	Systems in this group typically have low alkalinity and low pH water originating from their catchments. No pH or alkalinity adjustment is currently provided to manage this issue. Treatment plants are either under construction or in design for these systems and will address pH issues.
Branxholm	6.34	Untreated	
Derby	5.9	Untreated	
Herrick	6.07	Untreated	
Lady Barron	5.89	Untreated	
Legerwood	5.29	Untreated	
Ringarooma	6.17	Untreated	
Whitemark	5.93	Untreated	
Winnaleah	5.64	Untreated	
Pioneer	6.1	Untreated	Service replacement with rainwater tanks is in progress.
Gladstone	6.31	Untreated	Investigating options to improve water quality supplied under the Small Towns Water Supply Strategy. Anticipated delivery is 2018.
Gormanston	5.81	Untreated	
Colebrook	8.54	Disinfection only	No pH or alkalinity adjustment is currently provided to manage this issue.
Greater Hobart – Southern Midlands	8.92	Full treatment / disinfection only	Due to the transport distances and subsequent elevated retention times, pH levels have a tendency to rise as they leach carbonates from the concrete assets.

## Alternative potable water supplies

We currently operate five systems supplying water under a DNC notice. For these towns we provide water tanks containing potable water. The water is sourced from the closest potable water source which has undergone full treatment. The tanks are located in publicly accessible areas with storage levels maintained according to demand.

Tank water is tested weekly for the following critical parameters:

- ❖ *E. coli*
- ❖ Turbidity
- ❖ pH
- ❖ Chlorine residuals.

Testing for other ADWG regulated parameters occurs in the system from which the water was sourced, and results are available in the relevant system report. The microbiological performance of alternative potable water supplies for 2015–16 is outlined in Table 5–k below.

**Table 5–k Microbiological performance of alternative potable water tanks for 2015–16**

System	Performance (%)	WTP source	Tanks	Sampling events	Tests	Non-conformance
Avoca	100 ●	Longford	3	52	156	0
Pioneer	100 ●	Scottsdale	1	52	52	0
Ringarooma	100 ●	Scottsdale	4	52	163*	0
Rossarden	100 ●	Longford	1	52	52	0
Winnaleah	100 ●	Scottsdale	3	52	156	0

**Key** – (● > 98 per cent, ● < 98%) – Repeat samples excluded. Compliance assessed against the TDWQG requirement of >98 per cent samples having *E. coli* < 1 MPN/100 mL. \*A tank was added at the butchery during the reporting year and sampled for eight weeks.

## Aesthetic issues

The aesthetic quality of drinking water is generally not a direct health concern. It does, however, have the potential to significantly affect community perceptions of water quality and acceptability. Common aesthetic considerations include: taste, odour, colour, turbidity, and hardness.

In 2015–16 the most commonly received aesthetic complaints related to either turbid or discoloured water and/or issues relating to an objectionable taste and/or odour.

Discolouration issues are commonly caused by iron sediments typically mobilised by a change in water flow or direction. Issues are normally short lived and sporadic in nature, regularly caused by events such as planned maintenance work or a mains burst.

These issues are not considered harmful to health, but we do appreciate that a supply which is discoloured in this manner can be aesthetically unacceptable.

Taste and odour impacts on the aesthetic quality of supplied water can vary significantly in cause and nature, impacting consumers differently depending on individual sensitivities. A significant proportion of consumer concerns can be attributed to private plumbing materials, storage and handling practices within customer properties. Customers are encouraged to contact us so we can assist with identification of these issues.

Taste and odour problems will occasionally occur, originating from either the source water or distribution network. Of the numerous likely causes, “Earthy /Musty” or “chlorine” taste and/or odour issues were the most commonly encountered in 2015–16.

Earthy/musty issues, impacting entire systems, are typically caused by algae or bacteria metabolites in the source water. At certain periods in their seasonal lifecycle they can release small amounts of the chemicals 2-Methylisoborneol (MIB) and Geosmin. These compounds, at levels as low as five parts per billion, may cause consumer complaints. These levels are not harmful to human health but can taste unpleasant and are commonly observed during the warmer months.

Over the previous two years this issue has become more prevalent and prompted the development of our algal management and sampling plan. This plan established an early warning methodology and targeted high risk systems for the installation of additional treatment barriers (activated carbon).

Several systems were impacted in 2015–16. While carbon dosing was successful in mitigating the aesthetic impacts some complaints were still received, typically as dose rates were optimised. The affected systems included:

- ❖ Launceston (North Esk, South Esk, West Tamar)
- ❖ Deloraine
- ❖ Hobart
- ❖ Bothwell
- ❖ Leven River.

TasWater’s algal management plan will use the data collected over several years to inform future strategic decision making and help minimise aesthetic impacts on our consumers.

## Customer complaints

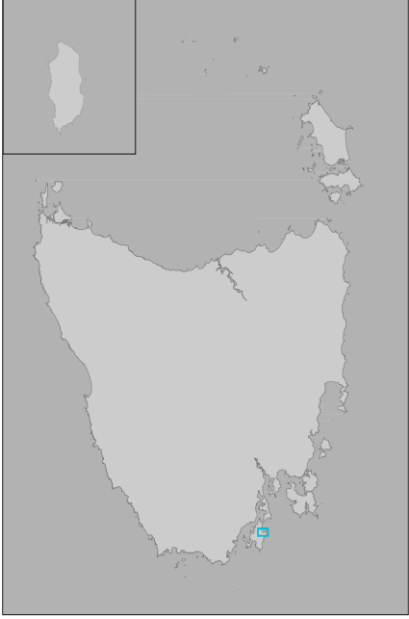
In this reporting period we received a total of 1,101 customer complaints relating to drinking water quality. This figure relates to all complaints which are received via our call centre or in written form, including Ombudsman enquiries.

In this period 641 complaints were received regarding discolouration, 343 regarding taste and odour, and 117 that were unable to be classified into either of the above, with the majority of these being enquiries or complaints relating to health alerts.

All complaints are investigated and under the provisions of the TasWater customer charter we are required to get back to the customer within 10 working days of receiving a complaint. Further details on complaints received are listed in the relevant individual system performance reports.

## 6. System reports

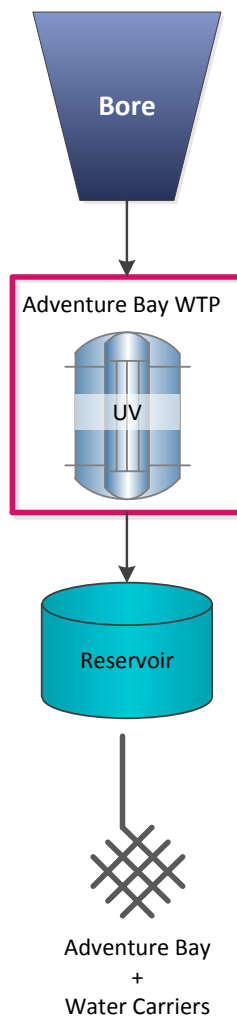
### 6.1. Adventure Bay drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	1 + multiple water carters
	<b>Catchment</b>	Groundwater bores
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	UV
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Adventure Bay (general store only)</li> <li>❖ Licensed water carters.</li> </ul>		



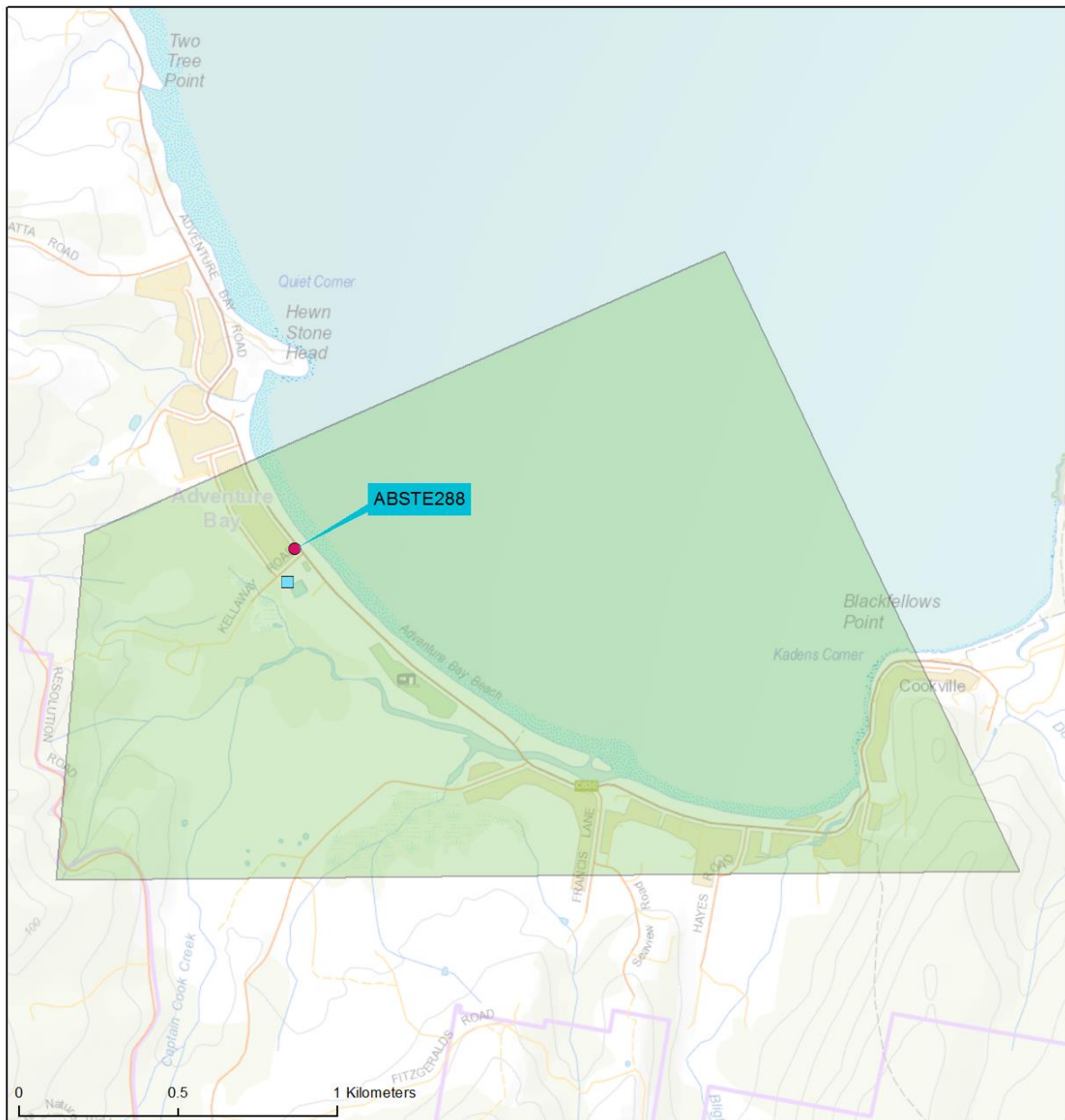
### 6.1.1. System description

Figure 6.1.1-a Adventure Bay system schematic



- ❖ **Catchment**  
The Adventure Bay drinking water system is supplied by an array of four groundwater bores (spears) located at Adventure Bay
- ❖ **Treatment**  
The Adventure Bay WTP employs an inline ultra-violet (UV) disinfection system. There is no disinfection residual provided by this treatment
- ❖ **Distribution**  
Treated water from the system is provided to the local shop and a treated water reservoir. Water carters fill from the reservoir.

Map 6.1.1-a Adventure Bay monitoring zone



ABSTE288 = Shop Sample Tap (Regular Compliance Point)

## 6.1.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.1.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: <b>Potable</b>
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	53	0	
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–	
DBPs <sup>(3)</sup>	N/A	N/A	–	–	–	
Metals <sup>(4)</sup>	100%	Yes ●	Annually	1	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL) Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (●) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.1.3. Summary of historic total system performance

Table 6.1.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance*					
	2011–12	2012–13	2013–14	2014–15	2015–16	
Microbiological <sup>(1)</sup>	–	100% ●	99.5% ●	100% ●	100% ●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	
	Distribution fluoride testing					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A		
Metals <sup>(3)</sup>	–	100% ●	100% ●	100% ●	100% ●	
DBPs <sup>(3)</sup>	N/A	N/A	N/A	N/A	N/A	
Pesticides <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A	
Complaints received <sup>(5)</sup>	Not recorded	Not recorded	0	0	0	
Public alerts issued <sup>(6)</sup>	–	0 ●	0 ●	0 ●	0 ●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL) Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.1.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ This system utilises UV disinfection, therefore DBPs are not formed.

#### 6.1.5. Microbiological performance

Figure 6.1.5-a Microbiological compliance 2015–16

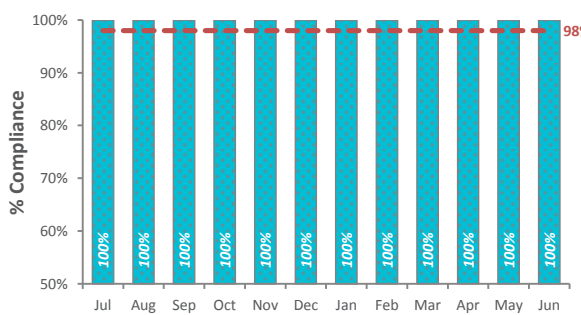


Figure 6.1.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.1.6. Fluoride performance

- ❖ This system is not fluoridated.

### 6.1.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.1.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples **	Non-compliance *	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	1	0	100	< 1	< 1	< 1
Barium	2000	µg/L	1	0	100	0.5	0.5	0.5
Cadmium	2	µg/L	1	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	1	0	100	< 1	< 1	< 1
Copper	2000	µg/L	1	0	100	117	117	117
Lead	10	µg/L	1	0	100	2	2	2
Manganese	500	µg/L	1	0	100	8.2	8.2	8.2
Mercury	1	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
Molybdenum	50	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	1	0	100	0.6	0.6	0.6
Selenium	10	µg/L	1	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Monochloroacetic acid	150	µg/L	N/A	N/A	–	–	–	–
Trichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Total trihalomethanes	250	µg/L	N/A	N/A	–	–	–	–

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (\*) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ This system utilises UV disinfection, therefore DBPs are not formed.

### 6.1.8. General physical parameters

Table 6.1.8-a General physical performance

General physical parameters (2015–16)					
Adventure Bay monitoring zone		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		52	0.34	0.17	0.67
pH		52	6.86	5.82	8.01

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ This system utilises UV disinfection, therefore no residual disinfection is provided
- ❖ pH levels are maintained within the recommended optimal range.

### 6.1.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.1.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.1.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

### 6.1.12. Catchment and source water issues

- ❖ The Adventure Bay drinking water system is supplied by an array of four groundwater spears located at Adventure Bay. An inspection of bore condition and aquifer risk assessment was undertaken in June 2016. No septic system influence was identified however TasWater will continue to monitor and assess this risk.
- ❖ No health regulated pesticides were detected in the raw water monitoring program.


### 6.1.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.1.14. Future planning

- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

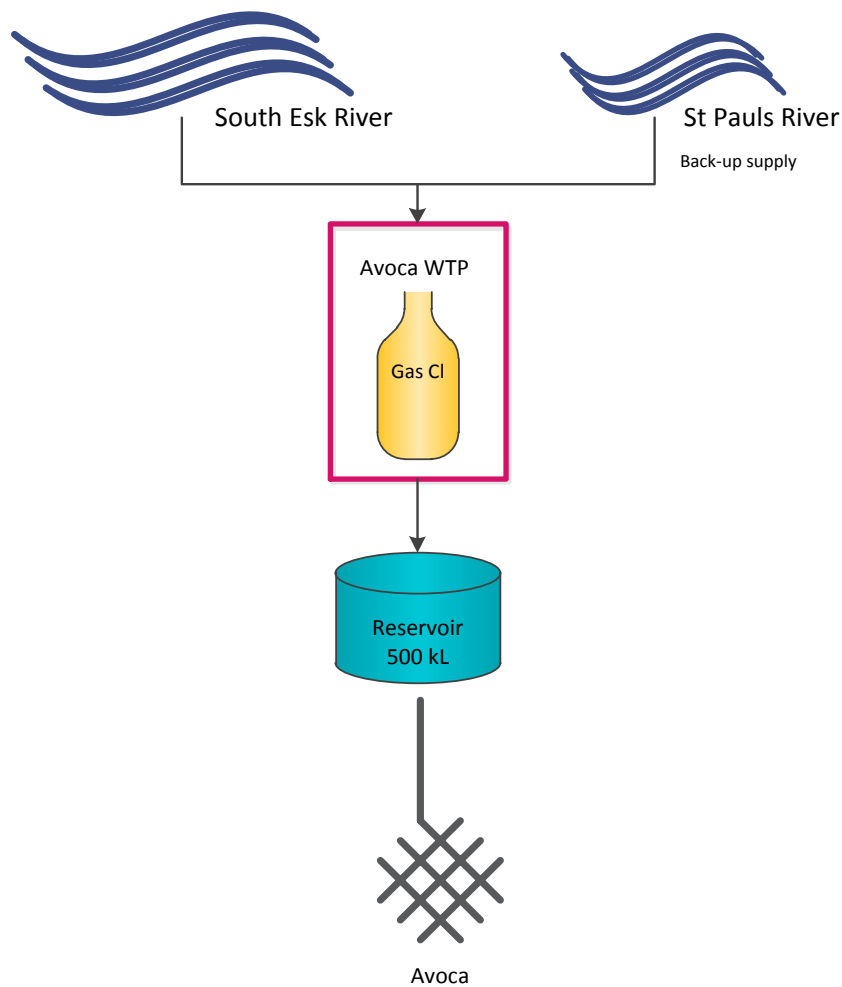
## 6.2. Avoca drinking water system

	<b>Current status</b>	<b>Do not consume</b>
	<b>Total connections</b>	125
	<b>Catchment</b>	South Esk River
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Avoca.</li> </ul>		



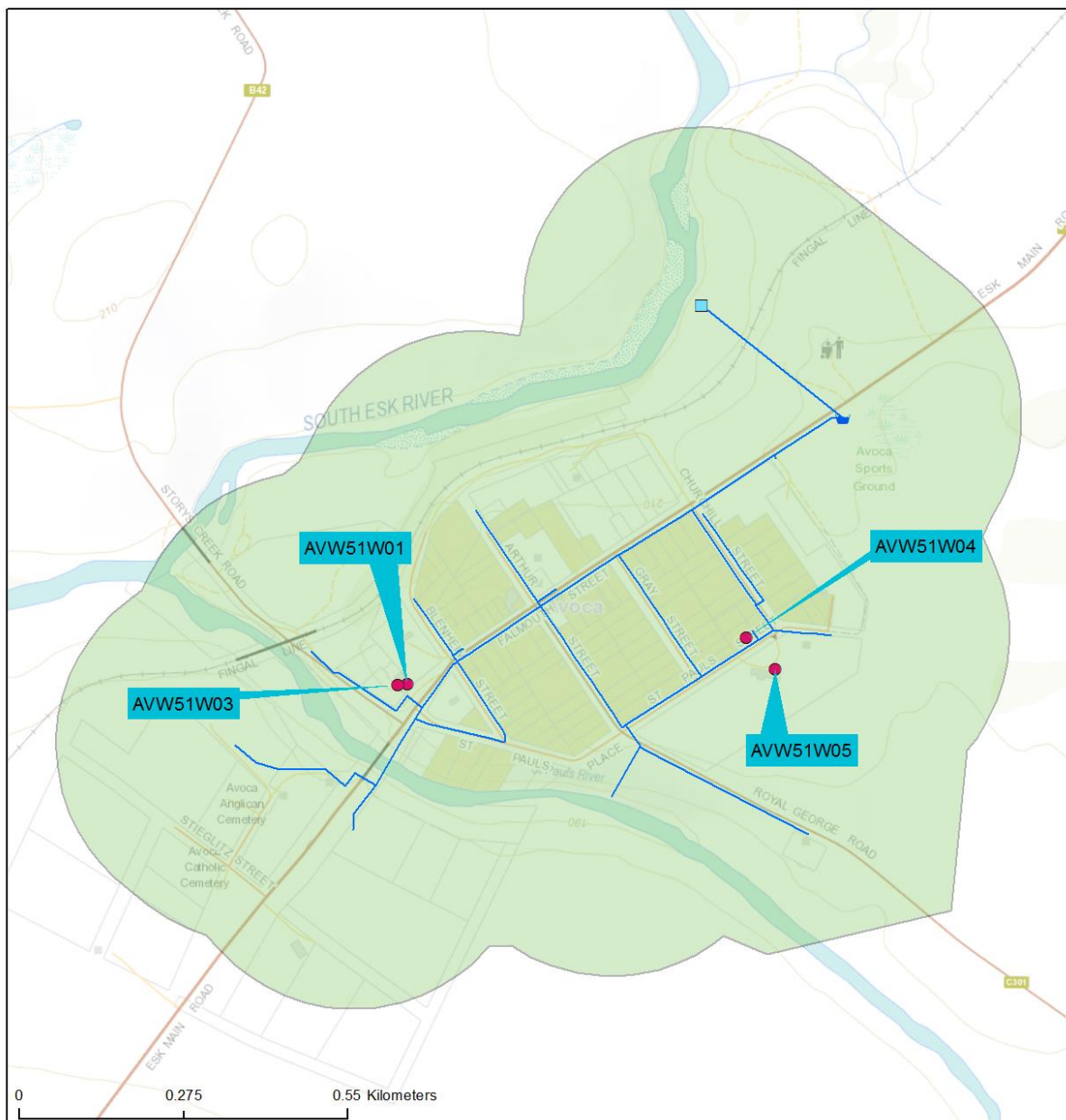
### 6.2.1. System description

Figure 6.2.1-a Avoca system schematic



- ❖ **Catchment**  
The Avoca drinking water system is supplied by the South Esk River, with a back-up supply from the St Pauls River
- ❖ **Treatment**  
Avoca is a disinfected raw water supply with no water treatment processes. Disinfection is achieved with chlorine gas
- ❖ **Distribution**  
There is one roofed service reservoir, connected via a common line in the distribution system. The Avoca drinking water system supplies 125 connections.

### Map 6.2.1-a Avoca monitoring zone



AVW51W01 = West side of Hall, AVW51W03 = Town Hall tank, AVW51W04 = Fire station tank, AVW51W05 = School tank

## 6.2.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.2.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: <b>Do not consume</b>	
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes ●	Weekly	45	0	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	69%	No ●	Quarterly	4	5	
<b>Metals</b> <sup>(4)</sup>	98%	No ●	Quarterly	4	1	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes ●	Weekly	4	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (●) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.2.3. Summary of historic total system performance

Table 6.2.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	93%	●	98%	●	100%	●	96%	●	100%#	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Metals</b> <sup>(3)</sup>	94%	●	94%	●	97%	●	98%	●	98%	●
<b>DBPs</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	69%	●
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>	1		0		5		5		1	
<b>Public alerts issued</b> <sup>(6)</sup>	0	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1–7–2013 collected at a frequency determined by a risk based methodology. Post 1–7–2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. (#) – Samples were not taken as per sampling program, therefore compliance cannot be calculated.

#### 6.2.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved greater than 98 per cent of samples free of *E. coli*
- ❖ Despite insufficient microbiological samples collected during 2015–16 to meet the scheduled sampling program, this system only requires a minimum of monthly sampling and therefore compliance can be determined against DHHS targets.
- ❖ This system is not fluoridated
- ❖ Cadmium was detected at levels exceeding the ADWG health limit, reducing compliance to 98 per cent during 2015–16. Metal contamination is persistent in the Avoca system and a Public Health Alert (Do not consume) is in place to mitigate the risk to public health.
- ❖ Disinfection by-product (DBP) performance for 2015–16 was 69 per cent and does not comply with ADWG. Five detections above ADWG health limits were recorded during this reporting period.
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.2.5. Microbiological performance

Figure 6.2.5-a Microbiological compliance 2015–16

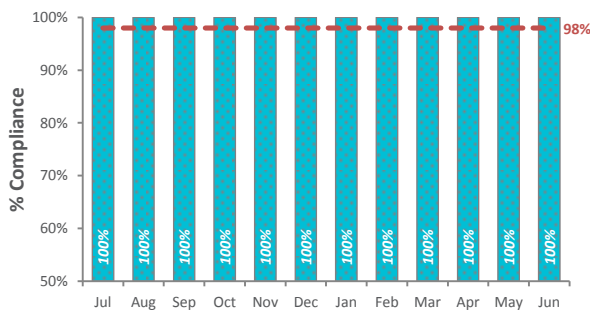


Figure 6.2.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.2.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.2.7. Other Australian drinking water guidelines (ADWG) health regulated parameters

Table 6.2.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples **	Non-compliance *	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	1
Barium	2000	µg/L	4	0	100	10.5	7	17
Cadmium	2	µg/L	4	1	75	1.17	0.6	2.3
Chromium	50	µg/L	4	0	100	< 1	< 1	2
Copper	2000	µg/L	4	0	100	11.5	8	15
Lead	10	µg/L	4	0	100	0.87	0.5	1.7
Manganese	500	µg/L	4	0	100	12	5.8	28
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	0.51	< 0.5	1.3
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	2	25	120.75	49	200
Monochloroacetic acid	150	µg/L	4	0	100	7.85	< 5	11
Trichloroacetic acid	100	µg/L	4	3	25	171.5	76	270
Total trihalomethanes	250	µg/L	4	0	100	130.75	93	190

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (\*) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ Cadmium was detected above the ADWG health limit at 2.3 µg/L. Persistent non-compliances with the ADWG health limit reinforces the need for the Public Health Alert (Do not consume) currently issued
- ❖ DBPs were detected above ADWG health limits on three separate occasions. Due to a lack of filtration barriers, precursors such as organic matter are not removed prior to disinfection
- ❖ A pipeline from the Fingal WTP to Avoca is currently under stakeholder review. Once complete, potable water will be pumped to the Avoca distribution system and the current raw water supply will be removed.

## 6.2.8. General physical parameters

**Table 6.2.8-a General physical performance**

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	44	0.76	0.04	1.65
Turbidity (NTU)	44	2.21	0.5	15.8
pH	44	6.45	5.62	6.97

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. **(Chlorine residuals)** are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. **(Turbidity)** levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. **(pH)** should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the distribution network were above minimum expectations and provide protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

## 6.2.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

## 6.2.10. System incidents and issues

**Table 6.2.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
12/08/2015	Dichloroacetic acid 150 µg/L	Due to a lack of filtration barriers, precursors to DBPs are not removed causing persistent detections. Until potable water is supplied from Fingal WTP, a Public Health Alert (Do not consume) is in place.	Yes	Yes
12/08/2015	Trichloroacetic acid 270 µg/L		Yes	Yes
18/11/2015	Trichloroacetic acid 160 µg/L		Yes	Yes
14/06/2016	Dichloroacetic acid 200 µg/L		Yes	Yes
14/06/2016	Trichloroacetic acid 180 µg/L		Yes	Yes
14/06/2016	Cadmium 2.3 µg/L	Public Health Alert (Do not consume)	Yes	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.2.11. Customer complaints

Figure 6.2.11-a Complaint classification

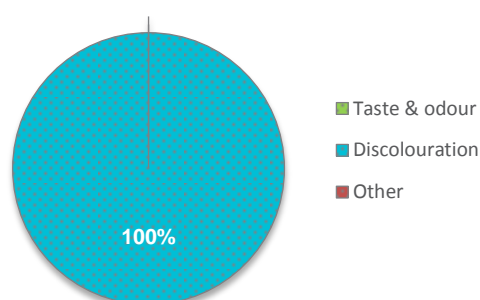


Figure 6.2.11-b Seasonal trend analysis



- ❖ One complaint was received in this reporting period relating to discoloured water.

### 6.2.12. Catchment and source water issues

- ❖ The Avoca drinking water system is supplied by the South Esk River, with a back-up supply from the St Pauls River. Major land uses within the catchment include native bushland, forestry, grazing, and cropping. There is also some recreational activity, historic and current mining activities, Level 1 & 2 wastewater treatment plant discharge and a number of properties utilising onsite wastewater management systems. Based on the catchment land uses, source water quality risks include:

- Microbial
- Turbidity issues
- Metals
- Pesticide residuals

- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.2.13. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to system during 2015–16.

### 6.2.14. Future planning

Table 6.2.14-a Future planning for the system

Project	Description	Progress	Anticipated Delivery	Estimated Spend
Avoca pipeline	Provide drinking water to Avoca from the Fingal WTP	Preliminary design undergoing stakeholder review	2016 – 17	\$4.7 million

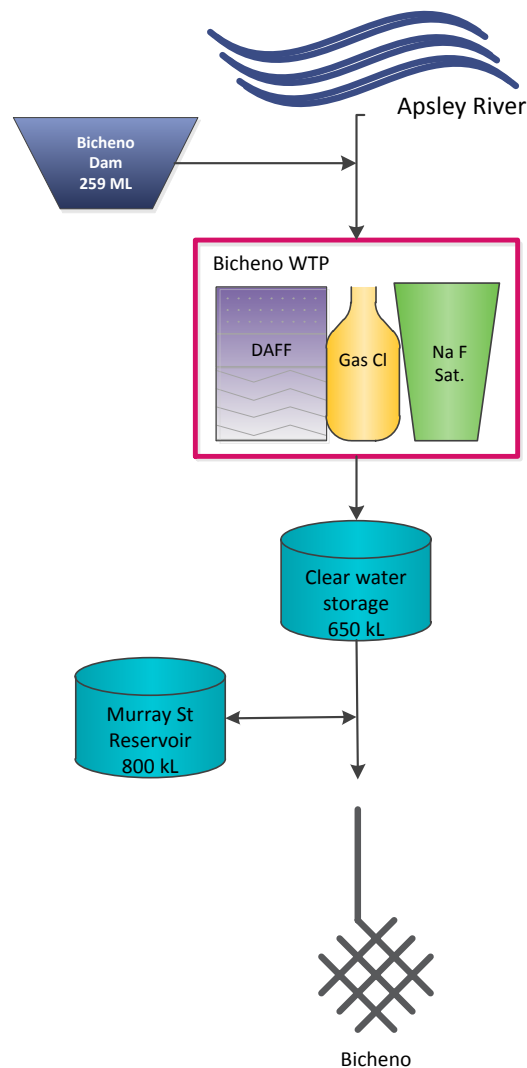
### 6.3. Bicheno drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	957
	<b>Catchment</b>	Apsley River
	<b>Primary treatment</b>	Dissolved Air Flotation and Filtration (DAFF)
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine Gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium Fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Bicheno.</li> </ul>		



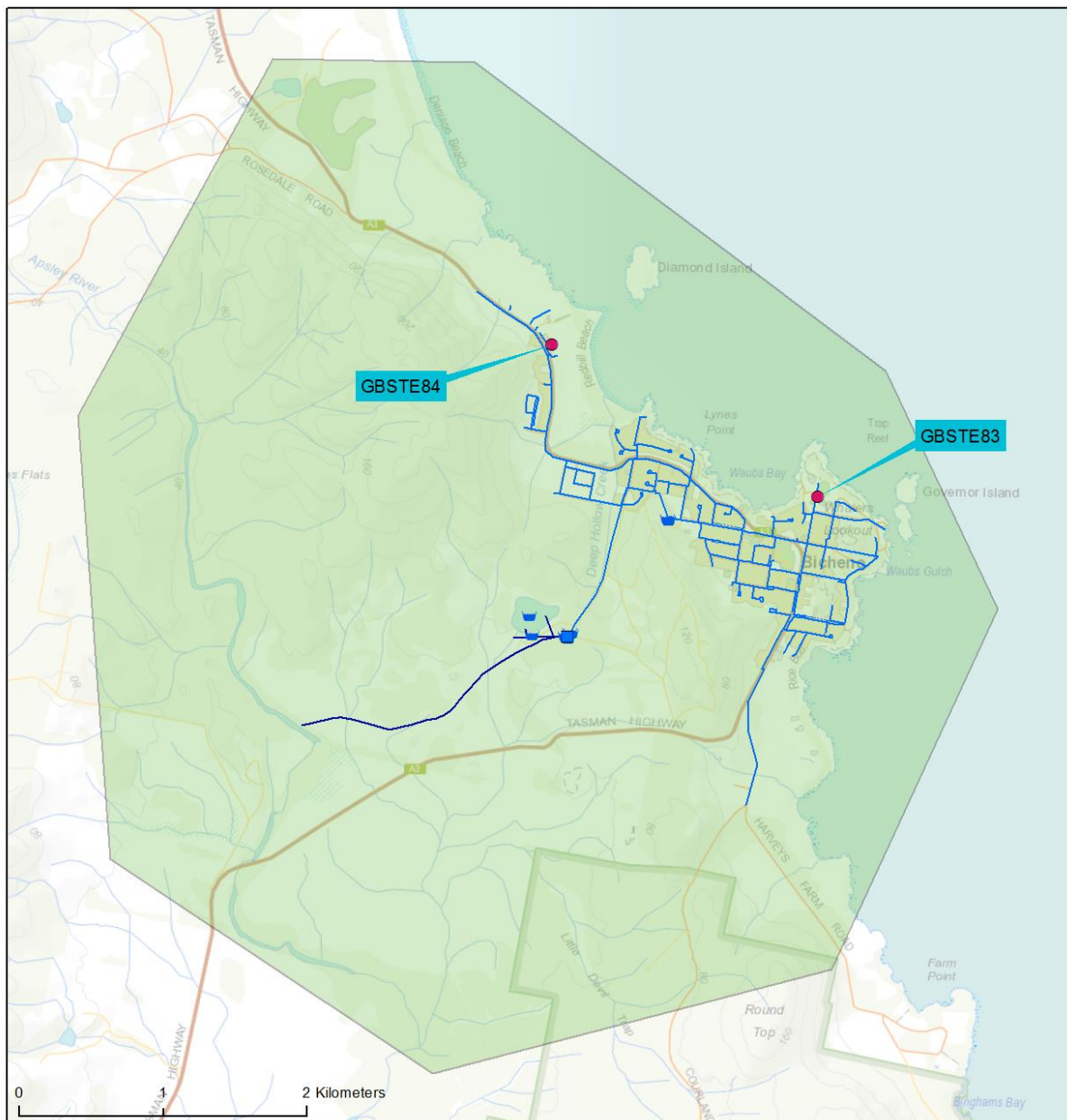
### 6.3.1. System description

Figure 6.3.1-a Bicheno system schematic



- ❖ **Catchment**  
The Bicheno drinking water system is supplied by the Apsley River, via the Bicheno storage dam
- ❖ **Treatment**  
The Bicheno water treatment plant (WTP) employs Dissolved Air Flotation and Filtration (DAFF) and gas chlorine disinfection. Water is fluoridated with a Sodium Fluoride saturator
- ❖ **Distribution**  
There is treated water storage at the WTP and one roofed reservoir in the distribution system. The Bicheno system supplies 957 connections.

Map 6.3.1–a Bicheno monitoring zone



GBSTE83 = Bicheno Primary School – GBSTE84 = 47 Tasman Highway

### 6.3.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.3.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	53	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	62	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

### 6.3.3. Summary of historic total system performance

Table 6.3.3-a Historic trends

Parameter group	Performance <sup>*</sup>									
	2011–12		2012–13		2013–14		2014–15		2015–16	
Microbiological <sup>(1)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	0	●		
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	95.7%	●		
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	0.95	●		
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	0	●		
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	85.5%	●		
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	0.92	●			
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	N/A		N/A	
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		0		0		0	
Public alerts issued <sup>(6)</sup>	–		0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

### 6.3.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoridation commenced in this system in December 2015. Fluoride compliance at the dosing point achieved the compliance target of greater than 90 per cent, and the mean dose was within target range. Performance was not consistent within the distribution network but can be seen to stabilise over the latter half of the financial year. Poor early results are attributed to trimming the new system to consistent operation
- ❖ No sample exceeded the ADWG health limit of 1.5 mg/L
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ Disinfection by-product (DBP) compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

### 6.3.5. Microbiological performance

Figure 6.3.5-a Microbiological compliance 2015–16

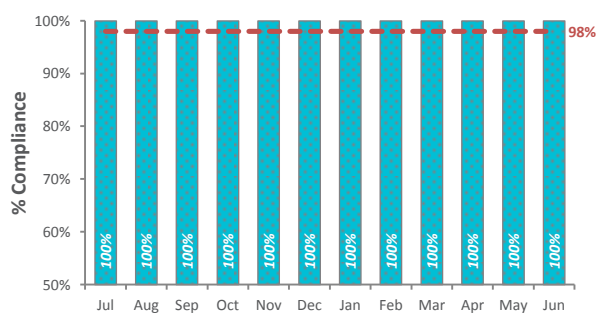


Figure 6.3.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

### 6.3.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.3.6-a Reticulation samples within target range

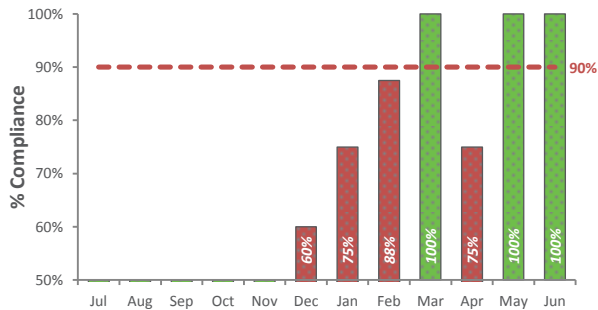


Figure 6.3.6-b Reticulation mean monthly dose (mg/L)

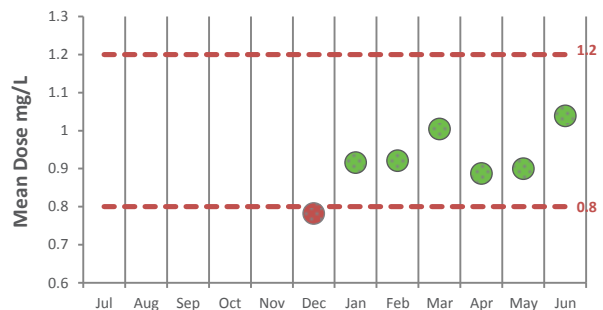


Figure 6.3.6-c Operational samples within target range

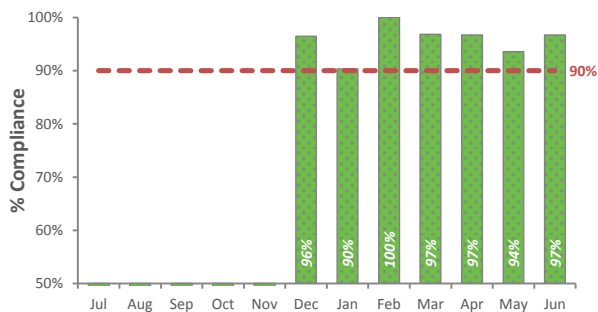
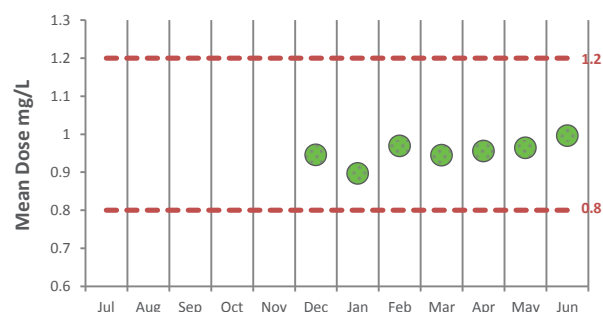


Figure 6.3.6-d Operational samples mean monthly dose (mg/L)



Note: **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Fluoridation commenced in this system in December 2015–16
- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ Performance was not consistent within the distribution network, but can be seen to stabilise over the latter half of the financial year. Poor early results are attributed to trimming the new system to consistent operation
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

### 6.3.7. Other Australian drinking water guidelines (ADWG) health regulated parameters

**Table 6.3.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	2	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	2	0	100	3	3	3
<b>Cadmium</b>	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	2	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	2	0	100	3.5	3	4
<b>Lead</b>	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Manganese</b>	500	µg/L	2	0	100	5.6	1.2	10
<b>Mercury</b>	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Selenium</b>	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	2.75	< 2	6
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	4.75	< 2	11
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	29.5	15	39

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.3.8. General physical parameters

Table 6.3.8-a General physical performance

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		53	0.21	0	0.6
Turbidity (NTU)		53	0.36	0.1	2.1
pH		53	7.51	7.23	7.9

Note: General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.3.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.3.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.3.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

### 6.3.12. Catchment and source water issues

- ❖ The Bicheno drinking water system is supplied by the Apsley River, via the Bicheno storage dam. The catchment is a mixture of bushland and agricultural land. Activities within the drinking water catchment include sheep and cattle grazing, forestry and some recreation.
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.3.13. Infrastructure and operational changes

- ❖ Installation of fluoride dosing equipment was carried out at Bicheno WTP in 2015–16. Fluoridation commenced in December 2016.

### 6.3.14. Future planning

- ❖ No water quality improvement projects are planned for the current 2016–2018 PSP period.

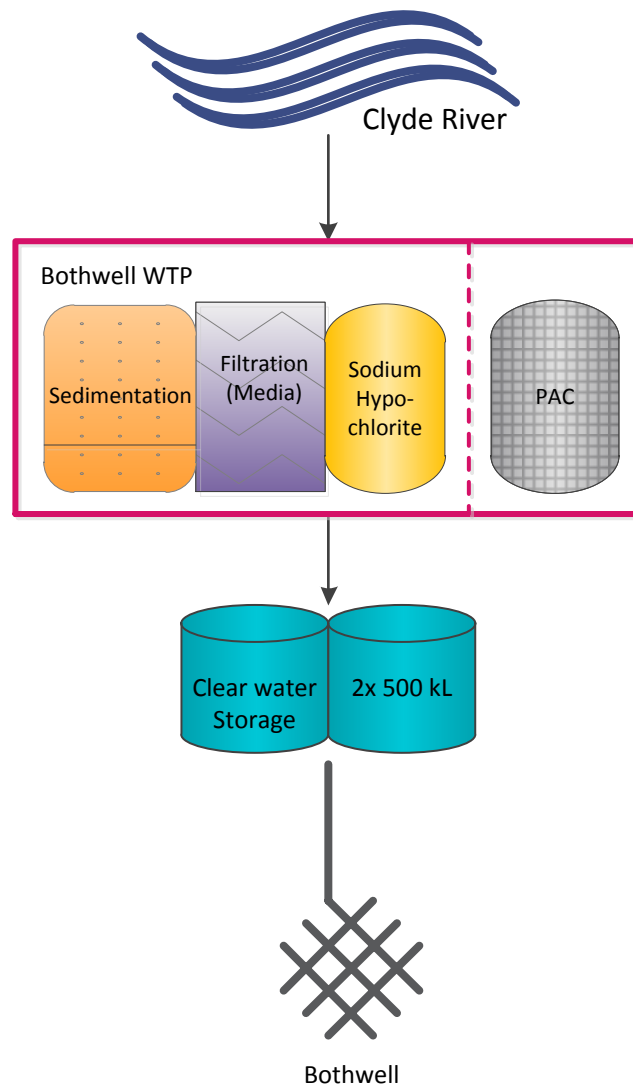
#### 6.4. Bothwell drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	274
	<b>Catchment</b>	Clyde River
	<b>Primary treatment</b>	Coagulation/filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Bothwell.</li> </ul>		



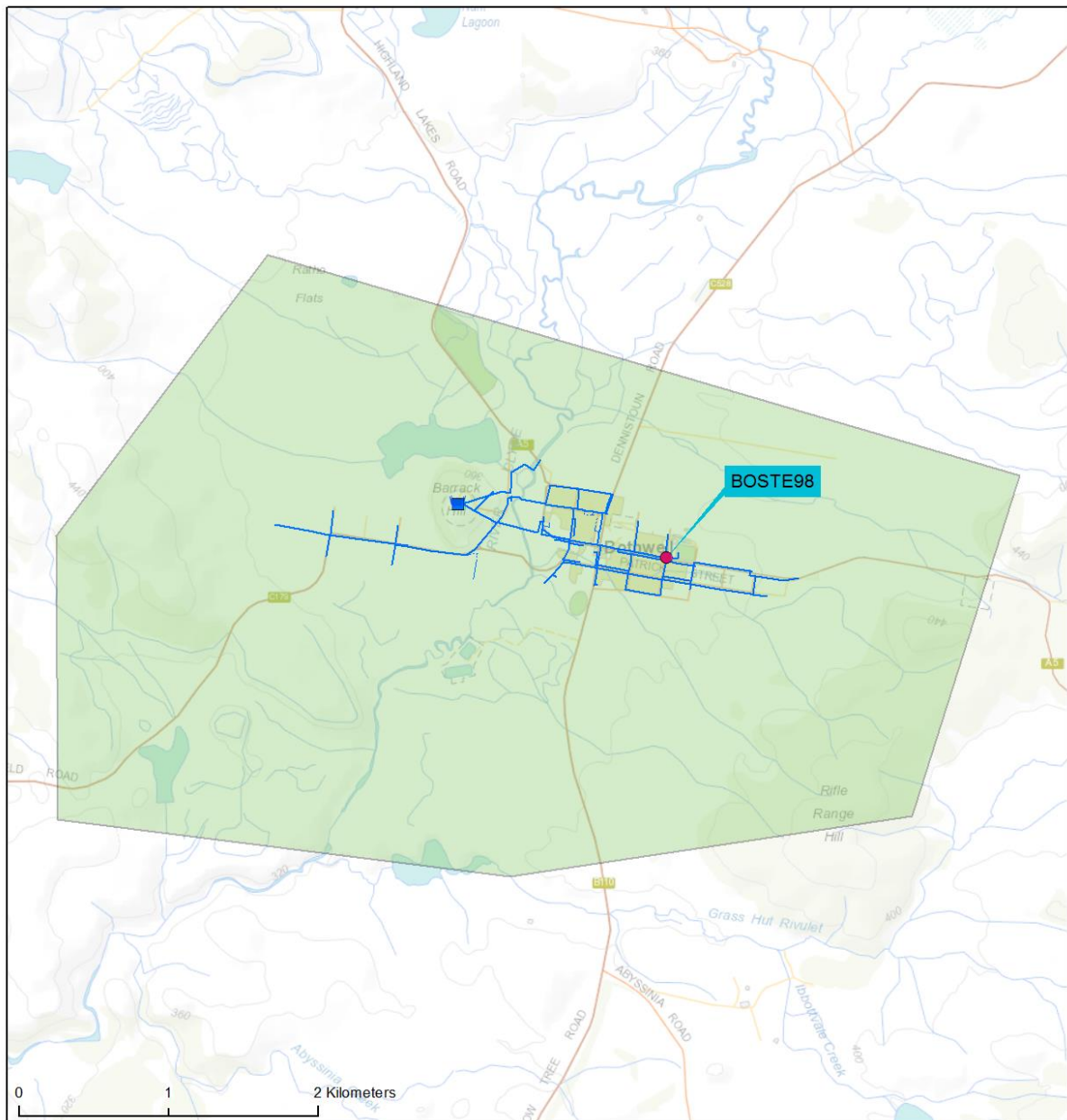
### 6.4.1. System description

Figure 6.4.1-a Bothwell system schematic



- ❖ **Catchment**  
The Bothwell drinking water system is supplied by the Clyde River
- ❖ **Treatment**  
The Bothwell water treatment plant employs coagulation and sand filtration with Sodium Hypochlorite disinfection. Treated water is stored in two roofed tanks before entering the reticulation system. PAC dosing is available when required
- ❖ **Distribution**  
The Bothwell system supplies 274 connections.

**Map 6.4.1-a Bothwell monitoring zone**



**BOSTE98 = Michael Street (Reticulation)**

## 6.4.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.4.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	52	0	
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Fortnightly	25	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (●) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.4.3. Summary of historic total system performance

Table 6.4.3-a Historic trends

Parameter group	Performance *										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	–		100% ●		99.5% ●		100% ●		100% ●		
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
Metals <sup>(3)</sup>	–		100% ●		100% ●		100% ●		100% ●		
DBPs <sup>(3)</sup>	–		100% ●		100% ●		100% ●		100% ●		
Pesticides <sup>(4)</sup>	0 ●		0 ●		0 ●		0 ●		0 ●		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		8		2		4		
Public alerts issued <sup>(6)</sup>	–		0 ●		0 ●		0 ●		0 ●		

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.4.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.4.5. Microbiological performance

Figure 6.4.5-a Microbiological compliance 2015–16

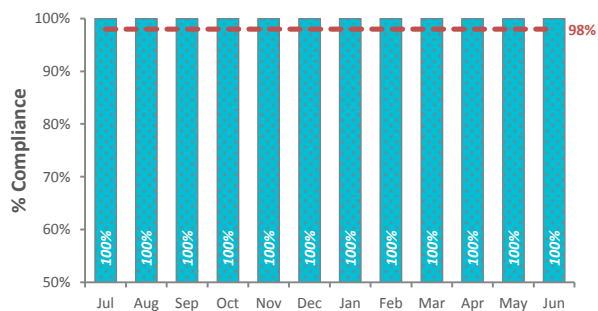


Figure 6.4.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.4.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.4.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.4.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	18.5	15	22
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	4.5	2	7
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	2	0	100	7.95	3.9	12
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	0.6
Nickel	20	µg/L	2	0	100	0.6	0.5	0.7
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	11.75	5	25
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	13.25	3	22
Total trihalomethanes	250	µg/L	4	0	100	44	30	54

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

#### 6.4.8. General physical parameters

**Table 6.4.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	51	0.26	0.03	0.99
Turbidity (NTU)	51	0.91	0.2	8.1
pH	51	6.69	5.85	8.75

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ One spike at 8.1 NTU exceeded the ADWG aesthetic limit during the reporting period
- ❖ Mean chlorine residuals in the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination.
- ❖ pH levels are maintained within the recommended optimal range.

#### 6.4.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

#### 6.4.10. System incidents and issues

**Table 6.4.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
12/02/2016	2,4-D 0.09µg/L MCPA 0.05µg/L	Carbon dosing at the Bothwell WTP was adjusted. Management and ongoing monitoring in place.	No	No
8/04/2016	Geosmin detected at 113ng/L Two Taste and Odour complaints received at the same time from customers in Bothwell	Carbon dosing at the Bothwell WTP was increased, and ongoing monitoring in place.	No	No

### 6.4.11. Customer complaints

Figure 6.4.11-a Complaint classification

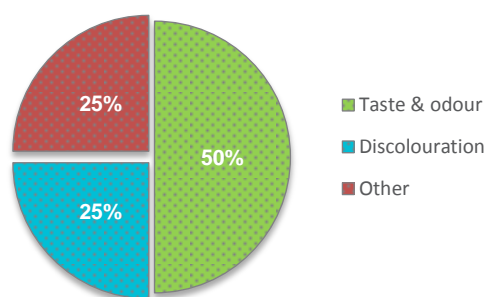
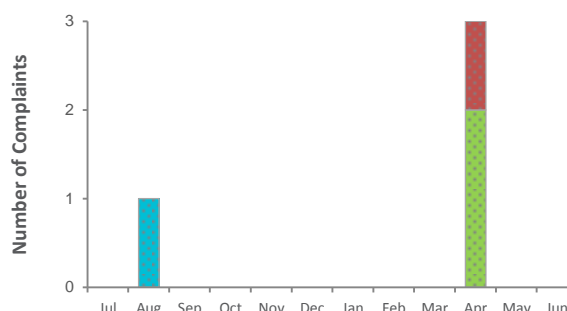


Figure 6.4.11-b Seasonal trend analysis



- ❖ Four complaints were received in this reporting period. Two complaints were relating to taste and odour issues, and one for discolouration issues. The other complaint was a customer with fluoride concerns.

### 6.4.12. Catchment and source water issues

- ❖ The Bothwell drinking water system is supplied by the Clyde River. The Clyde catchment covers 66,441 ha. The upper catchment is predominantly native bushland, with some grazing and forestry. Activities in the lower catchment include intensive irrigated cropping (including flood irrigation), cattle and sheep grazing, fishing and recreational activities. Flow in the Clyde River is controlled by an irrigation trust
- ❖ Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ Trace levels of pesticides were detected in the Clyde River catchment. Investigations were conducted in the distribution system of which all results were at levels well below the ADWG health limits.

### 6.4.13. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.4.14. Future planning

Table 6.4.14-a Future planning for the system

Project	Description	Progress	Anticipated Delivery	Estimated Spend
Bothwell Improvement Project	Infrastructure improvements to increase plant reliability and water quality	Minor process upgrades and implementation of PAC dosing system is underway	2016 – 17	\$91,000

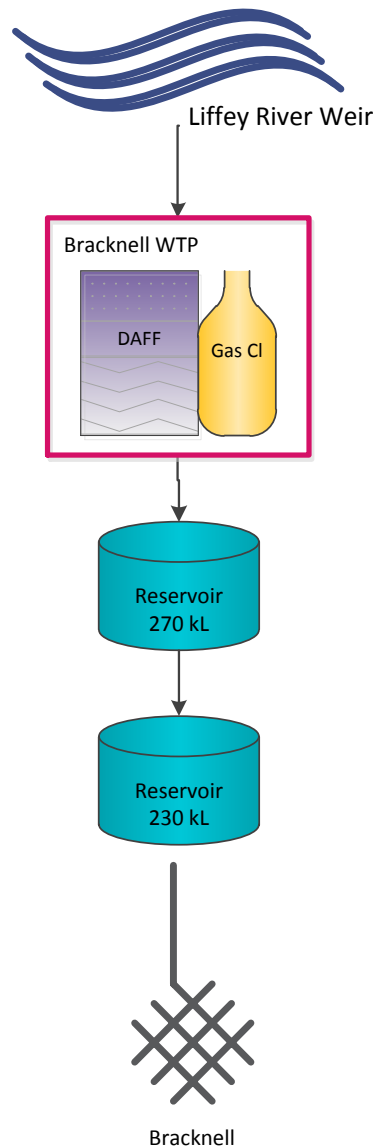
## 6.5. Bracknell drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	199
	<b>Catchment</b>	Liffey River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Bracknell.</li> </ul>		



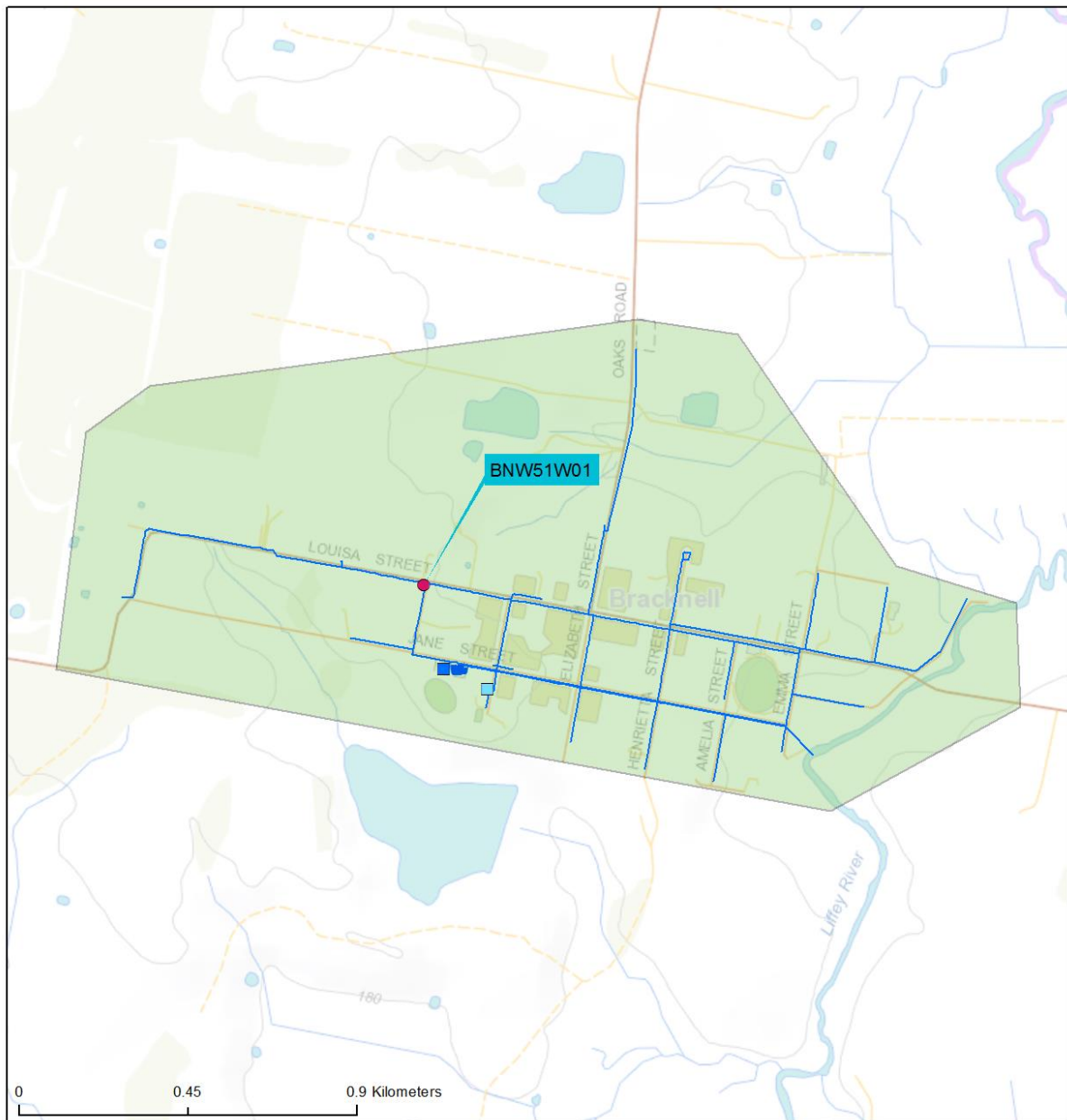
### 6.5.1. System description

Figure 6.5.1-a Bracknell system schematic



- ❖ Catchment  
The Bracknell drinking water system is supplied by the Liffey River
- ❖ Treatment  
The Bracknell water treatment plant employs screening, coagulation and flocculation dissolved air floatation and filtration, and gas chlorine disinfection
- ❖ Distribution  
The system feeds the township of Bracknell. There are two roofed reservoirs supplying the distribution system. The system supplies 199 connections.

Map 6.5.1-a Bracknell monitoring zone



BNW51W01 = Louisa Street, Bracknell

## 6.5.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.5.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	53	0	
Fluoride <sup>(2)</sup>	N/A	–	–	–	–	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. # Pesticide testing removed from the reticulation sampling program after April 2016

## 6.5.3. Summary of historic total system performance

Table 6.5.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)							
Parameter group	Performance*						
	2011–12	2012–13	2013–14	2014–15	2015–16		
Microbiological <sup>(1)</sup>	100%	98% ●	100% ●	100% ●	100%		
Fluoride <sup>(2)</sup>	Operational fluoride dosing						
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A
	Distribution fluoride testing						
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	
Metals <sup>(3)</sup>	100%	100% ●	100% ●	100% ●	100%		●
DBPs <sup>(3)</sup>	100%	100% ●	100% ●	100% ●	100%		●
Pesticides <sup>(4)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●		●
Complaints received <sup>(5)</sup>	4	2	2	0	2		
Public alerts issued <sup>(6)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●		●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.5.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.5.5. Microbiological performance

Figure 6.5.5-a Microbiological compliance 2015–16

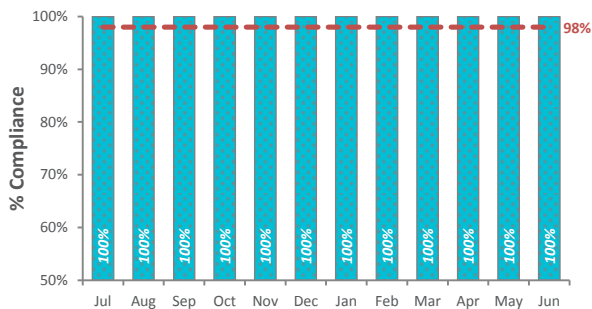


Figure 6.5.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.5.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.5.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.5.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	8.75	8	9
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	2.75	2	4
Lead	10	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	4	0	100	3.33	2.5	5.2
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	17.25	14	22
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	18.75	14	26
Total trihalomethanes	250	µg/L	4	0	100	22.5	15	27

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.5.8. General physical parameters

**Table 6.5.8-a General physical performance**

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	53	0.82	0.46	1.15
Turbidity (NTU)	53	0.2	0.1	0.5
pH	52	7.4	6.45	7.9

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were well above minimum expectations. During the reporting period 30 samples measured greater than 0.8 mg/L, with the maximum spike at 1.15 mg/L. All samples were well below the ADWG health limit of 5 mg/L
- ❖ pH levels are maintained within the recommended optimal range.

### 6.5.9. Aesthetic issues

- ❖ Chlorine residuals remain high within the system with mean levels greater than the aesthetic target value of 0.8 mg/L. The DAFF treatment plant effectively removes high colour and turbidity issues associated with the raw water supply and DBPs in the treated supply are minimal. There have been no customer complaints this reporting period related to high chlorine residuals.

### 6.5.10. System incidents and issues

**Table 6.5.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
12/11/2015	Seasonal testing for MIB & Geosmin was undertaken, Geosmin at the intake 15ng/L, and 11ng/L in the reticulation. (Detection limit is typically around 10ng/L).	Customer complaint reported on 5 November 2015 relating to musty tasting water. Intensive monitoring was triggered. Geosmin levels dropped below the taste and odour threshold after rainfall in the catchment. No further odour complaints were received.	No	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.5.11. Customer complaints

Figure 6.5.11-a Complaint classification

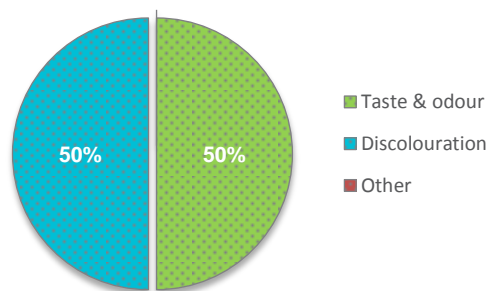
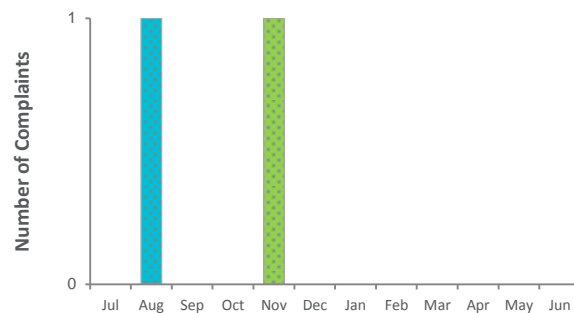


Figure 6.5.11-b Seasonal trend analysis



- ❖ Two complaints were received in this reporting period. One related to discolouration issues and the other related to a taste issue.

### 6.5.12. Catchment and source water issues

- ❖ The Bracknell system is supplied by the Liffey River. Land uses in the catchment include native bushland, cropping, dairy, forestry, road infrastructure and onsite wastewater management systems. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Colour issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.5.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.5.14. Future planning

- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

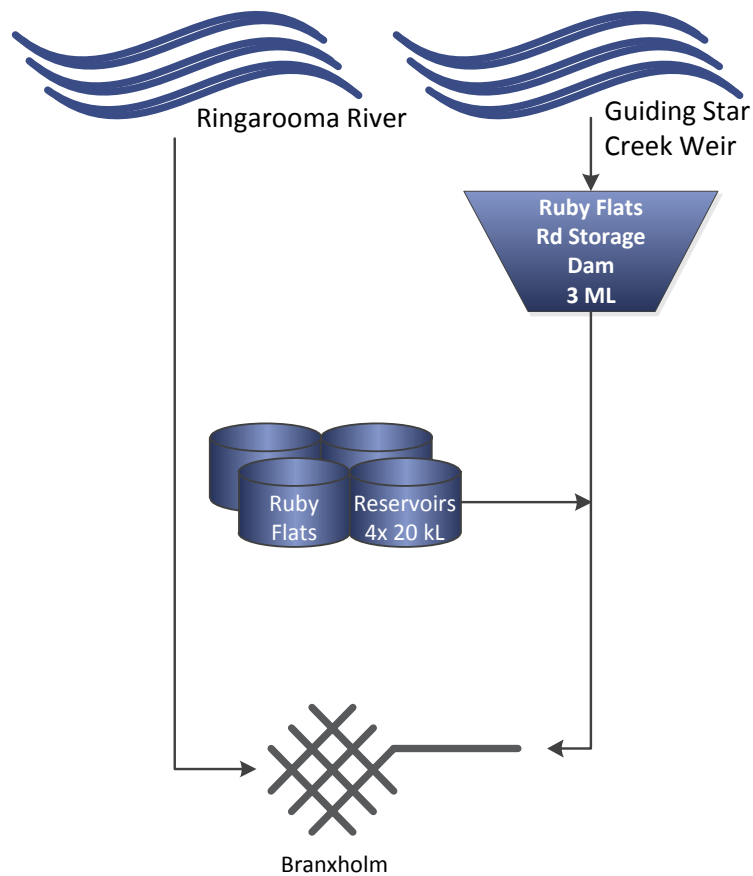
## 6.6. Branxholm drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	206
	<b>Catchment</b>	Ringarooma River and Guiding Star Creek
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Branxholm.</li> </ul>		



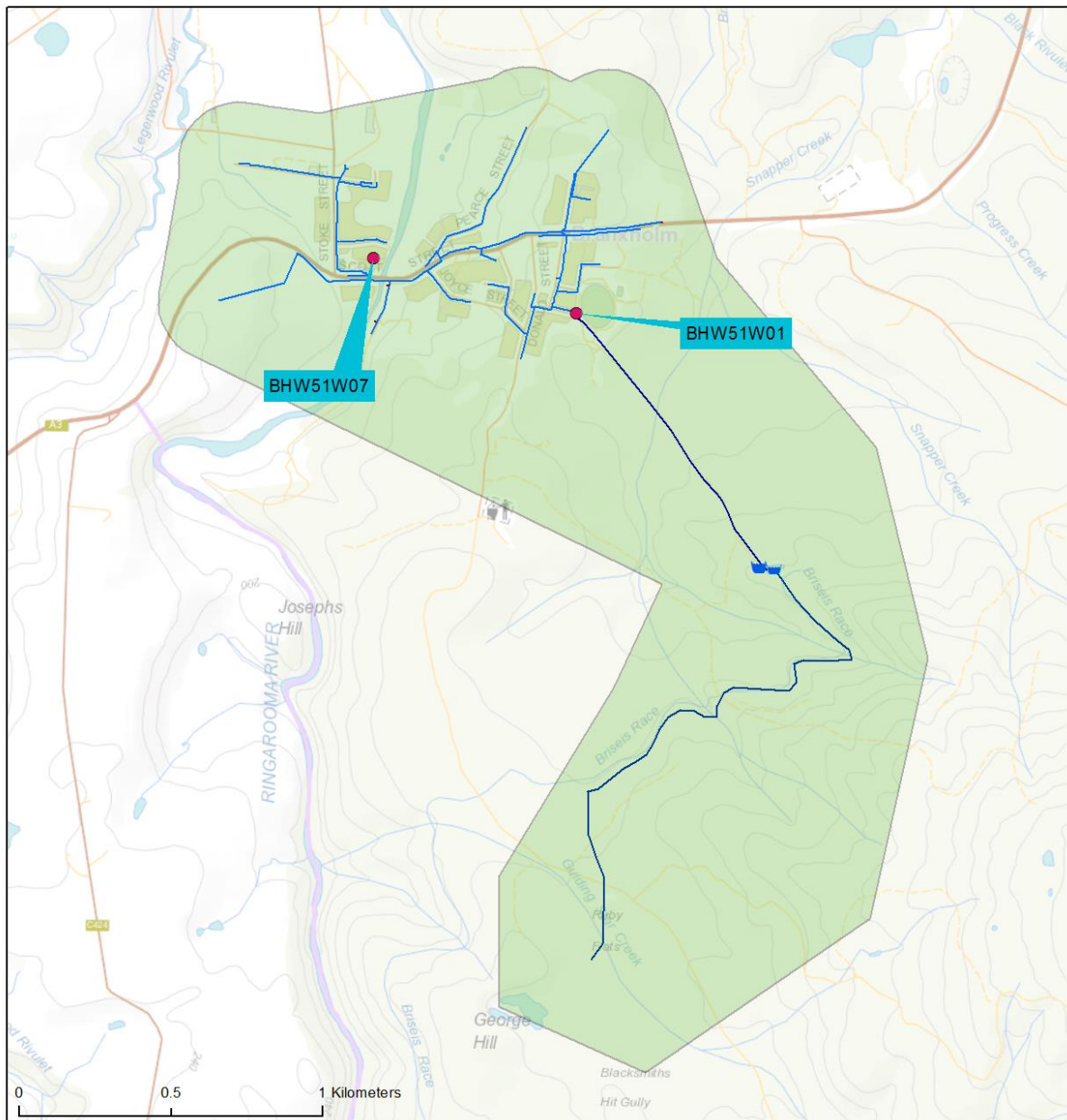
### 6.6.1. System description

Figure 6.6.1-a Branxholm system schematic



- ❖ **Catchment**  
The Branxholm drinking water system is supplied by the Ringarooma River and Guiding Star Creek
- ❖ **Treatment**  
The Branxholm system is a raw water system, with no treatment. Customers receiving water from the Branxholm system are subject to a Permanent BWA (prior July 2013)
- ❖ **Distribution**  
The system feeds the township of the Branxholm. There are four roofed reservoirs connected via a common line in the distribution system. The system supplies 206 connections.

Map 6.6.1—a Branhholm monitoring zone



BHW51W01 =Recreation Ground, Branhholm, BHW51W07 = Caravan Park, Branhholm.

## 6.6.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.6.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	0%	No ●	Monthly	12	12	
<b>Fluoride</b> <sup>(2)</sup>	N/A	–	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	

**Key** – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)  
**Note** – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (•) – Refers to compliance with current ADWG health guideline at the time of reporting. <sup>#</sup> Routine DBP and Pesticide testing were removed from the reticulation sampling program in May 2016.

## 6.6.3. Summary of historic total system performance

Table 6.6.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance*					
	2011–12	2012–13	2013–14	2014–15	2015–16	
<b>Microbiological</b> <sup>(1)</sup>	14% ●	0% ●	19% ●	8% <sup>#</sup> ●	0% ●	
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	
<b>Metals</b> <sup>(3)</sup>	100% ●	100% ●	100% ●	100% ●	100% ●	
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	N/A	N/A	N/A	
<b>Pesticides</b> <sup>(4)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●	
<b>Complaints received</b> <sup>(5)</sup>	4	2	5	2	2	
<b>Public alerts issued</b> <sup>(6)</sup>	1 ●	1 ●	1 ●	1 ●	1 ●	

**Key** – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

**Note** – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year’s report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all “Boil Water”, “Do Not Consume” or “Do Not Use” public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. <sup>#</sup> Samples were not taken as per the required sampling plan to calculate compliance against DHHS targets..

#### 6.6.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 was 0 per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 achieved 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.6.5. Microbiological performance

Figure 6.6.5-a Microbiological compliance 2015–16

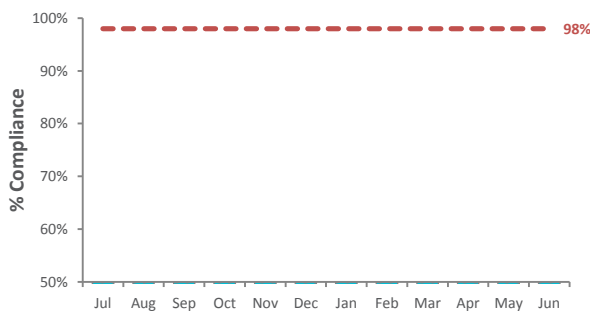
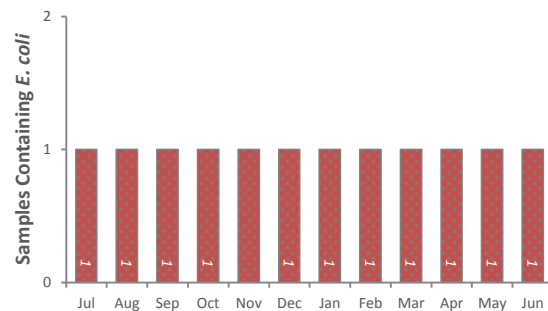


Figure 6.6.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Branxholm system was 0 per cent compliant in 2015–16. *E. coli* greater than 1 MPN/100 mL was detected in every monthly sample for the reporting period
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from the Ringarooma River and Guiding Star Creek
- ❖ The risk to public health is mitigated through the communication of the Permanent BWA to customers.

#### 6.6.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.6.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

Table 6.6.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	<0.5	<0.5	<0.5
Arsenic	10	µg/L	4	0	100	<1	<1	<1
Barium	2000	µg/L	4	0	100	9.25	8	11
Cadmium	2	µg/L	4	0	100	<0.1	<0.1	<0.1
Chromium	50	µg/L	4	0	100	<1	<1	<1
Copper	2000	µg/L	4	0	100	18.5	10	25
Lead	10	µg/L	4	0	100	1.35	0.9	1.8
Manganese	500	µg/L	4	0	100	6.3	2.8	12
Mercury	1	µg/L	4	0	100	<0.05	<0.05	<0.05
Molybdenum	50	µg/L	4	0	100	<0.5	<0.5	<0.5
Nickel	20	µg/L	4	0	100	<0.5	<0.5	0.7
Selenium	10	µg/L	4	0	100	<5	<2	<5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	3	0	100	<4	<1	<4
Monochloroacetic acid	150	µg/L	3	0	100	<5	<5	<5
Trichloroacetic acid	100	µg/L	3	0	100	<7	<2	<7
Total trihalomethanes	250	µg/L	3	0	100	<1.5	<1.5	<1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.6.8. General physical parameters

Table 6.6.8-a General physical performance

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	N/A	–	–	–
Turbidity (NTU)	12	3.89	1.35	12.7
pH	12	6.34	5.77	6.74

Note: General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network were below the ADWG aesthetic limit of 5 NTU. On three occasions the ADWG aesthetic limit was exceeded with a maximum spike of 12.7 NTU. There are no treatment processes in this system to mitigate turbidity fluctuations in the catchment
- ❖ pH levels are below the ADWG recommended range
- ❖ This system is not chlorinated.

### 6.6.9. Aesthetic issues

- ❖ Aesthetic issues cannot be mitigated due to a lack of treatment processes in this system.

### 6.6.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.6.11. Customer complaints

Figure 6.6.11-a Complaint classification

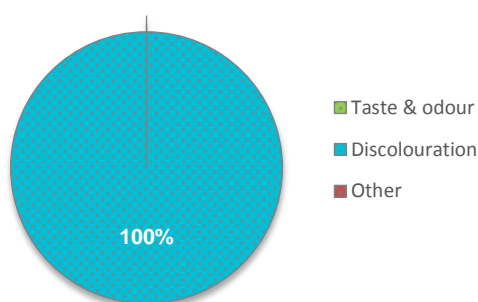
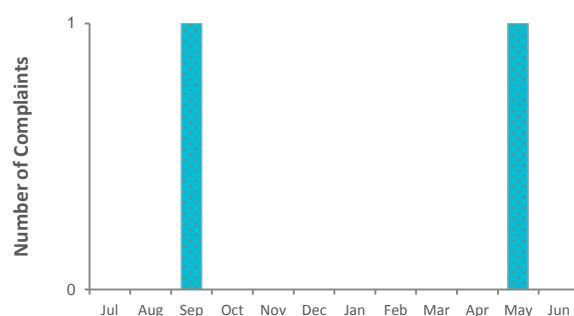


Figure 6.6.11-b Seasonal trend analysis



- ❖ Two complaints were received in this reporting period. Both complaints were for discoloured water issues.

#### 6.6.12. Catchment and source water issues

- ❖ The Branxholm drinking water system is supplied by the Ringarooma River and Guiding Star Creek. Activities in the drinking water catchment include forestry, grazing, dairy farming, historic mining and some native forest. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.6.13. Infrastructure and operational changes

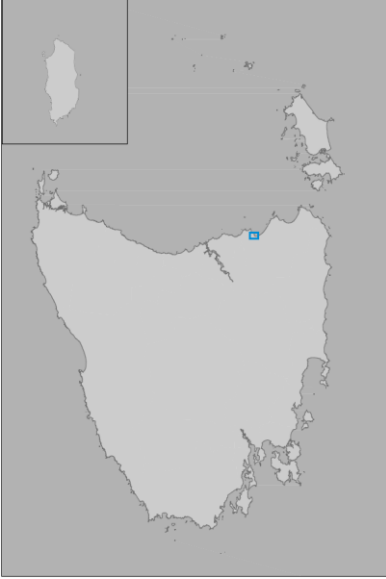
- ❖ No significant infrastructure or operational changes were made to the system during 2015–16.

#### 6.6.14. Future planning

**Table 6.6.14-a Future planning for the system**

Project	Description	Progress	Anticipated Delivery	Estimated Spend
Ringarooma Valley scheme	New WTP servicing Ringarooma, Derby, Branxholm and Legerwood	Pipeline construction is complete and WTP to be commissioned in early 2017	2016 – 17	\$4.6 million

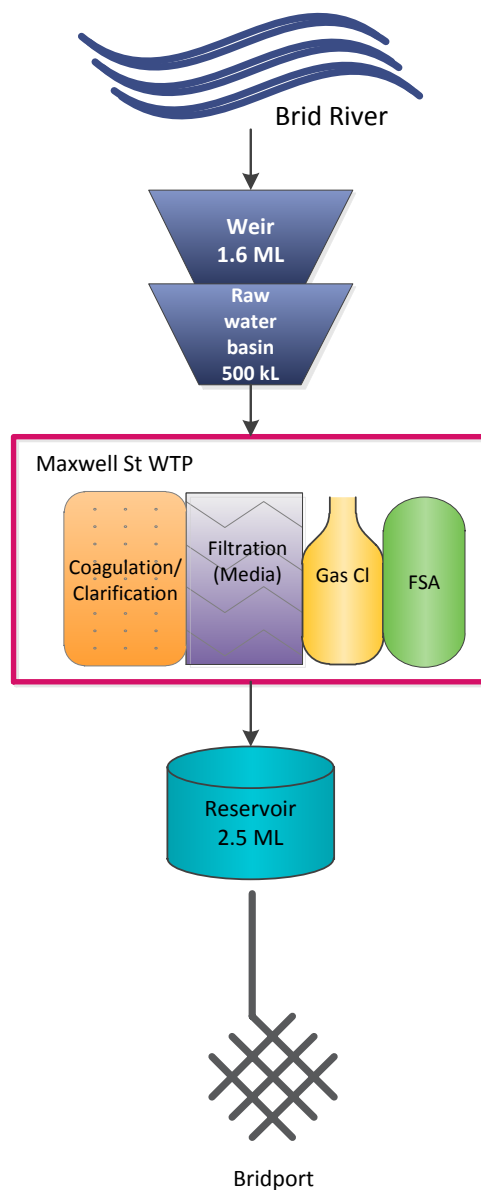
## 6.7. Bridport drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	1,154
	<b>Catchment</b>	Brid River
	<b>Primary treatment</b>	Coagulation/clarification/filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Bridport.</li> </ul>		



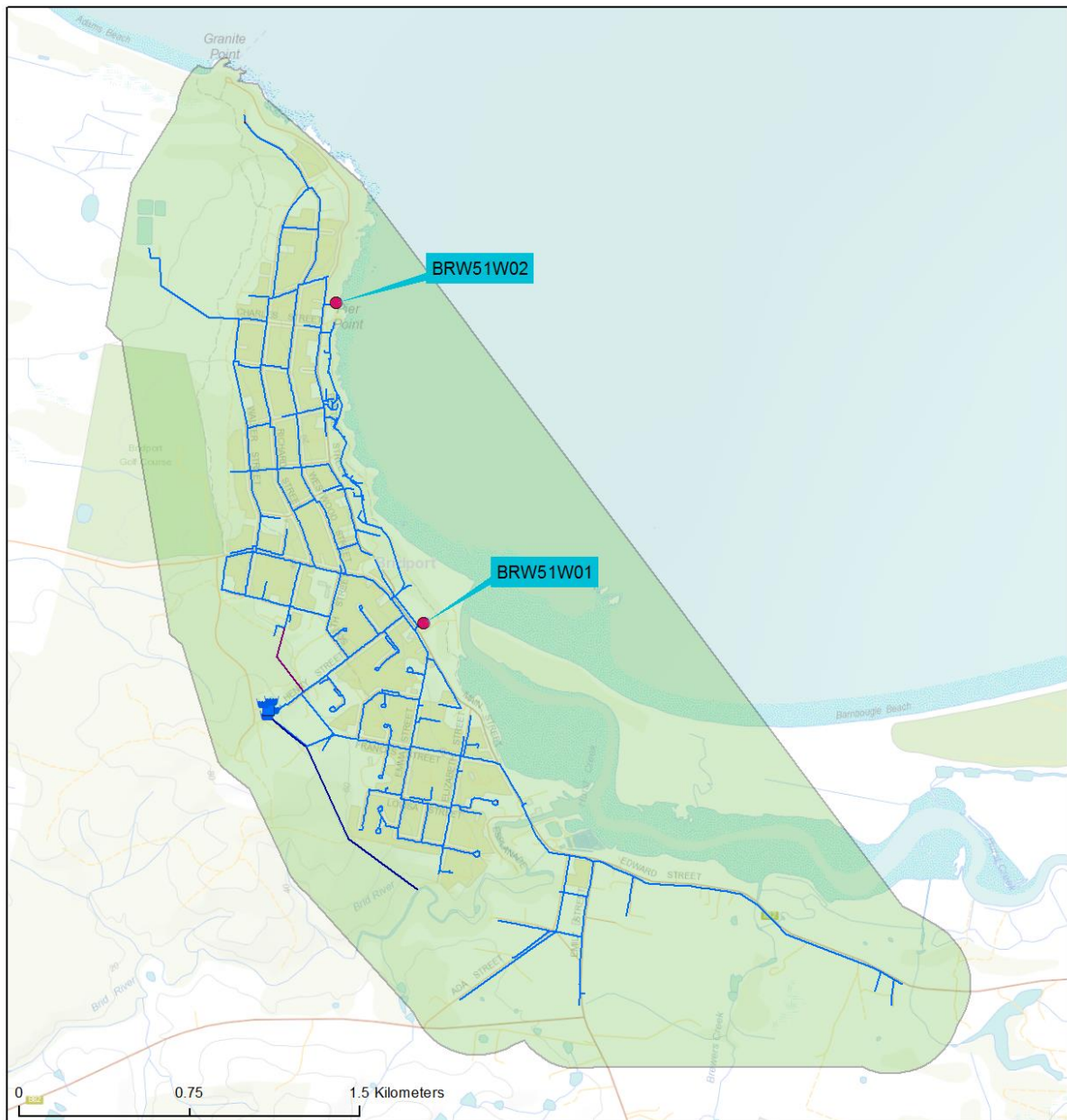
### 6.7.1. System description

Figure 6.7.1-a Bridport system schematic



- ❖ **Catchment**  
The Bridport drinking water system is supplied by the Brid River
- ❖ **Treatment**  
The Bridport WTP employs coagulation, clarification, media filtration, chlorine gas disinfection and fluoridation by fluorosilicic acid
- ❖ **Distribution**  
There is one roofed reservoir in the distribution system. The Bridport drinking water system supplies 1,154 connections.

### Map 6.7.1–a Bridport monitoring zone



BRW51W01 = Visitor Centre, BRW51W02 = Old Pier Bentley Street

## 6.7.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.7.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	109	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	104	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting. # DBP and Pesticide testing were removed from the sampling program in June 2016.

## 6.7.3. Summary of historic total system performance

Table 6.7.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		97%	●	97.5%	●	94.4%	●
	mean dose (mg/L) <sup>(c)</sup>	0.83	●	0.79	●	0.91	●	0.92	●	0.89	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		Not Recorded		99%	●	89.4%	●
mean dose (mg/L) <sup>(c)</sup>	Not Recorded		Not Recorded		Not Recorded		0.97	●	0.88	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
Complaints received <sup>(5)</sup>	5		2		6		4		2		
Public alerts issued <sup>(6)</sup>	0	●	1	●	0	●	0	●	100%	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.7.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Operational fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Distribution fluoride compliance for 2015–16 was below the compliance target of greater than 90 per cent of samples within target range. The system was taken offline for maintenance late April and completed in late May. The target dose rate was phased in over a number of days, and low residuals affected compliance
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.7.5. Microbiological performance

Figure 6.7.5-a Microbiological compliance 2015–16

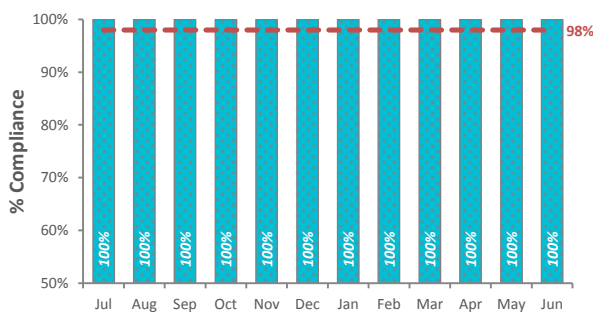
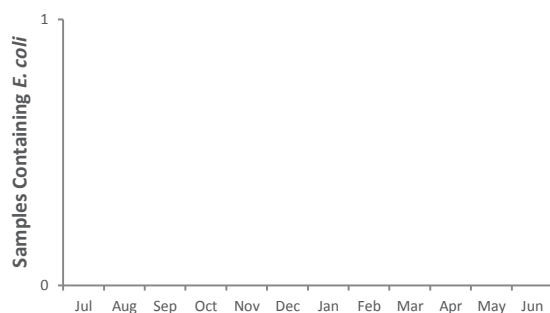


Figure 6.7.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.7.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.7.6-a Reticulation samples within target range

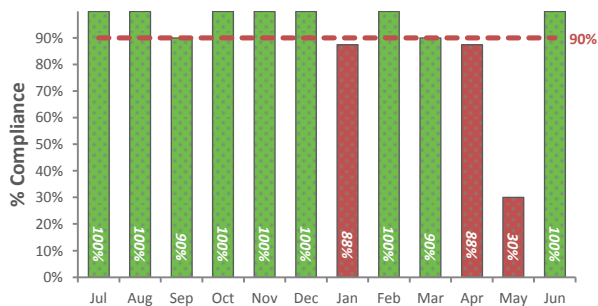


Figure 6.7.6-b Reticulation mean monthly dose (mg/L)

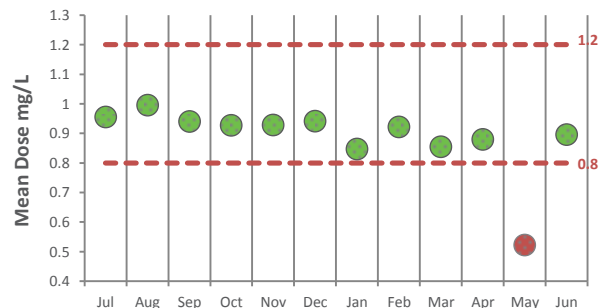


Figure 6.7.6-c Operational samples within target range

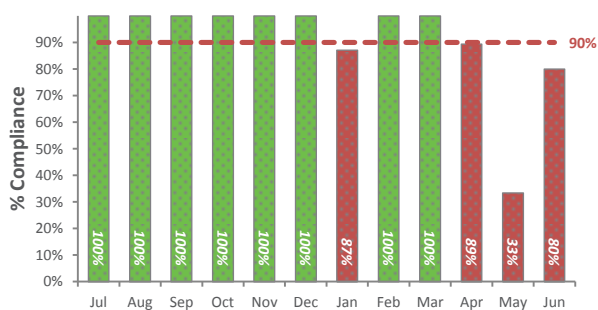
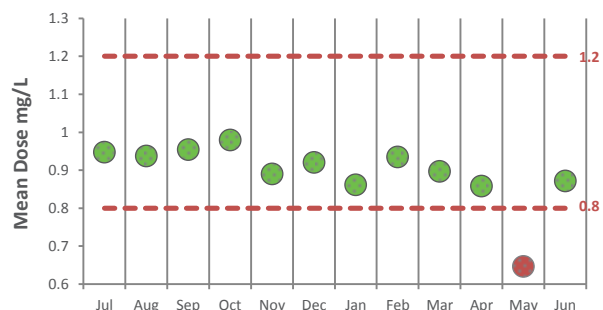


Figure 6.7.6-d Operational samples mean monthly dose (mg/L)



**Note:** **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ The system was taken offline for maintenance late April and completed in late May. The target dose rate was phased in over a number of days, and low residuals affected compliance
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

### 6.7.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.7.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	18.25	14	22
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	4.25	3	5
Lead	10	µg/L	4	0	100	< 0.5	< 0.5	0.5
Manganese	500	µg/L	4	0	100	16.63	5.1	31.9
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	20.25	8	27
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	31.75	20	40
Total trihalomethanes	250	µg/L	4	0	100	77.5	53	98

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.7.8. General physical parameters

**Table 6.7.8-a General physical performance**

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	104	0.3	0.02	1.39
Turbidity (NTU)	104	0.75	0.3	12.4
pH	103	6.99	6.52	7.49

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU. A spike of 12.4 NTU occurred on 22/9/15 after routine flushing exercises had taken place in the area
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.7.9. Aesthetic issues

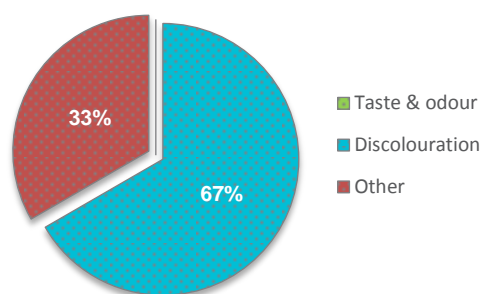
- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.7.10. System incidents and issues

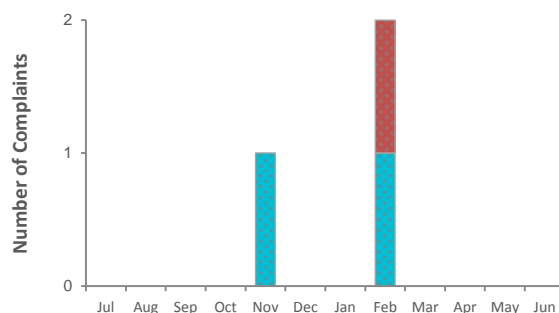
- ❖ No water quality incidents occurred in the reporting period.

### 6.7.11. Customer complaints

**Figure 6.7.11-a Complaint classification**



**Figure 6.7.11-b Seasonal trend analysis**



- ❖ Three complaints were received in this reporting period. Two complaints were relating to discoloured water issues and the other relating to symptoms of skin irritations. Water quality monitoring was assessed for January and February and was found to comply with ADWG health limits.

#### 6.7.12. Catchment and source water issues

- ❖ The Bridport drinking water system is supplied by the Brid River. The drinking water catchment covers an area of 14,849 ha. Land use in the catchment includes forestry, dairy farming, grazing, cropping and forestry. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ Trace levels of pesticides were detected in the Brid River catchment. Investigations were conducted in the distribution system of which all results were at levels well below the ADWG health limits.

#### 6.7.13. Infrastructure and operational changes

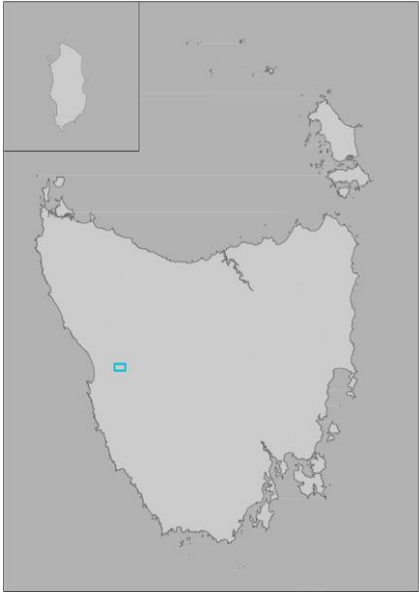
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.7.14. Future planning

- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

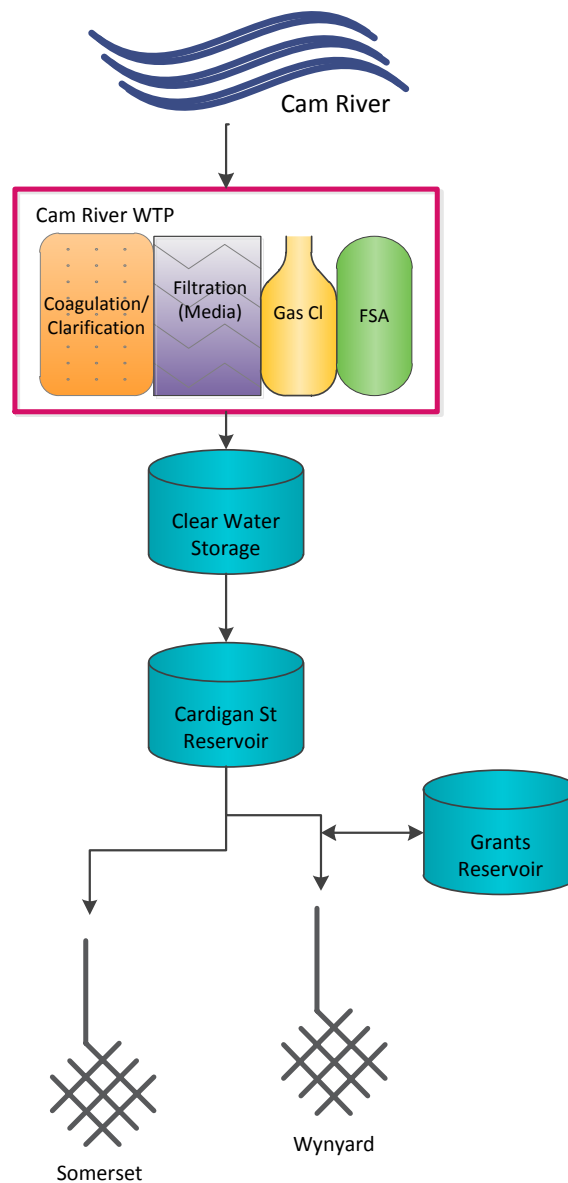


## 6.8. Cam River drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	3,961
	<b>Catchment</b>	Cam River
	<b>Primary treatment</b>	Coagulation/clarification/ filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Somerset</li> <li>❖ Wynyard.</li> </ul>		

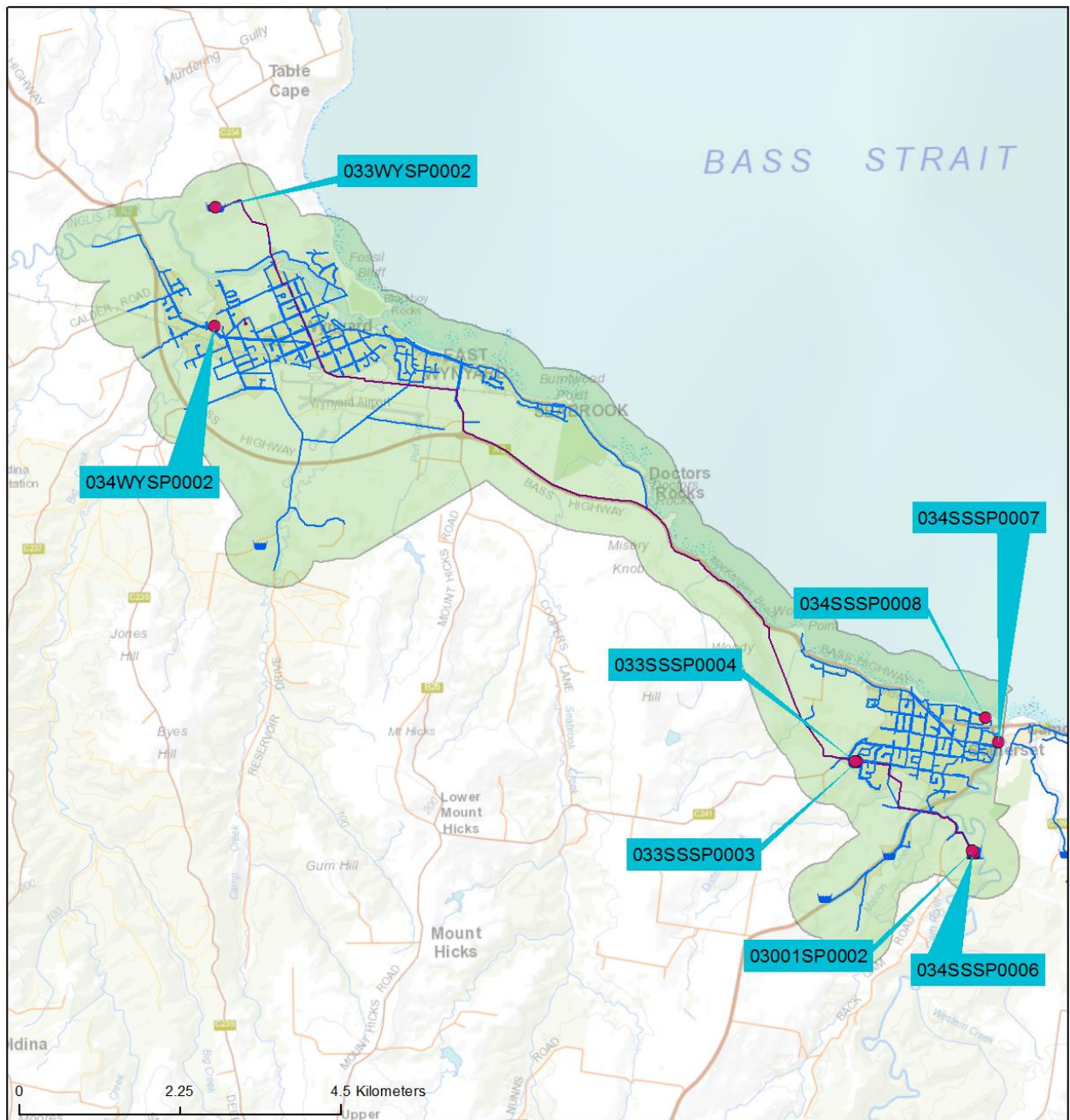
### 6.8.1. System description

Figure 6.8.1-a Cam River system schematic



- ❖ Catchment  
The Cam River drinking water system is supplied by the Cam River
- ❖ Treatment  
The Cam River WTP employs coagulation, clarification, media filtration, chlorine gas disinfection and fluoridation by fluorosilicic acid
- ❖ Distribution  
All storages in the distribution system are roofed. The Cam River system supplies 3,961 connections.

Map 6.8.1—a Cam River monitoring zone



033SSSP0003 = Big Cardigan Res, 034WYSP0002 = Big Creek, 03001SP0002 = Clear Water Outlet, 033SSSP0004 = Little Cardigan Res,  
 034SSSP0007 = Murchison Highway, 033WYSP0002 = Wynyard Grants Reservoir, 0343SSSP0006 = Pot 4,  
 034SSSP0008 = Somerset Surf Club

## 6.8.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.8.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99.4%	Yes ●	Weekly	311	2	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	85	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Monthly	55	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	35	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.8.3. Summary of historic total system performance

Table 6.8.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
Microbiological <sup>(1)</sup>	100%	●	99.8%	●	99.7%	●	99.7%	●	99.4%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	0	●	0	●	0	●	
	within target range <sup>(b)</sup>	N/A	N/A	88.4%	●	97%	●	98.5%	●	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	0.92	●	0.96	●	0.98	●	
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	0	●	0	●		
	within target range <sup>(b)</sup>	N/A	N/A	N/A	91%	●	86.8%	●		
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	0.93	●	0.91	●			
Metals <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●		
DBPs <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●		
Pesticides <sup>(4)</sup>	N/A	N/A	N/A		N/A		N/A			
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		2		2		45	
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.8.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*. However there were multiple failures in the Wynyard hydraulic zone during a one week period in December 2015
- ❖ A Temporary BWA was issued for the Wynyard zone by DHHS in December 2015 following significant *E. coli* exceedances. The BWA was lifted on 11 January 2016 following remedial action and additional re-tests which confirmed the system free of microbial contamination
- ❖ Fluoride compliance for 2015–16 met the operational compliance target of greater than 90 per cent of samples within target range, and the mean dose was within target range. Performance was not consistent in the distribution network and is currently under review
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.8.5. Microbiological performance

Figure 6.8.5-a Microbiological compliance 2015–16

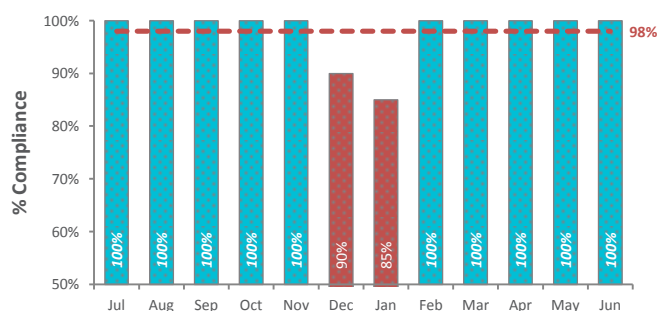
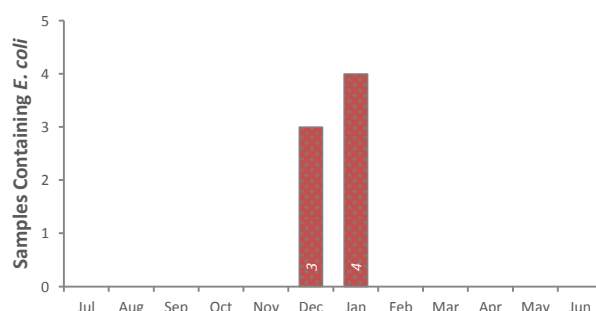


Figure 6.8.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Cam River system was 99.4 per cent compliant in 2015–16. *E. coli* was detected in seven samples during December 2015 to January 2016
- ❖ A Temporary BWA was issued by the DHHS on 31 December 2015 for the Wynyard zone, following two *E. coli* detections greater than 1 MPN/100 mL. Investigations found bird ingress at Grants Reservoir combined with low chlorine residuals caused these detections. A further five *E. coli* strikes occurred between 30 December 2015 and 2 January 2016. The reservoir was vacuumed, manually dosed with chlorine and proofed to prevent further bird ingress. Scouring and flushing of the distribution network occurred before re-testing confirmed the system free of *E. coli* and microbial contamination. The BWA was lifted on 11 January 2016.

## 6.8.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.8.6-a Operational samples within target range

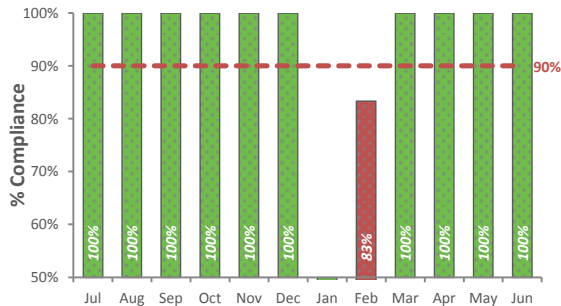


Figure 6.8.6-b Operational mean monthly dose (mg/L)

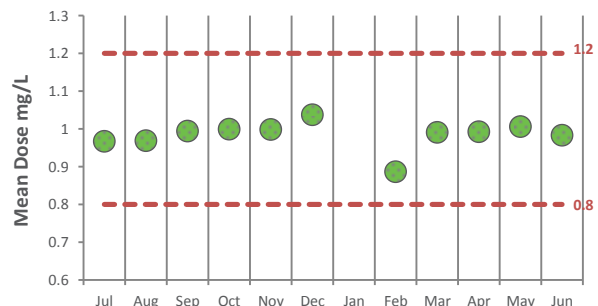
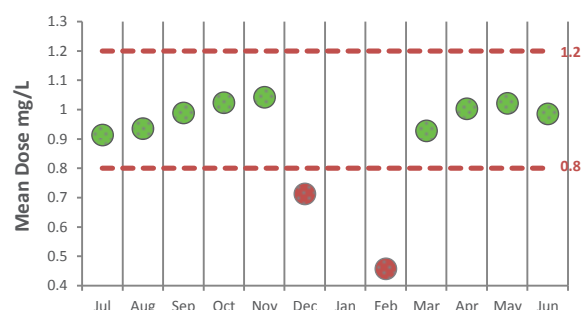
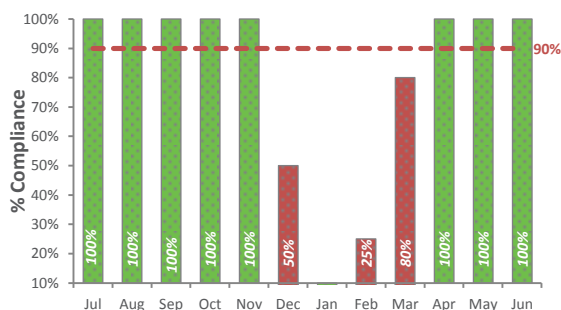


Figure 6.8.6-c Reticulation samples within target range Figure 6.8.6-d Reticulation samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L
- ❖ The plant was taken offline in December 2015 through to late February 2016 to replace the day tank due to a leak.

## 6.8.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.8.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	28	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	35	0	100	< 1	< 1	< 1
Barium	2000	µg/L	35	0	100	11.34	7	17
Cadmium	2	µg/L	35	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	35	0	100	< 1	< 1	< 1
Copper	2000	µg/L	28	0	100	3.7	< 1	22
Lead	10	µg/L	35	0	100	< 0.5	< 0.5	1.2
Manganese	500	µg/L	35	0	100	5.14	0.7	12.6
Mercury	1	µg/L	35	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	28	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	35	0	100	0.82	< 0.5	6.2
Selenium	10	µg/L	35	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	55	0	100	7.55	< 1	21
Monochloroacetic acid	150	µg/L	55	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	55	0	100	16.35	< 2	52
Total trihalomethanes	250	µg/L	55	0	100	48.18	12	100

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.8.8. General physical parameters

**Table 6.8.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	313	0.48	0.01	1.49
Turbidity (NTU)	295	0.31	0.08	1.56
pH	295	7.1	6.93	7.94

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Cam River distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation generally do not meet the target of greater than 0.1 mg/L. Re-chlorination does not occur in these zones and subsequently residuals are variable
- ❖ pH levels are maintained within the recommended optimal range.

### 6.8.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.8.10. System incidents and issues

**Table 6.8.10-a Identified issues and incidents**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
29/12/2015	Two sites for routine compliance testing revealed positive results for <i>E. coli</i> .	A TBWA was issued on 31/12/2015 as bird nests identified in the reservoir. The reservoir was cleaned, lines flushed and retests undertaken. TBWN was removed on 11/1/2016.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.



### 6.8.11. Customer complaints

Figure 6.8.11-a Complaint classification

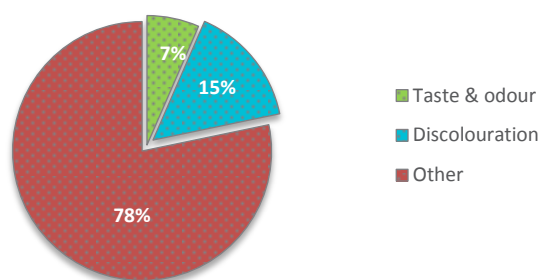
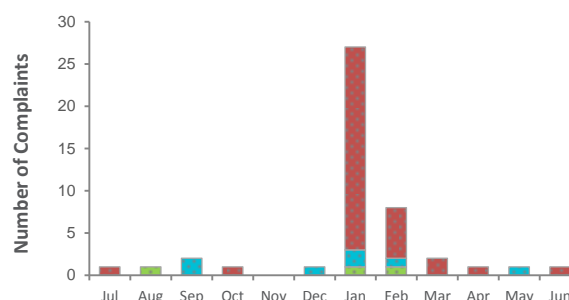


Figure 6.8.11-b Seasonal trend analysis



- ❖ Forty-five complaints were received in this reporting period. Thirty-three of the complaints were related to the Temporary BWA in Wynyard. Eight related to discolouration issues and three were related to taste and odour issues.

### 6.8.12. Catchment and source water issues

- ❖ The Cam River WTP is supplied by the Cam River. Activities in the catchment include agriculture, forestry, animal husbandry, dairy farming and cropping. Based on catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

### 6.8.13. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.8.14. Future planning

Table 6.8.14-a Future planning for the system

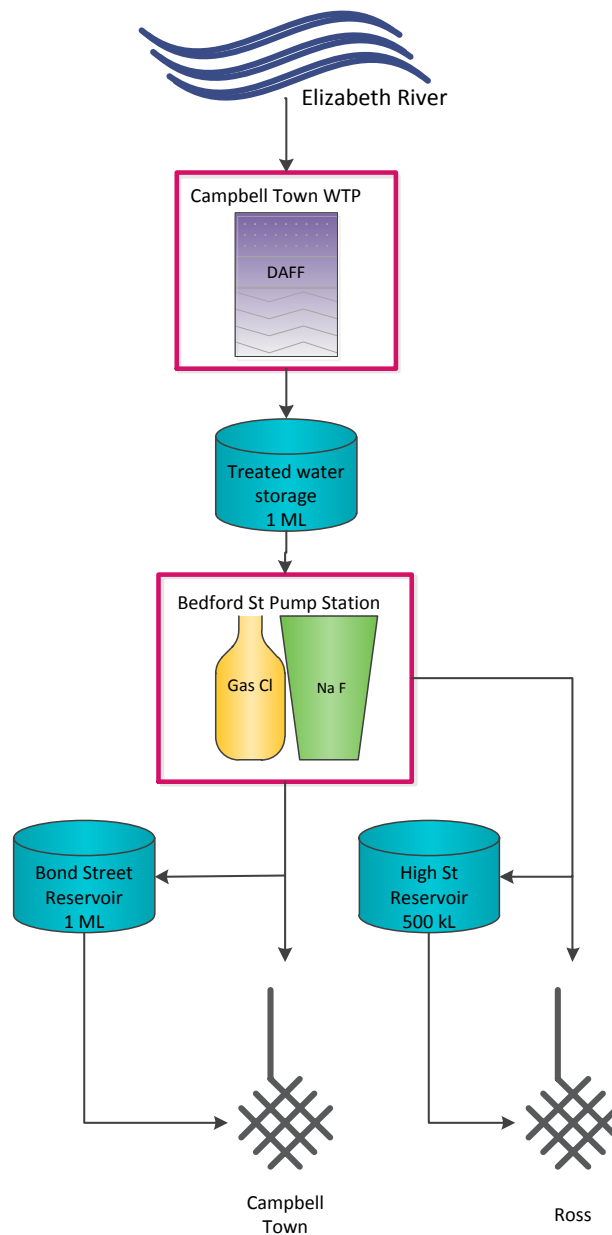
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Burnie – Cam pipeline	Provision of drinking water to Cam River distribution system from Pet River WTP to enable decommissioning of Cam River WTP	Construction to begin early 2018	2019–20	\$2.8 million

## 6.9. Campbell Town drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	868
	<b>Catchment</b>	Elizabeth River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Campbell Town</li> <li>❖ Ross.</li> </ul>		

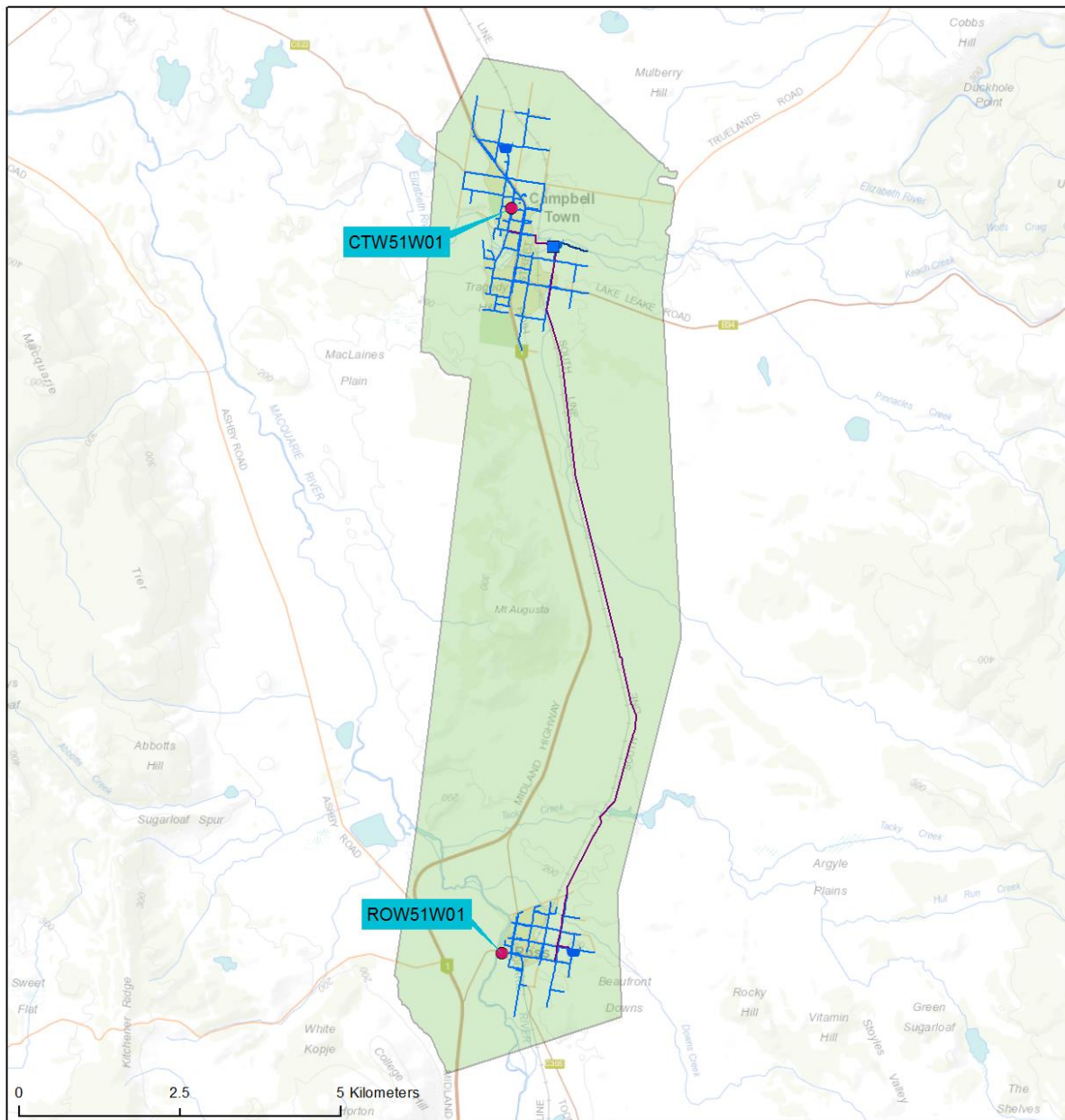
### 6.9.1. System description

Figure 6.9.1-a Campbell Town system schematic



- ❖ **Catchment**  
The Campbell Town drinking water system is supplied by the Elizabeth River
- ❖ **Treatment**  
The Campbell Town WTP employs DAFF, gas chlorine disinfection and fluoridation by sodium fluoride
- ❖ **Distribution**  
The system feeds the townships of Campbell Town and Ross. There are three roofed reservoirs within the distribution system. The system supplies 868 connections.

Map 6.9.1—a Campbell Town monitoring zone



CTW51W01 = Corner Bridge Street and Hamilton Street, Campbell Town, ROW51W01 = Bridge Street STP, Ross

## 6.9.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.9.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	107	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	104	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly	4	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.9.3. Summary of historic total system performance

Table 6.9.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	99%	●	100%	●	100%	●	100%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		89%	●	95%	●	92.2%	●
	mean dose (mg/L) <sup>(c)</sup>	0.70	●	0.76	●	0.94	●	0.97	●	0.97	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Required		Not Required		Not Required		98%	●	81.6%	●
mean dose (mg/L) <sup>(c)</sup>	Not Required		Not Required		Not Required		0.95	●	0.90	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
Complaints received <sup>(5)</sup>	4		2		2		40		4		
Public alerts issued <sup>(6)</sup>	1	●	1	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.9.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance at the dosing point achieved the compliance target of greater than 90 per cent within target range, and mean dose was within target range. Performance was not consistent within the distribution network due to ceasing of fluoride dosing during protected action
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.9.5. Microbiological performance

Figure 6.9.5-a Microbiological compliance 2015–16

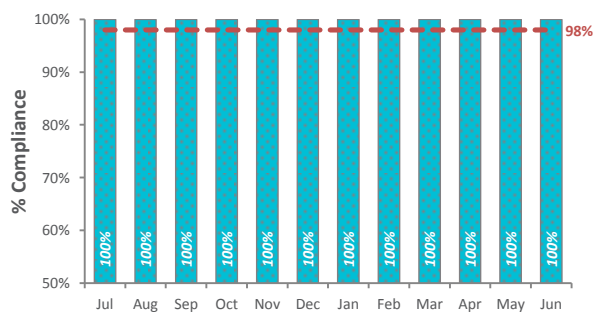
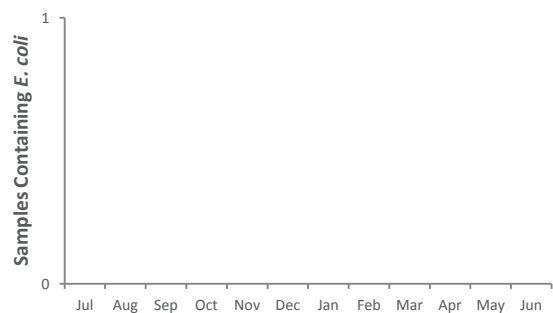


Figure 6.9.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.9.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.9.6-a Reticulation samples within target range

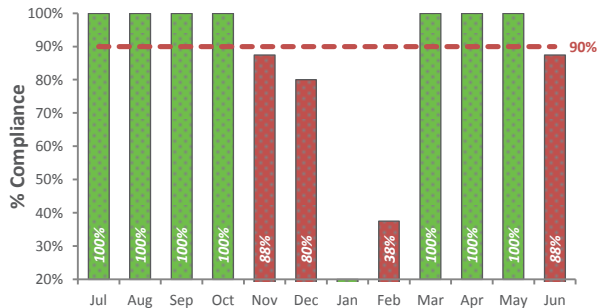


Figure 6.9.6-b Reticulation mean monthly dose (mg/L)

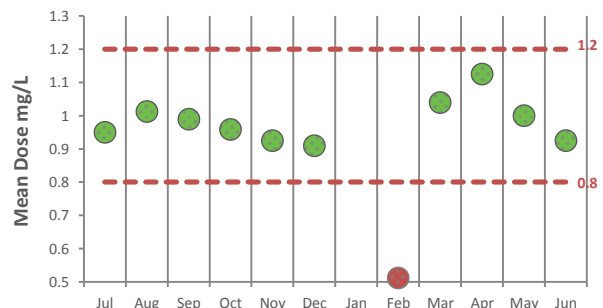


Figure 6.9.6-c Operational samples within target range

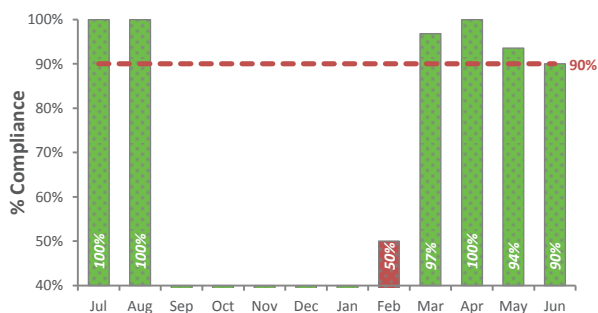
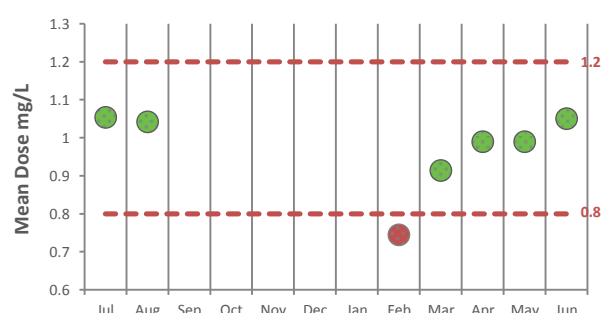


Figure 6.9.6-d Operational samples mean monthly dose (mg/L)



**Note:** (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (Operational) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ From September 2015 through to February 2016 no operational fluoride data were available for reporting due to protected action. With DHHS approval fluoride dosing was switched off from 18 December 2016 until 9 February 2016
- ❖ Low mean dose results in February 2016 are attributed to the phased reinstatement of fluoride dosing
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.9.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

**Table 6.9.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	3	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	11.25	9	14
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	4.75	3	6
Lead	10	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	4	0	100	6.35	2	11.5
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	19.75	15	24
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	> 5
Trichloroacetic acid	100	µg/L	4	0	100	15.5	8	28
Total trihalomethanes	250	µg/L	4	0	100	49	38	61

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.



### 6.9.8. General physical parameters

**Table 6.9.8-a General physical performance**

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	104	0.56	0.02	1.45
Turbidity (NTU)	104	0.17	0.1	0.5
pH	103	7.43	5.92	7.95

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. **(Chlorine residuals)** are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. **(Turbidity)** levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. **(pH)** should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network, were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.9.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.9.10. System incidents and issues

**Table 6.9.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
28/08/2015	An oil leak/spill was reported by the caravan park caretaker at Lake Leake.	Notify EPA and DHHS, samples collected for testing. TPH levels in the lake and at the intake very low. Microbiologist suggested oil slick is associated with algal bloom breakdown – a common natural occurrence. No concern to drinking water quality.	Yes	Yes
18/09/2015	Operators noticed that Lake Leake storage level was extremely low raising concerns for surety of supply over summer.	Discussions held with DPIPWE and EMIT. An irrigation ban has been imposed. Water restrictions being considered. Permanent PAC dosing facility to be installed. A working group with affected stakeholders including DPIPWE, EMIT, NMC, TI and TasWater is required.	No	No
22/03/2016	Seasonal testing for Geosmin was recorded at 11ng/L in the Raw water, and 12ng/L in the Treated water	Monitoring to continue.	No	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.9.11. Customer complaints

Figure 6.9.11-a Complaint classification

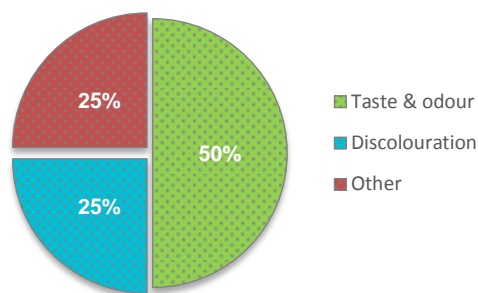
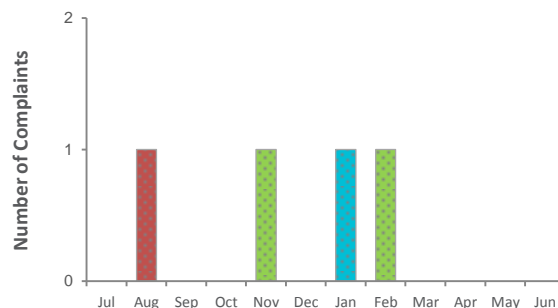


Figure 6.9.11-b Seasonal trend analysis



- ❖ Four complaints were received in this reporting period. Two complaints were related to taste and odour issues, one for discolouration, and the other not related to water quality.

### 6.9.12. Catchment and source water issues

- ❖ The Elizabeth River catchment covers an area of 33,516 ha. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ Blue green algae blooms are known to occur in Lake Leake, a major irrigation storage upstream of the water treatment plant, significantly impacting on the aesthetic quality of treated water
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

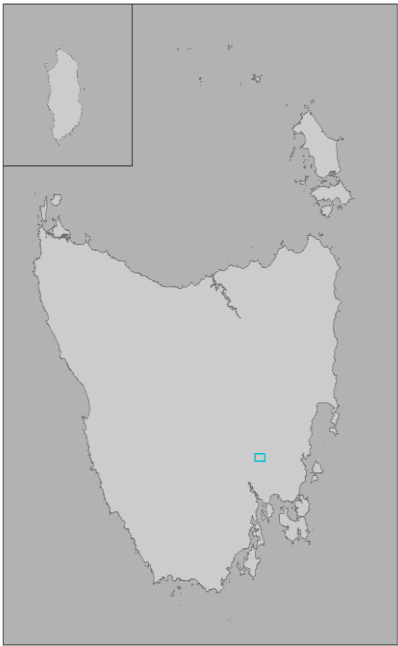
### 6.9.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.9.14. Future planning

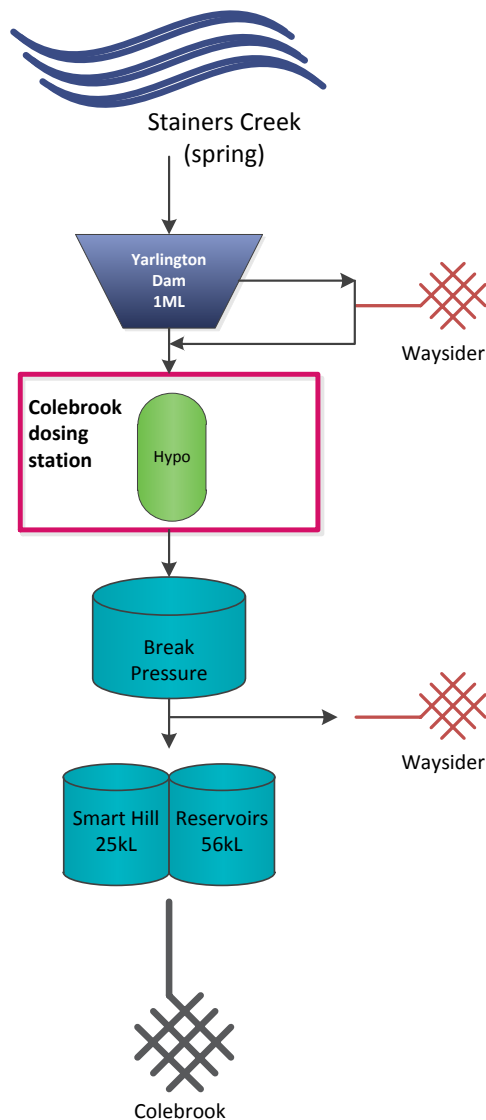
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.10. Colebrook drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	86
	<b>Catchment</b>	Strainers Spring
	<b>Primary treatment</b>	Coarse screen
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Colebrook.</li> </ul>		

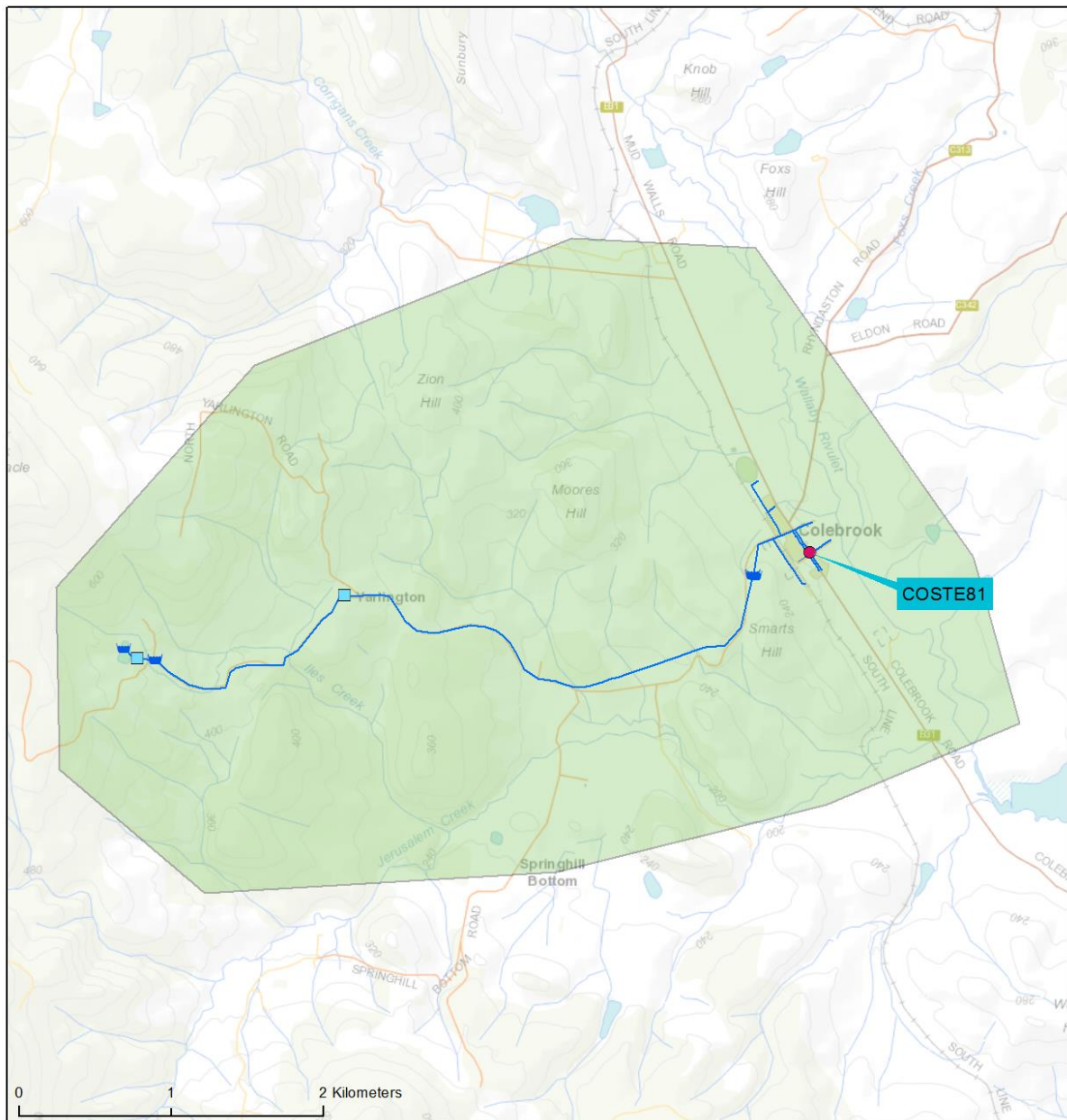
### 6.10.1. System description

Figure 6.10.1-a Colebrook system schematic



- ❖ **Catchment**  
The Colebrook drinking water system is supplied by Strainers Spring, via Yarlington Dam
- ❖ **Treatment**  
In-line screen filter cartridges provide primary screening of large particles prior to sodium hypochlorite disinfection at a break pressure tank
- ❖ **Distribution**  
Treated water is gravity fed to an unroofed reservoir located on Smarts Hill. Water is then gravity fed from the reservoir to Colebrook. The Colebrook drinking water system supplies 81 connections.

### Map 6.10.1-b Colebrook System monitoring zone



COSTE81 = Colebrook Public Toilets (Regular Compliance Point)

## 6.10.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.10.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance
Microbiological <sup>(1)</sup>	94.2%	No ●	Weekly	52	3
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–
DBPs <sup>(3)</sup>	60%	No ●	Fortnightly	28	36
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (●) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) sampling program changed to monthly in June 2016.

## 6.10.3. Summary of historic total system performance

Table 6.10.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance*					
	2011–12	2012–13	2013–14	2014–15	2015–16	
Microbiological <sup>(1)</sup>	89% ●	98% ●	96% ●	98.1% ●	94.2% ●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A
	Distribution fluoride testing					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	
Metals <sup>(3)</sup>	100% ●	100% ●	100% ●	100% ●	100% ●	
DBPs <sup>(3)</sup>	91% ●	78% ●	72% ●	62.8% ●	60% ●	
Pesticides <sup>(4)</sup>	0 ●	0 ●	N/A	N/A	N/A	
Complaints received <sup>(5)</sup>	Not Recorded	Not Recorded	1	0	8	
Public alerts issued <sup>(6)</sup>	0 ●	0 ●	0 ●	0 ●	1 ●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.10.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 94.2%
- ❖ Due to recent elevated turbidity levels in the source water and associated microbiological risk to public health the system is currently managed under a BWA to customers (6 June 2016)
- ❖ This system is not currently fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP performance for 2015–16 was 60 per cent and does not comply with ADWG. Thirty-eight detections above ADWG health limits were recorded during this reporting period. A system upgrade to mitigate this risk is part of the scope of our small towns project targeted for completion by 2018.

#### 6.10.5. Microbiological performance

Figure 6.10.5-a Microbiological compliance 2015–16

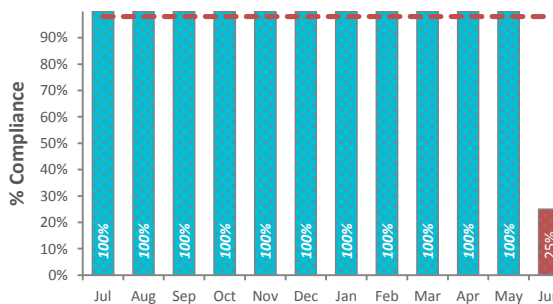


Figure 6.10.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Colebrook system was 94.2 per cent compliant in 2015–16. *E. coli* >1 MPN/100 mL was detected on 3 occasions in June 2016 due elevated turbidity in the raw water dam
- ❖ Following a long period of dry weather the Yarlington raw water dam reached critically low levels. During this time treated water was trucked to fill storage reservoirs. Subsequent storms and heavy rain washed loose clay down from the exposed backs of the dam causing a colloidal suspension that is unable to settle out
- ❖ Elevated turbidity levels have the potential to harbour harmful pathogens, protecting them from disinfection. This issue was the cause of the three failures in June and the reason for the current BWA
- ❖ A system upgrade to mitigate this risk is part of the scope of our small towns project targeted for completion by 2018.

### 6.10.6. Fluoride performance

- ❖ This system is not fluoridated.

### 6.10.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.10.7-a Other ADWG health regulated parameters (2015–16)**

Parameter	Limit	Unit	Samples **	Non-compliance *	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	5.5	5	6
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	6.5	5	8
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	2	0	100	11.75	7.4	16.1
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	0.85	0.8	0.9
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	28	14	50	91.2	0.5	250
Monochloroacetic acid	150	µg/L	28	0	100	15.8	< 5	110
Trichloroacetic acid	100	µg/L	28	19	32	162.6	18	290
Total trihalomethanes	250	µg/L	5	3	40	278	60	470

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (\*) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ A total of 36 DBP failures occurred in this reporting period. Thirty three originated from the Halo acetic acid suite and three failures from the Total trihalomethanes. The Colebrook system has a history of DBP detections caused by no filtration barrier high turbidity and organic carbon levels in the source water. These factors are exacerbated by long transit times and high chlorine dose levels required to achieve a residual in the town
- ❖ A system upgrade to mitigate this risk is part of the scope of our small towns project targeted for completion by 2018.



### 6.10.8. General physical parameters

Table 6.10.8-a General physical performance

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	52	0.2	0	1.14
Turbidity (NTU)	52	7.67	0.8	74.6
pH	52	8.54	7.39	9.79

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. **(Chlorine residuals)** are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. **(Turbidity)** levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. **(pH)** should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Turbidity levels recorded in the distribution network are consistently above optimum levels. Only a coarse screen currently exists to manage the significant variability of turbidity levels in the raw water supply. The average for the year was 7.7 NTU with spikes as high as 74 NTU.
- ❖ Chlorine disinfection control remains problematic due to fluctuating turbidity levels. Long transit times and the fact the reservoir remains unroofed are exacerbating this issue
- ❖ On average for the year pH levels were slightly above the operational maximum of 8.5. Trend analysis across the entire year shows a seasonal cycle to this elevation. This pattern suggests the presence of algal growth in the storage dam during the warmer months.

### 6.10.9. Aesthetic issues

- ❖ Persistent aesthetic water quality issues associated with turbidity were identified.

## 6.10.10. System incidents and issues

Table 6.10.10-a Identified incidents and issues

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
14/7/2015	Dichloroacetic acid 135 µg/L Trichloroacetic acid 233 µg/L	Ongoing monitoring. The system is an untreated (coarse screened), chlorinated supply. Chlorine residuals are monitored daily to maintain a consistent residual due to current supply arrangements with an unroofed reservoir and turbid water. Continue to adjust chlorine dosing to a level where disinfection is not compromised, and DBPs are minimised as much as is practical	Yes	Yes
28/7/2015	Dichloroacetic acid 115 µg/L Trichloroacetic acid 182 µg/L			
11/8/2015	Dichloroacetic acid 150 µg/L Trichloroacetic acid 200 µg/L			
28/5/2015	Dichloroacetic acid 160 µg/L Trichloroacetic acid 250 µg/L Dichloroacetic acid 160 µg/L Trichloroacetic acid 280 µg/L			
8/9/2015	Dichloroacetic acid 160 µg/L Trichloroacetic acid 290 µg/L			
22/9/2015	Dichloroacetic acid 170 µg/L Trichloroacetic acid 290 µg/L			
6/10/2015	Dichloroacetic acid 170 µg/L Trichloroacetic acid 280 µg/L			
20/10/2015	Dichloroacetic acid 110 µg/L Trichloroacetic acid 160 µg/L			
17/11/2015	Dichloroacetic acid 110 µg/L			
24/11/2015	Total trihalomethanes 350 µg/L			
15/12/2015	Dichloroacetic acid 140 µg/L			
29/12/2015	Dichloroacetic acid 190 µg/L Trichloroacetic acid 250 µg/L			
12/1/2016	Dichloroacetic acid 120 µg/L			
28/1/2016	Trichloroacetic acid 110 µg/L			
9/2/2016	Trichloroacetic acid 240 µg/L			
23/2/2016	Trichloroacetic acid 190 µg/L Trichloroacetic acid 200 µg/L Total trihalomethanes 470 µg/L			
8/3/2016	Trichloroacetic acid 150 µg/L			
22/3/2016	Trichloroacetic acid 250 µg/L			
5/4/2016	Trichloroacetic acid 220 µg/L			
17/5/2016	Trichloroacetic acid 140 µg/L			
24/5/2016	Dichloroacetic acid 110 µg/L Trichloroacetic acid 210 µg/L Total trihalomethanes 280 µg/L			
14/6/2016	<i>E. coli</i> 15.8 MPN/100mL	Turbidity reached 70NTU due to colloidal clay in the raw water dam. BWA initiated and remains in place.	Yes	Yes
21/6/2016	<i>E. coli</i> 1 MPN/100mL		Yes	Yes
28/6/2016	<i>E. coli</i> 2 MPN/100mL		Yes	Yes
6/06/2016	Significant rain event caused turbidity of (149NTU) in the raw water. This represents a risk to public health	Introduce a temporary BWA on the supply system to eliminate the public health risk.	Yes	Yes

Note: Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.10.11. Customer complaints

Figure 6.10.11-a Complaint classification

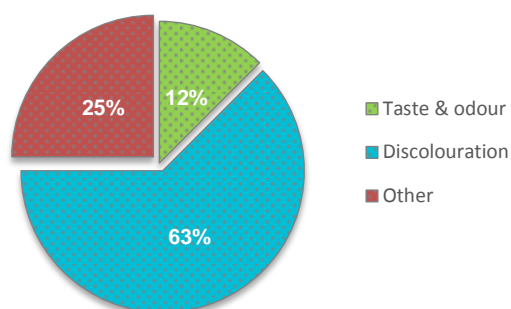


Figure 6.10.11-b Seasonal trend analysis



- ❖ Eight complaints were received during the reporting period. Seven of these were in the month of June and can be attributed to the significant flood event.

### 6.10.12. Catchment and source water issues

- ❖ The Colebrook drinking water system is supplied by Strainers Spring, via Yarlington Dam. The drinking water catchment is largely bushland, however there is some grazing (sheep) abutting the Yarlington dam.

### 6.10.13. Infrastructure and operational changes

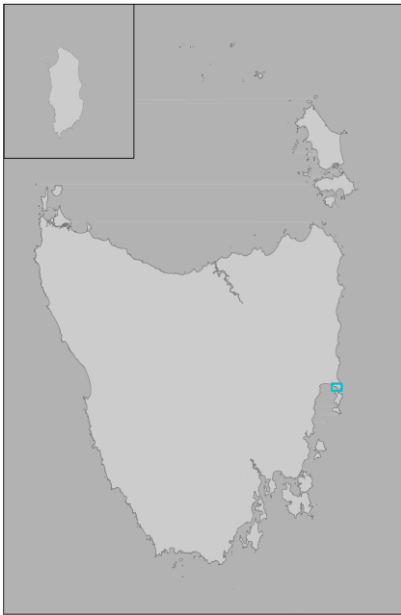
- ❖ In February and March 2016 water was provided from an alternative treated source due to low water levels in the Yarlington Dam
- ❖ In late June 2016 water was provided from an alternative treated source due to aesthetic impacts caused by elevated turbidity.

### 6.10.14. Future planning

Table 6.10.14-a Future planning for the system

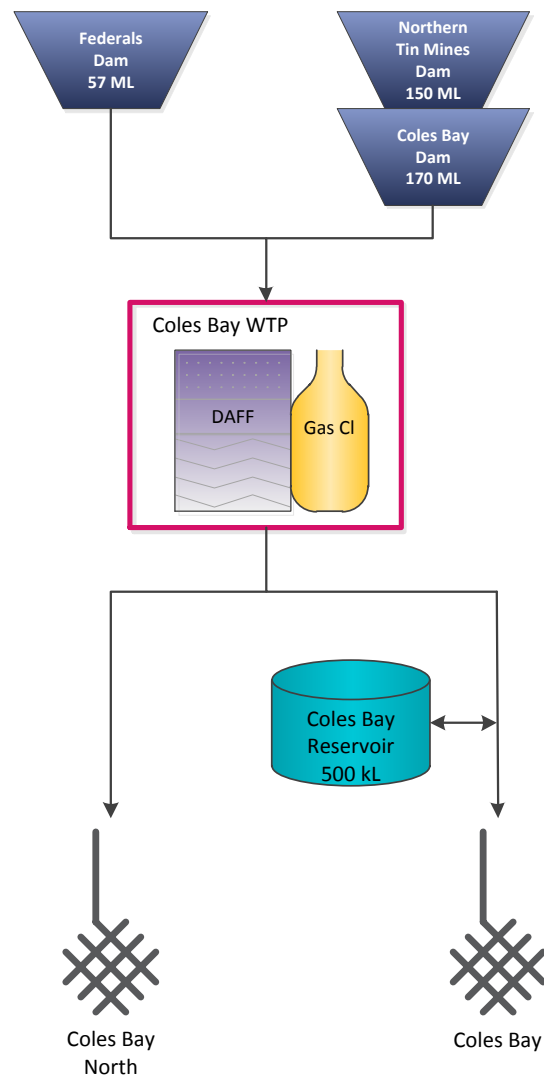
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Colebrook reservoir roofing	Reservoir roofing and chlorine improvement	Under construction, due for completion 2016–17	2015–16	\$238,000
Gladstone supply options	Investigation into options to improve water quality supplied to Gladstone	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

### 6.11. Coles Bay drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	293
	<b>Catchment</b>	Saltwater Creek
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Coles Bay</li> <li>❖ Freycinet National Park Visitors Centre.</li> </ul>		

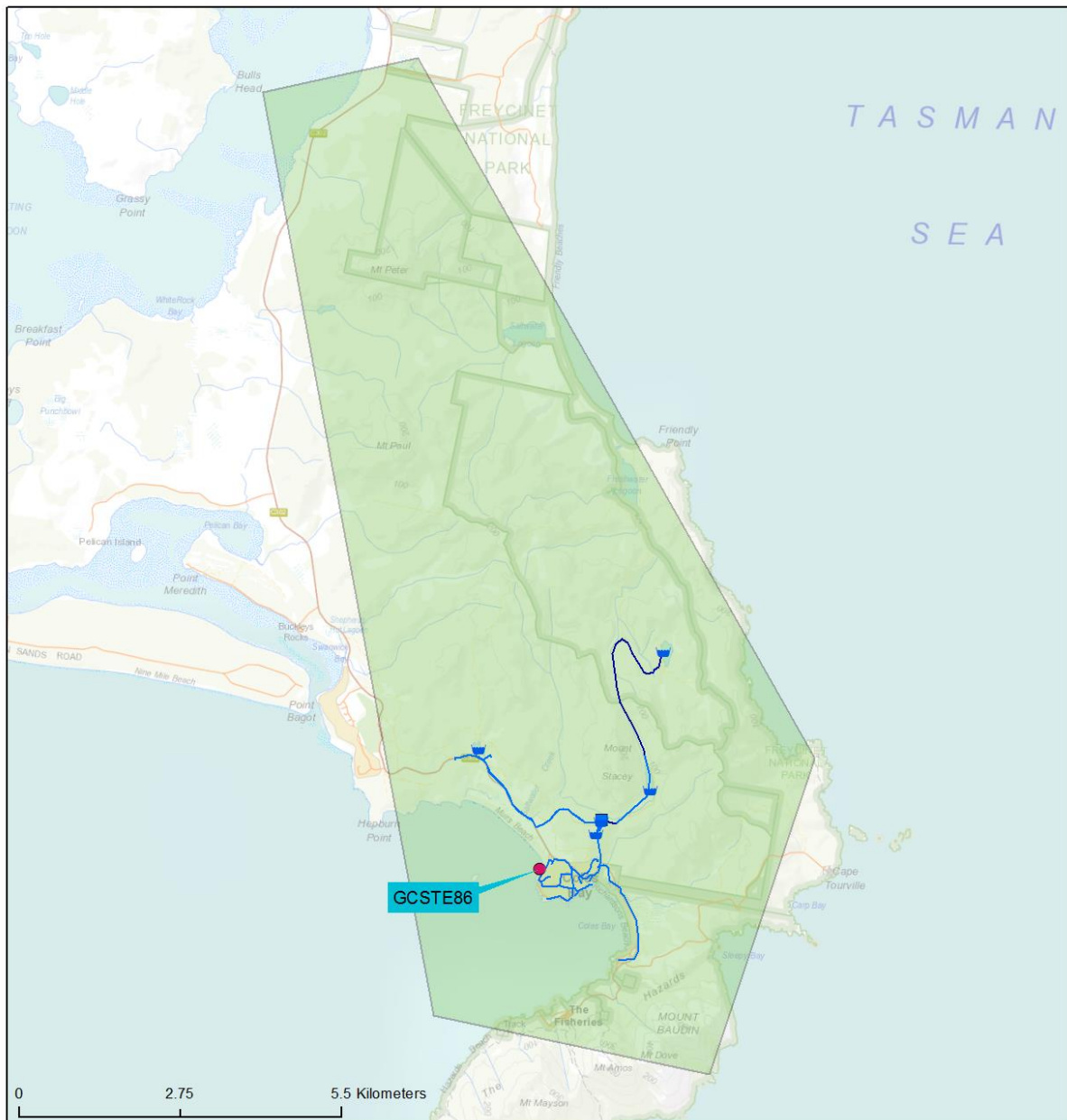
### 6.11.1. System description

Figure 6.11.1-a Coles Bay system schematic



- ❖ **Catchment**  
The Coles Bay drinking water system is supplied by Saltwater Creek via Federals Dam, Northern Tin Mines Dam and Coles Bay Dam
- ❖ **Treatment**  
The Coles Bay water treatment plant employs DAFF (providing full coagulation and filtration) followed by chlorine gas disinfection before entry into the reticulation system
- ❖ **Distribution**  
The distribution system has one roofed storage reservoir. The Coles Bay drinking water system supplies 293 connections, including the Freycinet National Park Visitors Centre.

Map 6.11.1—a Coles Bay monitoring zone



GCSTE86 = Park Esplanade (new sample tap)

## 6.11.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.11.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	53	0	
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–	
DBPs <sup>(3)</sup>	94%	No ●	Quarterly	4	1	
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.11.3. Summary of historic total system performance

Table 6.11.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)									
Parameter group	Performance*								
	2011–12	2012–13		2013–14		2014–15		2015–16	
Microbiological <sup>(1)</sup>	–	100%	●	99.5%	●	100%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing								
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Distribution fluoride testing								
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	94%
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	N/A
Complaints received <sup>(5)</sup>	Not Reported	Not Reported	0	●	0	●	0	●	1
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.11.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP performance for 2015–16 was 94 per cent and does not comply with ADWG. One detection above ADWG health limits was recorded during this reporting period

#### 6.11.5. Microbiological performance

Figure 6.11.5-a Microbiological compliance 2015–16

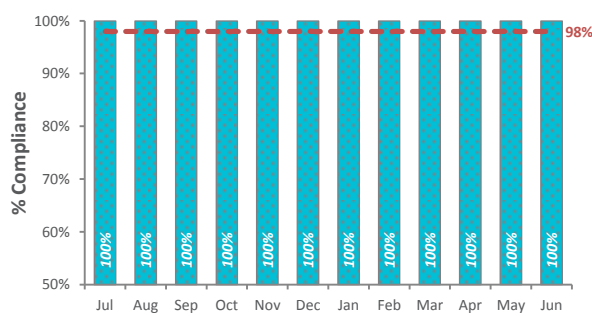


Figure 6.11.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.11.6. Fluoride performance

- ❖ This system is not fluoridated.



## 6.11.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.11.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	2	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	2	0	100	2.5	2	3
<b>Cadmium</b>	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	2	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	2	0	100	9.5	2	17
<b>Lead</b>	10	µg/L	2	0	100	0.97	< 0.5	1.7
<b>Manganese</b>	500	µg/L	2	0	100	5.95	2.7	9.2
<b>Mercury</b>	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Selenium</b>	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	< 4	< 4	10
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	< 7	< 7	11
<b>Total trihalomethanes</b>	250	µg/L	4	1	75	197.5	150	280

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ Total trihalomethanes were detected above ADWG health limits in May 2016. Operational investigations are underway to reduce the need for pre-chlorination at the WTP. It is believed that this will reduce the formation of DBPs.

### 6.11.8. General physical parameters

**Table 6.11.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	42	0.07	0	0.91
Turbidity (NTU)	43	0.51	0.3	2
pH	43	7.24	6.55	7.76

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were below minimum expectations. An investigation into chlorine management at this system aims to reduce DBP formation and improve chlorine residuals in the network
- ❖ pH levels are maintained within the recommended optimal range.

### 6.11.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.11.10. System incidents and issues

**Table 6.11.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
18/05/2016	Total trihalomethanes 280 µg/L	Investigation of pre-chlorination at WTP underway to reduce DBP formation	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.11.11. Customer complaints

Figure 6.11.11-a Complaint classification

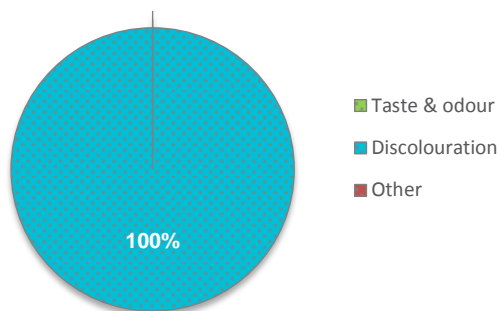
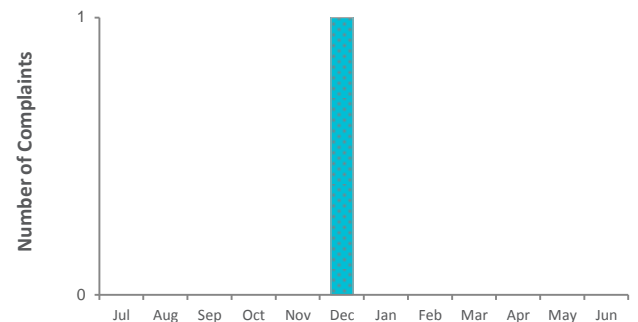


Figure 6.11.11-b Seasonal trend analysis



- ❖ One complaint was received relating to water discolouration issues.

### 6.11.12. Catchment and source water issues

- ❖ The Coles Bay drinking water system is supplied by Saltwater Creek. The drinking water catchment is relatively well protected within the national park. Several catchment dams including Old Mines Dam, Freycinet and the small South and Town Dams provide storage and basic settling prior to treatment. Activities in the catchment are limited to minor recreation
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

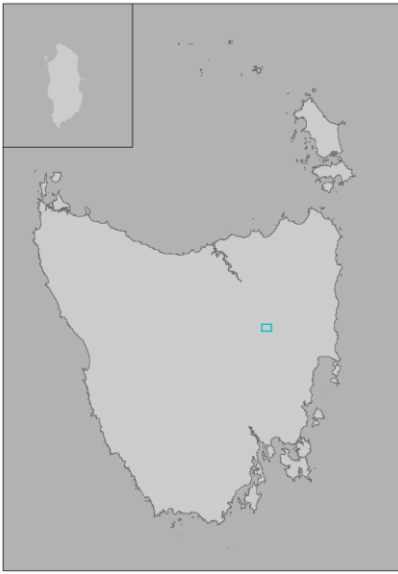
### 6.11.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.11.14. Future planning

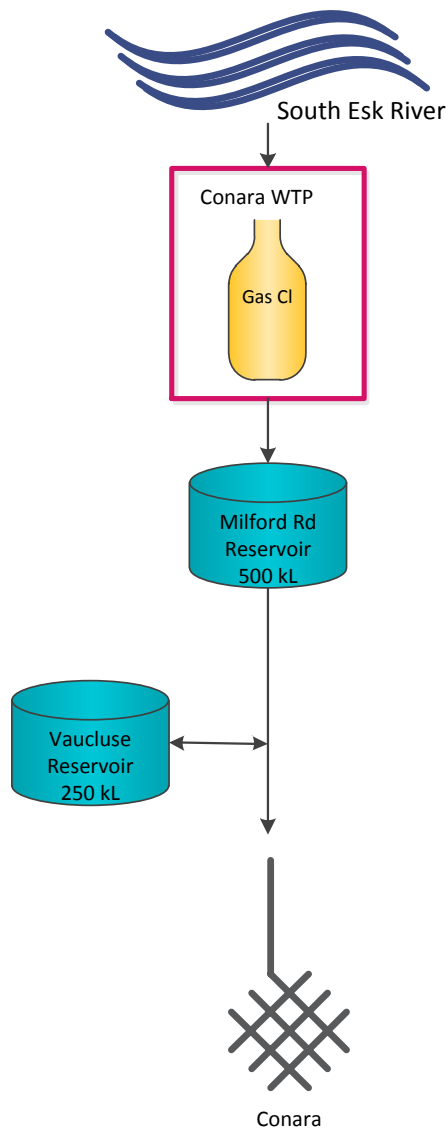
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.12. Conara drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	59
	<b>Catchment</b>	South Esk River
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Conara.</li> </ul>		

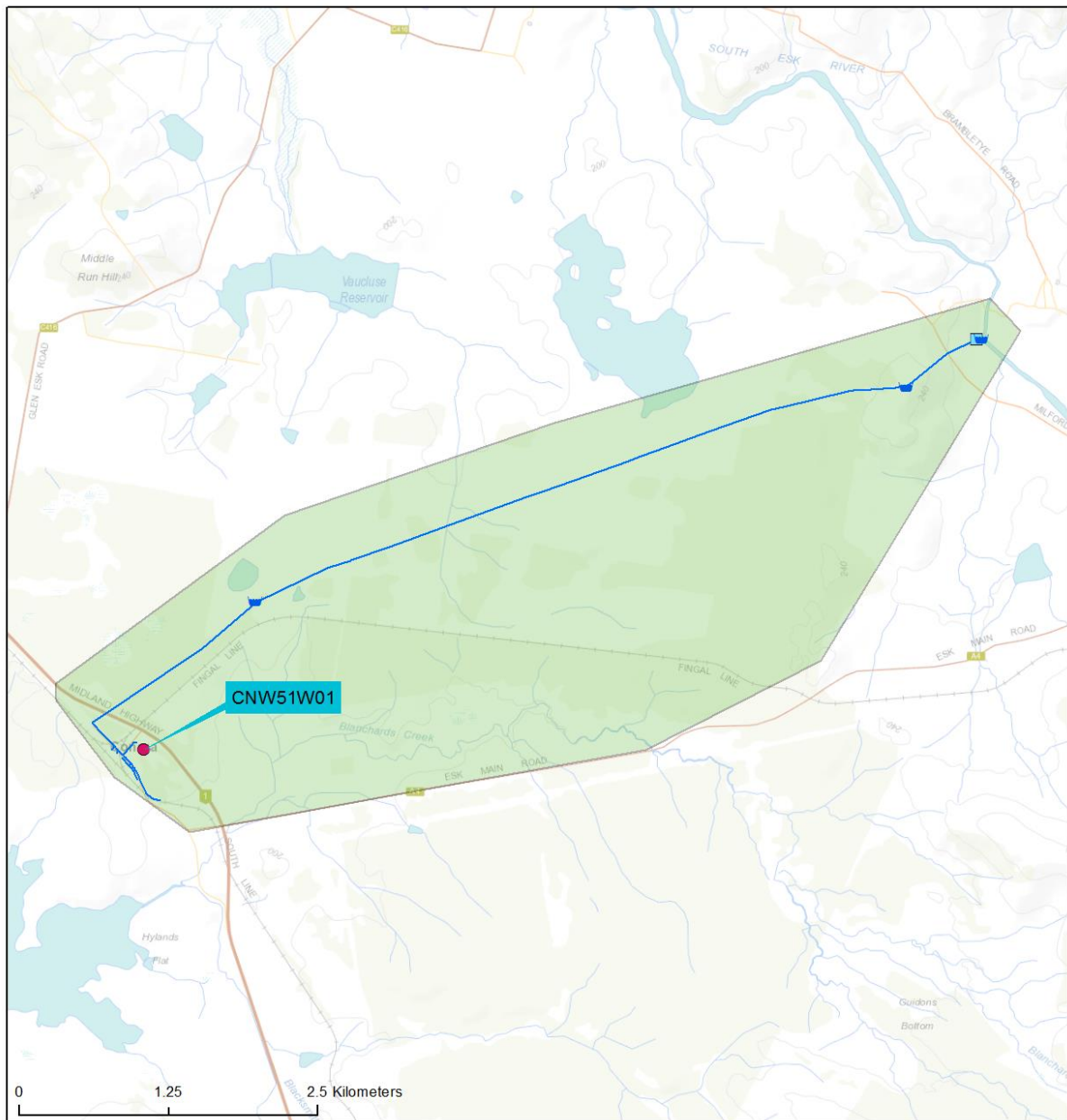
### 6.12.1. System description

Figure 6.12.1-a Conara system schematic



- ❖ **Catchment**  
The Conara drinking water system is supplied by the South Esk River
- ❖ **Treatment**  
The Conara WTP employs gas chlorine disinfection. Customers receiving water from the Conara system are subject to a Permanent BWA (prior July 2013)
- ❖ **Distribution**  
The system feeds the township of Conara. There are two roofed reservoirs within the distribution system. The system supplies 59 connections.

Map 6.12.1—a Conara monitoring zone



CNW51W01 = Conara public toilets

## 6.12.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.12.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes ●	Weekly	52	0	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	81%	No ●	Quarterly	4	3	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes ●	Quarterly	4	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (●) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.12.3. Summary of historic total system performance

Table 6.12.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	98%	●	100%	●	100%	●	100%	●	100%	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	81%	●
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>	0		0		2		0		3	
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.12.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ The historic microbiological performance of the Conara system has generally been compliant. A BWA was issued in January 2011 due to ineffective chlorination during peak flooding events in the South Esk River
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP performance for 2015–16 was 81 per cent and does not comply with ADWG. Three detections above ADWG health limits were recorded during this reporting period
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.12.5. Microbiological performance

Figure 6.12.5-a Microbiological compliance 2015–16

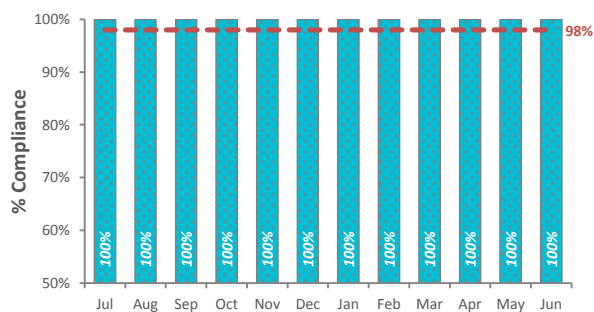


Figure 6.12.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.12.6. Fluoride performance

- ❖ This system is not fluoridated.



## 6.12.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.12.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	9.5	6	14
Cadmium	2	µg/L	4	0	100	0.7	0.6	1.1
Chromium	50	µg/L	4	0	100	< 1	< 1	2
Copper	2000	µg/L	4	0	100	26.75	16	42
Lead	10	µg/L	4	0	100	2.25	0.8	3.2
Manganese	500	µg/L	4	0	100	58.85	32.3	102
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	0.75	< 0.5	1.6
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	1	75	25.75	< 1	100
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	2	50	102.25	< 2	210
Total trihalomethanes	250	µg/L	4	0	100	167.5	100	210

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ DBPs were detected above the ADWG health limits in August 2015 and November 2015. Due to a lack of filtration barriers, precursors to DBPs such as organic matter are not removed. Chlorine residuals are maintained to provide disinfection.

### 6.12.8. General physical parameters

**Table 6.12.8-a General physical performance**

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	52	0.03	0	0.43
Turbidity (NTU)	52	4	0.9	15.2
pH	52	6.75	6.31	7.3

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are below the ADWG aesthetic limit of 5 NTU, however due to lack of treatment barriers turbidity spiked above ADWG aesthetic limits on 11 occasions, with the highest value recorded being 15.2 NTU
- ❖ Mean chlorine residuals are well below minimum expectations. Due to a lack of other treatment barriers, turbidity and colour impact greatly on chlorine residuals within the system
- ❖ pH levels are generally within the recommended optimal range.

### 6.12.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.12.10. System incidents and issues

**Table 6.12.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
26/08/2015	Trichloroacetic acid 212µg/L. Dichloroacetic acid 102µg/L.	Ongoing monitoring. Chlorine residuals are monitored daily to maintain a consistent residual due to current supply arrangements. Continue to adjust chlorine dosing to a level where disinfection is not compromised, and DBPs are minimised as much as is practical.	Yes	Yes
4/12/2015	Trichloroacetic acid 113µg/L.		Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.12.11. Customer complaints

Figure 6.12.11-a Complaint classification

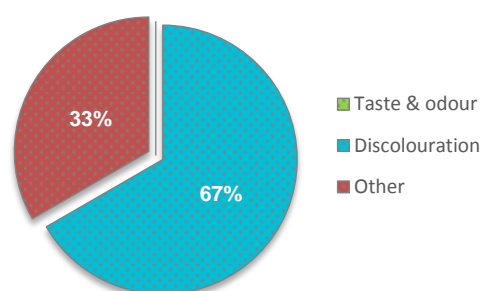
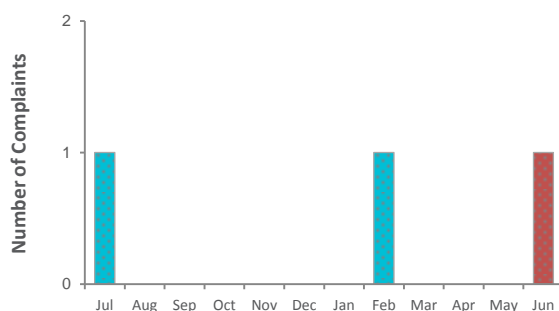


Figure 6.12.11-b Seasonal trend analysis



- ❖ Three complaints were received in this reporting period. Two complaints were relating to discoloured water issues and the other was not related to water quality.

### 6.12.12. Catchment and source water issues

- ❖ The South Esk River catchment covers an area of 231,768 ha. Seasonal changes in the South Esk River directly affect drinking water quality due to the lack of treatment processes. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.12.13. Infrastructure and operational changes

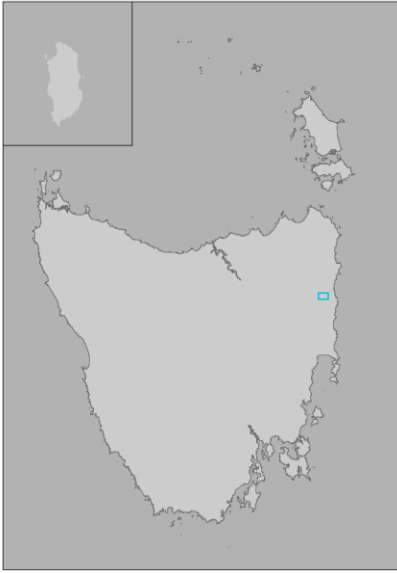
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.12.14. Future planning

Table 6.12.14-a Future planning for the system

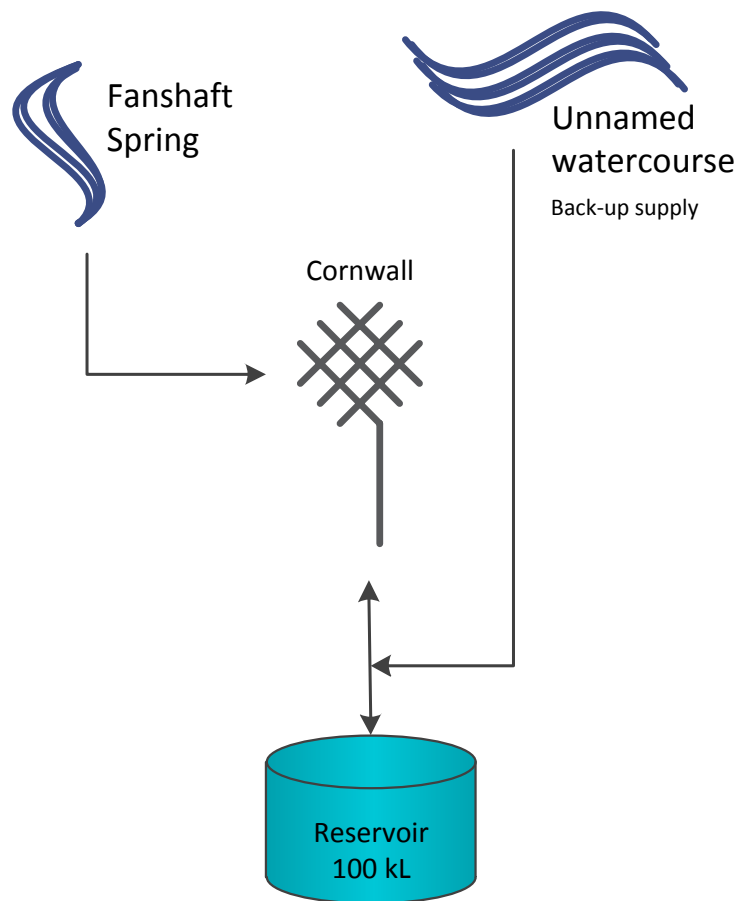
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Conara supply options	Investigation into options to improve water quality supplied to Conara	Business case under development and part of the Small Towns Water Supply Strategy	2018	To be determined

### 6.13. Cornwall drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	50
	<b>Catchment</b>	Fanshaft Spring
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Cornwall.</li> </ul>		

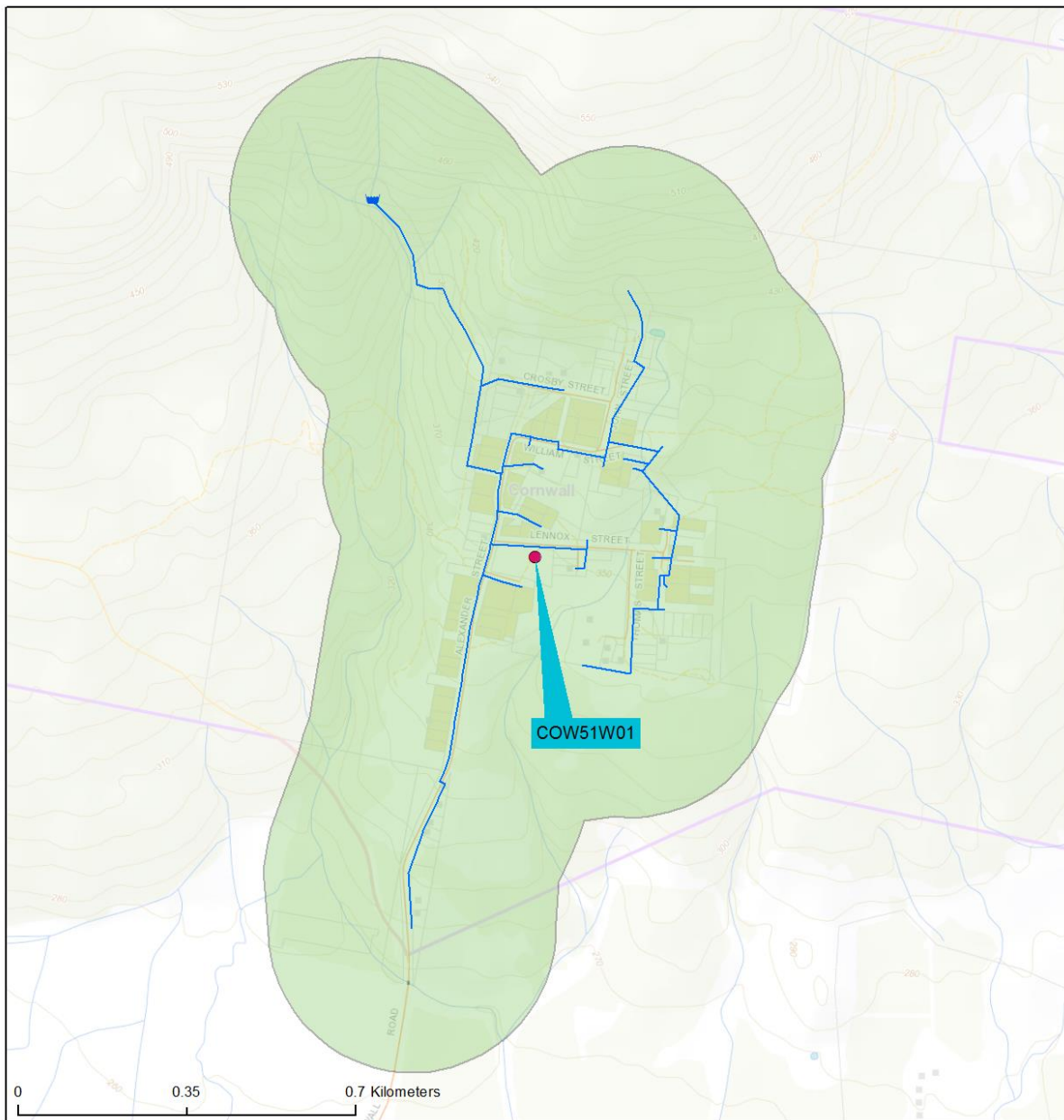
### 6.13.1. System description

Figure 6.13.1-a Cornwall system schematic



- ❖ Catchment  
The Cornwall drinking water system is supplied by Fanshaft Spring
- ❖ Treatment  
There is no treatment in this system. Customers receiving water from the Cornwall system are subject to a permanent BWA (prior July 2013)
- ❖ Distribution  
The system feeds the township of Cornwall. There is one roofed reservoir within the distribution system. The system supplies 50 connections.

**Map 6.13.1-a Cornwall monitoring zone**



**COW51W01 = Miners Park, Cornwall**

## 6.13.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.13.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	63.6%	No^ ●	Monthly	11	4	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) DBP and Pesticide testing was removed from the reticulation sampling program in May 2016 (\*) – Samples were not taken as per sampling program, therefore compliance cannot be calculated. ^compliance determined on 11 sampling events only.

## 6.13.3. Summary of historic total system performance

Table 6.13.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)		Performance*				
Parameter group		2011–12	2012–13	2013–14	2014–15	2015–16
<b>Microbiological</b> <sup>(1)</sup>		60% ●	76% ●	64% ●	58% ●	67%^ ●
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A
	<b>Distribution fluoride testing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	
<b>Metals</b> <sup>(3)</sup>		100% ●	100% ●	98% ●	100% ●	100% ●
<b>DBPs</b> <sup>(3)</sup>		N/A	N/A	N/A	N/A	100% ●
<b>Pesticides</b> <sup>(4)</sup>		0 ●	0 ●	0 ●	0 ●	0 ●
<b>Complaints received</b> <sup>(5)</sup>		1	0	0	0	1
<b>Public alerts issued</b> <sup>(6)</sup>		1 ●	1 ●	1 ●	1 ●	1 ●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. (^) – Samples were not taken as per sampling program, therefore compliance cannot be calculated.

#### 6.13.4. Analysis of current performance and historic trends

- ❖ Sufficient microbiological samples were collected during 2015–16 to meet ADWG minimum testing requirements; however these samples were not taken in line with the required frequency to calculate compliance against DHHS targets
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 achieved 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 achieved 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.13.5. Microbiological performance

Figure 6.13.5-a Microbiological compliance 2015–16

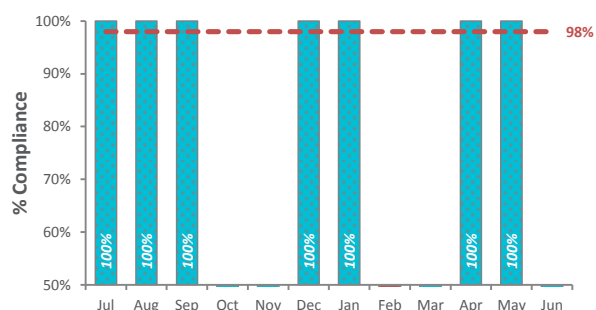
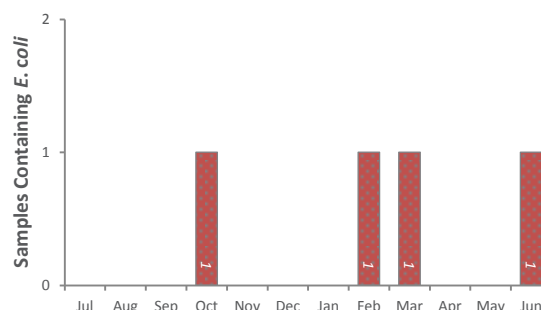


Figure 6.13.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Cornwall system was 63.6 per cent compliant in 2015–16. *E. coli* greater than 1 MPN/100 mL was detected in four monthly samples during the reporting period
- ❖ A total of 11 *E. coli* samples were taken over the reporting period, however sampling in November was missed. Performance has been determined as non-compliant based on 11 sampling events and with approval from DHHS.
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in Fanshaft Spring
- ❖ The risk to public health is mitigated through the communication of a permanent BWA to customers.

#### 6.13.6. Fluoride performance

- ❖ This system is not fluoridated.



### 6.13.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.13.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	4	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	4	0	100	152.75	114	172
<b>Cadmium</b>	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	4	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	4	0	100	27.5	7	77
<b>Lead</b>	10	µg/L	4	0	100	2.26	0.8	7.5
<b>Manganese</b>	500	µg/L	4	0	100	4.7	< 0.5	10
<b>Mercury</b>	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	4	0	100	0.57	< 0.5	0.9
<b>Nickel</b>	20	µg/L	4	0	100	0.52	< 0.5	1
<b>Selenium</b>	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	12	0	100	3.925	<1	9.8
<b>Monochloroacetic acid</b>	150	µg/L	12	0	100	<5	<5	<5
<b>Trichloroacetic acid</b>	100	µg/L	12	0	100	12.29	<1	54
<b>Total trihalomethanes</b>	250	µg/L	12	0	100	35.33	18	67

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (\*) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.13.8. General physical parameters

**Table 6.13.8-a General physical performance**

General physical parameters (2015–16)				
Parameters	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	N/A	–	–	–
Turbidity (NTU)	11	1.15	0.1	6.9
pH	11	7.33	7.05	7.8

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. **(Chlorine residuals)** are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. **(Turbidity)** levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. **(pH)** should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network were generally below the ADWG aesthetic limit of 5 NTU. Due to lack of filtration barriers turbidity spiked above the ADWG limit on one sample at 6.9 NTU
- ❖ pH levels are maintained within the recommended optimal range
- ❖ This system is not chlorinated.

### 6.13.9. Aesthetic issues

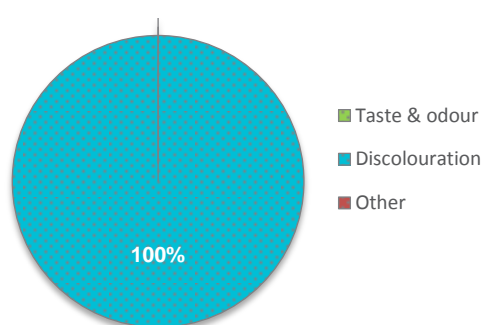
- ❖ No persistent aesthetic water quality issues were identified.

### 6.13.10. System incidents and issues

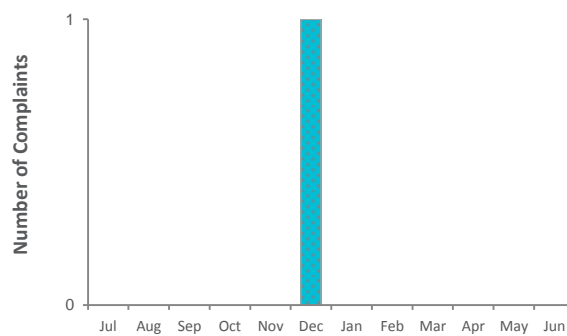
- ❖ No water quality incidents occurred in the reporting period.

### 6.13.11. Customer complaints

**Figure 6.13.11-a Complaint classification**



**Figure 6.13.11-b Seasonal trend analysis**



- ❖ One complaint was received in the reporting period and was not related to water quality.

#### 6.13.12. Catchment and source water issues

- ❖ The Cornwall drinking water system is supplied by a spring rising from a disused mine fanshaft. There is also an unnamed watercourse that can be used as a back-up supply. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.13.13. Infrastructure and operational changes

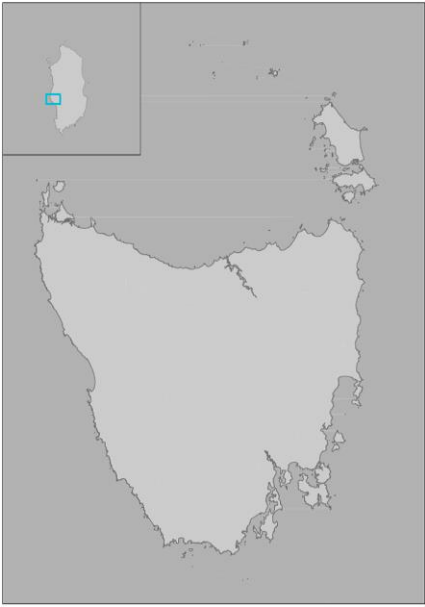
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.13.14. Future planning

**Table 6.13.14-a Future planning for the system**

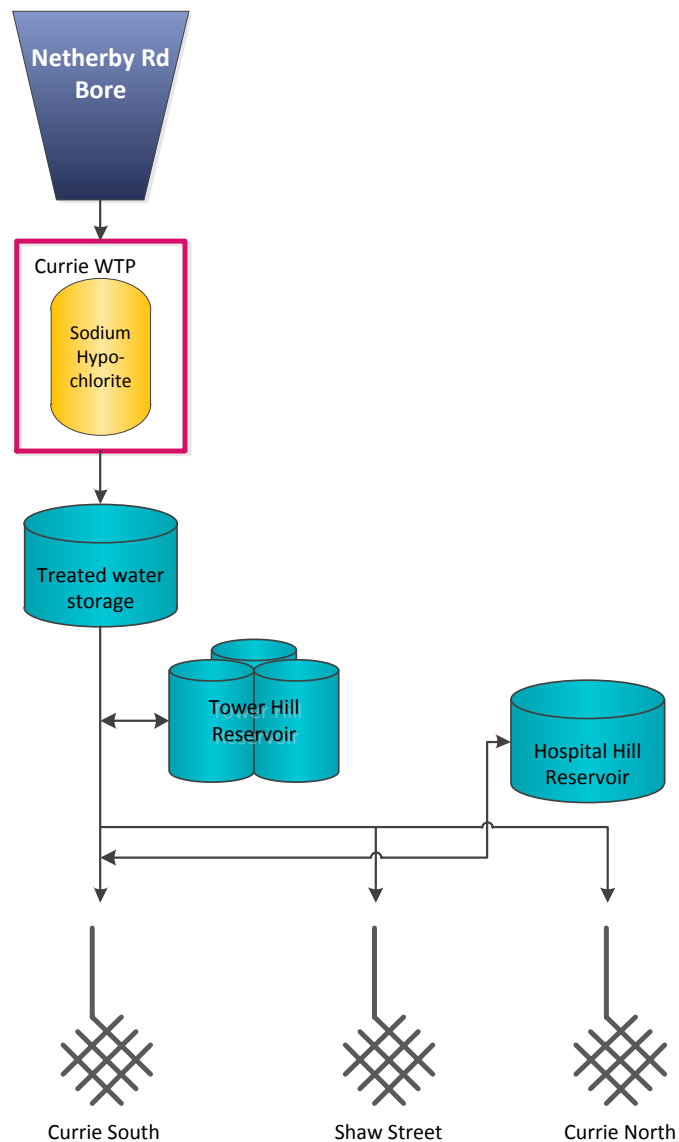
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Cornwall supply options	Investigation into options to improve water quality supplied to Cornwall	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

## 6.14. Currie drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	522
	<b>Catchment</b>	Netherby road bore field
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Currie.</li> </ul>		

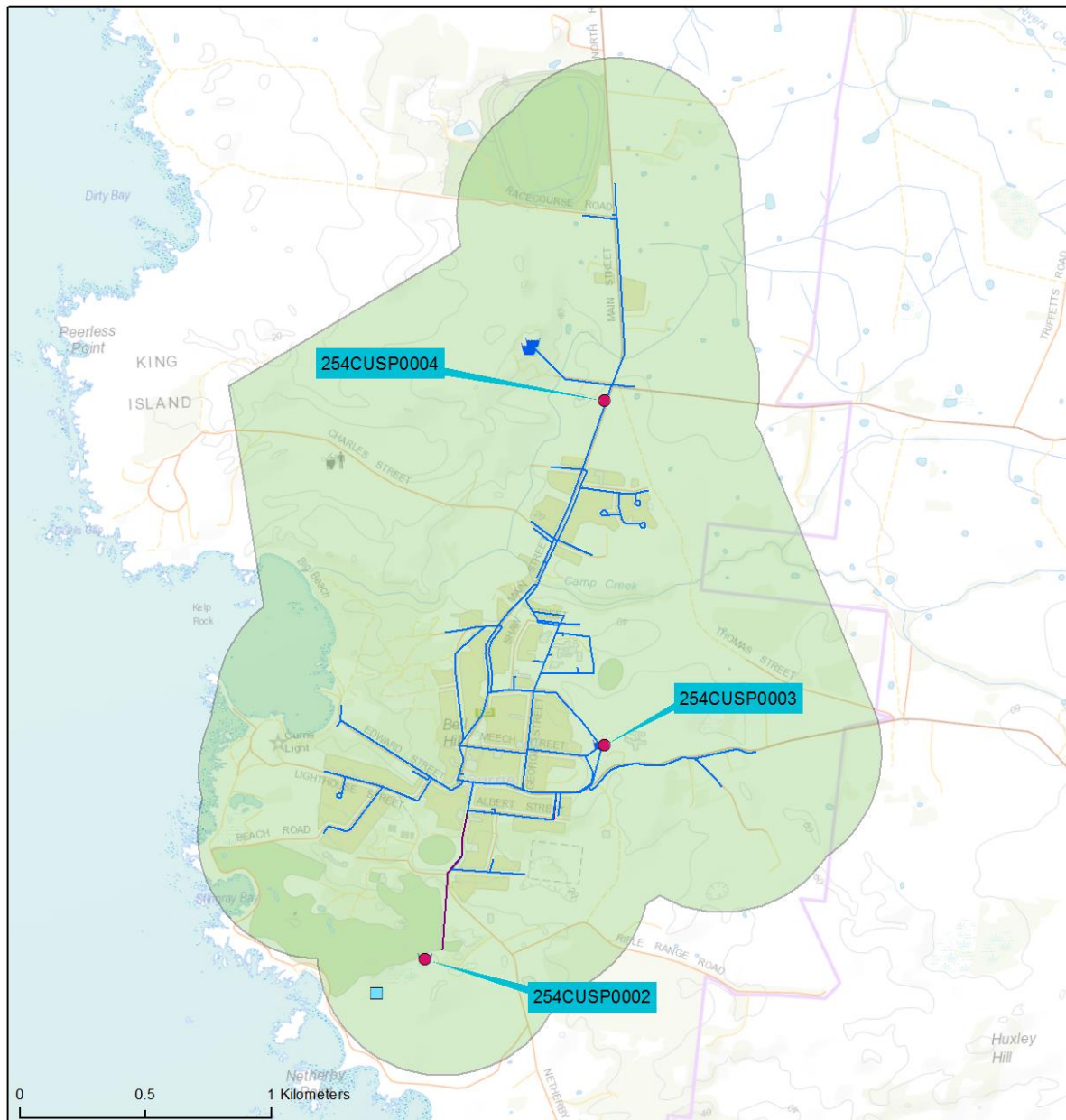
### 6.14.1. System description

Figure 6.14.1-a Currie system schematic



- ❖ **Catchment**  
The Currie drinking water system is supplied by groundwater sourced from the Netherby infiltration gallery
- ❖ **Treatment**  
The Currie system is a chlorinated raw water system and employs sodium hypochlorite disinfection
- ❖ **Distribution**  
All reservoirs located within the distribution system are roofed. The Currie drinking water system supplies 522 connections.

**Map 6.14.1—a Currie monitoring zone**



254CUSP0004 = Depot Site 3, 254CUSP0003 = Hospital Tank Site 2, 254CUSP0002 = Netherby Rd Pump Station.

## 6.14.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.14.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	156	0	
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	7	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	8	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.14.3. Summary of historic total system performance

Table 6.14.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
Microbiological <sup>(1)</sup>	100%	●	100%	●	98.2%	●	99.1%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Metals <sup>(3)</sup>	N/A	N/A	N/A	100%	●	100%	●	100%	●	●
DBPs <sup>(3)</sup>	N/A	N/A	N/A	95.2	●	100%	●	100%	●	●
Pesticides <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		2		0		0	
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHs. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.14.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.14.5. Microbiological performance

Figure 6.14.5-a Microbiological compliance 2015–16

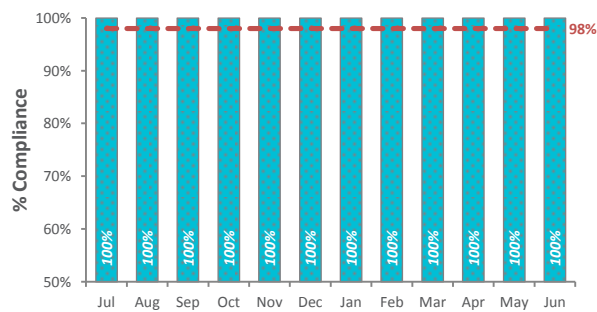
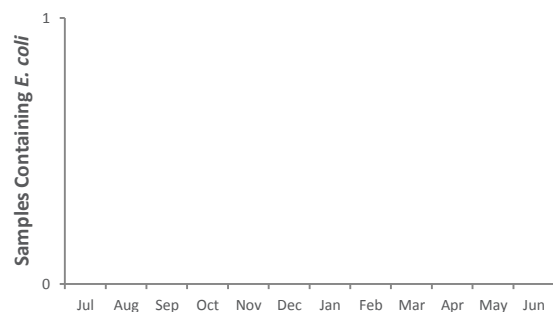


Figure 6.14.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.14.6. Fluoride performance

- ❖ This system is not fluoridated.



## 6.14.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.14.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	8	0	100	< 1	< 1	< 1
Arsenic	10	µg/L	8	0	100	< 1	< 1	1
Barium	2000	µg/L	8	0	100	1.32	1.3	1.4
Cadmium	2	µg/L	8	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	8	0	100	< 1	< 1	< 1
Copper	2000	µg/L	8	0	100	26.25	1	77
Lead	10	µg/L	8	0	100	< 1	< 1	1
Manganese	500	µg/L	8	0	100	< 1	< 1	1
Mercury	1	µg/L	8	0	100	< 0.1	< 0.1	0.1
Molybdenum	50	µg/L	8	0	100	< 1	< 1	< 1
Nickel	20	µg/L	8	0	100	< 1	< 1	< 1
Selenium	10	µg/L	8	0	100	1	< 1	< 1
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	7	0	100	< 2	< 2	< 2
Monochloroacetic acid	150	µg/L	7	0	100	< 2	< 2	< 2
Trichloroacetic acid	100	µg/L	7	0	100	< 2	< 2	< 2
Total trihalomethanes	250	µg/L	7	0	100	13.01	4.1	17

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (\*) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.14.8. General physical parameters

**Table 6.14.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	162	0.51	0.11	2.18
Turbidity (NTU)	25	0.11	0	0.8
pH	160	7.44	7.14	7.92

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit. The bore field provides water with consistently low turbidity
- ❖ Chlorine residuals are typically greater than 0.2 mg/L across the distribution network
- ❖ pH levels remained within the ADWG optimal range for disinfection.

#### 6.14.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

#### 6.14.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

#### 6.14.11. Customer complaints

- ❖ There were no complaints raised during the reporting period.

#### 6.14.12. Catchment and source water issues

- ❖ The Currie drinking water system is supplied by groundwater sourced from the Netherby infiltration gallery. Although the bore is in a vegetated area and is capped, it is thought that there may be potential for aquifer contamination from localised runoff
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

#### 6.14.13. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.14.14. Future planning

**Table 6.14.14-a Future planning for the system**

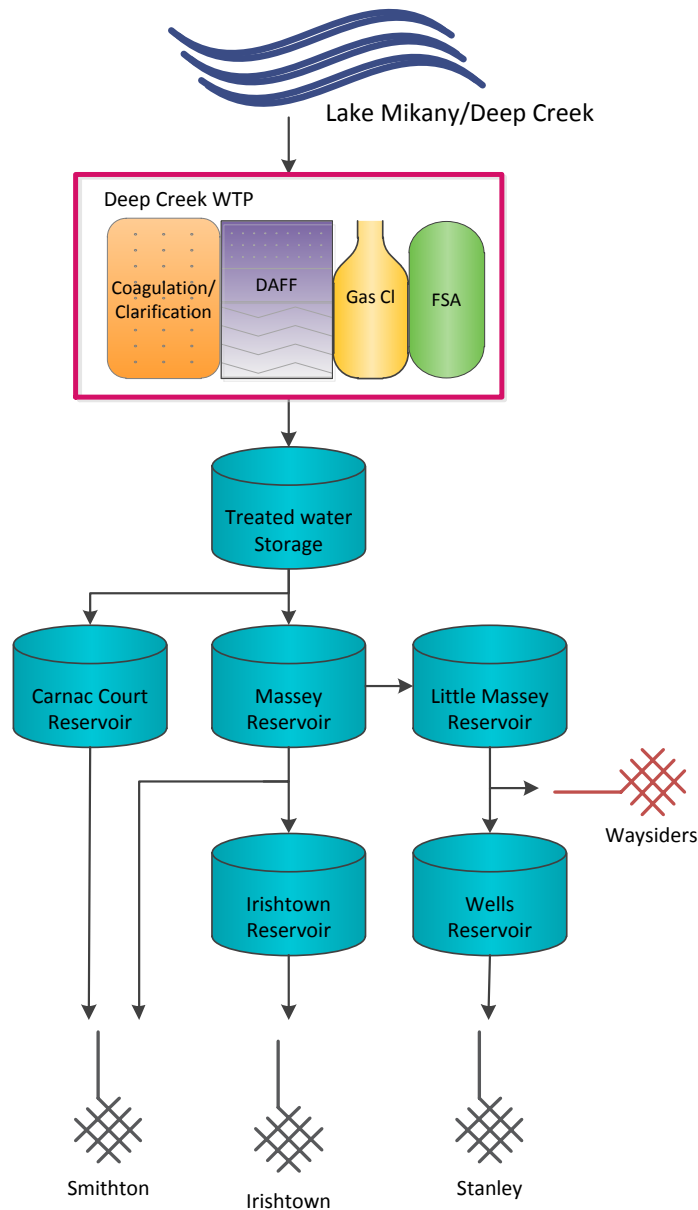
Project	Description	Progress	Anticipated Delivery	Estimated Spend
King Island water supply project	New WTP/pipeline to supply Grassy and Currie	Construction due to begin early 2017.	2017–18	\$15.8 million

### 6.15. Deep Creek drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	2,394
	<b>Catchment</b>	Lake Mikany/Deep Creek
	<b>Primary treatment</b>	Dissolved Air Flotation and Filtration (DAFF)
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine Gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Smithton</li> <li>❖ Irishtown</li> <li>❖ Stanley.</li> </ul>		

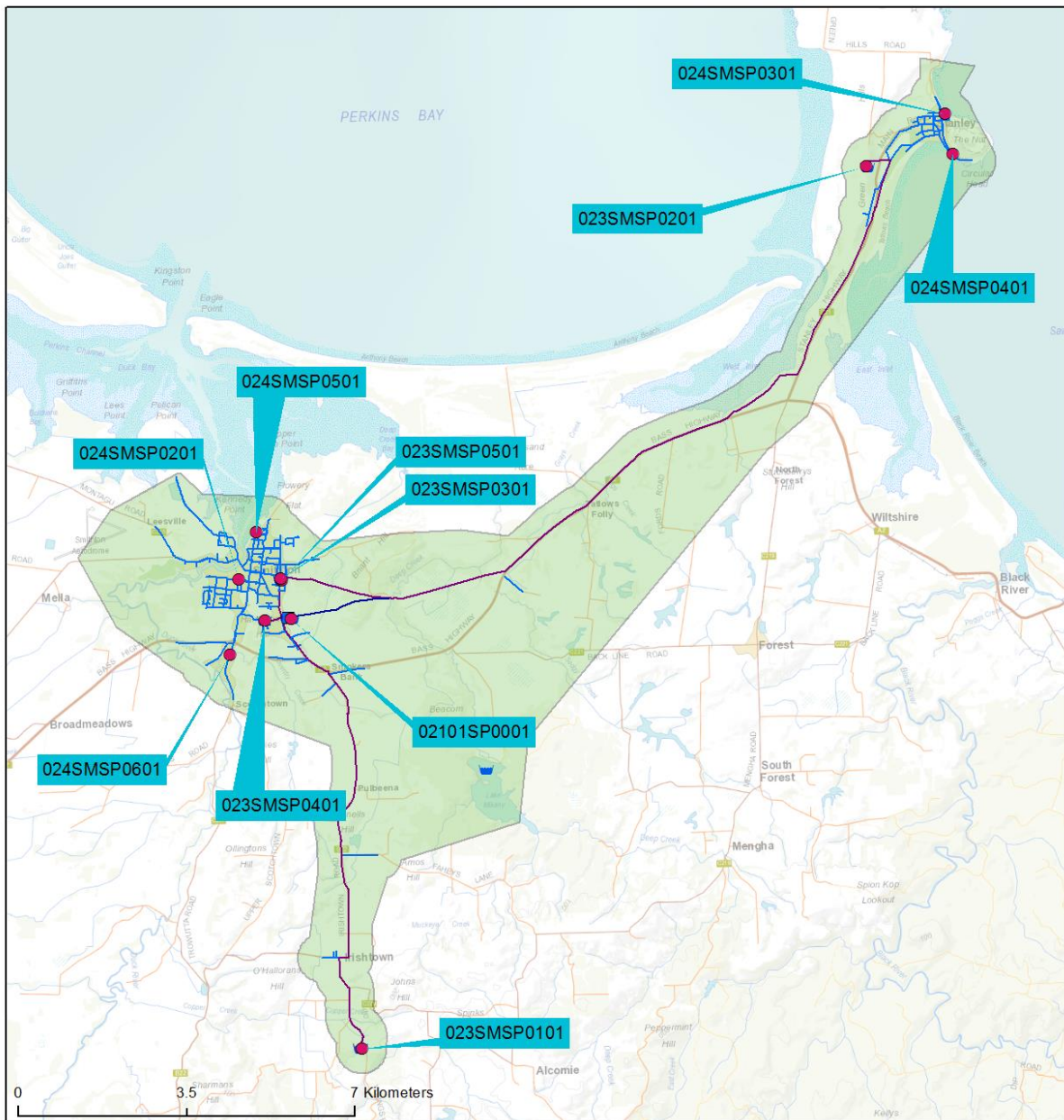
### 6.15.1. System description

Figure 6.15.1-a Deep Creek system schematic



- ❖ Catchment  
The Deep Creek drinking water system is supplied by Deep Creek via Lake Mikany
- ❖ Treatment  
The Deep Creek WTP employs coagulation, flocculation, DAFF, gas chlorine disinfection and fluoridation by fluorosilicic acid
- ❖ Distribution  
There are five roofed storages in the distribution system. The Deep Creek drinking water system supplies 2,394 connections throughout Smithton, Irishtown and Stanley.

Map 6.15.1—a Deep Creek monitoring zone



023SMSP0501 = Big Massey Res, 024SMSP0201 = Gibson St, 024SMSP0301 = Kings Park, 023SMSP0301 = Little Massey Res, 024SMSP0401 = Marine Park, 024SMSP0501 = Nelson St, 024SMSP0601 = Scotchtown Rd, 02101SP0001 = Treated Water Storage, 023SMSP0201 = Wells Res, 023SMSP0101 = Youngs Res, 023SMSP0401 = Carnac Court Res.

## 6.15.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.15.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99%	Yes ●	Weekly	572	6	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	104	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	36	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	60	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.15.3. Summary of historic total system performance

Table 6.15.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)									
Parameter group	Performance*								
	2011–12	2012–13	2013–14	2014–15	2015–16				
Microbiological <sup>(1)</sup>	99.7% ●	99.8% ●	99.2% ●	99.4% ●	99% ●				
Fluoride <sup>(2)</sup>	Operational fluoride dosing								
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	0 ●	0 ●				
	within target range <sup>(b)</sup>	N/A	N/A	99.2% ●	99.6% ●				
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	0.95 ●	0.98 ●				
	Distribution fluoride testing								
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	0 ●				
	within target range <sup>(b)</sup>	N/A	N/A	N/A	100% ●				
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	0.96 ●					
Metals <sup>(3)</sup>	N/A	N/A	100% ●	100% ●	100% ●				
DBPs <sup>(3)</sup>	N/A	N/A	100% ●	100% ●	100% ●				
Pesticides <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A				
Complaints received <sup>(5)</sup>	Not recorded	Not recorded	2	3	3				
Public alerts issued <sup>(6)</sup>	0 ●	0 ●	0 ●	0 ●	1 ●				

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.15.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent free of *E. coli*
- ❖ One Temporary BWA was issued by DHHS in January 2016 for the Irishtown zone of the distribution system. The BWA was lifted on 27 January 2016
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.15.5. Microbiological performance

Figure 6.15.5-a Microbiological compliance 2015–16

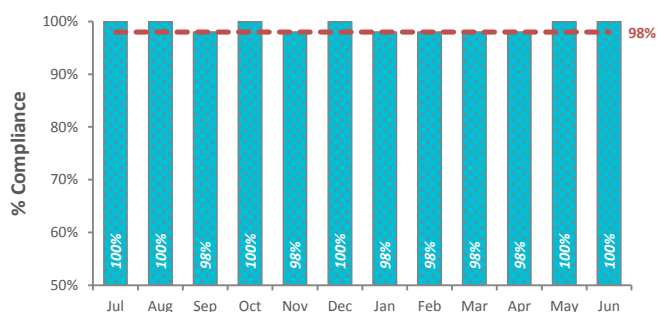
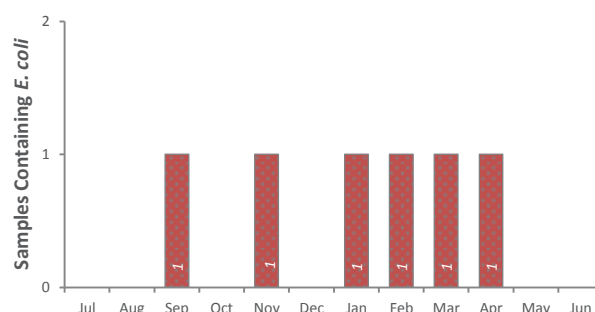


Figure 6.15.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015

- ❖ The Deep Creek system was 99 per cent compliant in 2015–16. *E. coli* was detected in six weekly samples during the reporting period
- ❖ An *E. coli* strike occurred in September 2015 in the Stanley zone of the distribution system with a detection of 1 MPN/100 mL. Water quality characteristics indicated reduced chlorine residuals. Manual chlorine dosing of the reservoir and flushing within the localised distribution network was undertaken. A re-test was conducted which confirmed the system free of *E. coli* and microbial contamination
- ❖ Two *E. coli* strikes occurred in the Smithton zone of the distribution system during the reporting period. One in March 2016 with a detection of 12 MPN/100 mL, and one in April 2016 with a detection of 1 MPN/100 mL. Water quality characteristics indicated good chlorine residuals and low turbidities on both occasions. Manual chlorine dosing of the reservoirs and flushing within the localised distribution network was undertaken after each exceedance. A re-test was conducted following remedial works which confirmed the system free of *E. coli* and microbial contamination
- ❖ Three *E. coli* strikes occurred in the Irishtown zone of the distribution system during the reporting period. Two occurred in January 2016 with detections of 28.8 MPN/100 mL and the following re-test detected *E. coli* at 1 MPN/100 mL. A Temporary BWA was issued by DHHS on 22 January following the detection in the re-test. Manual chlorine dosing of the reservoir was conducted and flushing initiated to ensure turnover of water within the system. All



connections in the Irishtown reticulation were inspected and a meter replacement program was bought forward to assist this process. Several connections detected inadequate backflow protection. The temporary BWA was lifted on 27 January 2016 once additional samples, taken throughout the Irishtown reticulation confirmed the system was free from microbial contamination

- ❖ An additional exceedance occurred in the Irishtown zone in February 2016 with a detection of 3.1 MPN/100 mL. Manual chlorine dosing of the reservoirs and flushing within the localised distribution network was undertaken after each exceedance. A re-test was conducted following remedial works which confirmed the system free of *E. coli* and microbial contamination
- ❖ Modelling of water usage within the system has been completed to assist with planning future improvements, particularly increasing chlorine residuals at the extremities.

### 6.15.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.15.6-a Operational samples within target range

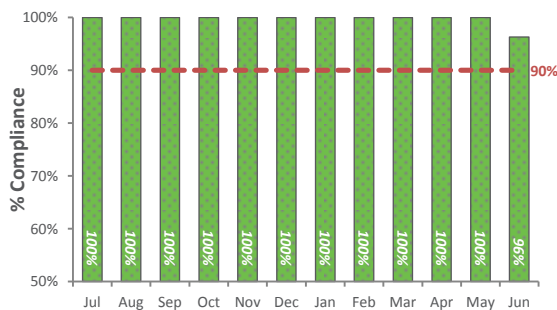


Figure 6.15.6-b Operational mean monthly dose (mg/L)

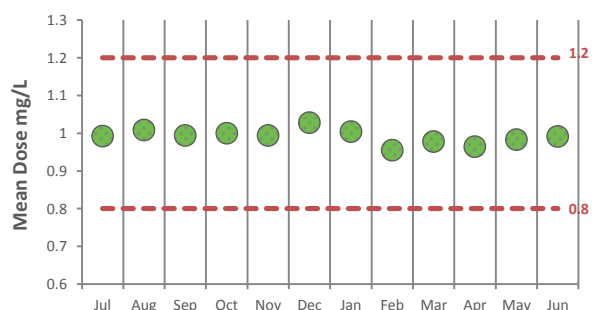
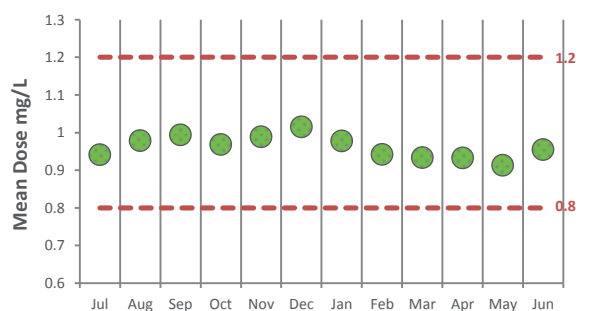
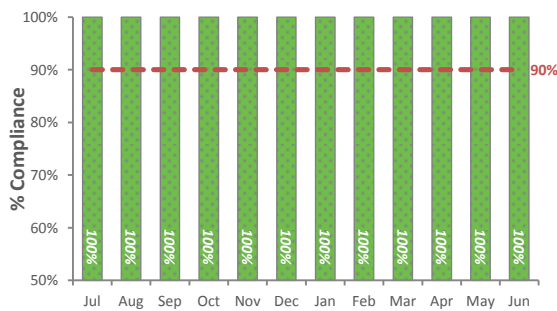


Figure 6.15.6-c Reticulation samples within target range Figure 6.15.6-d Reticulation samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ No sample exceeded the ADWG health limit of 1.5mg/L.



## 6.15.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.15.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	48	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	60	0	100	< 1	< 1	< 1
Barium	2000	µg/L	60	0	100	13.9	7	50
Cadmium	2	µg/L	60	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	60	0	100	< 1	< 1	1
Copper	2000	µg/L	48	0	100	3.67	< 1	15
Lead	10	µg/L	60	0	100	< 0.5	< 0.5	3.8
Manganese	500	µg/L	60	0	100	12.35	0.7	60.1
Mercury	1	µg/L	60	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	48	0	100	< 0.5	< 0.5	0.7
Nickel	20	µg/L	60	0	100	0.88	< 0.5	2.7
Selenium	10	µg/L	60	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	36	0	100	5.86	< 1	31
Monochloroacetic acid	150	µg/L	36	0	100	< 5	< 5	22
Trichloroacetic acid	100	µg/L	36	0	100	10.76	< 1	42
Total trihalomethanes	250	µg/L	36	0	100	59.81	17	100

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (\*) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.15.8. General physical parameters

**Table 6.15.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	564	0.4	0.01	2.2
Turbidity (NTU)	562	0.23	0.1	1.4
pH	563	7.48	6.9	8.09

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Smithton area of the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation at Stanley and Irishtown are both too low. A re-chlorination station has been installed for the Stanley zone and a business case has been approved to change the hydraulic flow in the Irishtown zone of the reticulation together with a re-chlorination station
- ❖ pH levels are maintained within the recommended optimal range.

### 6.15.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.15.10. System incidents and issues

**Table 6.15.10-a Identified Incidents and Issues.**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
15/09/2015	<i>E. coli</i> detection of 1 MPN/100mL	Scouring of system undertaken to ensure adequate chlorine residuals within the township. Resample result was clear. Most probable cause was sample contamination.	Yes	Yes
17/11/2015	Youngs reservoir <i>E. coli</i> detection of 1 MPN/100mL	Scouring of the system was undertaken, and the reservoir was manually chlorinated. The reservoir was inadvertently drained when flushing after the completion of repairs to a hydrant in Irishtown. Re-test all clear of <i>E. coli</i>	Yes	Yes
19/01/2016	Youngs reservoir <i>E. coli</i> detection of 28.8 MPN/100mL	Irishtown placed on TBWA after resample confirmed <i>E. coli</i> . Reservoir manually chlorine dosed and flushing of the system. Modelling of water usage within the system has been completed to assist with planning future improvements increasing chlorine residuals at the extremities. All connections inspected and a meter replacement program was bought forward. Several connections detected without adequate backflow protection.	Yes	Yes
21/01/2016	Youngs reservoir <i>E. coli</i> detection of 1 MPN/100mL			
15/03/2016	Big Massey reservoir <i>E. coli</i> detection of 12 MPN/100mL	Reservoir manually chlorine dosed and flushing initiated to ensure turnover of water within the system. Modelling of water usage within the system has been completed to assist with planning future improvements, particularly increasing chlorine residuals at the extremities.	Yes	Yes
12/04/2016	Scotchtown Rd <i>E. coli</i> detection of 1 MPN/100mL			

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.

### 6.15.11. Customer complaints

Figure 6.15.11-a Complaint classification

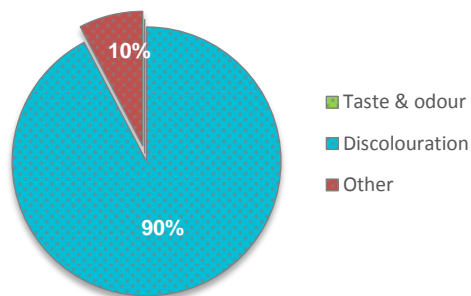
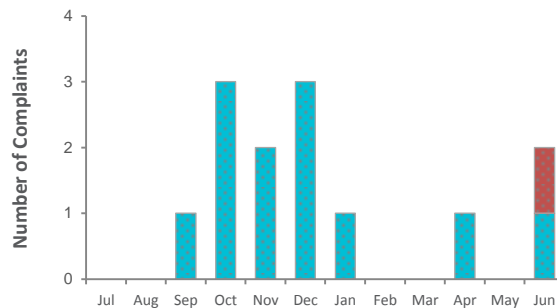


Figure 6.15.11-b Seasonal trend analysis



- ❖ Thirteen complaints were received in this reporting period. Twelve complaints were relating to discoloured water issues and one complaint related to an illness complaint.

### 6.15.12. Catchment and source water issues

- ❖ The Deep Creek drinking water system is supplied by Deep Creek via Lake Mikany. Activities in the catchment include dairy farming, animal husbandry and agriculture
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

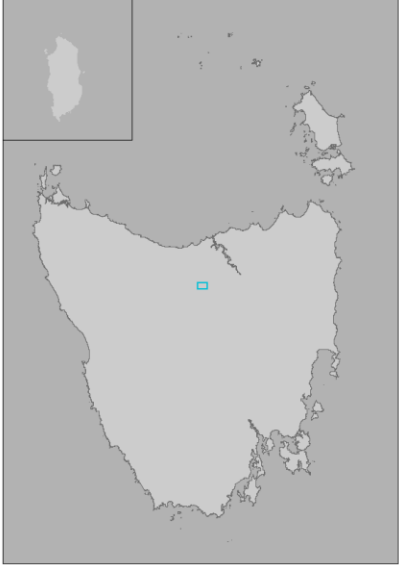
### 6.15.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16. A routine flushing program was initiated during the reporting period which assisted with improving all facets of water quality.

### 6.15.14. Future planning

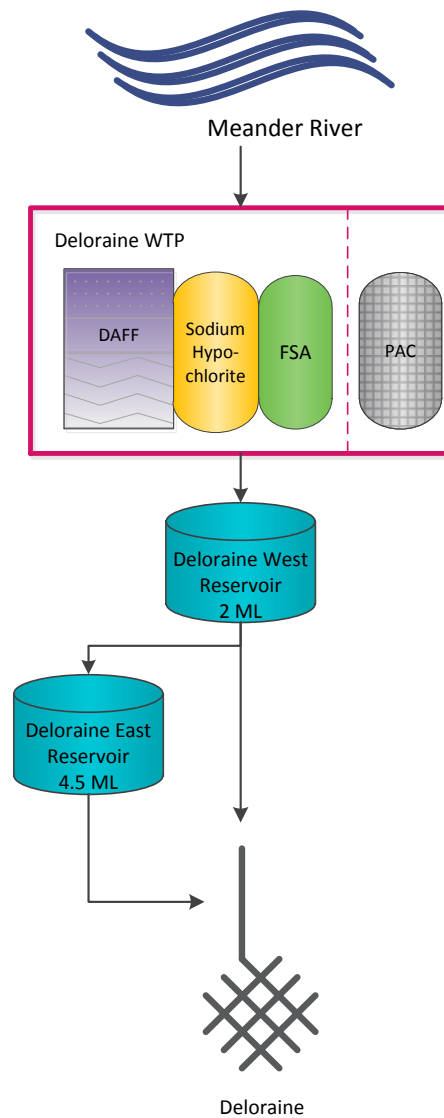
- ❖ No major water quality improvement projects are planned for the current 2016–18 PSP period. Minor works to improve chlorine levels in Stanley and Irishtown will be completed during the next reporting period.

## 6.16. Deloraine drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	1,327
	<b>Catchment</b>	Meander River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Deloraine.</li> </ul>		

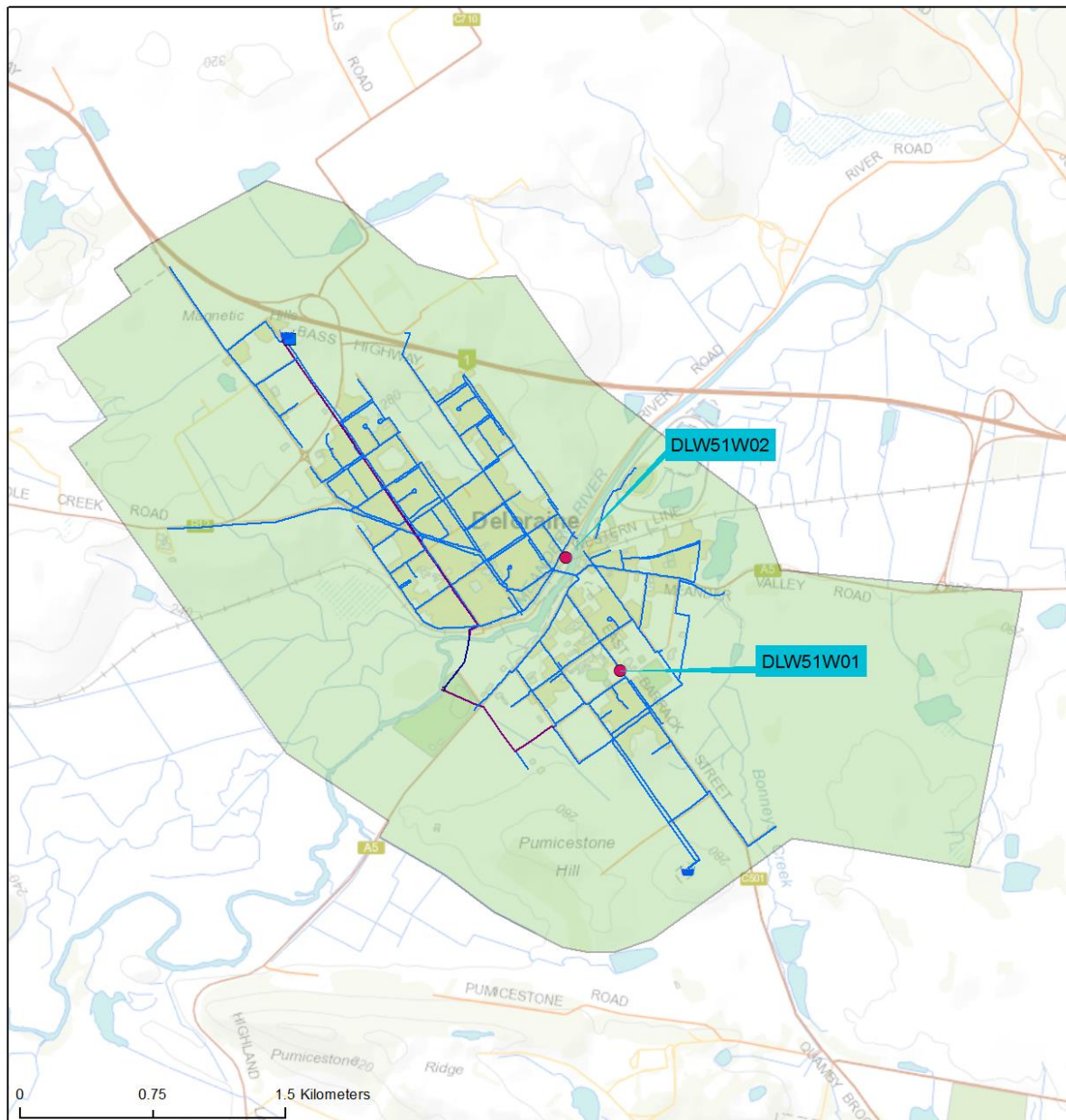
### 6.16.1. System description

Figure 6.16.1-a Deloraine system schematic



- ❖ **Catchment**  
The Deloraine drinking water system is supplied by the Meander River
- ❖ **Treatment**  
The Deloraine WTP employs DAFF, sodium hypochlorite disinfection and fluoridation by fluorosilicic acid. A temporary powder activated dosing (PAC) system is used when required
- ❖ **Distribution**  
The system feeds the township of Deloraine. There are two roofed reservoirs within the distribution system. The system supplies 1,327 connections.

Map 6.16.1—a Deloraine monitoring zone



DLW51W01 = Barrack Street, Deloraine, DLW51W02 = Train Park

## 6.16.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.16.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	110	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	106	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	5	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	5	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.16.3. Summary of historic total system performance

Table 6.16.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	98%	●	100%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		89.7%	●	97%	●	88.5%	●
	mean dose (mg/L) <sup>(c)</sup>	0.97	●	0.94	●	0.92	●	0.97	●	0.95	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Required		Not Required		Not Required		98%	●	85.6%	●
mean dose (mg/L) <sup>(c)</sup>	Not Required		Not Required		Not Required		0.94	●	0.83	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	1	●	0	●	
Complaints received <sup>(5)</sup>	19		22		32		10		6		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.16.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance achieving greater than 90 per cent within target range. Low results within the distribution network during December 2015 to February 2016 are attributed to fluoride dosing ceasing during the protected action
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.16.5. Microbiological performance

Figure 6.16.5-a Microbiological compliance 2015–16

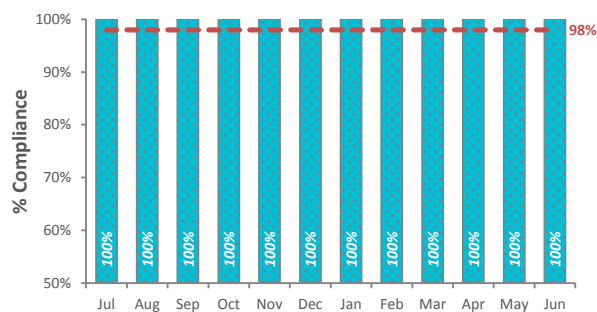


Figure 6.16.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.



## 6.16.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.16.6-a Reticulation samples within target range

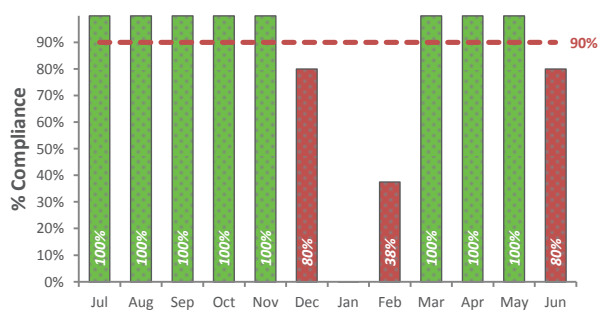


Figure 6.16.6-b Reticulation mean monthly dose (mg/L)

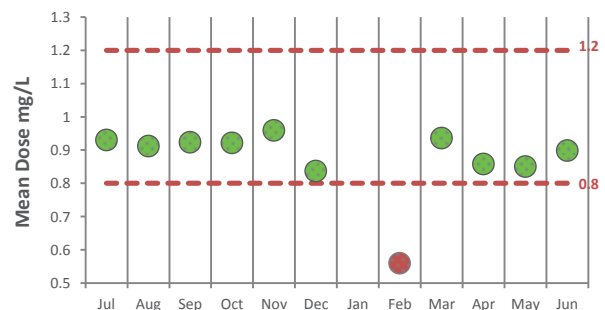


Figure 6.16.6-c Operational samples within target range

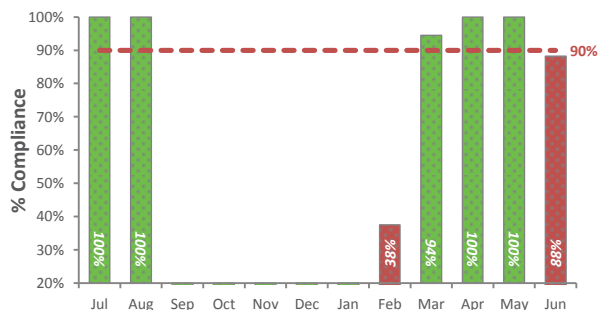
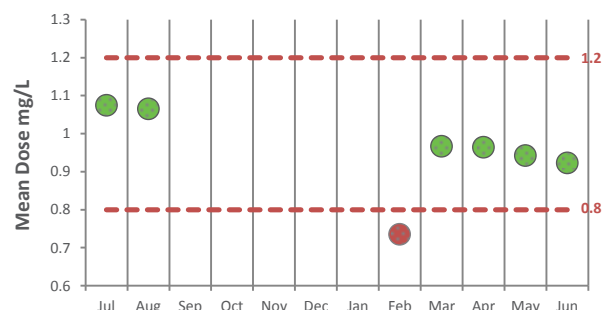


Figure 6.16.6-d Operational samples mean monthly dose (mg/L)



**Note:** (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (Operational) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ Performance in the distribution network is variable and is currently under review
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L
- ❖ From September 2015 to early February 2016, daily testing at the dosing station was undertaken but results were not recorded due to protected action. Fluoride dosing was switched off with agreement from DHHS from 18 December 2015 to 10 February 2016
- ❖ Low results in February are attributed to the phased approach to bring fluoride back online following cessation of the protected action.

## 6.16.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.16.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	5	0	100	< 1	< 1	< 1
Barium	2000	µg/L	5	0	100	6.8	6	8
Cadmium	2	µg/L	5	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	5	0	100	< 1	< 1	< 1
Copper	2000	µg/L	5	0	100	1.9	< 1	5
Lead	10	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	5	0	100	4.18	0.7	10
Mercury	1	µg/L	5	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	5	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	5	0	100	9.4	3	15
Monochloroacetic acid	150	µg/L	5	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	5	0	100	16.8	8	24
Total trihalomethanes	250	µg/L	5	0	100	25.4	13	42

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (\*) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.16.8. General physical parameters

**Table 6.16.8-a General physical performance**

General physical parameters (2015–16)				
Parameters	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	105	0.58	0.18	1.09
Turbidity (NTU)	106	0.34	0.1	0.9
pH	106	7.32	6.8	7.8

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.16.9. Aesthetic issues

- ❖ Seasonal issues with elevated MIB and Geosmin levels in the raw water from October 2015. PAC dosing commenced 24 October 2015 until 1 March 2016 to mitigate taste and odour issues.

### 6.16.10. System incidents and issues

**Table 6.16.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
24/10/2015	Seasonal testing for MIB & Geosmin was undertaken. MIB detected at 15ng/L, and Geosmin at 5ng/L	PAC dosing commenced. Monitoring to continue.	No	No
12/11/2015	Seasonal testing for MIB & Geosmin was undertaken. MIB detected at 26ng/L, and Geosmin at 9ng/L	PAC dosing underway. Monitoring to continue.	No	No
1/02/2016	The network connection at Deloraine WTP was lost on the Telstra/NBN Co side. No SCADA visibility or alarming from the WTP.	WTP manned overnight, until issue resolved.	No	No
11/02/2016	Seasonal testing for Geosmin detected at 19ng/L in the Raw Water	PAC dosing underway. Monitoring to continue.	No	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.16.11. Customer complaints

Figure 6.16.11-a Complaint classification

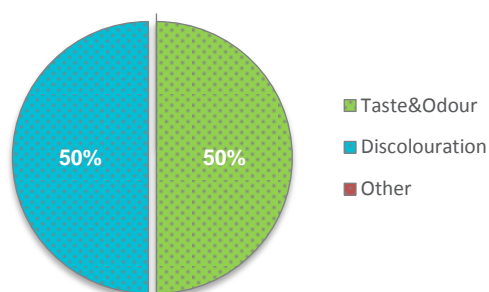
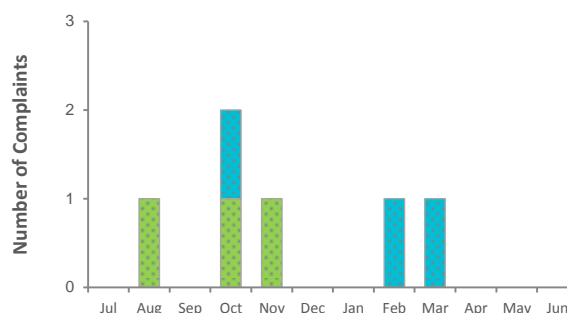


Figure 6.16.11-b Seasonal trend analysis



- ❖ Six complaints were received in this reporting period. Three complaints were related to discolouration issues and three complaints were related to taste and odour issues.

### 6.16.12. Catchment and source water issues

- ❖ The Deloraine drinking water system is supplied by the Meander River. The catchment is mixed use. Major land uses include forestry, dairy farming, cropping, grazing and residential properties with septic tanks. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.16.13. Infrastructure and operational changes

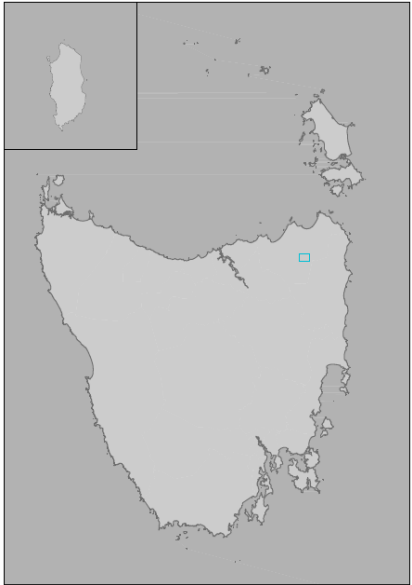
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.16.14. Future planning

Table 6.16.14-a Future planning for the system

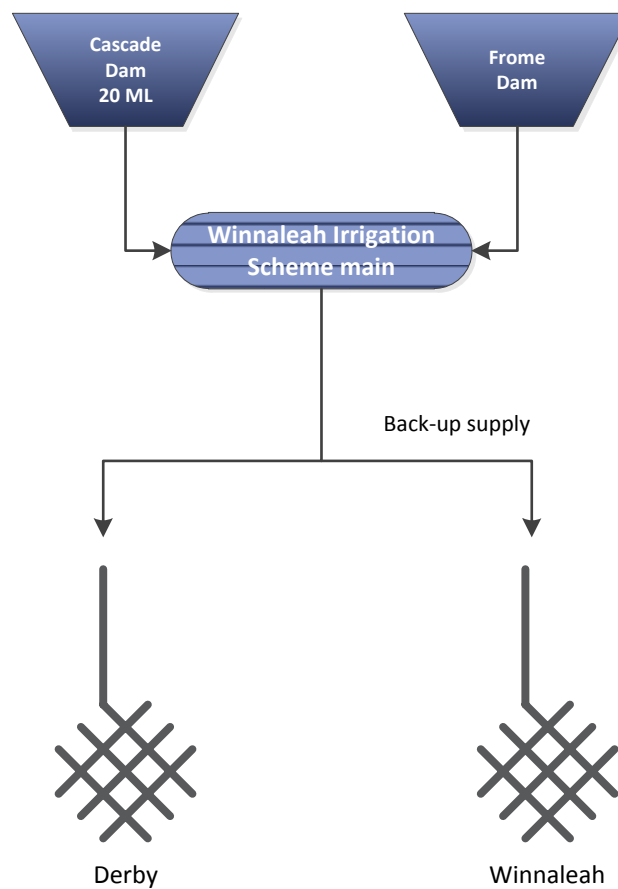
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Filter improvements	Repairs to filter to improve backwashing	Filtration cell undergoing maintenance	2016–17	\$800,000

## 6.17. Derby drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	165
	<b>Catchment</b>	Cascade Dam & Frome Dam via Winnaleah Irrigation Scheme
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Derby.</li> </ul>		

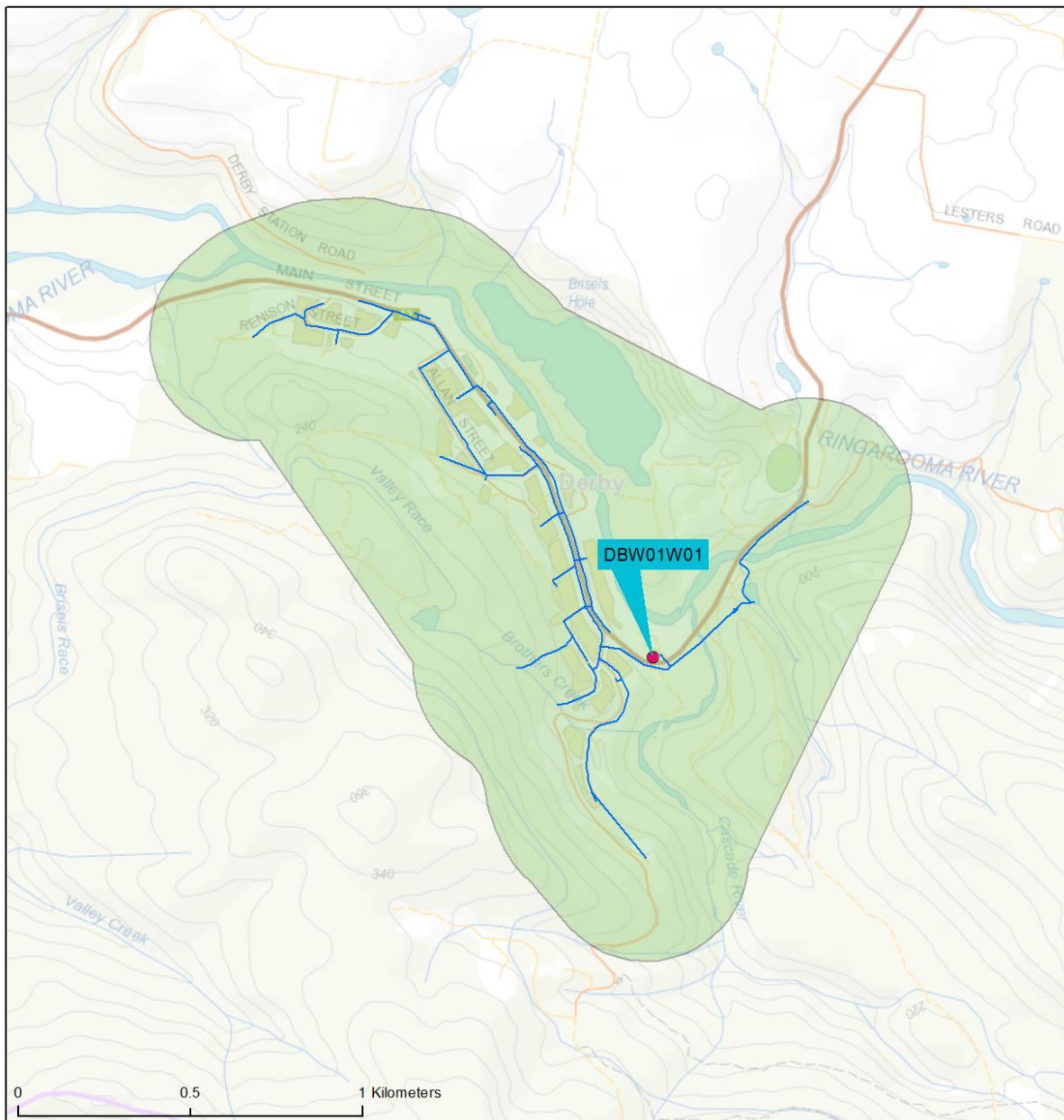
### 6.17.1. System description

Figure 6.17.1-a System schematic



- ❖ **Catchment**  
The Derby drinking water system is supplied by the Winnaleah Irrigation Scheme which draws from the Cascade Dam and the Frome Dam
- ❖ **Treatment**  
The Derby drinking water scheme is a raw water system with no treatment
- ❖ **Distribution**  
The Derby drinking water system supplies 165 connections.

Map 6.17.1-a Derby monitoring zone



DBW01W01 = Council depot

## 6.17.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.17.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	75%	No ●	Monthly	12	3	
<b>Fluoride</b> <sup>(2)</sup>	N/A	–	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

<sup>#</sup>DBP and Pesticide testing were removed from the sampling program in June 2016.

## 6.17.3. Summary of historic total system performance

Table 6.17.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)		Performance*					
Parameter group		2011–12	2012–13	2013–14	2014–15	2015–16	
<b>Microbiological</b> <sup>(1)</sup>		36% ●	42% ●	50% ●	59.4% <sup>^</sup> ●	75% ●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>						
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	
	<b>Distribution fluoride testing</b>						
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A		
<b>Metals</b> <sup>(3)</sup>		100% ●	100% ●	100% ●	100% ●	100% ●	
<b>DBPs</b> <sup>(3)#</sup>		N/A	N/A	N/A	N/A	100% ●	
<b>Pesticides</b> <sup>(4)#</sup>		0 ●	0 ●	0 ●	0 ●	0 ●	
<b>Complaints received</b> <sup>(5)</sup>		0	0	1	0	1	
<b>Public alerts issued</b> <sup>(6)</sup>		1 ●	1 ●	1 ●	1 ●	1 ●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. <sup>#</sup>DBP and Pesticide testing were removed from the sampling program in June 2016. <sup>^</sup>samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.



#### 6.17.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 75 per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ This system is not chlorinated and DBP testing was not required. The monitoring program was amended in June 2016
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.17.5. Microbiological performance

Figure 6.17.5-a Microbiological compliance 2015–16

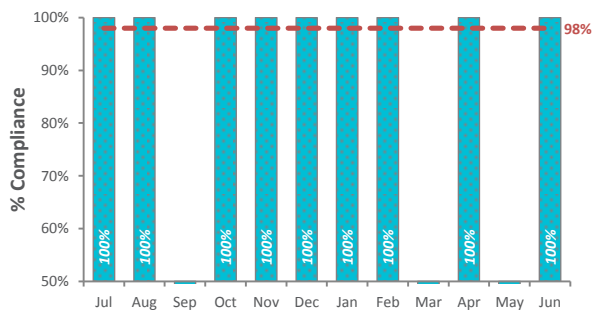
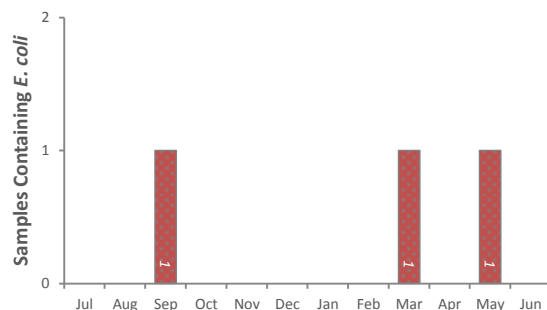


Figure 6.17.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Derby system was 75 per cent compliant in 2015–16. *E. coli* was detected in three samples for the reporting period.
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from the Winnaleah Irrigation Scheme.
- ❖ The risk to public health is mitigated through the communication of the Permanent BWA to customers.

#### 6.17.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.17.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.17.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	2.5	2	3
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	10	5	17
Lead	10	µg/L	4	0	100	1.6	0.9	2.1
Manganese	500	µg/L	4	0	100	6.85	1.6	19
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	3	0	100	< 4	< 1	< 4
Monochloroacetic acid	150	µg/L	3	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	3	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	3	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.17.8. General physical parameters

**Table 6.17.8-a General physical performance**

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	N/A	–	–	–
Turbidity (NTU)	12	1.12	0.7	1.7
pH	12	5.9	5.45	6.24

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. **(Chlorine residuals)** are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. **(Turbidity)** levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. **(pH)** should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU
- ❖ This system is not chlorinated
- ❖ pH levels are below the recommended optimal range.

### 6.17.9. Aesthetic issues

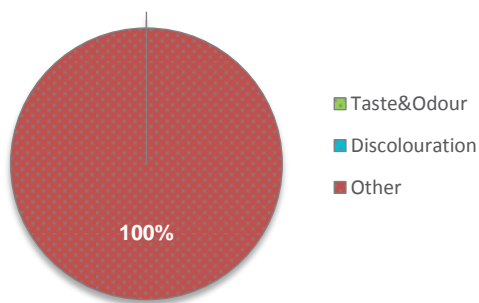
- ❖ No persistent aesthetic water quality issues were identified.

### 6.17.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.17.11. Customer complaints

**Figure 6.17.11-a Complaint classification**



**Figure 6.17.11-b Seasonal trend analysis**



- ❖ One complaint was received in this reporting period and was not related to water quality

#### 6.17.12. Catchment and source water issues

- ❖ The catchment areas are predominantly bushland, and activities include forestry and historic mining. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.17.13. Infrastructure and operational changes

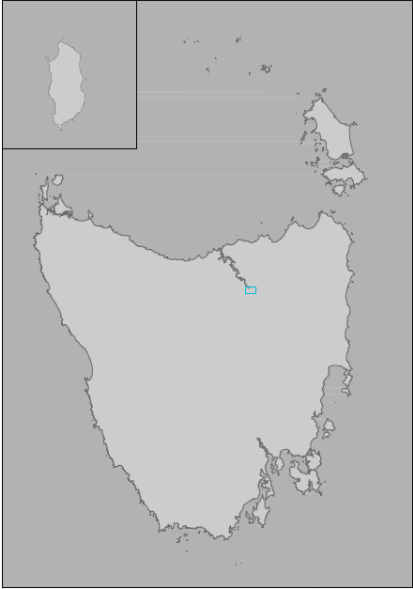
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.17.14. Future planning

**Table 6.17.14-a Future planning for the system**

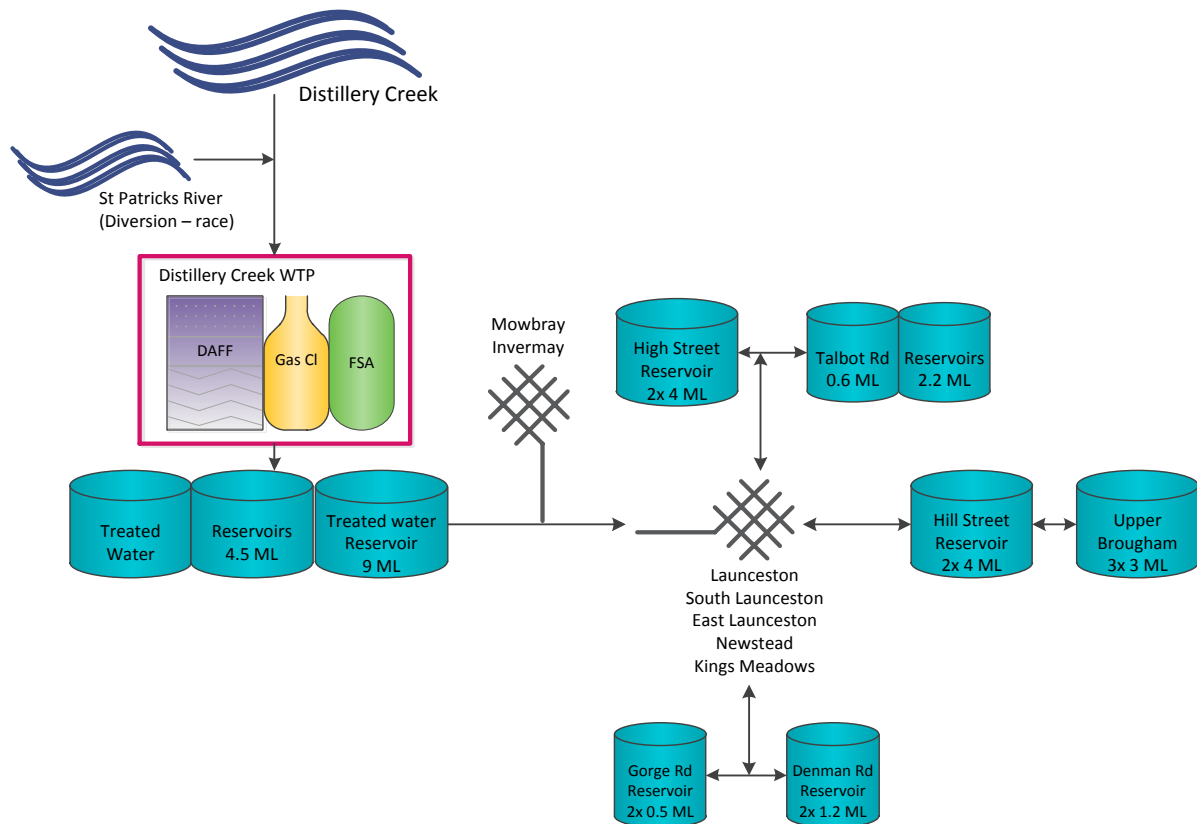
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Ringarooma Valley scheme	New WTP to supply the Branxholm, Legerwood, Derby and Ringarooma distribution systems	Pipeline construction is complete and WTP to be commissioned in early 2017.	2016–17	\$4.6 million

## 6.18. Distillery Creek drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	17,743
	<b>Catchment</b>	Distillery Creek and St Patricks River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Launceston</li> <li>❖ South Launceston</li> <li>❖ East Launceston</li> <li>❖ Newstead</li> <li>❖ Kings Meadows</li> <li>❖ Mowbray</li> <li>❖ Invermay.</li> </ul>		

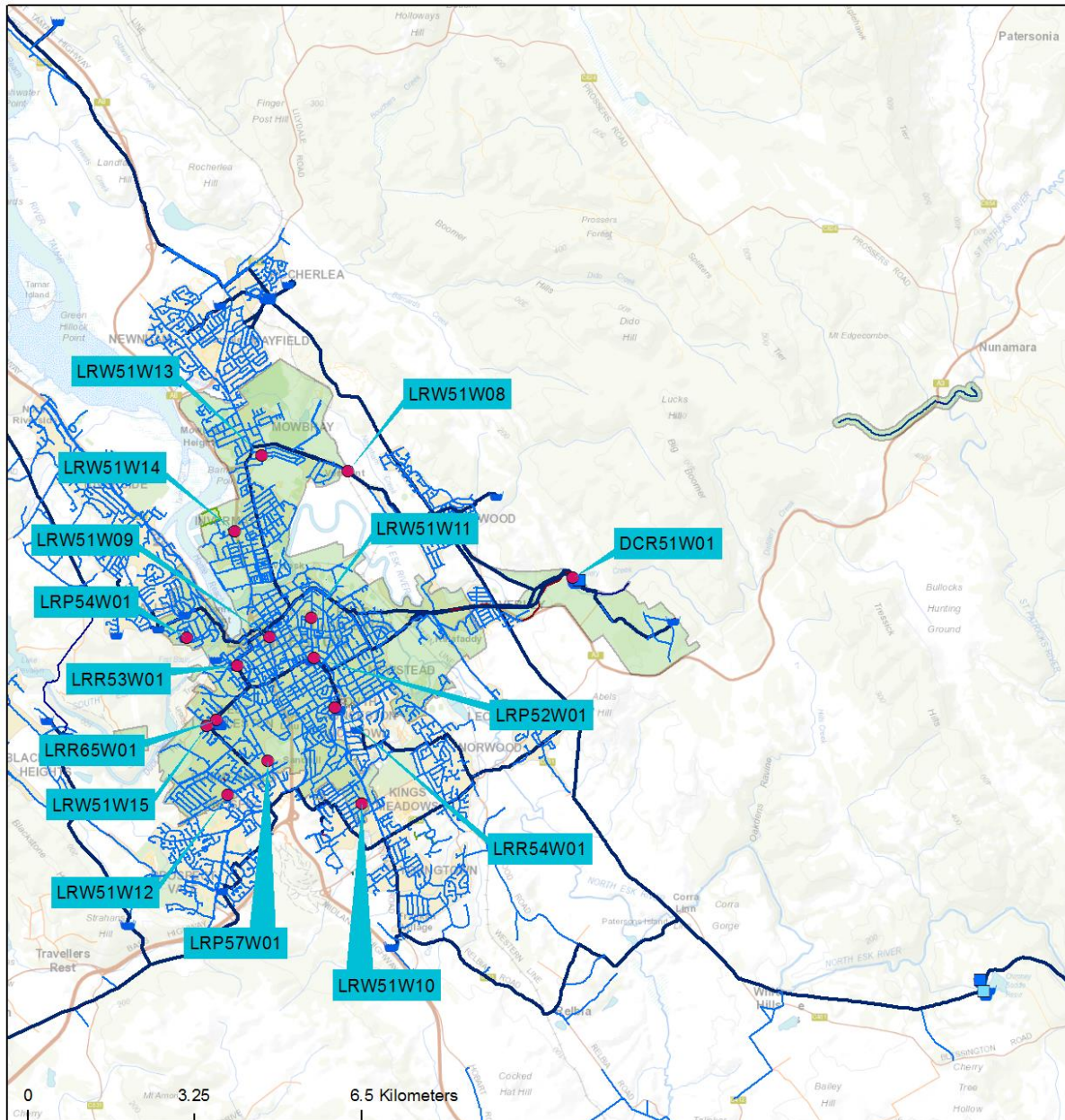
### 6.18.1. System description

Figure 6.18.1-a Distillery Creek System schematic



- ❖ **Catchment**  
The Distillery Creek drinking water system is supplied by the St Patricks River above Nunamara and Distillery Creek
- ❖ **Treatment**  
The Distillery Creek WTP employs screening, coagulation and flocculation, dissolved air flotation/filtration, chlorine gas disinfection, and fluoridation with fluorosilicic acid
- ❖ **Distribution**  
There are 13 roofed reservoirs in the distribution system. The system supplies 17,743 connections.

Map 6.18.1—a Distillery Creek monitoring zone



LRP54W01 = Denman Rd PS, LRW51W11 = East Launceston, Corner High & Adelaide St , LRP52W01 = East Launceston, High St Pump Station, LRR53W01 = East Launceston, Hill St Res Yard, LRW51W14 = Invermay, Mayne St , LRW51W10 = Kings Meadows, 9/11 Blaydon St, LRW51W09 = Launceston, York Street Public Toilets , LRW51W13 = Mowbray, 7 Derby St, LRW51W08 = Mowbray, Vermont Rd Bridge, LRR54W01 = South Launceston, Effingham St, LRW51W12 = Summerhill, 194 Peel St, DCR51W01 = Treatment Plant, Res Outflow, LRW51W15 = W Launceston, Cambridge St. Bus, LRP57W01 = W Launceston, Granville St, LRR65W01 = W Launceston, Upper Brougham St Res



## 6.18.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.18.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes	●	Weekly	357	0
<b>Fluoride</b> <sup>(2)</sup>	100%	Yes	●	Weekly	104	0
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	4	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly	4	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.18.3. Summary of historic total system performance

Table 6.18.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	100%	●	100%	●	99%	●	99%	●	100%	●	
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		Not Recorded		97%	●	88%	●
	mean dose (mg/L) <sup>(c)</sup>	0.93	●	0.91	●	0.91	●	0.95	●	0.97	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		Not Recorded		100%	●	58%	●
mean dose (mg/L) <sup>(c)</sup>	Not Recorded		Not Recorded		Not Recorded		1.0	●	0.67	●	
<b>Metals</b> <sup>(3)</sup>	100%	●	98%	●	100%	●	100%	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
<b>Complaints received</b> <sup>(5)</sup>	20		40		38		18		52		
<b>Public alerts issued</b> <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.



#### 6.18.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 was less than 90 per cent and not consistently within target range at the dosing point or the distribution system. Periodic maintenance to the system affected performance
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.18.5. Microbiological performance

Figure 6.18.5-a Microbiological compliance 2015–16

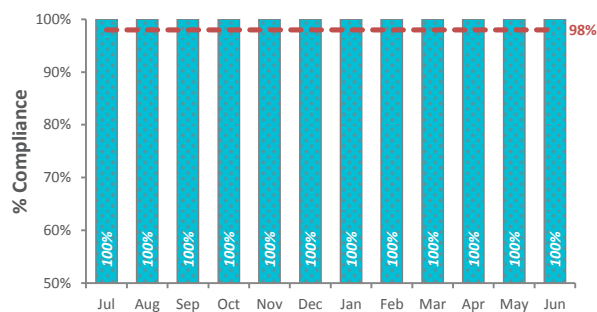


Figure 6.18.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.18.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.18.6-a Reticulation samples within target range

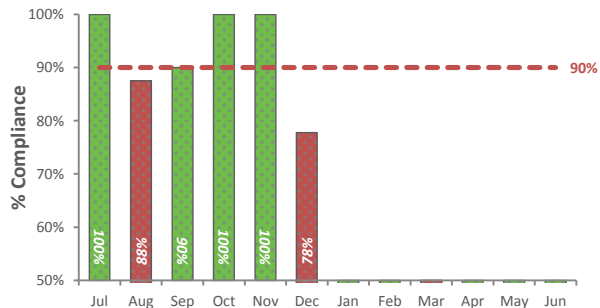


Figure 6.18.6-b Reticulation mean monthly dose (mg/L)

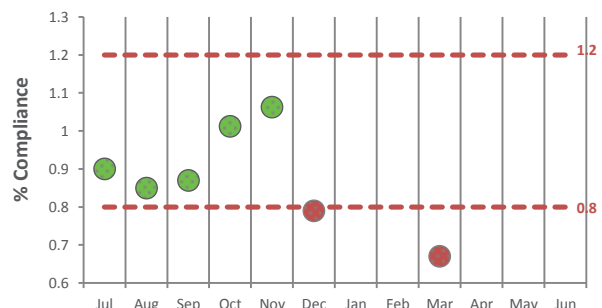
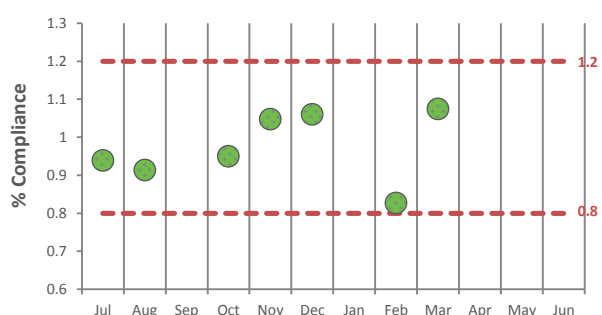
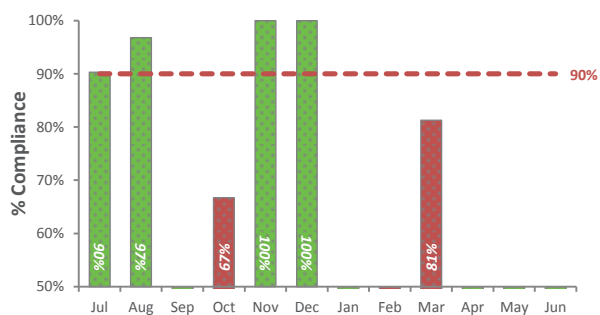


Figure 6.18.6-c Operational samples within target range Figure 6.18.6-d Operational samples mean monthly dose (mg/L)



**Note:** (**Reticulation**) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (**Operational**) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Performance in the distribution and operational points did not meet regulatory requirements
- ❖ From September 2015 to early February 2016, daily testing at the dosing station was undertaken but results were not recorded due to protected action
- ❖ The dosing system was shut down in April 2016 to make changes to the fluoride dosing system and remains under maintenance. It is expected the fluoride levels will be maintained within range once the new system is brought online
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.18.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.18.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	4	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	4	0	100	12	9	19
<b>Cadmium</b>	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	4	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	4	0	100	1.375	< 1	2
<b>Lead</b>	10	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Manganese</b>	500	µg/L	4	0	100	6.25	3.1	9.6
<b>Mercury</b>	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	4	0	100	< 0.5	< 0.5	0.7
<b>Selenium</b>	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	18.25	14	25
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	19.5	12	26
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	23.25	12	36

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.18.8. General physical parameters

Table 6.18.8-a General physical performance

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		364	0.51	0	1.22
Turbidity (NTU)		364	0.27	0.1	0.9
pH		364	7.07	6.46	7.93

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations. Chlorine residuals are low in some extremities of system. These areas are adversely influenced by the hydraulic layout and seasonal changes particularly during summer months. An investigation to assess current chlorination performance and improve future disinfection is in progress
- ❖ pH levels are maintained within the recommended optimal range.

### 6.18.9. Aesthetic issues

- ❖ Low complaint numbers for taste and odour in the system were recorded through the year. Algal metabolites are commonly responsible for these issues; however indicator compounds were measured in the supply and were below detections limits.

### 6.18.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period

### 6.18.11. Customer complaints

Figure 6.18.11-a Complaint classification

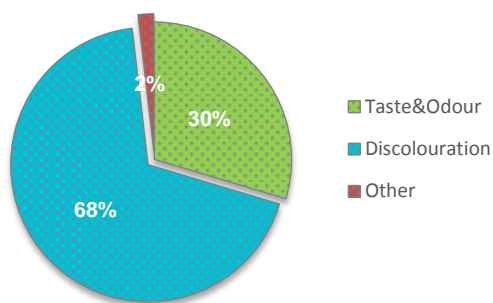
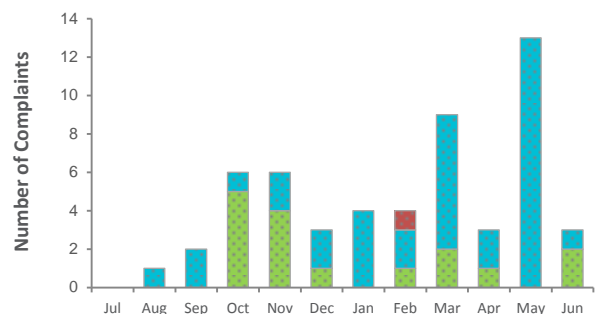


Figure 6.18.11-b Seasonal trend analysis



- ❖ Fifty four complaints were received for this reporting period. Two thirds of complaints received were relating to water discolouration issues, and a third of complaints were for taste and odour issues. Discolouration is usually associated with disruptions to the supply such as main breaks. Scouring and flushing practices are undertaken in extremities as required.

### 6.18.12. Catchment and source water issues

- ❖ The Distillery Creek drinking water system is supplied by the St Patricks River above Nunamara and Distillery Creek. Activities in the drinking water catchment consist of dairy farming, forestry, grazing, cropping, aquaculture, quarrying and some residential properties with septic tanks. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

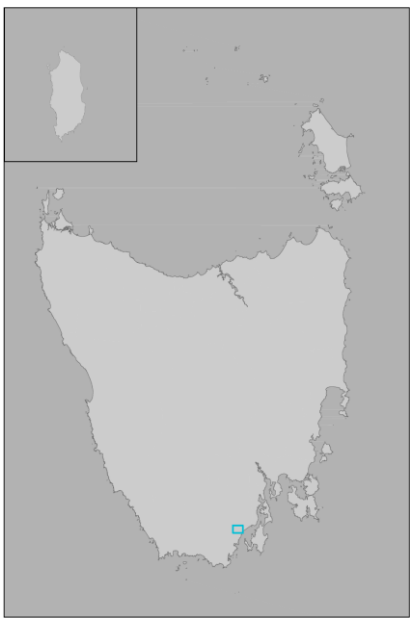
### 6.18.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.18.14. Future planning

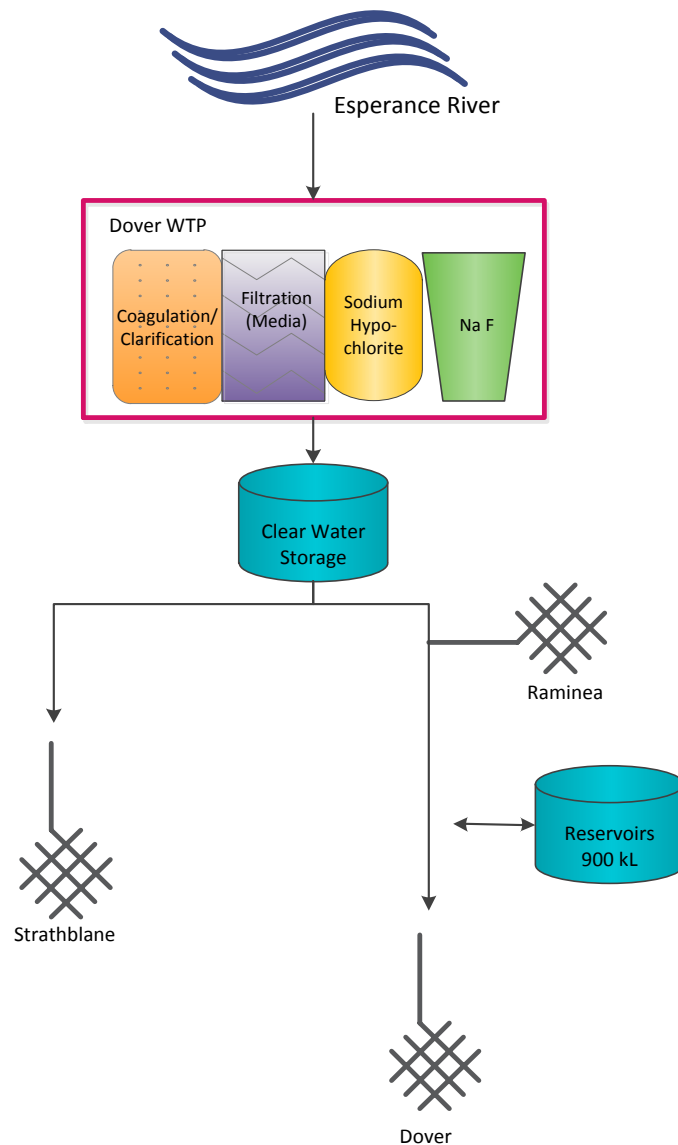
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.19. Dover drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	744
	<b>Catchment</b>	Esperance River
	<b>Primary treatment</b>	Dissolved air flotation and filtration (DAFF)
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Dover</li> <li>❖ Raminea</li> <li>❖ Strathblane.</li> </ul>		

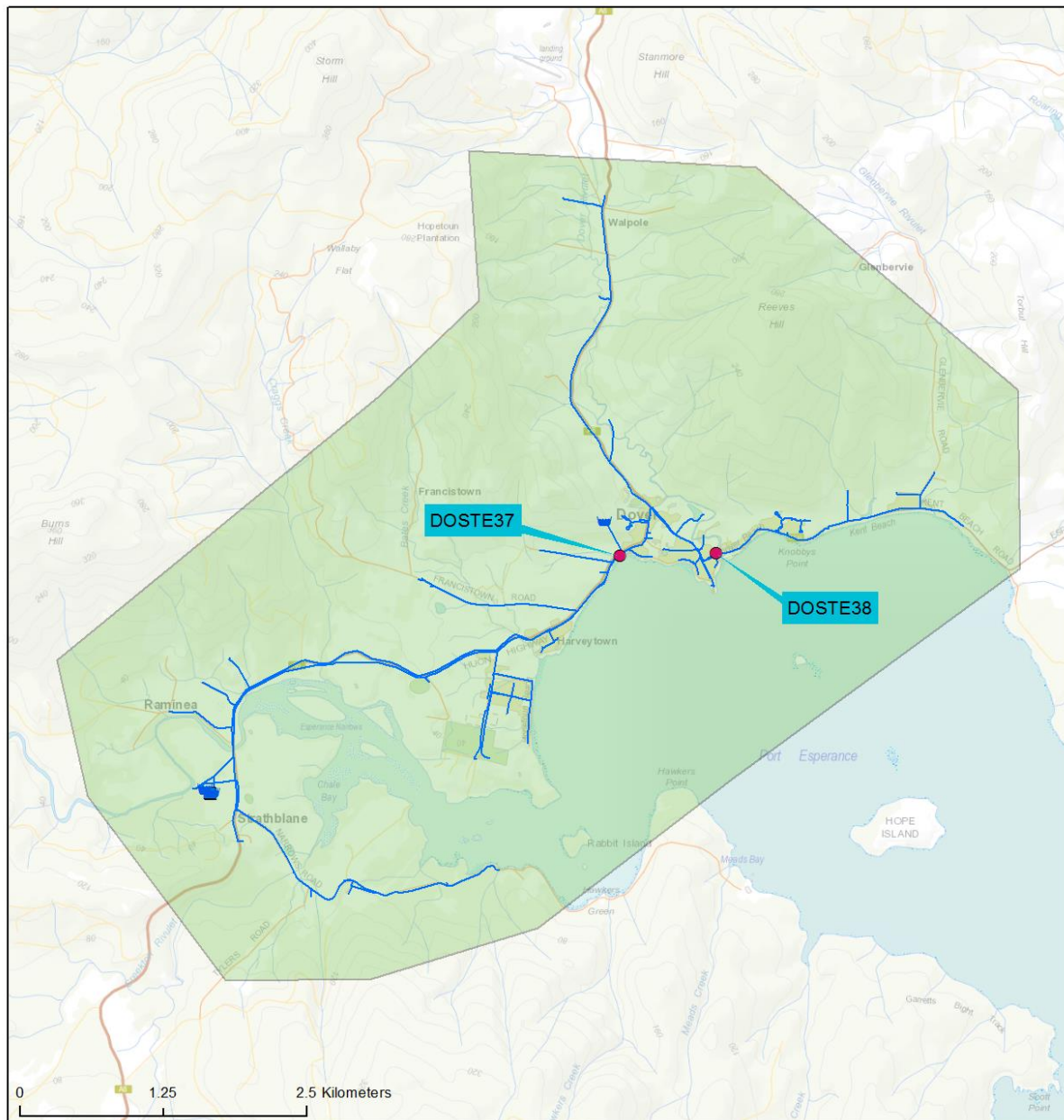
### 6.19.1. System description

Figure 6.19.1-a Dover system schematic



- ❖ **Catchment**  
The Dover drinking water system is supplied by the Esperance River
- ❖ **Treatment**  
The Dover WTP employs screening, coagulation and flocculation (with tube assisted settling), dissolved air flotation/mixed media filtration, sodium hypochlorite disinfection, and fluoridation via sodium fluoride
- ❖ **Distribution**  
There is one roofed service reservoir, connected via a common line in the distribution system. The Dover drinking water system supplies 744 connections.

**Map 6.19.1—a Dover monitoring zone**



**DOSTE37** = Huon Highway (Regular Compliance Point) – **DOSTE38** = No. 4 P/S Kent Beach Rd (Fluoride Sample Point)



## 6.19.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.19.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	53	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	105	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.19.3. Summary of historic total system performance

Table 6.19.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	99%	●	98%	●	100%	●	100%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	100%	●	98%	●	93%	●	95.9%	●	97.5%	●
	mean dose (mg/L) <sup>(c)</sup>	0.94	●	0.97	●	0.92	●	0.95	●	0.95	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
within target range <sup>(b)</sup>	Not required		Not required		Not reported		86.3%	●	92.4%	●	
mean dose (mg/L) <sup>(c)</sup>	Not required		Not required		Not reported		1.02	●	0.97	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	N/A		N/A		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		6		0		4		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.19.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.19.5. Microbiological performance

Figure 6.19.5-a Microbiological compliance 2015–16

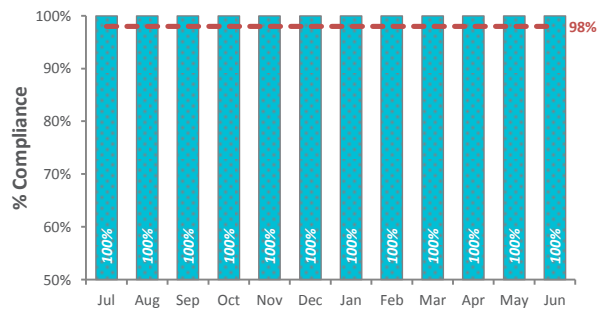


Figure 6.19.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.19.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.19.6-a Reticulation samples within target range

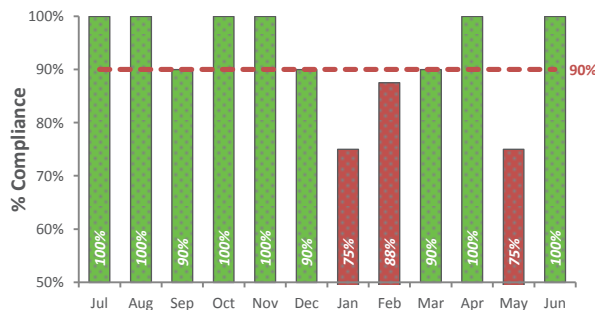


Figure 6.19.6-b Reticulation mean monthly dose (mg/L)

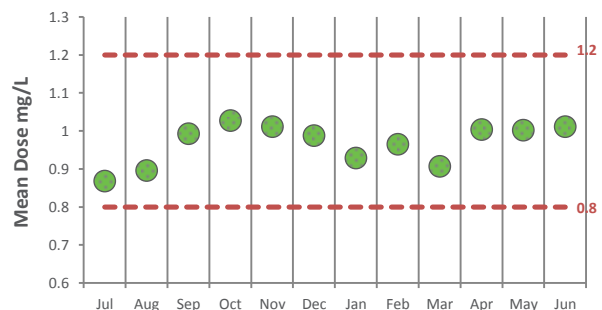
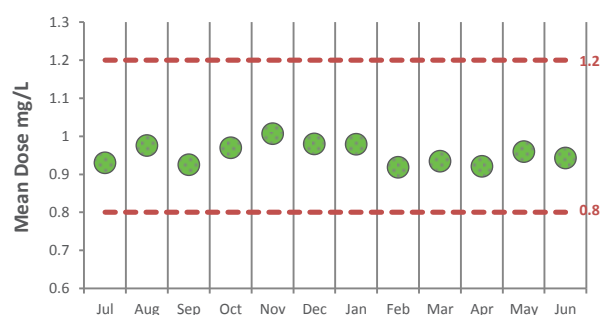
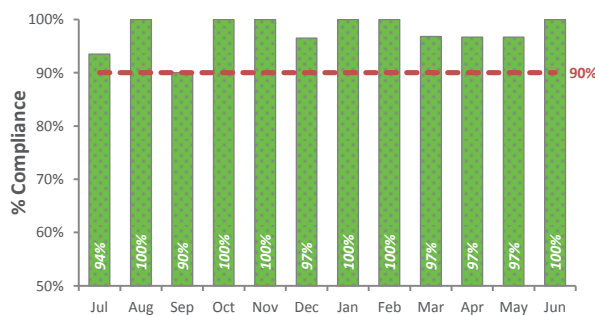


Figure 6.19.6-c Operational samples within target range Figure 6.19.6-d Operational samples mean monthly dose (mg/L)



**Note:** **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ Performance in the distribution network is variable and is currently under review
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.19.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.19.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	2	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	2	0	100	6.5	6	7
<b>Cadmium</b>	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	2	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	2	0	100	12	11	13
<b>Lead</b>	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Manganese</b>	500	µg/L	2	0	100	2.65	2.2	3.1
<b>Mercury</b>	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Selenium</b>	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	< 4	< 1	< 4
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	10	6	14
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	34	19	47

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (..) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.19.8. General physical parameters

**Table 6.19.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	53	0.06	0.01	0.21
Turbidity (NTU)	53	0.5	0.2	1.3
pH	53	7.4	6.63	8.17

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the distribution network generally do not meet the target of greater than 0.1 mg/L. Chlorine residuals have historically been very poor in this system. In 2015–16 average results were again significantly below the TasWater target of >0.1 mg/L. The reason for this poor performance is believed to be high chlorine demands driven by elevated turbidity and organic carbon levels and the hydraulic layout of the distribution network
- ❖ pH levels are maintained within the recommended optimal range.

### 6.19.9. Aesthetic issues

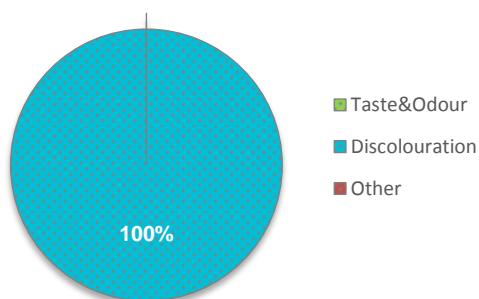
- ❖ No persistent aesthetic water quality issues were identified.

### 6.19.10. System incidents and issues

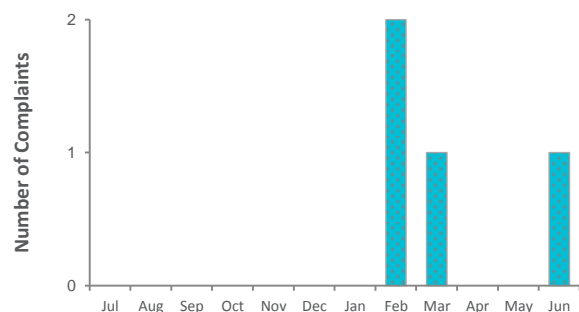
- ❖ No water quality incidents occurred in the reporting period.

### 6.19.11. Customer complaints

**Figure 6.19.11-a Complaint classification**



**Figure 6.19.11-b Seasonal trend analysis**



- ❖ Four complaints were received relating to discolouration issues.

#### 6.19.12. Catchment and source water issues

- ❖ The Esperance River catchment contains areas of State Forest, production forestry, road infrastructure and a small number of properties utilising on-site wastewater management
- ❖ Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.19.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.19.14. Future planning

**Table 6.19.14-a Future planning for the system**

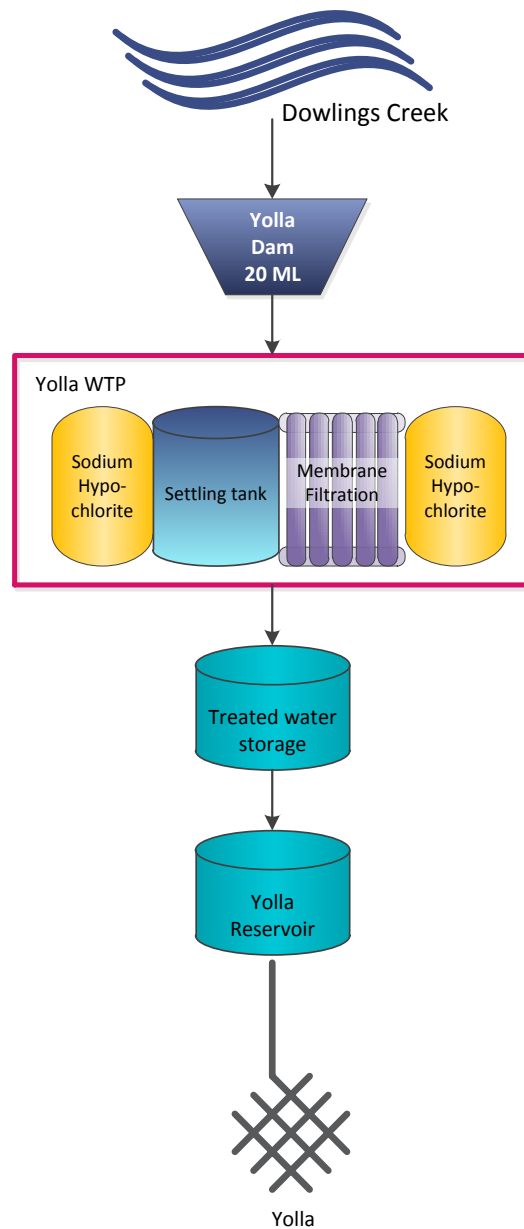
Project	Description	Progress	Anticipated Delivery	Estimated Spend
WTP improvements	Upgrade treatment equipment to improve plant reliability and water quality	Business case is in progress	2017–18	\$100,000

## 6.20. Dowlings Creek drinking water system

	<b>Current status</b>	Potable
	<b>Total connections</b>	111
	<b>Catchment</b>	Dowlings Creek
	<b>Primary treatment</b>	Membrane filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Yolla.</li> </ul>		

## 6.20.1. System description

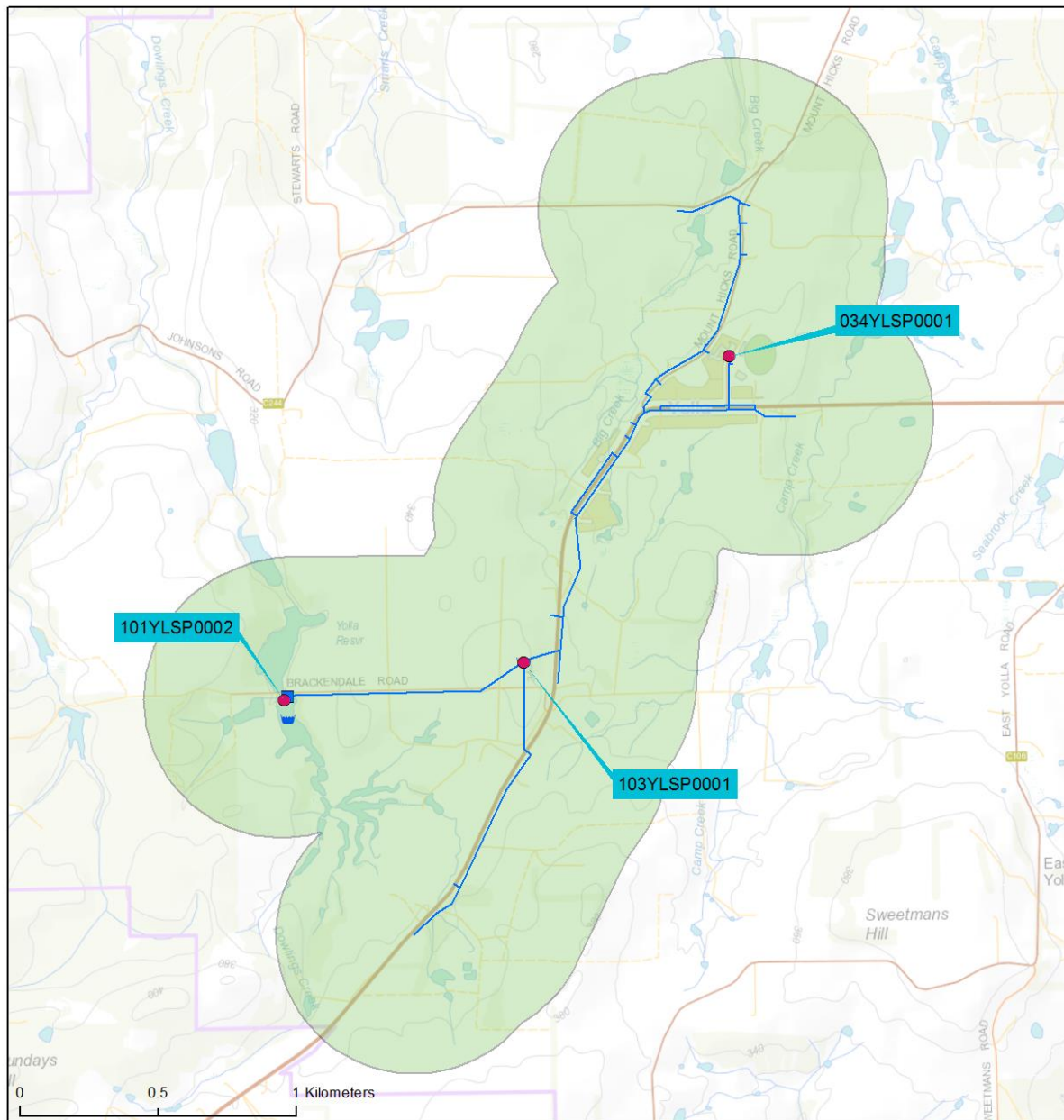
Figure 6.20.1-a Dowlings Creek system schematic



- ❖ **Catchment**  
The Dowlings Creek drinking water system is supplied by Dowlings Creek via Yolla Dam
- ❖ **Treatment**  
The Yolla WTP employs oxidation, settling, membrane filtration and sodium hypochlorite disinfection
- ❖ **Distribution**  
There are two roofed storages in the distribution system. The Yolla drinking water system supplies 111 connections.



Map 6.20.1-a Dowlings Creek monitoring zone



101YLSP0002 = WTP Outlet, 034YLSP0001 = School, 103YLSP0001 = Reservoir

## 6.20.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.20.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99.3%	Yes	● Weekly	156	1	
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–	
DBPs <sup>(3)</sup>	100%	Yes	● Monthly <sup>#</sup>	22	0	
Metals <sup>(4)</sup>	99%	No	● Quarterly	10	1	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) Sampling program changed to Quarterly in May 2016.

## 6.20.3. Summary of historic total system performance

Table 6.20.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	98%	●	100%	●	100%	●	100%	●	99.3%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
Metals <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	99.3%	●	
DBPs <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	N/A		N/A		N/A		N/A		N/A		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		0		0		2		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.20.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Lead was detected at levels exceeding the ADWG health limit reducing compliance to 99.3 per cent in 2015–16 with one exceedance detected during the reporting period. Investigations and re-tests showed the system to be clear of metal contamination
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.20.5. Microbiological performance

Figure 6.20.5-a Microbiological compliance 2015–16

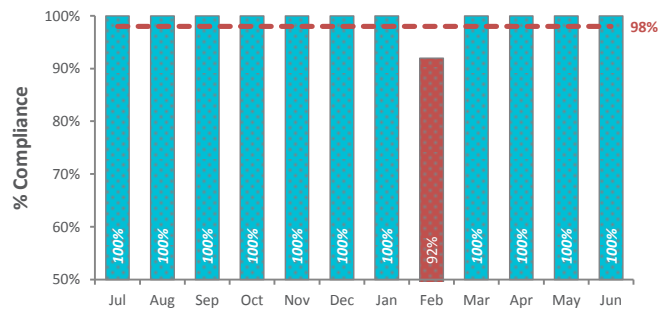
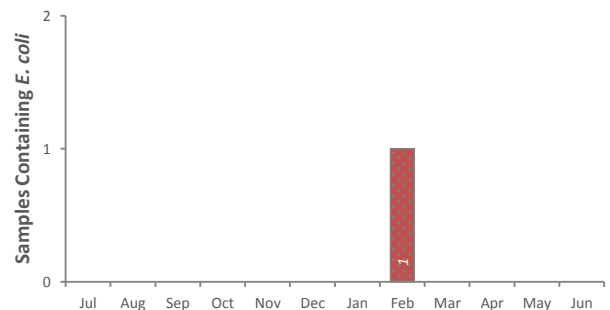


Figure 6.20.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Dowlings Creek system was 99.3 per cent compliant in 2015–16. *E. coli* was detected in one weekly sample during the reporting period
- ❖ An *E. coli* strike occurred in November 2015 with a detection of 2 MPN/100mL. Water quality characteristics indicated reduced chlorine residuals. A re-test was conducted which confirmed improvement to chlorine residuals and the system was free of *E. coli* and microbial contamination.

#### 6.20.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.20.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.20.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	9	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	10	0	100	< 1	< 1	< 1
Barium	2000	µg/L	10	0	100	4	3	6
Cadmium	2	µg/L	10	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	10	0	100	< 1	< 1	< 1
Copper	2000	µg/L	9	0	100	92	5	172
Lead	10	µg/L	10	1	90	3.1	< 0.5	20.5
Manganese	500	µg/L	10	0	100	42.42	4.8	75.8
Mercury	1	µg/L	10	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	9	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	10	0	100	0.78	< 0.5	1.4
Selenium	10	µg/L	10	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	22	0	100	16.75	< 1	61
Monochloroacetic acid	150	µg/L	22	0	100	< 5	< 5	10
Trichloroacetic acid	100	µg/L	22	0	100	29.34	< 7	88
Total trihalomethanes	250	µg/L	22	0	100	71.14	11	160

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ One lead exceedance above ADWG health limits occurred during the reporting period with a detection of 20.5 µg/L. Flushing of the rising main and oxidation tanks at WTP was conducted to ensure there was not a build-up within the infrastructure. Re-testing of the sample point confirmed the water to be within the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.20.8. General physical parameters

**Table 6.20.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		155	0.6	0.03	1.98
Turbidity (NTU)		151	0.26	0.1	0.7
pH		151	6.97	5.4	8.74

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Dowlings Creek distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are generally maintained within the recommended optimal range.

## 6.20.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

## 6.20.10. System incidents and issues

**Table 6.20.10-a Identified incidents and issues**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
9/02/2016	Lead exceedance of 20.5 µg/L	Flushing of the rising main and oxidation tanks at the plan were conducted to ensure there was not a build-up within the infrastructure. Immediate resampling of the point determined the water to be within the ADWG limits.	Yes	Yes
23/02/2016	<i>E. coli</i> detection	Immediate resampling was free from contamination and an investigation determined the possible cause was contamination during sampling/analysis.	Yes	Yes
15/03/2016	Pesticide detection (trace)	Immediate resampling to confirm levels of pesticides detected. Trace levels of pasture management herbicides were present at levels less than 2.5 per cent of the ADWG limit.	No	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.

### 6.20.11. Customer complaints

Figure 6.20.11-a Complaint classification

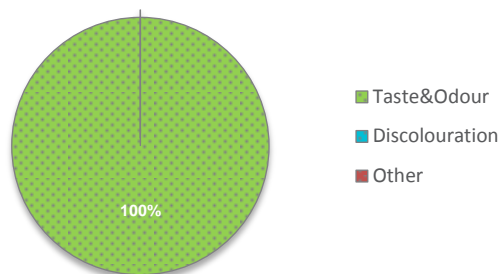
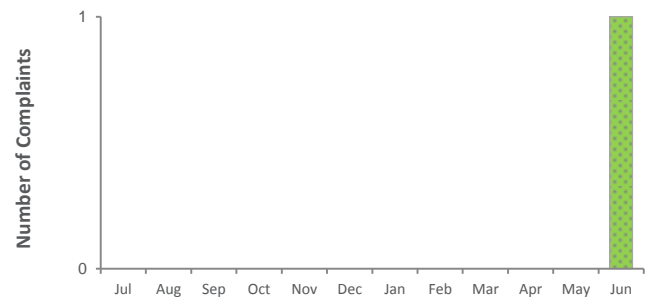


Figure 6.20.11-b Seasonal trend analysis



- ❖ There was one isolated complaint received relating to discoloured water.

### 6.20.12. Catchment and source water issues

- ❖ The Dowlings Creek treatment plant is supplied by Dowlings Creek via Yolla Dam. The drinking water catchment is predominantly bush and farmland. Activities in the catchment include limited human activity, animal husbandry, dairy farming and cropping. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ Trace levels of pesticides were detected in samples conducted as part of the raw water monitoring program. Resampling of water determined that the trace levels of pasture management herbicides were present just above the detection levels of the testing laboratory. All results were less than 2.5 per cent of ADWG health limits.

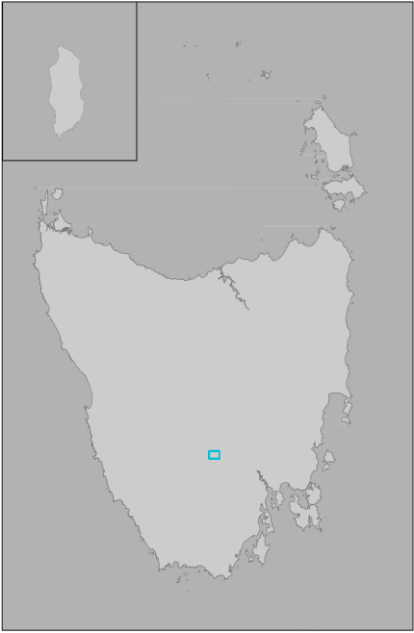
### 6.20.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.20.14. Future planning

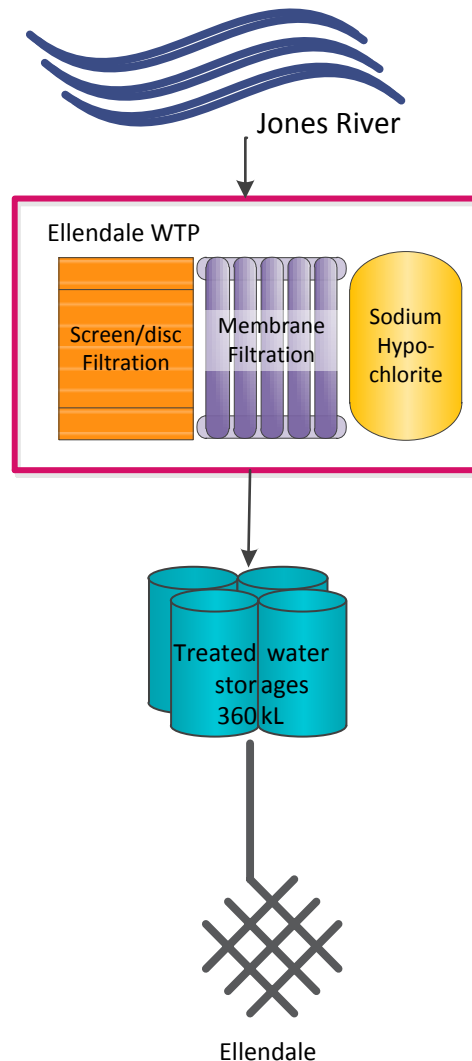
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.21. Ellendale drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	88
	<b>Catchment</b>	Jones River
	<b>Primary treatment</b>	UF membrane
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Ellendale.</li> </ul>		

### 6.21.1. System description

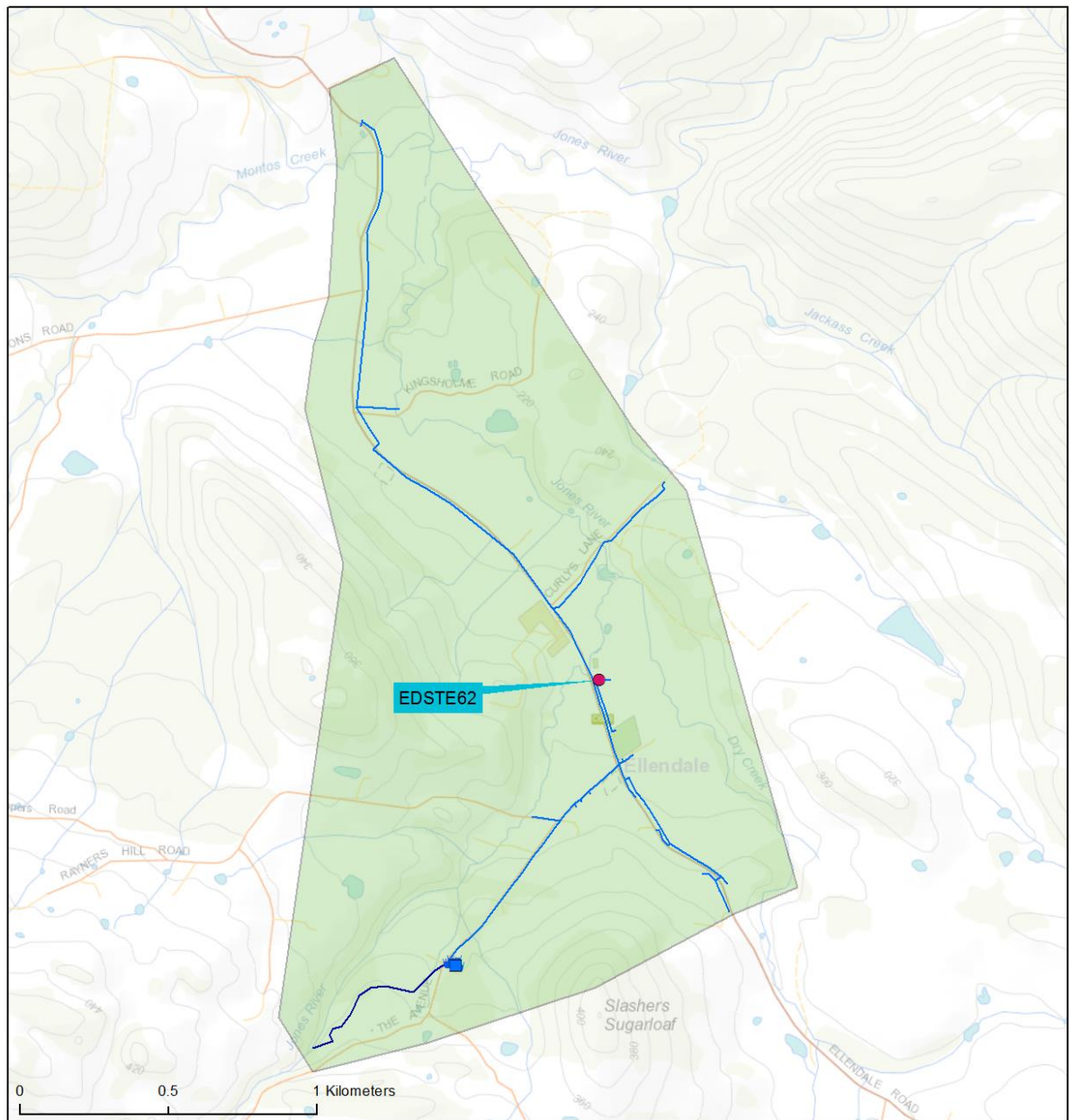
Figure 6.21.1-a Ellendale system schematic



- ❖ **Catchment**  
The Ellendale drinking water system is supplied by the Jones River
- ❖ **Treatment**  
The Ellendale WTP employs a coarse filter, membrane filtration and sodium hypochlorite disinfection
- ❖ **Distribution**  
Treated water is stored in four roofed reservoirs. The Ellendale system supplies 88 connections.



Map 6.21.1-a Ellendale monitoring zone



EDSTE62 = Ellendale Community Park

## 6.21.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.21.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes	●	Weekly	51 <sup>^</sup>	0
Fluoride <sup>(2)</sup>	N/A	N/A		–	–	–
DBPs <sup>(3)</sup>	95%	No	●	Quarterly / Monthly <sup>#</sup>	5	1
Metals <sup>(4)</sup>	100%	Yes	●	6 Monthly	2	0
Pesticides <sup>(5)</sup>	N/A	N/A		–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) Sampling frequency was changed from Quarterly to Monthly in June 2016. <sup>^</sup>22 sampling events scheduled, 1 sample missed due to inaccessibility to sample point, compliance still able to be determined with 51 sampling events.

## 6.21.3. Summary of historic total system performance

Table 6.21.3-a Historic trends

Parameter group	Performance <sup>*</sup>									
	2011–12		2012–13		2013–14		2014–15		2015–16	
Microbiological <sup>(1)</sup>	85%	●	80%	●	100%	●	100%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
DBPs <sup>(3)</sup>	100%	●	93.7%	●	100%	●	100%	●	95%	●
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	N/A	
Complaints received <sup>(5)</sup>	Not Reported		Not Reported		1		1		0	
Public alerts issued <sup>(6)</sup>	1	●	1	●	1	●	1 <sup>#</sup>	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. <sup>#</sup> Boil Water alert lifted in May 2015.

#### 6.21.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP performance for 2015–16 was 95 per cent and does not comply with ADWG. A detection above ADWG health limits was recorded during this reporting period.

#### 6.21.5. Microbiological performance

Figure 6.21.5-a Microbiological compliance 2015–16

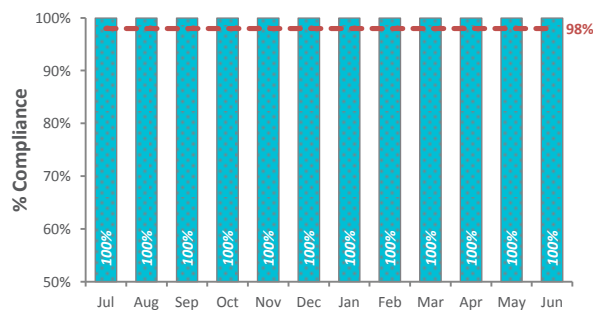


Figure 6.21.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.21.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.21.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.21.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	5	5	5
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	3.5	3	4
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	2	0	100	1.05	0.6	1.5
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	5	0	100	22.9	< 1	96
Monochloroacetic acid	150	µg/L	5	0	100	< 5	< 5	8
Trichloroacetic acid	100	µg/L	5	1	80	97	65	150
Total trihalomethanes	250	µg/L	5	0	100	130	70	220

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (+) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ DBPs were detected above ADWG health limits in August 2015. Work is underway to optimise turbidity control at the inlet to reduce load onto the membranes and reduce DBP formation.

## 6.21.8. General physical parameters

Table 6.21.8-a General physical performance

General physical parameters (2015–16)					
	Samples	Mean	Min.	Max.	
Chlorine residual (mg/L)	51	0.3	0.05	0.67	
Turbidity (NTU)	51	0.28	0.1	2.5	
pH	51	7.57	7.07	7.88	

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.21.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.21.10. System incidents and issues

**Table 6.21.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
20/08/2015	Trichloroacetic acid 120 µg/L	Inlet works are being undertaken to reduce turbidity load on membranes. This should reduce DBP forming potential	Yes	Yes

Note: Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.21.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

### 6.21.12. Catchment and source water issues

- ❖ The Ellendale drinking water system is supplied by the Jones River. The upper catchment lies within Mt Field National Park and activities in the lower catchment include forestry and agriculture. The catchment covers approximately 1,047 ha
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

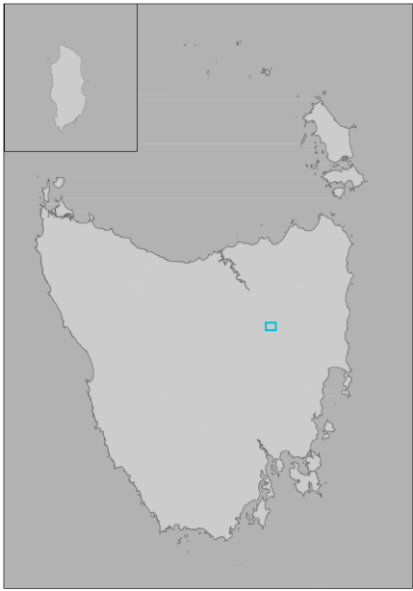
### 6.21.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.21.14. Future planning

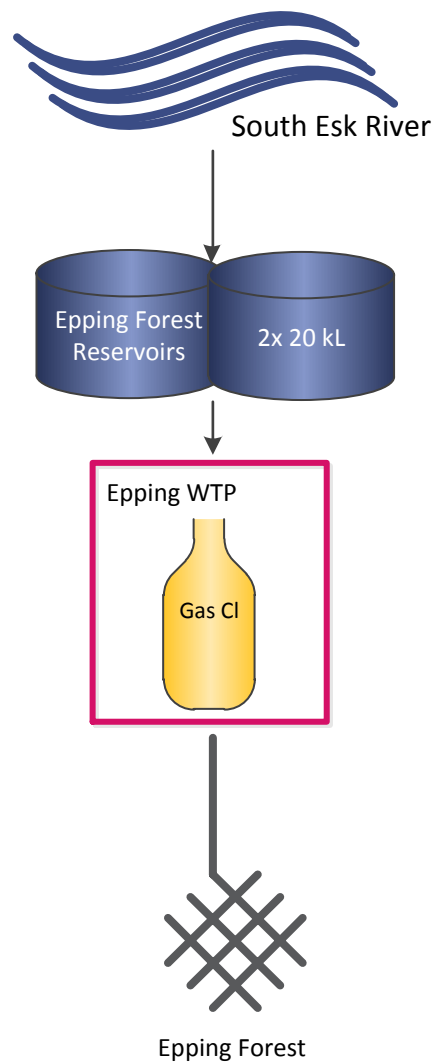
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.22. Epping drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	33
	<b>Catchment</b>	South Esk River
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Epping Forest</li> </ul>		

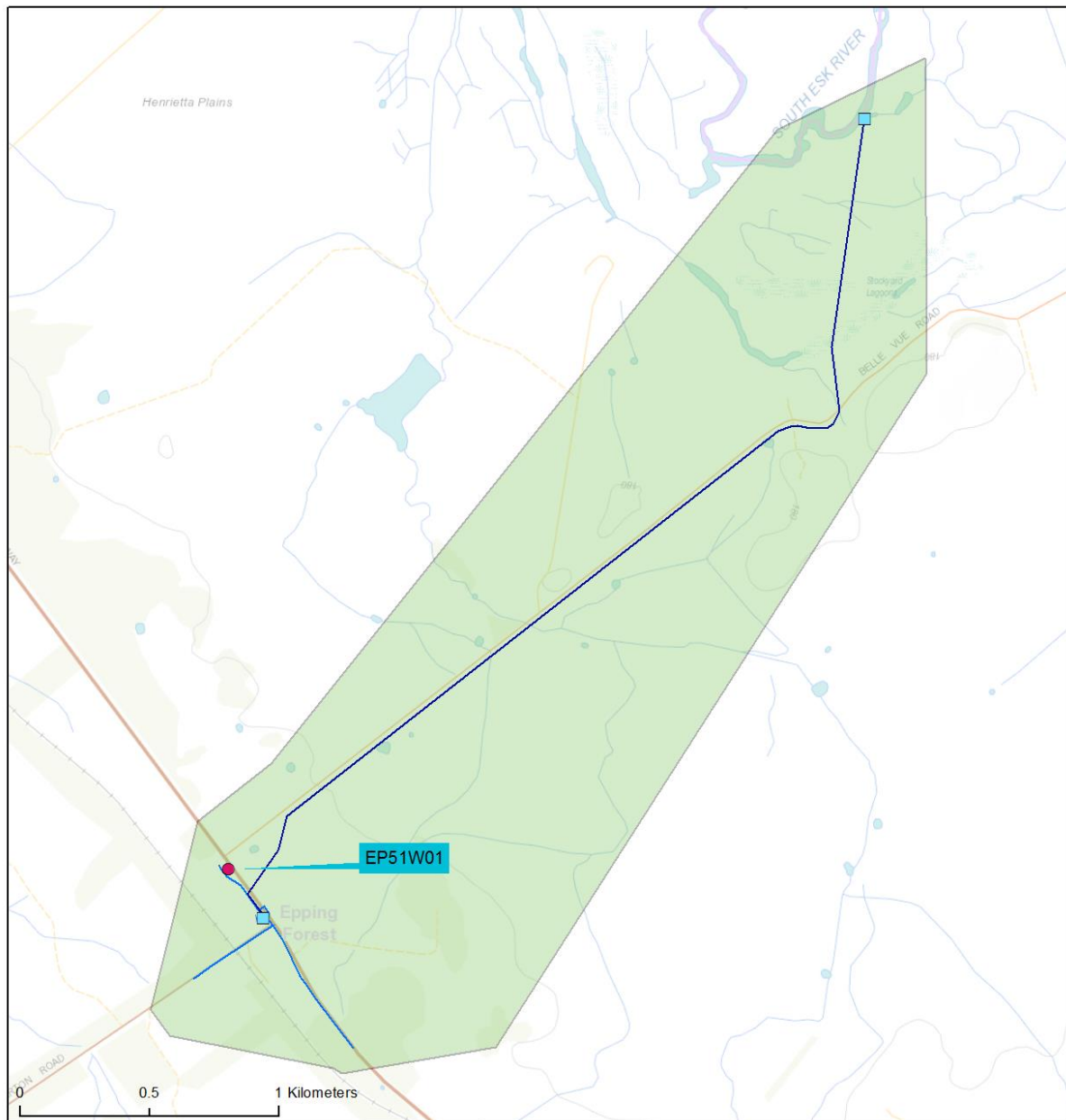
### 6.22.1. System description

Figure 6.22.1-a Epping system schematic



- ❖ **Catchment**  
The Epping drinking water system is supplied by the South Esk River
- ❖ **Treatment**  
The Epping drinking water scheme is a raw water system with chlorine gas disinfection
- ❖ **Distribution**  
The Epping drinking water system supplies 33 connections.

Map 6.22.1-a Epping monitoring zone



EP51W01 = Epping Forest Behind Hall



## 6.22.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.22.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	96.2%	No	●	Weekly	52	2
<b>Fluoride</b> <sup>(2)</sup>	N/A	–	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	88%	No	●	Quarterly	4	2
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	4	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly	4	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.22.3. Summary of historic total system performance

Table 6.22.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)		Performance*									
Parameter group		2011–12	2012–13	2013–14	2014–15	2015–16					
<b>Microbiological</b> <sup>(1)</sup>		98%	●	100%	●	100%	●	96%	●	96.2%	●
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	<b>Distribution fluoride testing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Metals</b> <sup>(3)</sup>		100%	●	100%	●	100%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>		100%	●	100%	●	100%	●	100%	●	88%	●
<b>Pesticides</b> <sup>(4)</sup>		0	●	0	●	0	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>		0		0		2		0		0	
<b>Public alerts issued</b> <sup>(6)</sup>		0	●	0	●	0	●	0	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.22.4. Analysis of current performance and historic trends

- ❖ The DHHS issued a Permanent BWA on 24 March 2016 due to reduced confidence in the disinfection system during variable turbidity events. A lack of filtration barriers means the supply is susceptible to changes in quality from the South Esk River
- ❖ Microbiological compliance for 2015–16 achieved 96.2 per cent and did not meet the requirements of the TDWQG. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP performance for 2015–16 was 88 per cent and does not comply with ADWG. Two detections above ADWG health limits were recorded during this reporting period
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.22.5. Microbiological performance

Figure 6.22.5-a Microbiological compliance 2015–16

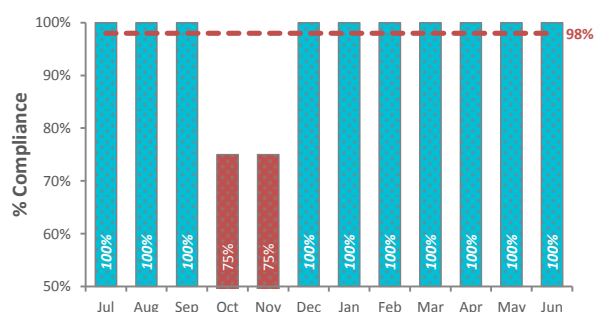
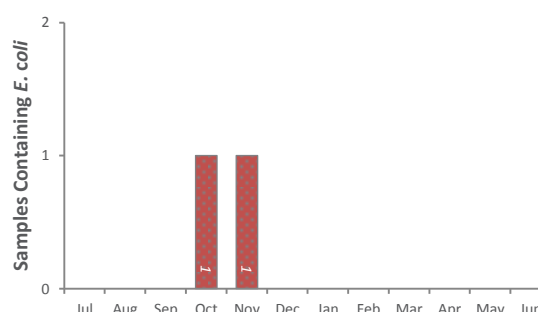


Figure 6.22.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Epping system was 96.2 per cent compliant in 2015–16 and is below the TDWQG requirement of greater than 98 per cent
- ❖ *E. coli* detections occurred in October and November 2015. Based on the review of water quality data and system performance, a reduced level of disinfection over a two-week period led to the exceedances. Unreliable disinfection was due to a lack of filtration barriers creating high chlorine demand and harbouring pathogens from disinfection. In addition, the current system configuration does not allow for an acceptable contact time and therefore effective disinfection cannot be guaranteed
- ❖ DHHS issued a permanent BWA on the 24 March 2016 to mitigate the risk to public health.

### 6.22.6. Fluoride performance

- ❖ This system is not fluoridated.

### 6.22.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.22.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	4	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	4	0	100	8.75	7	13
<b>Cadmium</b>	2	µg/L	4	0	100	0.47	0.2	0.7
<b>Chromium</b>	50	µg/L	4	0	100	< 1	< 1	2
<b>Copper</b>	2000	µg/L	4	0	100	32.25	18	53
<b>Lead</b>	10	µg/L	4	0	100	1.67	1.3	2.3
<b>Manganese</b>	500	µg/L	4	0	100	20.6	15.6	27.3
<b>Mercury</b>	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	4	0	100	0.85	< 0.5	2
<b>Selenium</b>	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	1	75	89	51	120
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	6.12	< 5	9
<b>Trichloroacetic acid</b>	100	µg/L	4	1	75	103.25	52	210
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	87	36	140

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (•) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ Two DBPs exceedances above ADWG health limits in August 2015 from the single sampling event. There are no filtration barriers in this system to remove DBP precursors. Chlorine dosing is adjusted and maintained at target levels that achieve appropriate disinfection.

### 6.22.8. General physical parameters

Table 6.22.8-a General physical performance

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		52	0.67	0.04	2.06
Turbidity (NTU)		52	2.65	0.2	22.2
pH		52	6.68	6.16	7.79

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Chlorine residuals range considerably depending on the turbidity levels. Minimum residuals do not meet the target of greater than 0.1 mg/L. Maximum residuals are required during high turbidity events, however, they create problems with DBPs
- ❖ Turbidity levels recorded in the distribution network frequently exceed the ADWG aesthetic limit of 5 NTU and the optimal level for maintaining effective disinfection of 1 NTU
- ❖ pH levels are maintained within the recommended optimal range..

### 6.22.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.22.10. System incidents and issues

Table 6.22.10-a Identified incidents and issues

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
12/08/2015	Trichloroacetic acid 210 µg/L	Chlorine gas dose trimmed accordingly but not to compromise disinfection. Retests returned clear.	Yes	Yes
12/08/2015	Dichloroacetic acid 120 µg/L		Yes	Yes
27/10/2015	<i>E. coli</i> 1 MPN/100mL	Increased chlorine demand during high turbidity periods and insufficient contact time led to <i>E. coli</i> detections. Subsequently the system was placed on a permanent BWA on the 24 March 2016.	Yes	Yes
3/11/2015	<i>E. coli</i> 1 MPN/100mL		Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.22.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

#### 6.22.12. Catchment and source water issues

- ❖ The Epping drinking water system is supplied by the South Esk River. The South Esk catchment above Fingal covers an area of 118,851 ha. Major land uses within the catchment include native bushland, forestry, grazing, and cropping. There is also some recreational activity, historic and current mining activities, Level 1 & 2 wastewater treatment plant discharge and a number of properties/communities utilising onsite wastewater management systems. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.22.13. Infrastructure and operational changes

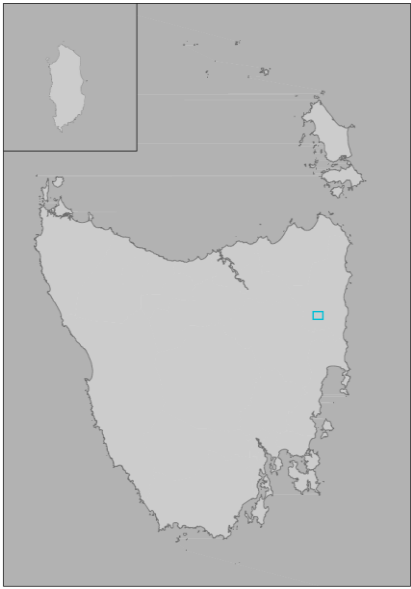
- ❖ DHHS issued a permanent BWA on the 24 March 2016 to mitigate the risk to public health.

#### 6.22.14. Future planning

**Table 6.22.14-a Future planning for the system**

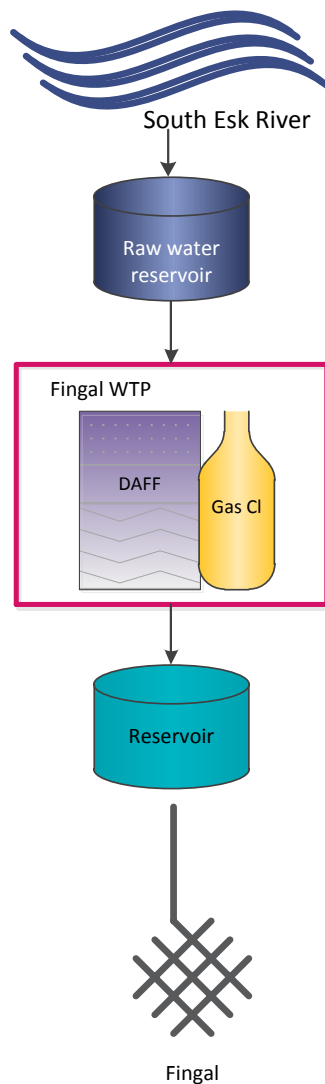
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Epping supply options	Investigation into options to improve water quality supplied to Epping	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

### 6.23. Fingal drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	308
	<b>Catchment</b>	South Esk River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Fingal.</li> </ul>		

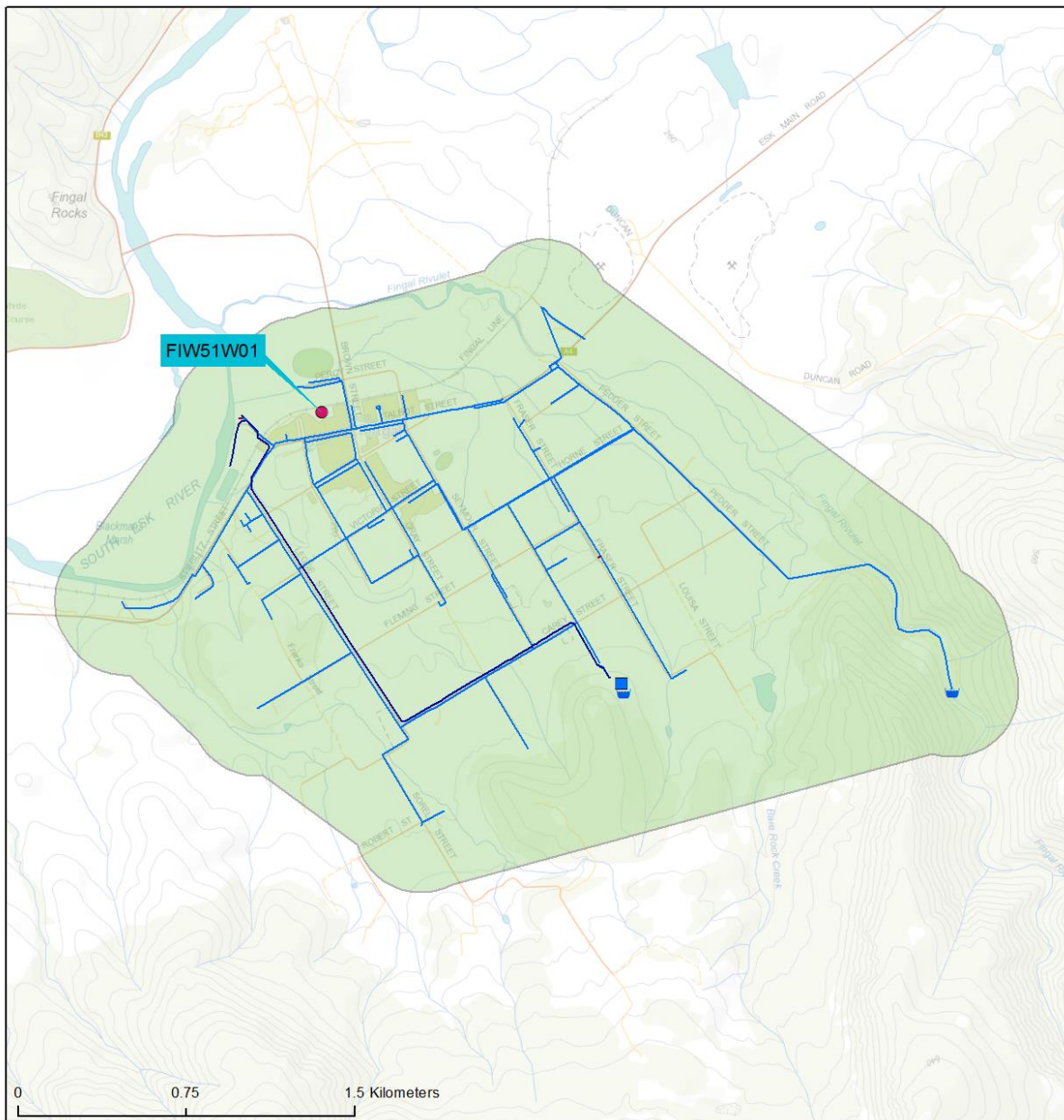
### 6.23.1. System description

Figure 6.23.1-a Fingal System schematic



- ❖ **Catchment**  
The Fingal drinking water system is supplied by the South Esk River
- ❖ **Treatment**  
The Fingal WTP employs DAFF and gas chlorine disinfection
- ❖ **Distribution**  
There is one roofed service reservoir, connected via a common line in the distribution system. The Fingal drinking water system supplies 308 connections.

Map 6.23.1—a Fingal monitoring zone



FIW51W01 = Miners Park



## 6.23.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.23.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes	●	Weekly	52	0
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	4	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly	4	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.23.3. Summary of historic total system performance

Table 6.23.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	53%	●	30%	●	29%	●	97%	●	100%	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
<b>Metals</b> <sup>(3)</sup>	97%	●	100%	●	98%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		100%	●	100%	●
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>	5		2		6		4		2	
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.23.4. Analysis of current performance and historic trends

- ❖ A new WTP was commissioned and the Permanent BWA was lifted in November 2015
- ❖ Microbiological compliance for 2015–16 achieved greater than 98 per cent of samples free of *E. coli*. Significant improvement to microbiological compliance is evident over the past five years
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.23.5. Microbiological performance

Figure 6.23.5-a Microbiological compliance 2015–16

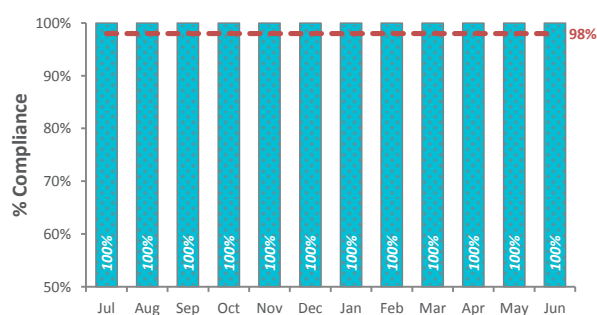


Figure 6.23.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.23.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.23.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.23.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	4	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	4	0	100	7.75	6	9
<b>Cadmium</b>	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	4	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	4	0	100	12	7	20
<b>Lead</b>	10	µg/L	4	0	100	< 0.5	< 0.5	0.5
<b>Manganese</b>	500	µg/L	4	0	100	3.98	0.8	8.5
<b>Mercury</b>	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Selenium</b>	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	14.5	10	17
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	10.5	8	14
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	32	20	47

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.23.8. General physical parameters

Table 6.23.8-a General physical performance

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		52	0.57	0.1	1.17
Turbidity (NTU)		52	0.34	0.1	2.3
pH		52	7.36	6.72	8.17

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.23.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.23.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.23.11. Customer complaints

Figure 6.23.11-a Complaint classification

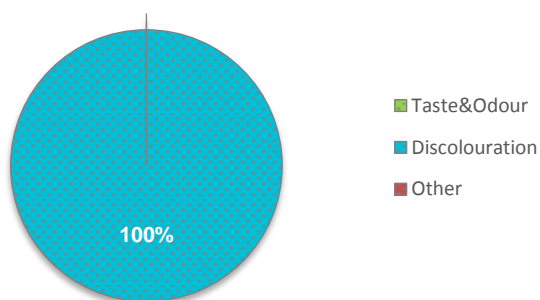
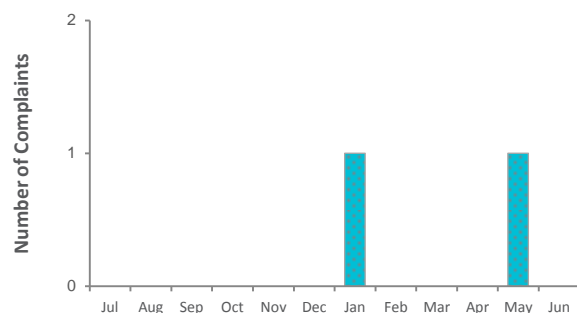


Figure 6.23.11-b Seasonal trend analysis



- ❖ Two complaints were received relating to water discolouration issues.

#### 6.23.12. Catchment and source water issues

- ❖ The Huon River catchment covers an area of 224,004 ha. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals.
- ❖ No health regulated pesticides were detected in the raw water monitoring program.


#### 6.23.13. Infrastructure and operational changes

- ❖ A new WTP was commissioned and the BWA was lifted in November 2015.

#### 6.23.14. Future planning

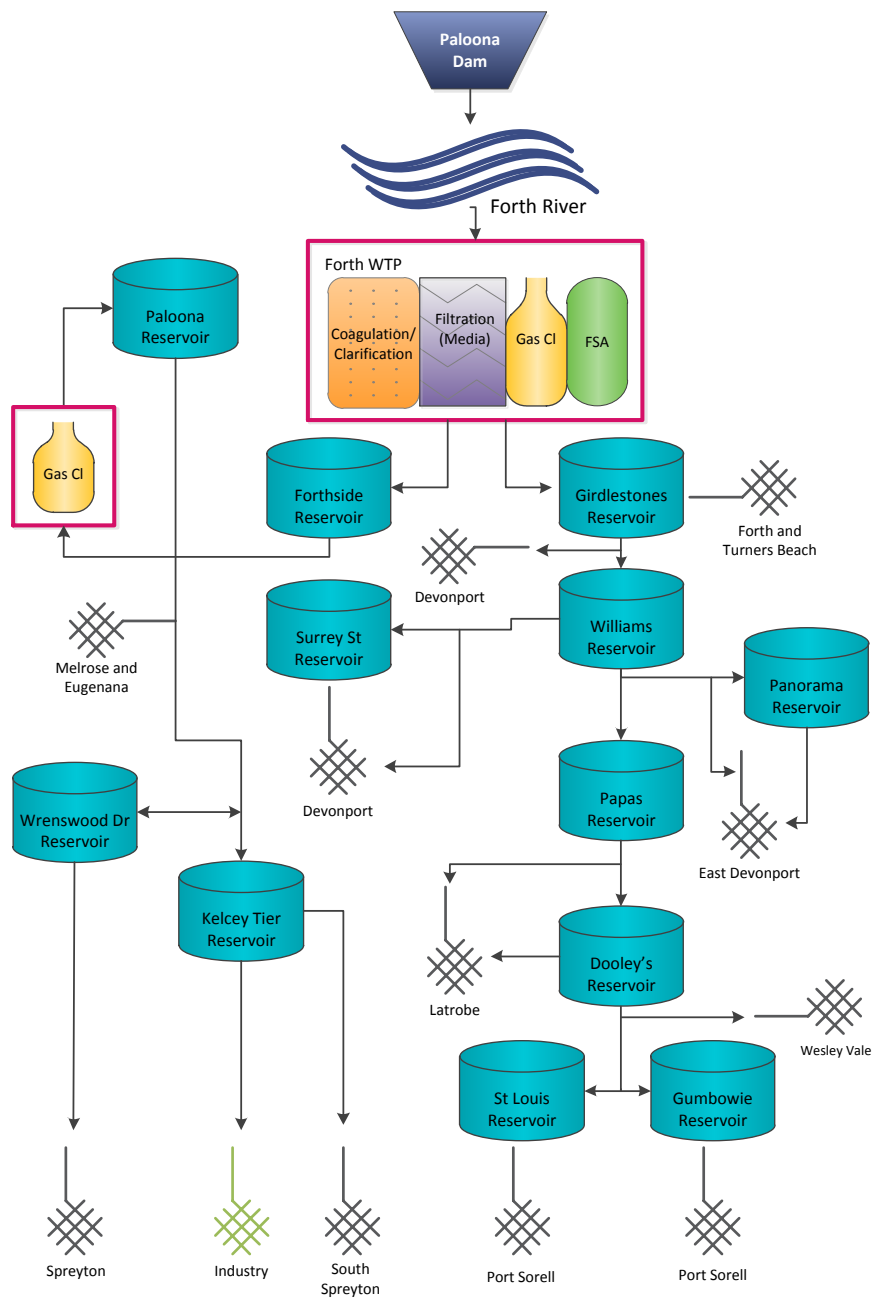
- ❖ No water quality improvement projects are planned for the current 2016–2018 PSP period.

## 6.24. Forth drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	18,300
	<b>Catchment</b>	Forth River
	<b>Primary treatment</b>	Coagulation/clarification
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Forth</li> <li>❖ Leith</li> <li>❖ Devonport</li> <li>❖ Spreyton</li> <li>❖ East Devonport</li> <li>❖ Latrobe</li> <li>❖ Wesley Vale</li> <li>❖ Port Sorell.</li> </ul>		

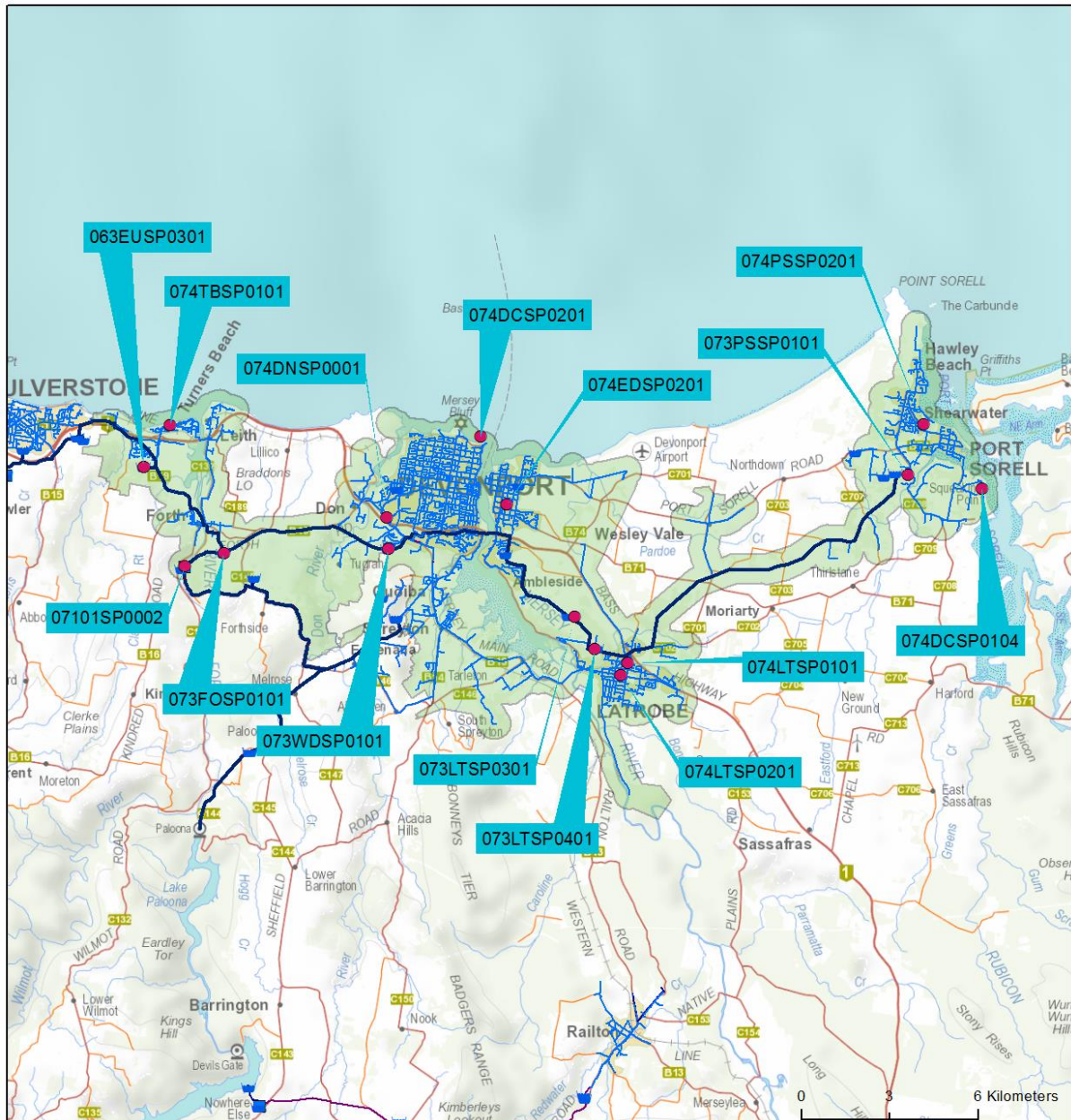
### 6.24.1. System description

Figure 6.24.1-a Forth system schematic



- ❖ **Catchment**  
The Forth drinking water system is supplied by the Forth River
- ❖ **Treatment**  
The Forth WTP employs coagulation, clarification, media filtration, chlorine gas disinfection and fluoridation by fluorosilicic acid
- ❖ **Distribution**  
All storage reservoirs in the reticulation system are roofed. The Forth drinking water system supplies 18,300 connections.

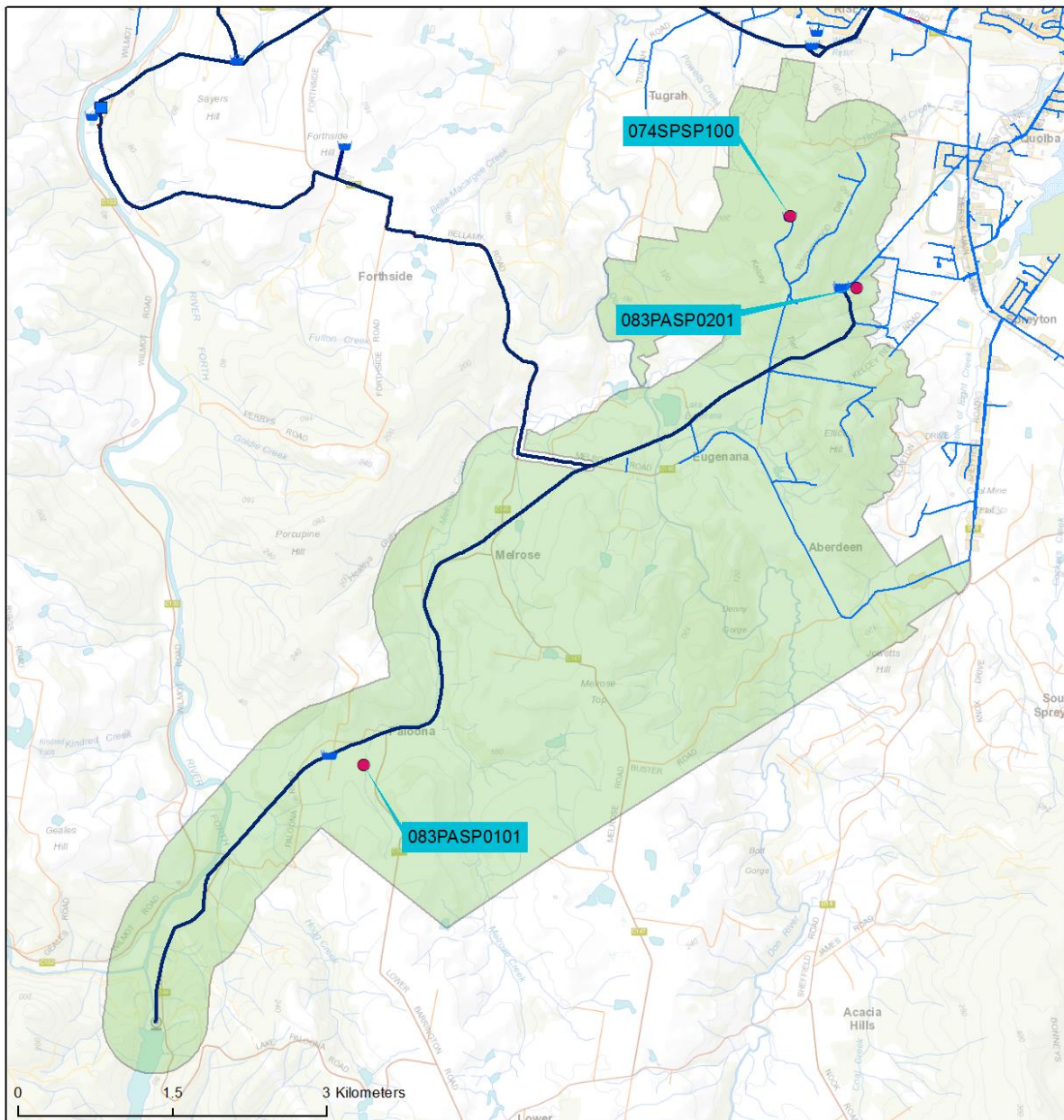
Map 6.24.1—a Forth monitoring zone



07101SP0002 = Clear Water Outlet, 073FOSP0101 = Girdlestones Res, 074DNSP0001 = Mackay's Castings,  
 074DCSP0201 = Mersey Bluff Surf Club, 074DCSP0103 = Panorama Reservoir, 07101SP0001 = Raw Water, 073WDSP0101 = Williams Res,  
 074EDSP0201 = Wright St, 073PSSP0101 = Port Sorell Res, 073LTSP0301 = Little Papas Res, 073LTSP0401 – Dooleys Res,  
 074LTSP0201 = Latrobe Town Hall, 074TBSP0101 = Turners Beach Esplanade, 074DCSP0104 = Shannon Drive, 063EUSP0301 = Stubbs Res.



### Map 6.24.1–b Lake Palooa monitoring zone



083PASP0101 = Palooa Res, 083PASP0201 = Big Kelcey Res, 074SPSP100 = Wrenswood Drive

## 6.24.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.24.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	630	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	101	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Monthly	54	0	
Metals <sup>(4)</sup>	100%	Yes ●	Monthly	59	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.24.3. Summary of historic total system performance

Table 6.24.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12	2012–13	2013–14	2014–15	2015–16					
Microbiological <sup>(1)</sup>	99.3%	●	100%	●	99.8%	●	100%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	0	●	0	●	0	●	●
	within target range <sup>(b)</sup>	N/A	N/A	97.8%	●	100%	●	100%	●	●
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	0.98	●	1.01	●	1.01	●	●
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	0	●	0	●	0	●
	within target range <sup>(b)</sup>	N/A	N/A	N/A	93%	●	93.1%	●	93.1%	●
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	0.94	●	0.93	●	0.93	●	
Metals <sup>(3)</sup>	N/A	N/A	100%	●	99.4%	●	100%	●	100%	●
DBPs <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●	100%	●
Pesticides <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Complaints received <sup>(5)</sup>	Not recorded	Not recorded	42	20	58					
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.24.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits

#### 6.24.5. Microbiological performance

Figure 6.24.5-a Microbiological compliance 2015–16

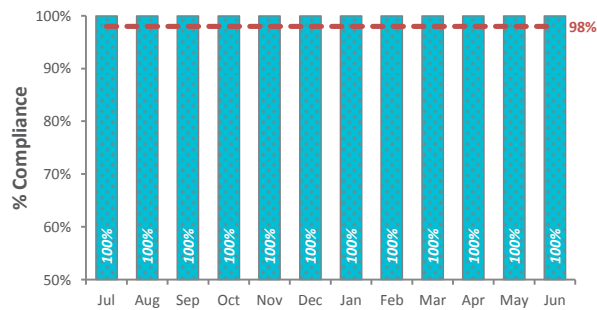


Figure 6.24.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.24.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.24.6-a Operational samples within target range

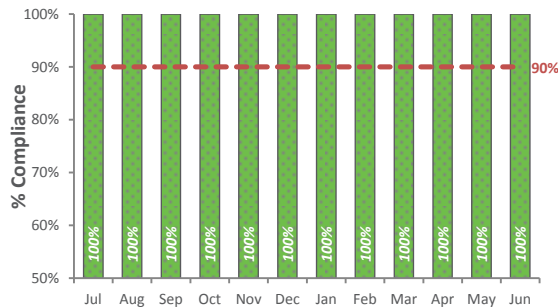


Figure 6.24.6-b Operational mean monthly dose (mg/L)

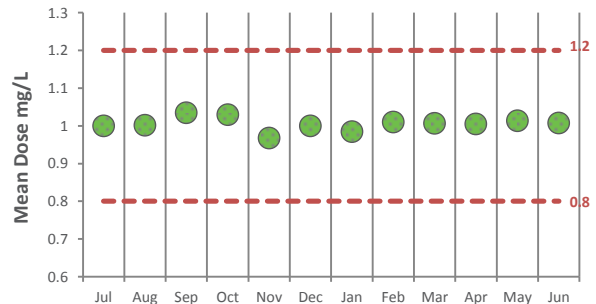
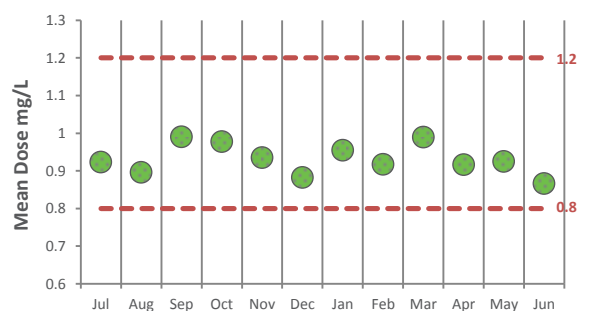
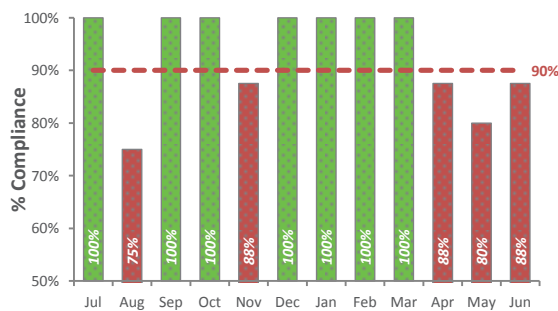


Figure 6.24.6-c Reticulation samples within target range Figure 6.24.6-d Reticulation samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ Performance in the distribution network is variable and is currently under review
- ❖ No sample exceeded the ADWG health limit of 1.5mg/L.

## 6.24.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.24.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	59	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	59	0	100	< 1	< 1	< 1
Barium	2000	µg/L	59	0	100	8.78	5	16
Cadmium	2	µg/L	59	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	59	0	100	< 1	< 1	1
Copper	2000	µg/L	58	0	100	10.181	0.5	141
Lead	10	µg/L	59	0	100	< 0.5	< 0.5	2.6
Manganese	500	µg/L	59	0	100	5.22	0.8	56.6
Mercury	1	µg/L	59	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	58	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	59	0	100	< 0.5	< 0.5	0.6
Selenium	10	µg/L	59	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	54	0	100	16.64	< 1	50
Monochloroacetic acid	150	µg/L	54	0	100	< 5	< 5	36
Trichloroacetic acid	100	µg/L	54	0	100	24.56	8	56
Total trihalomethanes	250	µg/L	54	0	100	37.91	8.6	71

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.24.8. General physical parameters

Table 6.24.8-a General physical performance

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		628	0.35	0	2.2
Turbidity (NTU)		621	0.37	0.1	7.1
pH		628	7.53	5.84	9.23

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the majority of the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation generally do not meet the target of >0.1 mg/L. Re-chlorination does not occur in these zones and subsequently residuals are variable
- ❖ Mean pH was within the ADWG’s optimal range for disinfection. The Forthside – Paloona side of the system has higher pH which is associated with the water’s interaction with new infrastructure.

### 6.24.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.24.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.24.11. Customer complaints

Figure 6.24.11-a Complaint classification

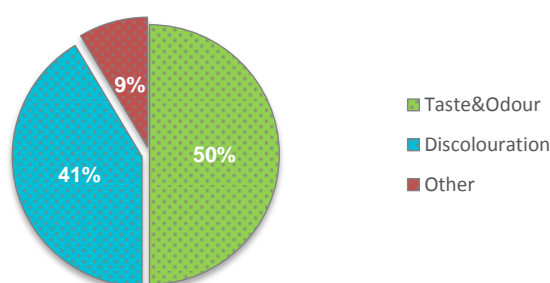
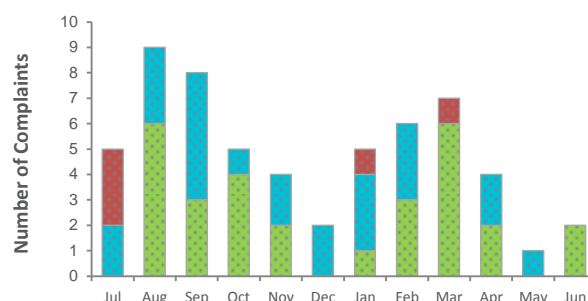


Figure 6.24.11-b Seasonal trend analysis



- ❖ Fifty eight complaints were received in the reporting period. This was a significant increase from previous reporting years. Twenty four complaints related to discolouration issues, most related to works completed within the reticulation system or were isolated complaints which required localised flushing. Twenty nine complaints related to taste and odour, mostly related to elevated chlorine in areas which had historically lower levels.

### 6.24.12. Catchment and source water issues

- ❖ The Forth drinking water system is supplied by the Forth River, downstream of Hydro Tasmania's Palooka dam. The catchment covers 4,175ha and is primarily bushland and agricultural land. Activities in the catchment include forestry, dairy farming, grazing, irrigated cropping and some residential properties with septic tanks.
- ❖ No health regulated pesticides detected in the raw water monitoring program.

### 6.24.13. Infrastructure and operational changes


- ❖ Flooding within the Forth River caused significant damage to the treated water storage in early June 2016. This resulted in the operation of the plant being altered to compensate for the loss of the asset. The change in operation has not resulted in any change to water quality but has increased operational costs associated with daytime pumping.

### 6.24.14. Future planning

Table 6.24.14-a Future planning for the system

Project	Description	Progress	Anticipated Delivery	Estimated Spend
Forth WTP optimisation	Works to optimise WTP processes, including the addition of a second clarifier	Business Case is in progress.	2018	\$4.4 million

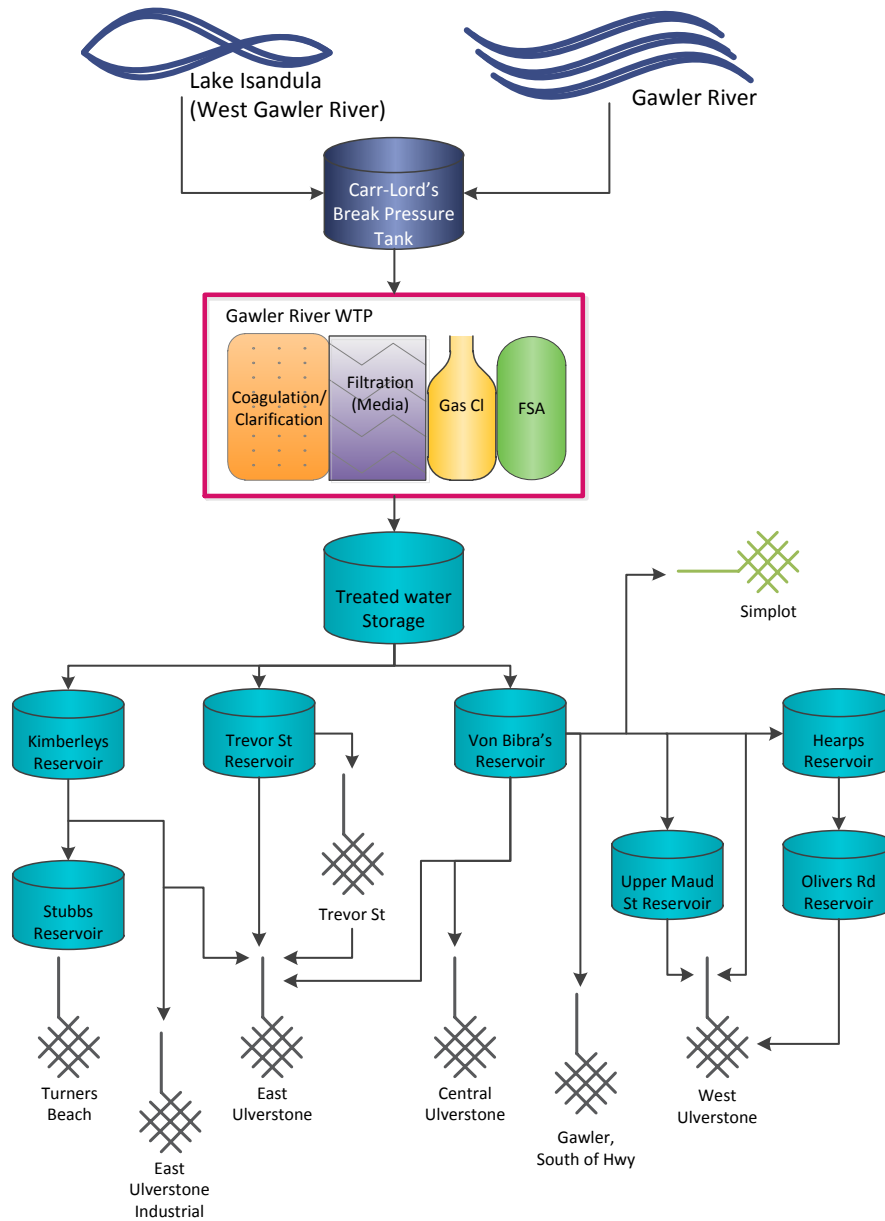
## 6.25. Gawler drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	5,212
	<b>Catchment</b>	Gawler River
	<b>Primary treatment</b>	Coagulation/clarification
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Ulverstone</li> <li>❖ Turners Beach</li> <li>❖ Gawler.</li> </ul>		



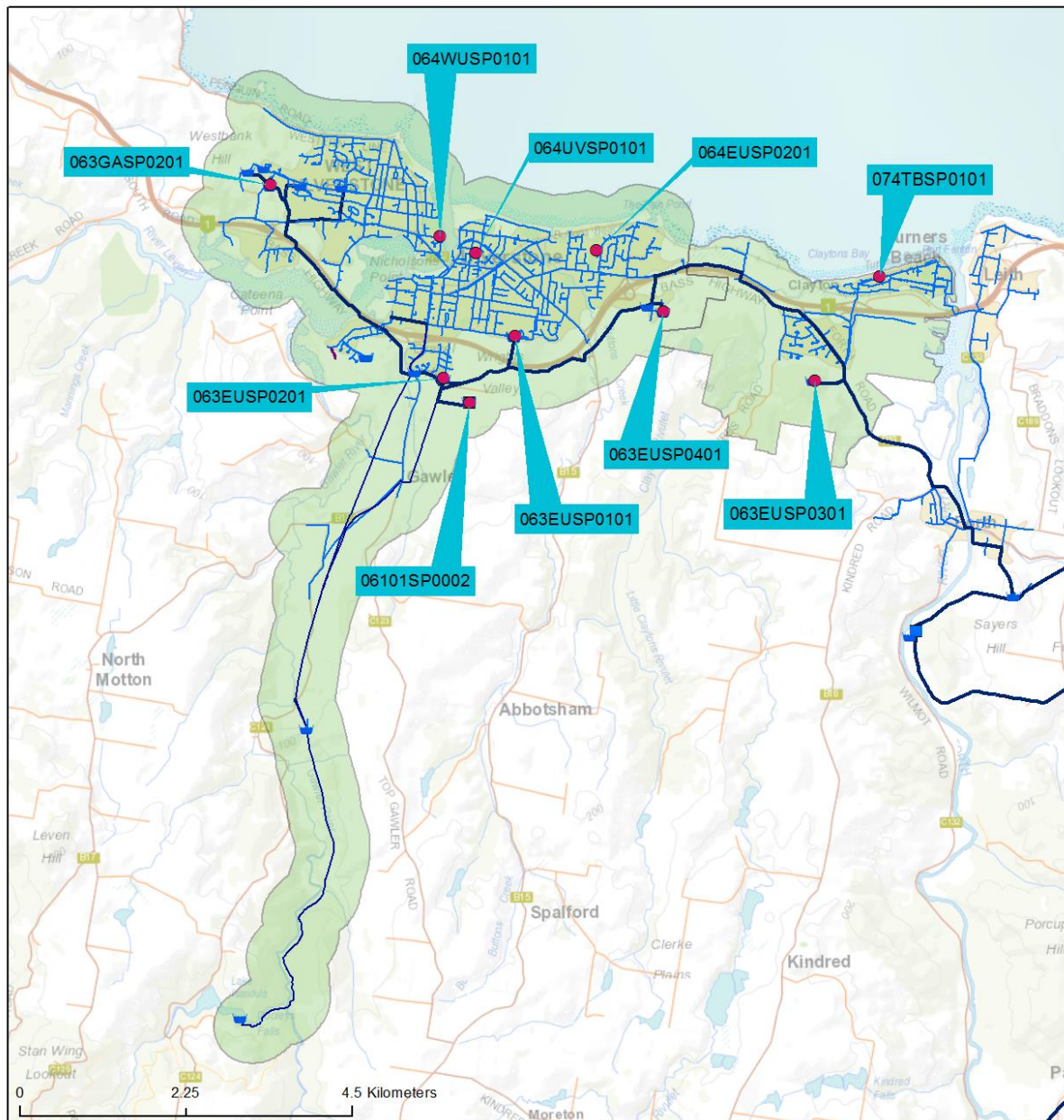
## 6.25.1. System description

Figure 6.25.1-a Gawler system schematic



- ❖ **Catchment**  
The Gawler drinking water system is supplied by Lake Isandula and the Gawler River
- ❖ **Treatment**  
The Gawler River WTP employs coagulation, clarification, media filtration, chlorine gas disinfection and fluoridation by fluorosilicic acid
- ❖ **Distribution**  
There are eight roofed reservoirs within the distribution system, with some interconnections. Some tanks are able to supply multiple zones. The Gawler drinking water system supplies 5,212 connections to the Ulverstone area.

Map 6.25.1—a Gawler monitoring zone



064WUSP0101 = Flora St West Ulverstone, 063GASP0201 = Hearps Res, 063EUSP0101 = Heazlewood Res, 063EUSP0401 = Kimberley Res, 063WUSP0102 = Oliver's Rd Res, 063EUSP0301 = Stubbs Res, 064UVSP0101 = Ulverstone Council Chambers, 064EUSP0201 = Ulverstone Swimming Pool, 063EUSP0201 = Von Bibra Res, 06101SP0002 = WTP Treated Storage.

## 6.25.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.25.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99.8%	Yes ●	Weekly	420	1	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	102	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	33	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	22	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.25.3. Summary of historic total system performance

Table 6.25.3-a Historic trends

Parameter group	Performance <sup>*</sup>										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	99.8%	●	100%	●	100%	●	99.7%	●	99.8%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		0	●	0	●	0	●
	within target range <sup>(b)</sup>	N/A		N/A		97.3%	●	98%	●	99.5%	●
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		0.91	●	0.99	●	1.02	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		0	●	0	●
	within target range <sup>(b)</sup>	N/A		N/A		N/A		51%	●	93.7%	●
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		0.80	●	0.96	●	
Metals <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	N/A		N/A		N/A		N/A		N/A		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		27		15		66		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2013 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.25.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range. A significant improvement was made with fluoride compliance within the distribution system compared with previous reporting year
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.25.5. Microbiological performance

Figure 6.25.5-a Microbiological compliance 2015–16

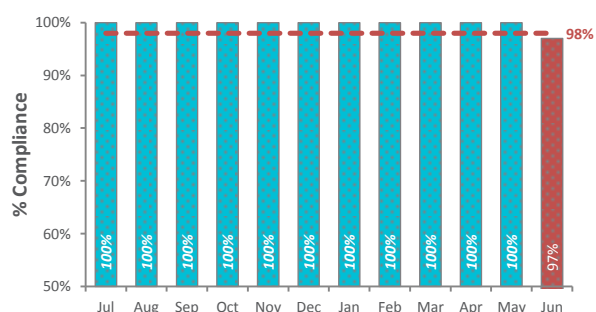


Figure 6.25.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Gawler system was 99.8 per cent compliant in 2015–16. *E. coli* was detected in one weekly sample during the reporting period
- ❖ An *E. coli* strike occurred in June 2016 with a detection of 1 MPN/100 mL. Water quality characteristics indicated good chlorine residual and low turbidity. A re-test was conducted which confirmed the system was free of *E. coli* and microbiological contamination.

## 6.25.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.25.6-a Reticulation samples within target range

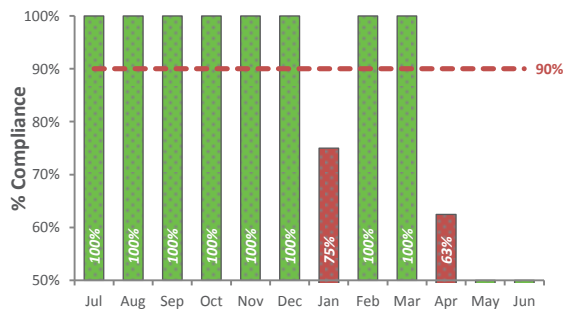


Figure 6.25.6-b Reticulation mean monthly dose (mg/L)

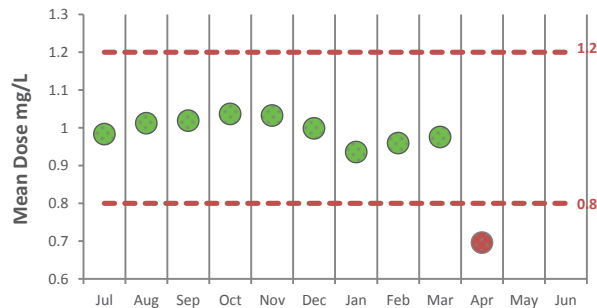


Figure 6.25.6-c Operational samples within target range

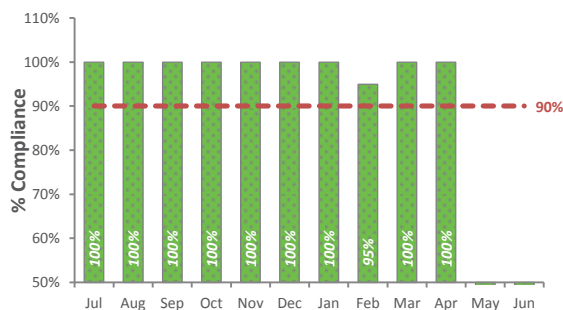
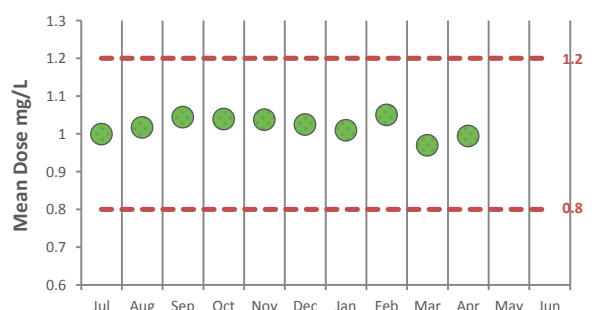


Figure 6.25.6-d Operational samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ No sample exceeded the ADWG health limit of 1.5 mg/L
- ❖ The dosing station was off line from April 2016 through to end of reporting period to replace the fluoride day tank and load cells. DHHS was notified of the planned maintenance.

## 6.25.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.25.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	22	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	22	0	100	< 1	< 1	< 1
Barium	2000	µg/L	22	0	100	15.5	9	23
Cadmium	2	µg/L	22	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	22	0	100	< 1	< 1	< 1
Copper	2000	µg/L	12	0	100	6.2917	0.5	10
Lead	10	µg/L	22	0	100	< 0.5	< 0.5	0.7
Manganese	500	µg/L	22	0	100	19.93	2.8	58
Mercury	1	µg/L	22	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	12	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	22	0	100	1.66	< 0.5	4.3
Selenium	10	µg/L	22	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	33	0	100	10.94	< 1	50
Monochloroacetic acid	150	µg/L	33	0	100	< 5	< 5	27
Trichloroacetic acid	100	µg/L	33	0	100	21.82	3	51
Total trihalomethanes	250	µg/L	33	0	100	51.91	20	82

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.25.8. General physical parameters

**Table 6.25.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		419	0.41	0	1.72
Turbidity (NTU)		419	0.34	0.2	1.1
pH		418	7.34	6.52	8.26

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Gawler water system were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation generally do not meet the target of greater than 0.1 mg/L
- ❖ pH levels are maintained within the recommended optimal range.

## 6.25.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

## 6.25.10. System incidents and issues

**Table 6.25.10-a Identified incidents and issues**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
9/06/2016	<i>E. coli</i> detection	Immediate resampling was free from contamination and an investigation determined the possible cause was contamination during sampling/analysis.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.



### 6.25.11. Customer complaints

Figure 6.25.11-a Complaint classification

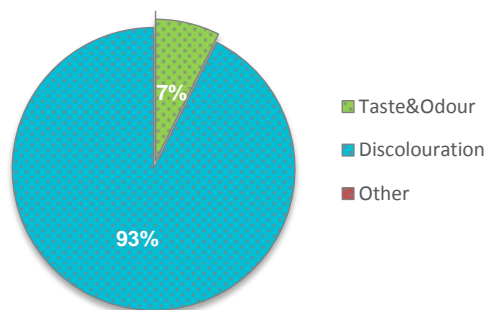
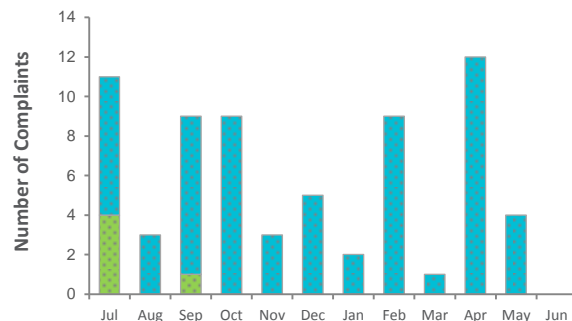


Figure 6.25.11-b Seasonal trend analysis



- ❖ Sixty eight complaints were received in this reporting period. Sixty three complaints were relating to discoloured water issues. A major flushing program was undertaken in West Ulverstone which alleviated poor trends within that part of the distribution system. Major main breaks caused by external parties in February and April 2016 resulted in a spike in complaints from consumers in the immediate areas. Five further complaints related to taste and odour issues.

### 6.25.12. Catchment and source water issues

- ❖ The Gawler drinking water system is supplied by Lake Isandula and the Gawler River. Activities in the drinking water catchment include agriculture, forestry, animal husbandry, cropping and residential properties with septic tanks. Based on catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

### 6.25.13. Infrastructure and operational changes

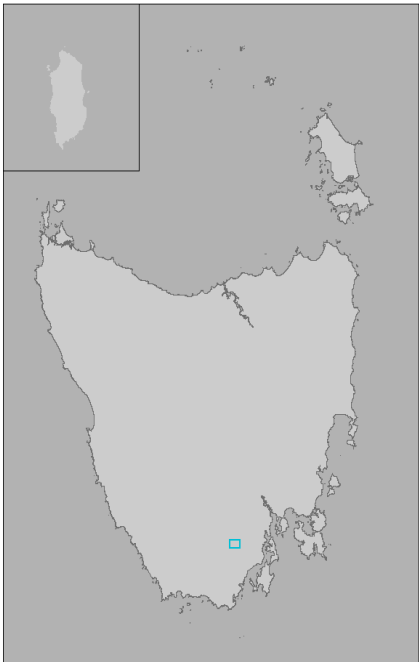
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.25.14. Future planning

- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

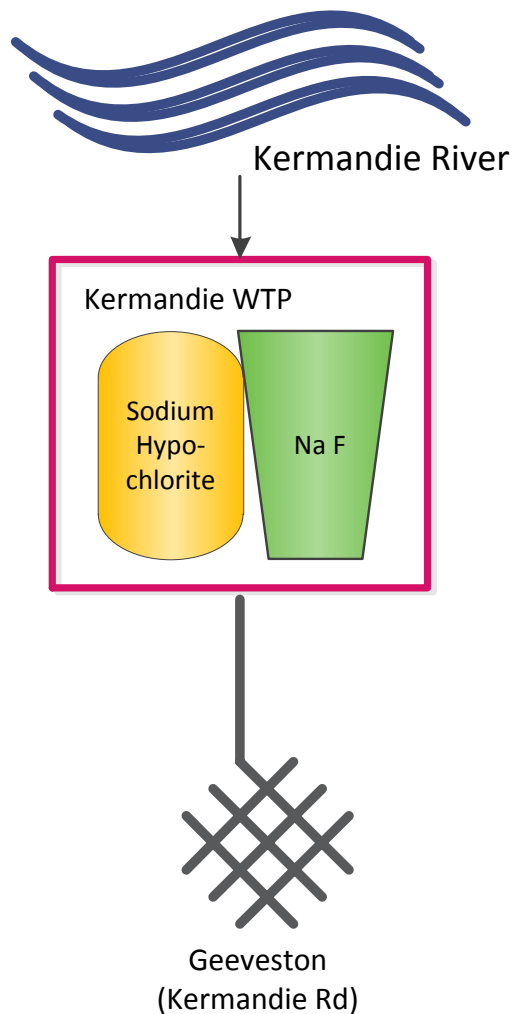


## 6.26. Geeveston Kermandie Road drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	<20
	<b>Catchment</b>	Kermandie River
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Geeveston (parts of Kermandie Road)</li> </ul>		

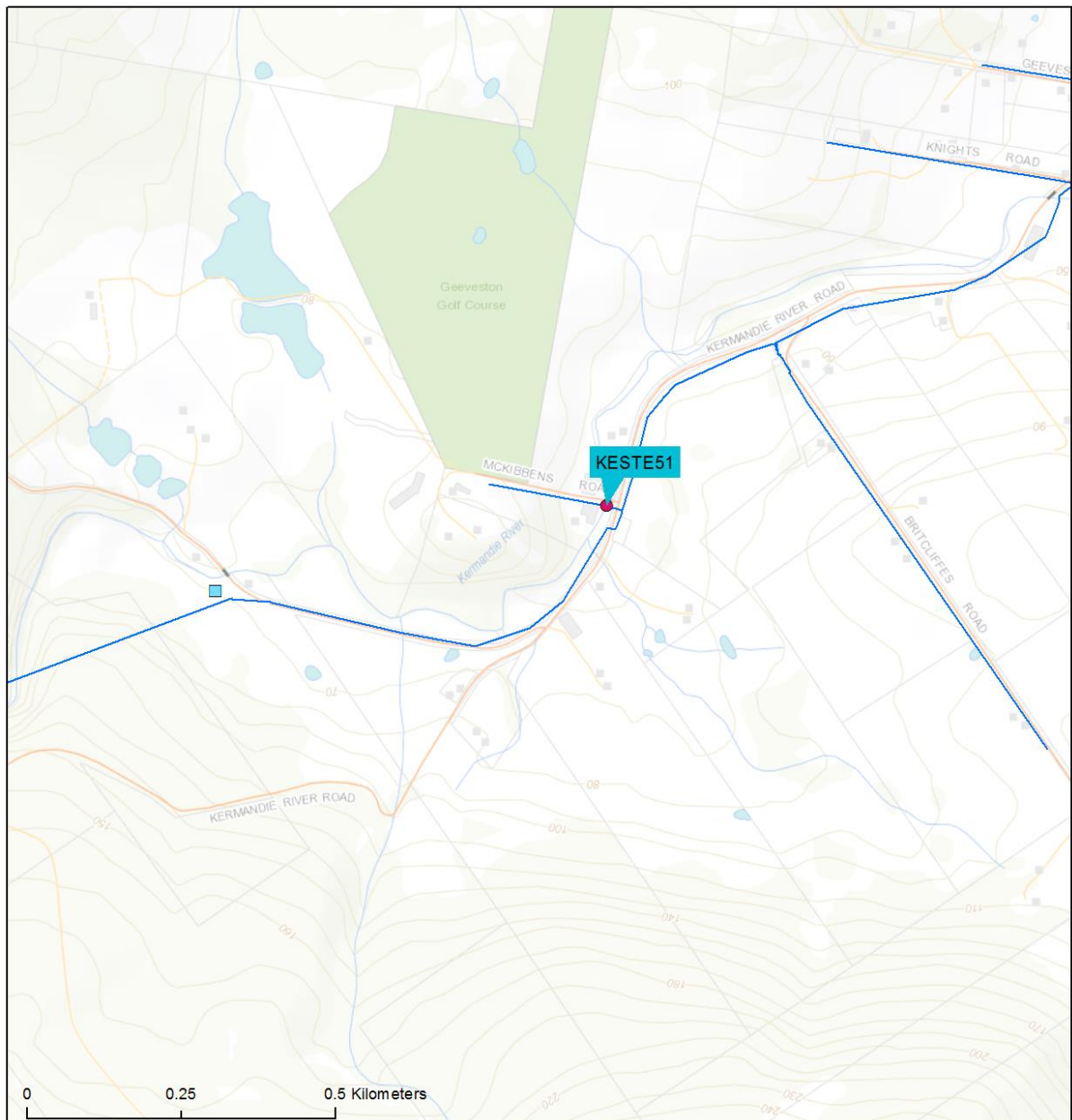
### 6.26.1. System description

Figure 6.26.1-a Kermandie Road system schematic



- ❖ Catchment  
The Geeveston – Kermandie Rd, drinking water system is supplied by the Kermandie River
- ❖ Treatment  
The Kermandie road WTP employs sodium hypochlorite disinfection prior to fluoridation by sodium fluoride
- ❖ Distribution  
Treated water is supplied to <20 connections.

Map 6.26.1—a Kermadie Road monitoring zone



KESTE51 = Crn McKibens Rd (Regular Compliance Point)

## 6.26.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.26.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	N/A	Weekly <sup>#</sup>	20	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly <sup>#</sup>	18	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	2	0	
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly <sup>#</sup>	1	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) System operated and reported from 1 July 2015 until 25 November 2015. System supplied via Huon Valley from 26 November 2016.

## 6.26.3. Summary of historic total system performance

Table 6.26.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	100%	●	98%	●	N/A		
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	98.6%	●	86.6%	●	93.8%	●	97.8%	●	93.4%	●
	mean dose (mg/L) <sup>(c)</sup>	0.93	●	0.92	●	0.98	●	0.95	●	0.94	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Required		Not Required		Not Reported		75%	●	66%	●
mean dose (mg/L) <sup>(c)</sup>	Not Required		Not Required		Not Reported		0.98	●	0.87	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	N/A		N/A		N/A		N/A		N/A		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		1		0		0		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2013 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

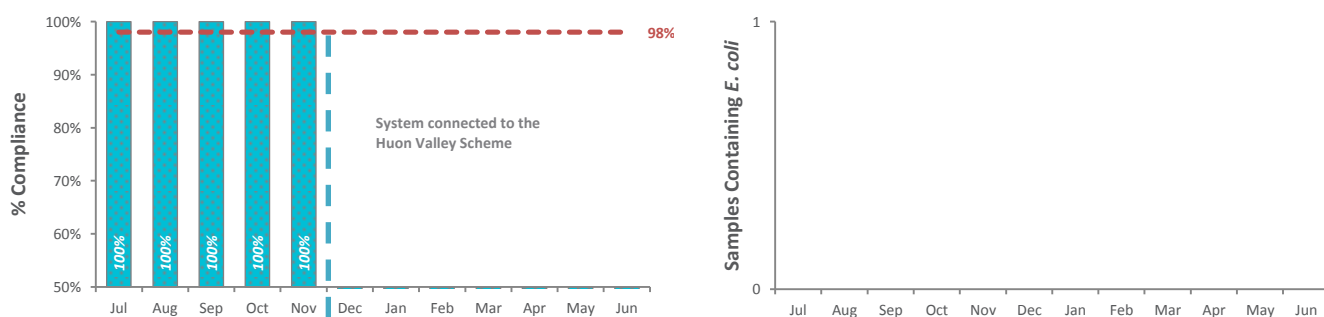
#### 6.26.4. Analysis of current performance and historic trends

- ❖ A microbiological compliance statistic cannot be provided for this system as 52 weekly samples were not tested. The system was connected to the Huon Valley regional water scheme on 25 November 2015; see Huon Valley drinking water system on page 323 for more performance details. Microbiological performance from July to November 2015 was 100 per cent
- ❖ Fluoride compliance for 2015–16 continued to meet the compliance target of greater than 90 per cent of samples within target range. No samples exceeded the ADWG health limit of 1.5 mg/L
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits

#### 6.26.5. Microbiological performance

Figure 6.26.5-a Microbiological compliance 2015–16

Figure 6.26.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.26.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.26.6-a Reticulation samples within target range

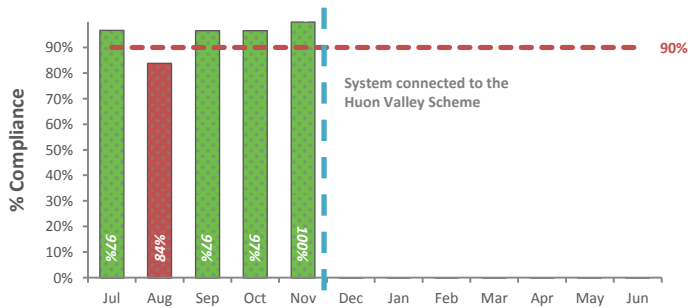


Figure 6.26.6-b Reticulation mean monthly dose (mg/L)

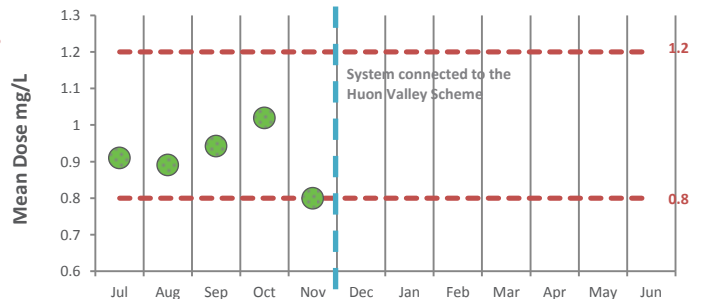


Figure 6.26.6-c Operational samples within target range

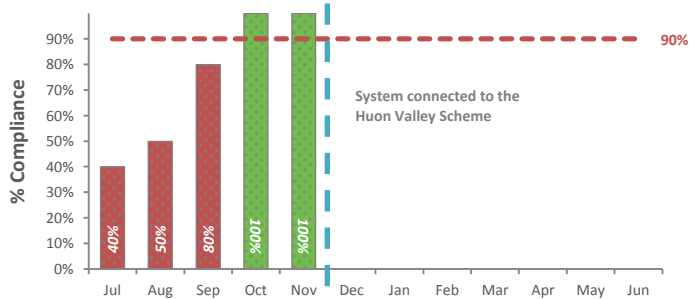
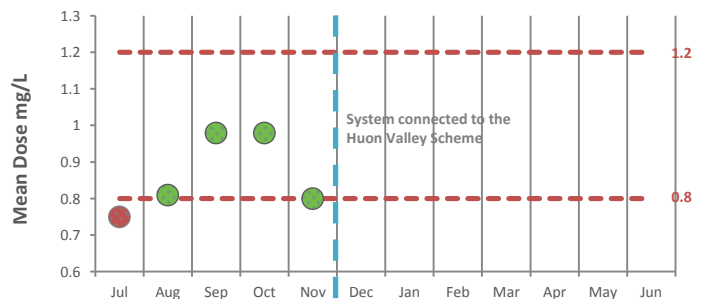


Figure 6.26.6-d Operational samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Fluoride compliance at the dosing point for the duration between 1 July until 27 October 2015 failed to meet percentage compliance within target range. The system was connected to the Huon Valley regional water scheme on the 25 November 2015
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.26.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.26.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	1	0	100	< 1	< 1	< 1
Barium	2000	µg/L	1	0	100	2	2	2
Cadmium	2	µg/L	1	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	1	0	100	< 1	< 1	< 1
Copper	2000	µg/L	1	0	100	4	4	4
Lead	10	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	1	0	100	2.9	2.9	2.9
Mercury	1	µg/L	1	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	1	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	1	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	2	0	100	23.5	< 4	45
Monochloroacetic acid	150	µg/L	2	0	100	< 5	< 5	> 5
Trichloroacetic acid	100	µg/L	2	0	100	31	21	41
Total trihalomethanes	250	µg/L	2	0	100	33	29	37

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.26.8. General physical parameters

**Table 6.26.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		20	0.13	0	0.34
Turbidity (NTU)		20	0.98	0.2	1.9
pH		20	7.17	6.68	7.49

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. **(Chlorine residuals)** are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. **(Turbidity)** levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. **(pH)** should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean chlorine residuals measured across the distribution network, were above minimum expectations. Fluctuations in levels were observed due to the fact the source water is unfiltered providing an unstable chlorine demand.
- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU. Turbidity levels also fluctuate due to the lack of a filtration barrier.
- ❖ pH levels are maintained within the recommended optimal range.

## 6.26.9. Aesthetic issues

- ❖ This system has persistent issues with organic colour above the aesthetic limit of 15 NTU.

## 6.26.10. System incidents and issues

- ❖ No water quality issues were identified during the time this system was in operation within this reporting period.

## 6.26.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

## 6.26.12. Catchment and source water issues

- ❖ The drinking water catchment is consists of state forest, road infrastructure, a small number of residential properties with septic tanks and limited recreation.



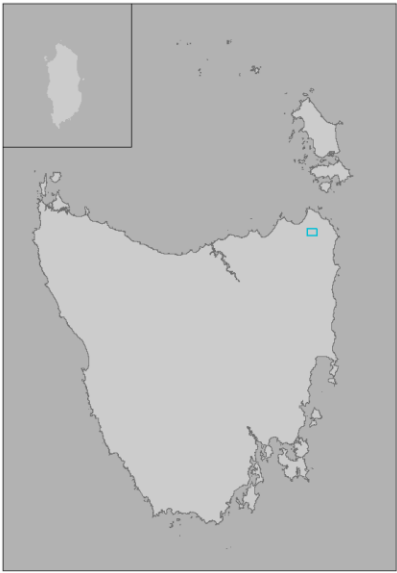
#### 6.26.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during the time this system was in operation within this reporting period.
- ❖ The system was connected to the Huon Valley Regional Water Scheme in November 2015.

#### 6.26.14. Future planning

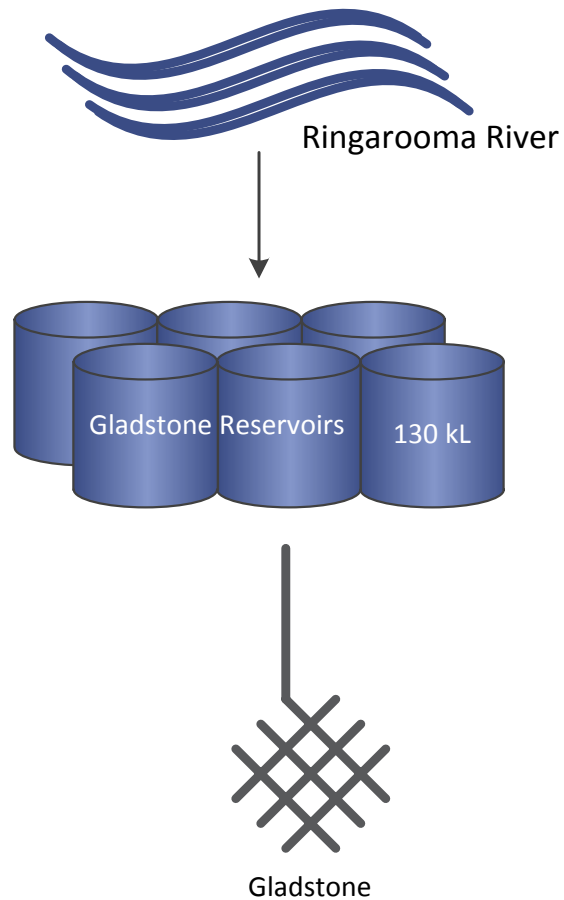
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.27. Gladstone drinking water system

	<b>Current status</b>	<b>Permanent Boil Water Alert</b>
	<b>Total connections</b>	88
	<b>Catchment</b>	Gladstone
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Gladstone.</li> </ul>		

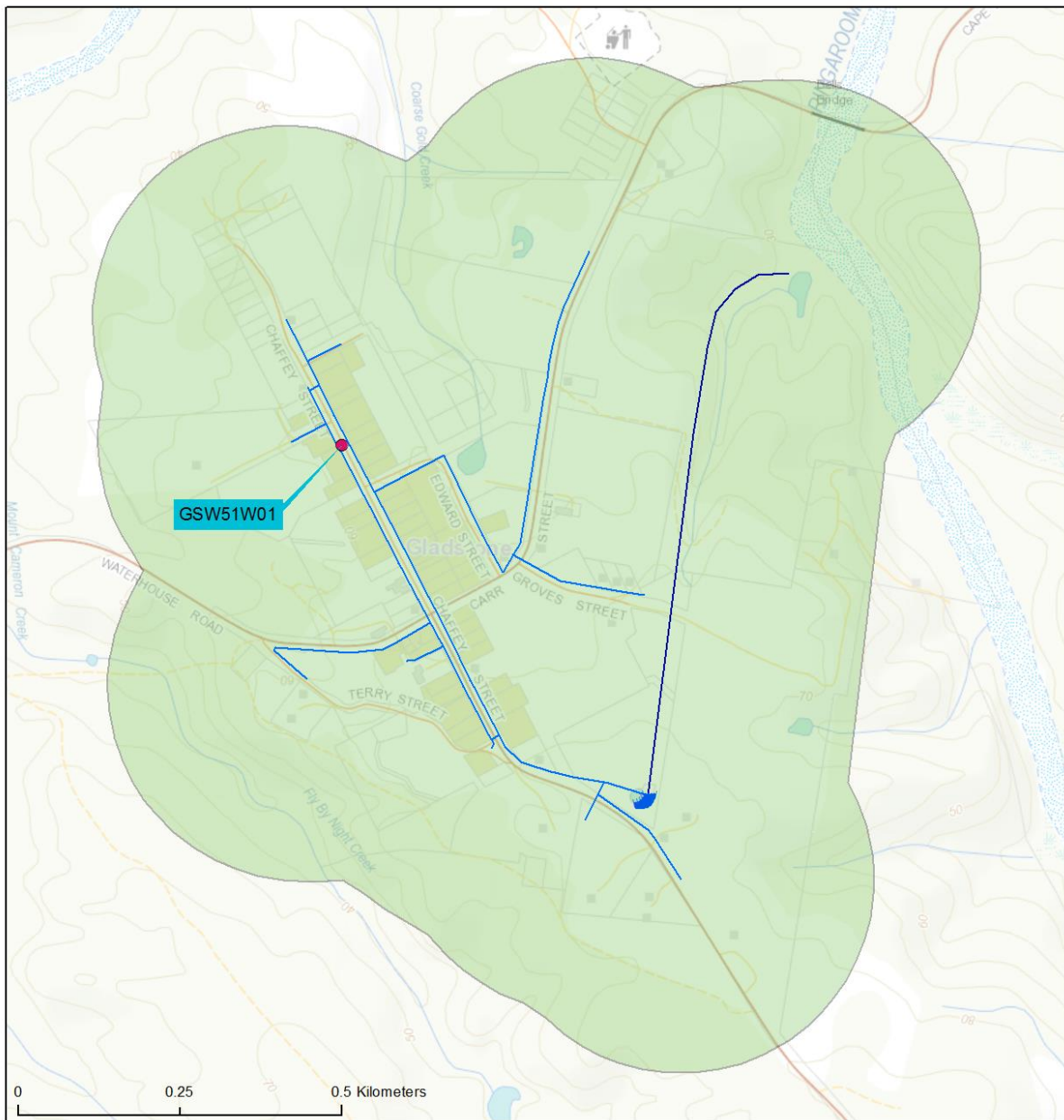
### 6.27.1. System description

Figure 6.27.1-a Gladstone system schematic



- ❖ **Catchment**  
The Gladstone drinking water system is supplied by the Ringarooma River
- ❖ **Treatment**  
The Gladstone system is a raw water system, with no treatment. Customers receiving water from the Gladstone system are subject to a Permanent BWA (prior July 2013)
- ❖ **Distribution**  
There are six roofed reservoirs in the distribution system. The Gladstone drinking water system supplies 88 connections.

Map 6.27.1-a Gladstone monitoring zone



GSW51W01 = Fire Station (compliance point)

## 6.27.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.27.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	33.3%	No	●	Monthly	12	8
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly	3 <sup>#</sup>	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	4	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly	4	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. .

<sup>#</sup> Routine DBP testing was removed from the reticulation sampling program in May 2016.

## 6.27.3. Summary of historic total system performance

Table 6.27.3-a Historic trends

Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	–		100%	●	99.5%	●	36.9% <sup>^</sup>	●	33.3%	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		100%	●
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>	0		0		0		0		1	
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

#### 6.27.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 33.3 per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 achieved 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.27.5. Microbiological performance

Figure 6.27.5-a Microbiological compliance 2015–16

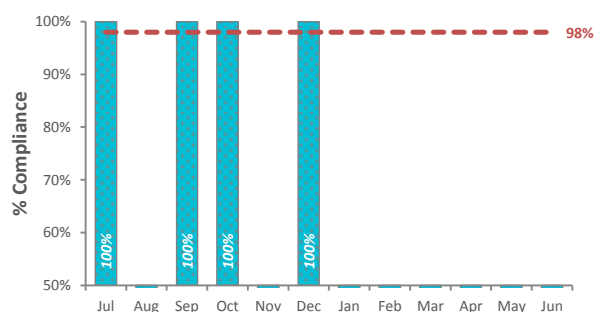
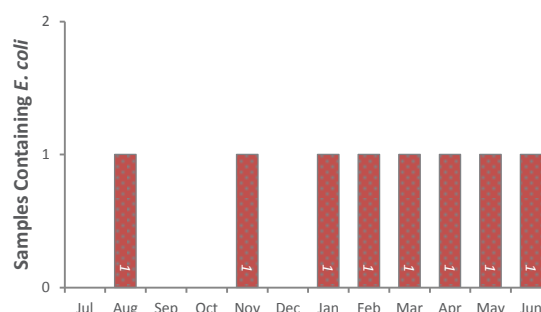


Figure 6.27.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Gladstone system was 33.3 per cent compliant in 2015–16. Eight samples during the reporting period detected *E. coli* greater than 1 MPN/100 mL
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality in the Ringarooma River
- ❖ The risk to public health is mitigated through the communication of the permanent BWA to customers.

#### 6.27.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.27.7. Other Australian Drinking water Guideline (ADWG) health regulated parameters

**Table 6.27.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	<0.5	<0.5	<0.5
Arsenic	10	µg/L	4	0	100	<1	<1	<1
Barium	2000	µg/L	4	0	100	4	3	5
Cadmium	2	µg/L	4	0	100	<0.1	<0.1	<0.1
Chromium	50	µg/L	4	0	100	<1	<1	<1
Copper	2000	µg/L	4	0	100	15.75	14	18
Lead	10	µg/L	4	0	100	1.07	0.9	1.2
Manganese	500	µg/L	4	0	100	15.48	1	58.3
Mercury	1	µg/L	4	0	100	<0.05	<0.05	<0.05
Molybdenum	50	µg/L	4	0	100	<0.5	<0.5	<0.5
Nickel	20	µg/L	4	0	100	<0.5	<0.5	<0.5
Selenium	10	µg/L	4	0	100	<5	<5	<5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	12	0	100	<4	<1	<4
Monochloroacetic acid	150	µg/L	12	0	100	<5	<5	<5
Trichloroacetic acid	100	µg/L	12	0	100	<7	<2	<7
Total trihalomethanes	250	µg/L	12	0	100	<1.5	<1.5	<1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.27.8. General physical parameters

Table 6.27.8-a General physical performance

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		12	0.59	0.4	0.9
pH		12	6.31	5.92	6.62

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ pH levels are below the recommended optimal range
- ❖ This system is not chlorinated.

### 6.27.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.27.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.27.11. Customer complaints

Figure 6.27.11-a Complaint classification

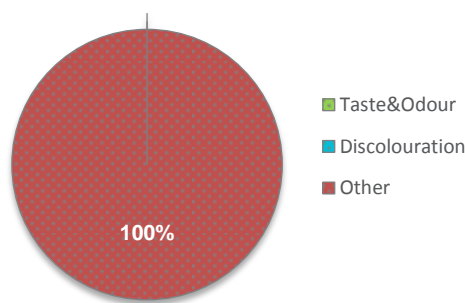
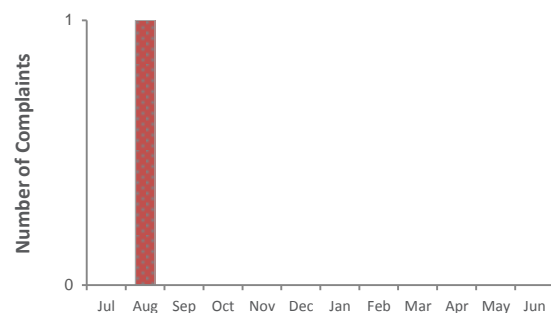


Figure 6.27.11-b Seasonal trend analysis



- ❖ One complaint was received requesting further information on the BWA issued for this system.



#### 6.27.12. Catchment and source water issues

- ❖ The Gladstone drinking water system is supplied by the Ringarooma River. Activities in the drinking water catchment include forestry, dairy farming, grazing. There is also a significant history of mining in the Ringarooma catchment. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.27.13. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.27.14. Future planning

**Table 6.27.14-a Future planning for the system**

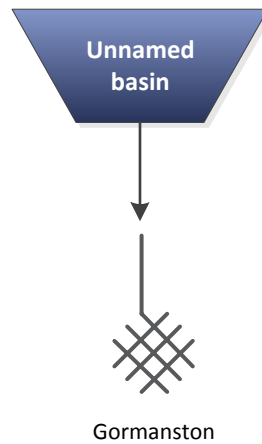
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Gladstone supply options	Investigation into options to improve water quality supplied to Gladstone	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

## 6.28. Gormanston drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	35
	<b>Catchment</b>	Unnamed basin
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Gormanston.</li> </ul>		

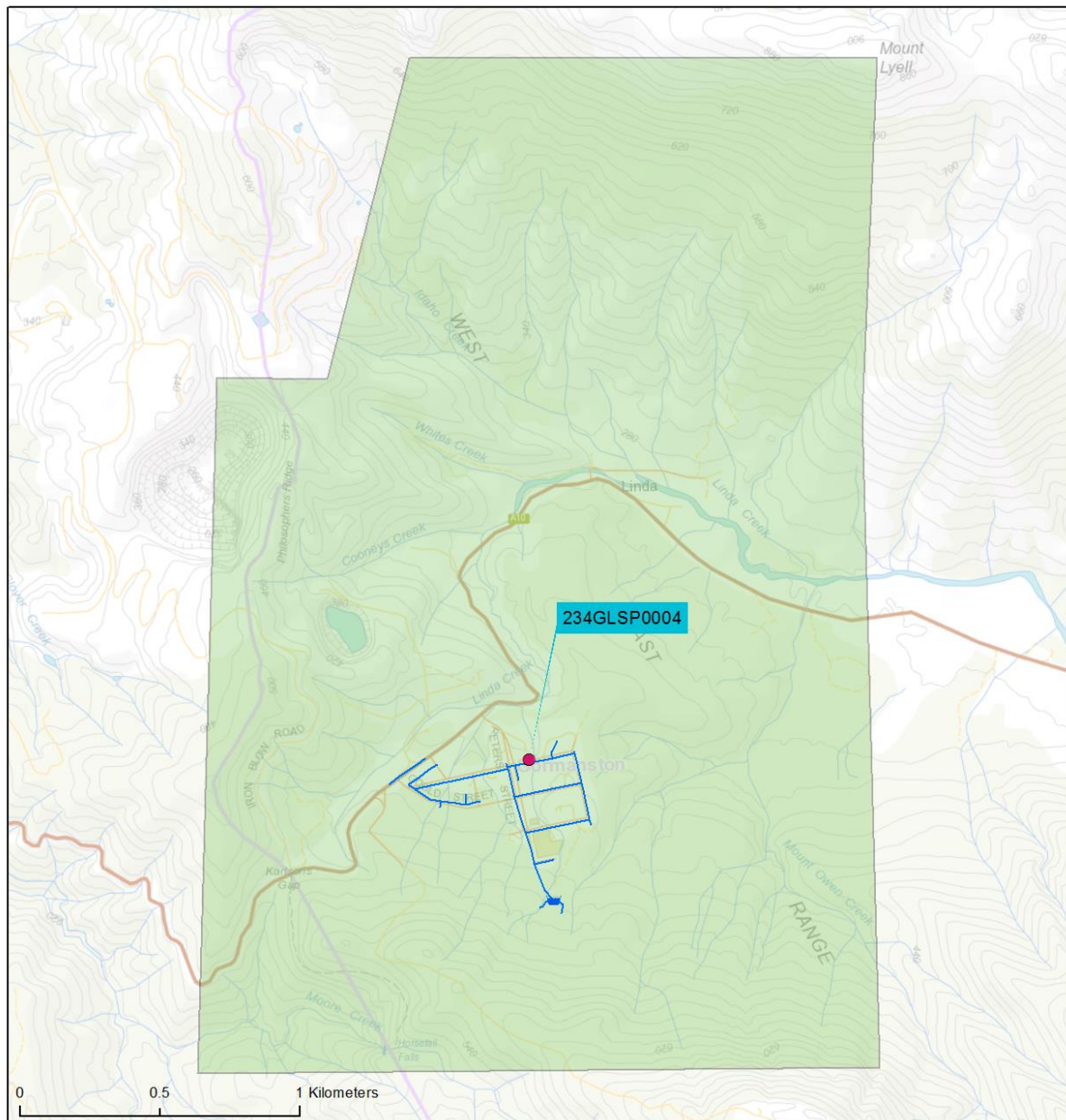
### 6.28.1. System description

Figure 6.28.1-a Gormanston system schematic



- ❖ **Catchment**  
The Gormanston drinking water system draws from an unnamed basin
- ❖ **Treatment**  
The Gormanston system is a raw water system with no treatment that gravity feeds into Gormanston. Customers who receive water from the Gormanston system are subject to a Permanent BWA (prior July 2013)
- ❖ **Distribution**  
The Gormanston system supplies 35 connections.

Map 6.28.1—a Gormanston monitoring zone



234GLSP0004 = Montgomery St.

## 6.28.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.28.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	48.9%	No	●	Monthly / Weekly	45 <sup>#</sup>	23
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	–	–	–	–
<b>Metals</b> <sup>(4)</sup>	97.7%	No	●	Quarterly	5	1
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) Implemented weekly sampling during the reporting period.

## 6.28.3. Summary of historic total system performance

Table 6.28.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)									
Parameter group	Performance*								
	2011–12	2012–13	2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	N/A	96.6%	●	100% <sup>^</sup>	●	84.6% <sup>^</sup>	●	48.9%	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing								
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Distribution fluoride testing								
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
<b>Metals</b> <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	97.7%	●	
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
<b>Pesticides</b> <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
<b>Complaints received</b> <sup>(5)</sup>	Not recorded	Not recorded	0	2	1				
<b>Public alerts issued</b> <sup>(6)</sup>	N/A	N/A	1	●	1	●	1	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

#### 6.28.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 48.9 per cent. The microbiological risk to public health is mitigated through the communication of a permanent boil water alert to customers
- ❖ This system is not fluoridated
- ❖ Lead was detected at levels exceeding ADWG health limits reducing compliance to 97.7 per cent during 2015–16. Investigations and re-tests showed the levels to be below ADWG health limits
- ❖ DBP are not measured as chlorination does not occur in this system.

#### 6.28.5. Microbiological performance

Figure 6.28.5-a Microbiological compliance 2015–16

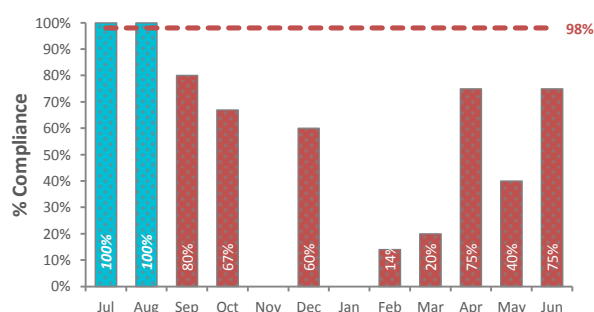
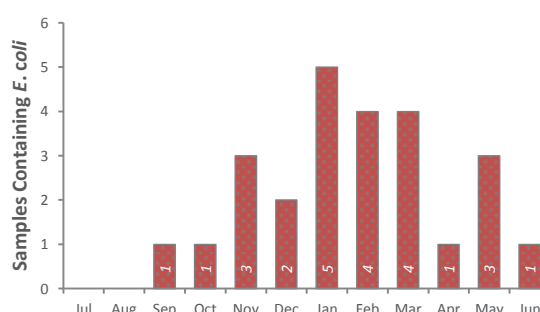


Figure 6.28.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Gormanston system was 48.9 per cent compliant in 2015–16. *E. coli* was detected during every month with the exception of samples taken in July and August 2015
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality of water in the unnamed basin
- ❖ The risk to public health is mitigated through the communication of the Permanent BWA to customers.

#### 6.28.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.28.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

Table 6.28.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	1.62	< 1	5
Barium	2000	µg/L	4	0	100	2.5	2	4
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	22.75	10	37
Lead	10	µg/L	4	1	75	5.88	1.5	14.3
Manganese	500	µg/L	4	0	100	32.15	14.1	43.8
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Monochloroacetic acid	150	µg/L	N/A	N/A	–	–	–	–
Trichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Total trihalomethanes	250	µg/L	N/A	N/A	–	–	–	–

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (–) – Refers to compliance with current ADWG health limits. (–) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ Investigative samples detected a lead exceedance in May 2016 caused by roadworks within the headwaters of the system and high rainfall within the catchment. There was a dramatic spike in the turbidity of the water within the basin which prompted the investigation. Immediate resampling of the water determined that the levels were back within ADWG limits. Customers were made aware of the issue and were provided with temporary water
- ❖ DBPs are not measured as chlorination does not occur in this system.

### 6.28.8. General physical parameters

**Table 6.28.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		43	10.59	0.3	128
pH		43	5.81	5.07	6.9

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ This system is not chlorinated
- ❖ Mean turbidity levels recorded in the distribution network well above the ADWG aesthetic limit of 5 NTU. There are no treatment barriers in this system to mitigate turbidity fluctuations in the source water
- ❖ pH levels are naturally low. Being from a small catchment from a very high rainfall area of Tasmania, pH readings tend to be slightly acidic.

### 6.28.9. Aesthetic issues

- ❖ High turbidity can impact on the aesthetics of this water. However this is a raw water supply and customers are accustomed to the variability in turbidity
- ❖ TasWater assisted DHHS to investigate the case of two residents of the town suffering rashes, which were thought to have been caused by the town’s water. Although there were two rounds of samples taken, the Tasmanian Government’s toxicologist could not determine if the water was contributing to the rash or not.

### 6.28.10. System incidents and issues

**Table 6.28.10-a Identified incidents and issues**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
10/05/2016	Metals exceedance – Lead 14.3 µg/L.	Investigative samples detected a lead exceedance in a single sample which was caused by and roadworks within the headwaters of the system and high rainfall within the catchment. There was a dramatic spike in the turbidity of the water within the basin which prompted the investigation. Immediate resampling of the water determined that the levels were back within ADWG limits.	Yes	Yes



### 6.28.11. Customer complaints

Figure 6.28.11-a Complaint classification

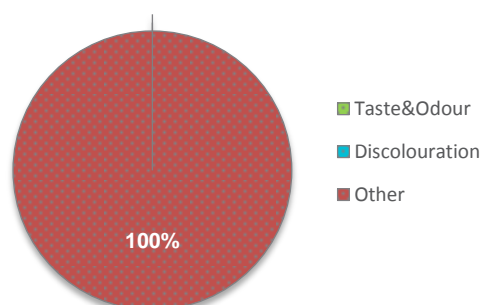


Figure 6.28.11-b Seasonal trend analysis



- ❖ One complaint was received in the reporting period relating to the status of the Permanent BWA.

### 6.28.12. Catchment and source water issues

- ❖ The Gormanston system draws water from an unnamed basin. The catchment is largely rocky with low vegetation. Based on catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

### 6.28.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to the system during 2015–16.

### 6.28.14. Future planning

Table 6.28.14-a Future Planning for the Gormanston drinking water system

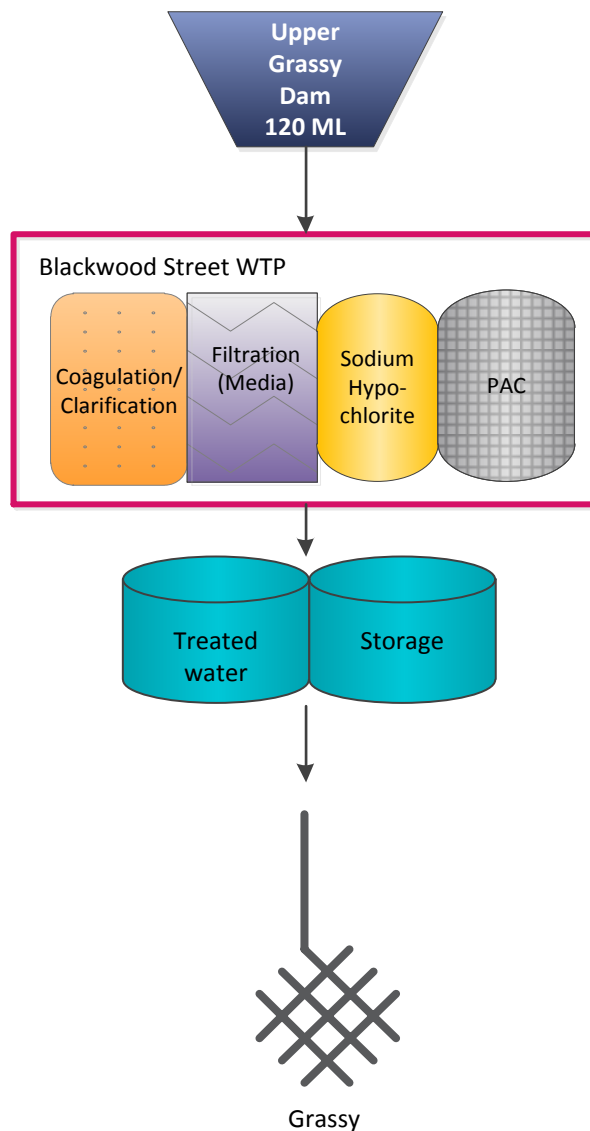
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Gormanston supply options	Investigation into options to improve water quality supplied to Gormanston	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

## 6.29. Grassy drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	169
	<b>Catchment</b>	Upper Grassy Dam
	<b>Primary treatment</b>	Coagulation/clarification
	<b>Advanced treatment</b>	Powdered activated carbon
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Grassy.</li> </ul>		

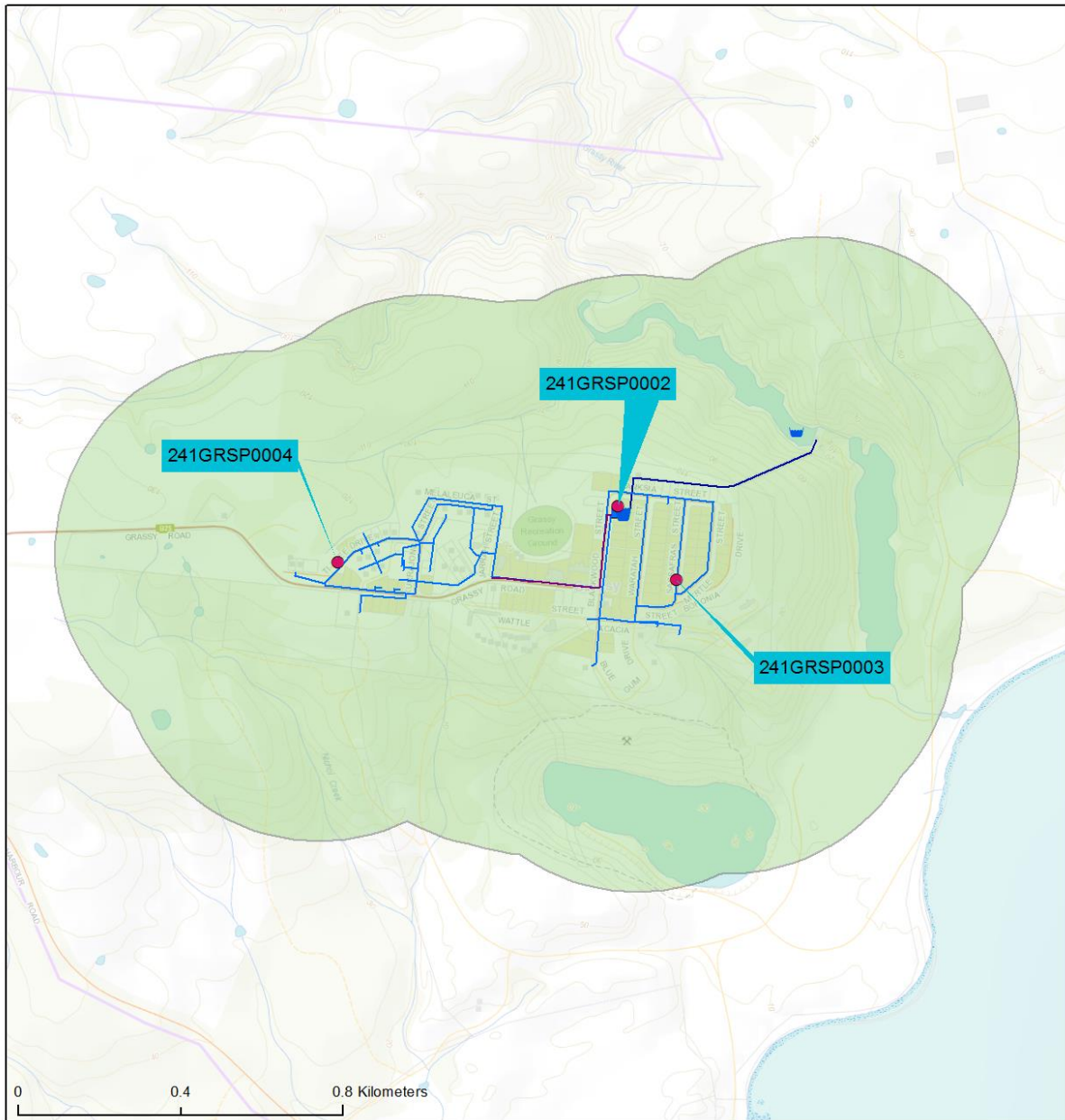
### 6.29.1. System description

Figure 6.29.1-a Grassy system schematic



- ❖ **Catchment**  
The Grassy drinking water system is supplied by the Grassy River via the Upper Grassy Dam
- ❖ **Treatment**  
The Grassy WTP employs coagulation, clarification, media filtration, sodium hypochlorite disinfection and powdered activated carbon dosing
- ❖ **Distribution**  
There are two clear water storage reservoirs that receive treated water prior to the distribution system. The Grassy system supplies 169 connections.

**Map 6.29.1-a-a Grassy monitoring zone**



**241GRSP0002** = Treated Water Storage, **241GRSP0004** = Ti Tree Drive Site 3, **241GRSP0003** = Sassafrass St Site.

## 6.29.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.29.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes	●	Weekly	156	0
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A		–	0	0
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly	7	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	6 Monthly	16	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A		–	–	–

Key – (1) – (● = >98 per cent, ● = <98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.29.3. Summary of historic total system performance

Table 6.29.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12	2012–13	2013–14	2014–15	2015–16					
<b>Microbiological</b> <sup>(1)</sup>	98%	●	100%	●	100%	●	99.4%	●	100%	●
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	<b>Distribution fluoride testing</b>									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
<b>Metals</b> <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●	100%	●
<b>Pesticides</b> <sup>(4)</sup>	N/A	N/A	N/A		N/A		N/A		N/A	
<b>Complaints received</b> <sup>(5)</sup>	Not recorded	Not recorded	0		0		1			
<b>Public alerts issued</b> <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.29.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.29.5. Microbiological performance

Figure 6.29.5-a Microbiological compliance 2015–16

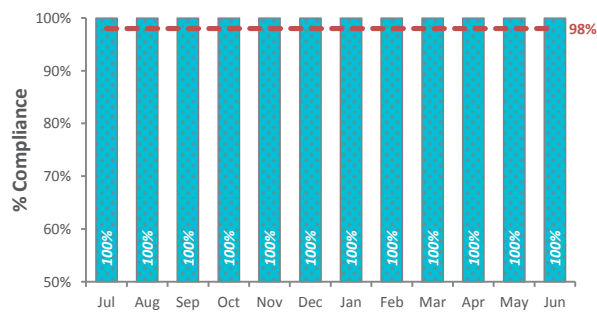


Figure 6.29.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.29.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.29.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.29.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	8	0	100	< 1	< 1	< 1
Arsenic	10	µg/L	15	0	100	< 1	< 1	< 1
Barium	2000	µg/L	14	0	100	7.07	5	10
Cadmium	2	µg/L	15	0	100	< 0.2	< 0.2	< 0.2
Chromium	50	µg/L	15	0	100	< 1	< 1	< 1
Copper	2000	µg/L	8	0	100	15.31	< 1	49
Lead	10	µg/L	15	0	100	<1	<1	4
Manganese	500	µg/L	15	0	100	91.8	5	690
Mercury	1	µg/L	15	0	100	<0.1	<0.1	<0.1
Molybdenum	50	µg/L	8	0	100	5.25	1	10
Nickel	20	µg/L	15	0	100	2.07	<1	5
Selenium	10	µg/L	15	0	100	<1	<1	<1
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	7	0	100	4.42	3	6
Monochloroacetic acid	150	µg/L	7	0	100	< 2	< 2	< 2
Trichloroacetic acid	100	µg/L	7	0	100	2	< 2	2
Total trihalomethanes	250	µg/L	7	0	100	53.42	16	170

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.29.8. General physical parameters

Table 6.29.8-a General physical performance

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		160	0.51	0.05	1.22
Turbidity (NTU)		56	0.6	0	17.3
pH		163	7.33	7.09	9.9

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Grassy distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ Mean pH levels are maintained within the recommended optimal range.

### 6.29.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.29.10. System incidents and issues

- ❖ No water quality issues were identified.

### 6.29.11. Customer complaints

Figure 6.29.11-a Complaint classification

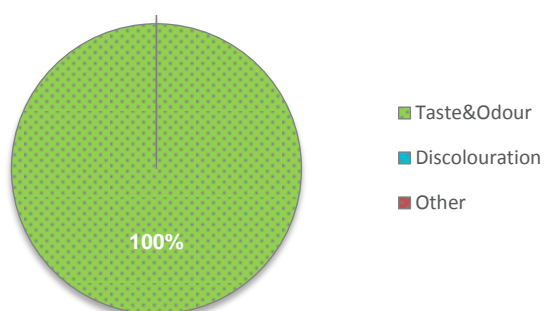
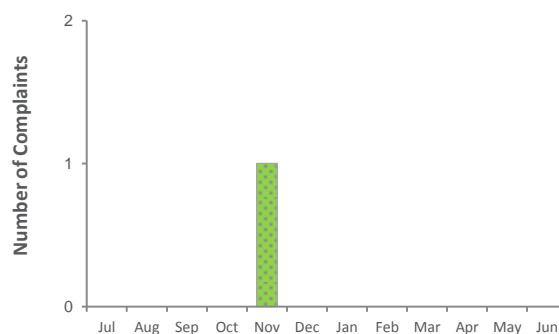


Figure 6.29.11-b Seasonal trend analysis



- ❖ One complaint was received in the reporting period relating to a taste and odour issue.



#### 6.29.12. Catchment and source water issues

- ❖ The Grassy drinking water system is supplied by the Upper Grassy Dam. Activities in the catchment include cattle and dairy farming, and residential properties with septic tanks. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

#### 6.29.13. Infrastructure and operational changes

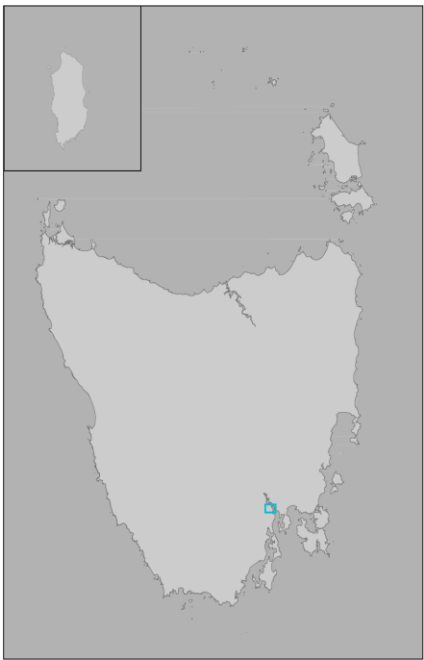
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.29.14. Future planning

**Table 6.29.14-a Future planning for the system**

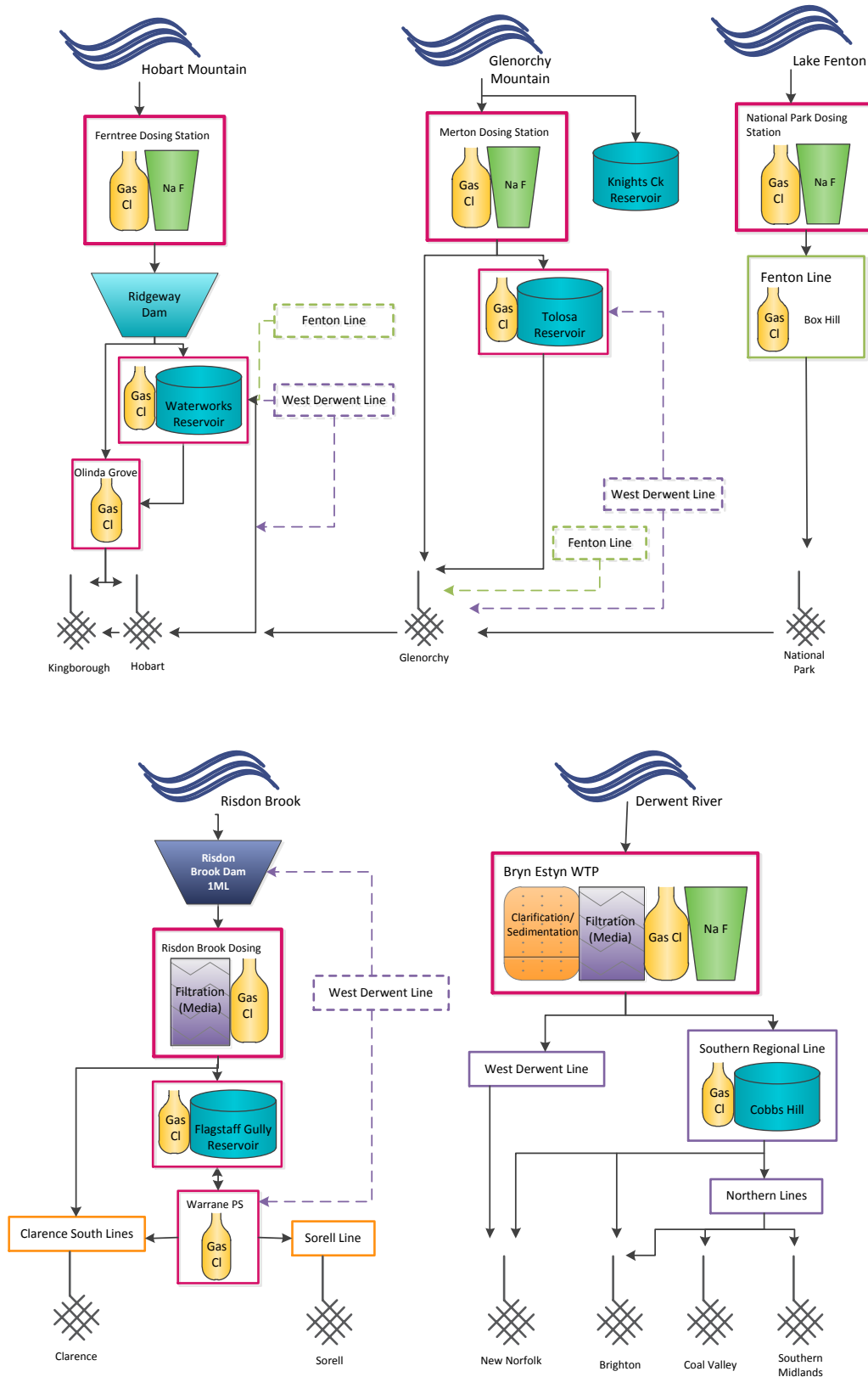
Project	Description	Progress	Anticipated Delivery	Estimated Spend
King Island water supply project	New WTP and pipeline to supply Grassy and Currie	Construction due to begin early 2017.	2016–17	\$15.8 million

## 6.30. Greater Hobart drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	96,760
	<b>Catchment</b>	Derwent River, Hobart Mountain, Lake Fenton
	<b>Primary treatment</b>	Varies dependent on catchment
	<b>Advanced treatment</b>	GAC/PAC available to treat the Derwent River
	<b>Primary disinfection</b>	Chorine gas
	<b>Secondary disinfection</b>	Chlorine gas
	<b>Fluoridation agent</b>	Lake Fenton = Sodium fluoride All others = Fluorosilicic acid
<b>Towns serviced:</b>		
<ul style="list-style-type: none"> <li>❖ <b>Municipality of Brighton</b> <ul style="list-style-type: none"> <li>Bridgewater</li> <li>Green Point</li> <li>Gagebrook</li> <li>Old Beach</li> <li>Brighton</li> </ul> </li> <li>❖ <b>Municipality of Kingborough</b> <ul style="list-style-type: none"> <li>Blackmans Bay</li> <li>Bonnet Hill</li> <li>Howden</li> <li>Huntingfield</li> <li>Kingston</li> <li>Firthside</li> <li>Maranoa Heights</li> <li>Kingston Beach</li> <li>Taroona</li> </ul> </li> <li>❖ <b>City of Clarence</b> <ul style="list-style-type: none"> <li>Acton Park</li> <li>Bellerive</li> <li>Cambridge</li> <li>Clarendon Vale</li> <li>Geilston Bay</li> <li>Howrah</li> <li>Lauderdale</li> <li>Seven Mile Beach</li> <li>Lindisfarne</li> <li>Flagstaff Gully</li> <li>Montagu Bay</li> <li>Mornington</li> <li>Mount Rumney</li> <li>Oakdowns</li> <li>Otago Bay</li> <li>Risdon</li> <li>Risdon Vale</li> <li>Roches Beach</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>❖ <b>City of Glenorchy</b> <ul style="list-style-type: none"> <li>Austins Ferry</li> <li>Berriedale</li> <li>Chigwell</li> <li>Claremont</li> <li>Abbotsfield</li> <li>Collinsvale</li> <li>Derwent Park</li> <li>Dowsing Point</li> <li>Glenlusk</li> <li>Glenorchy</li> <li>Elwick</li> <li>Merton</li> <li>Goodwood</li> <li>Granton</li> <li>Lutana</li> <li>Montrose</li> <li>Moonah</li> <li>Rosetta</li> </ul> </li> <li>❖ <b>City of Hobart</b> <ul style="list-style-type: none"> <li>Battery Point</li> <li>Dynnyrne</li> <li>Fern Tree</li> <li>Glebe</li> <li>Hobart</li> <li>Lenah Valley</li> <li>Mount Nelson</li> <li>Mount Stuart</li> <li>New Town</li> <li>Cornelian Bay</li> <li>North Hobart</li> <li>Ridgeway</li> <li>Sandy Bay</li> <li>Lower Sandy Bay</li> <li>South Hobart</li> <li>Cascades</li> <li>Tolmans Hill</li> <li>West Hobart</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>❖ <b>Southern Midlands</b> <ul style="list-style-type: none"> <li>Bagdad</li> <li>Kempton</li> <li>Mangalore</li> <li>Dysart</li> </ul> </li> <li>❖ <b>Coal Valley</b> <ul style="list-style-type: none"> <li>Campania</li> <li>Richmond</li> </ul> </li> <li>❖ <b>National Park</b> <ul style="list-style-type: none"> <li>National Park</li> <li>Westerway</li> <li>Fentonbury</li> </ul> </li> <li>❖ <b>Sorell</b> <ul style="list-style-type: none"> <li>Midway Point</li> <li>Sorell</li> </ul> </li> <li>❖ <b>New Norfolk</b> <ul style="list-style-type: none"> <li>New Norfolk</li> </ul> </li> </ul>

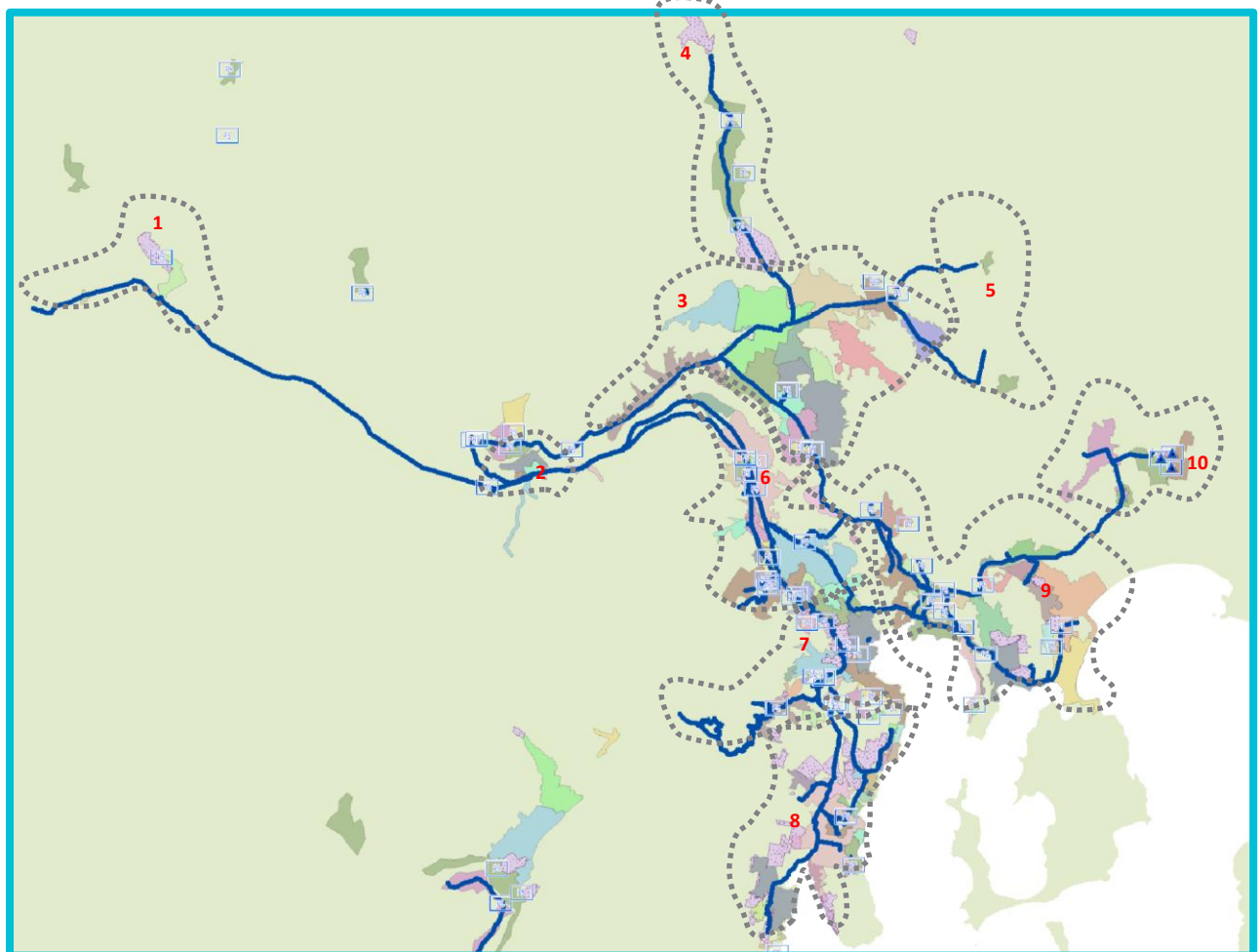
### 6.30.1. System description

Figure 6.30.1-a Greater Hobart System schematic



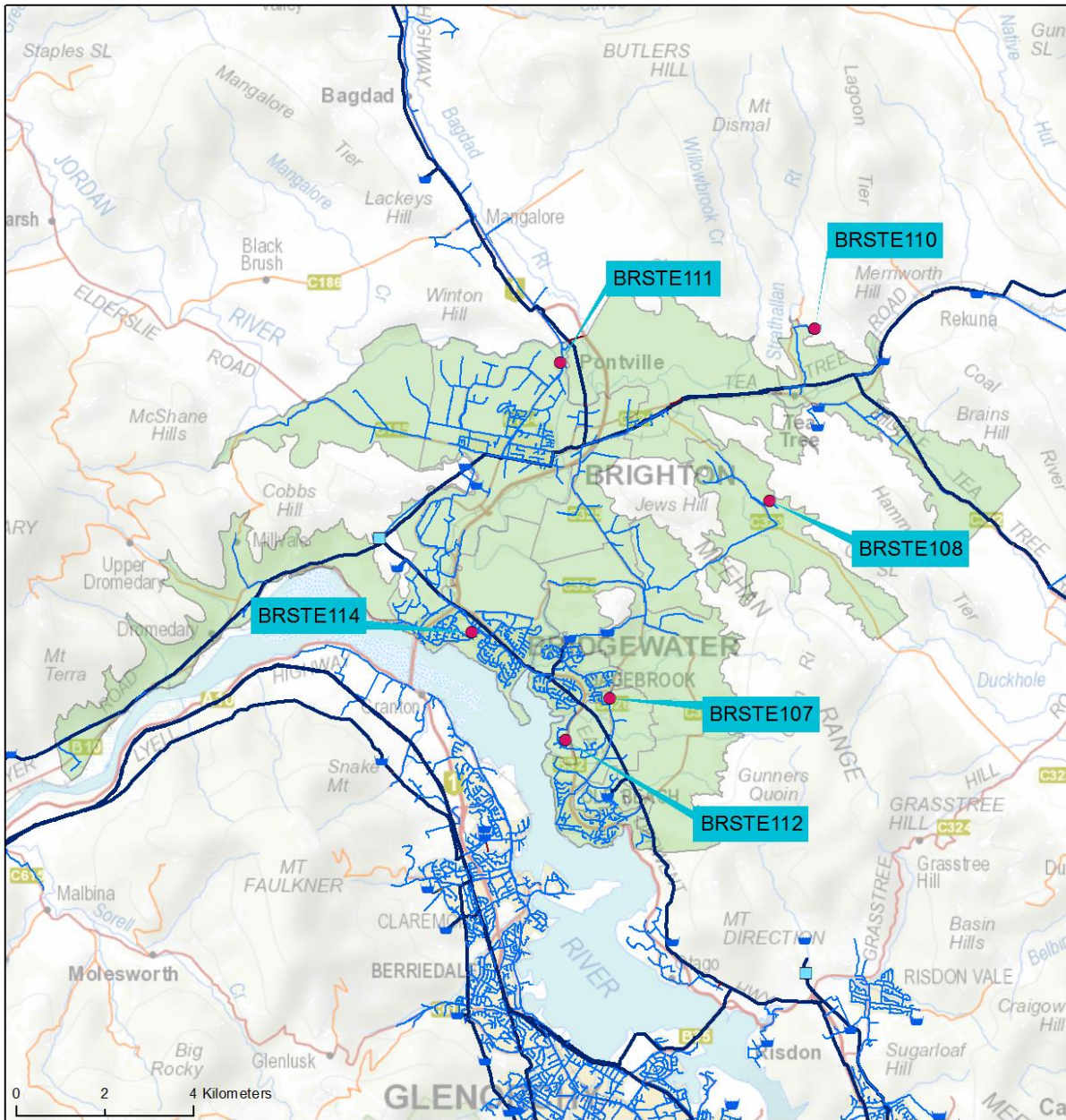
- ❖ **Catchment**  
The Greater Hobart drinking water system is supplied from multiple sources including the Derwent River, Lake Fenton and the Hobart Mountain catchments
- ❖ **Treatment**  
The Bryn Estyn WTP employs coagulation, clarification, media filtration, GAC and PAC available as required, gas chlorine disinfection and fluoridation by fluorosilicic acid. The Risdon Brook dosing station has a media filter followed by gas chlorine disinfection. The Fern Tree and Merton dosing stations employ chlorine gas disinfection and fluoridation by fluorosilicic acid. National Park dosing stations employ chlorine gas disinfection and fluoridation by sodium fluoride
- ❖ **Distribution**  
The Greater Hobart drinking water system has multiple interconnections, which allows TasWater to supply customers with water originating from different catchments. The distribution system has multiple open storage reservoirs and seven re-chlorination stations. The Greater Hobart drinking water system supplies 96,760 connections.

**Map 6.30.1—a Geographic layout of the Greater Hobart supply area**



(1) **National Park** Monitoring Zone – (2) **New Norfolk** Monitoring Zone – (3) **Brighton** Monitoring Zone – (4) **Southern Midlands** Monitoring Zone – (5) **Cole Valley** monitoring Zone – (6) **Glenorchy** Monitoring Zone – (7) **Hobart** Monitoring Zone – (8) **Kingborough** Monitoring Zone – (9) **Clarence** Monitoring Zone – (10) **Sorell** Monitoring Zone

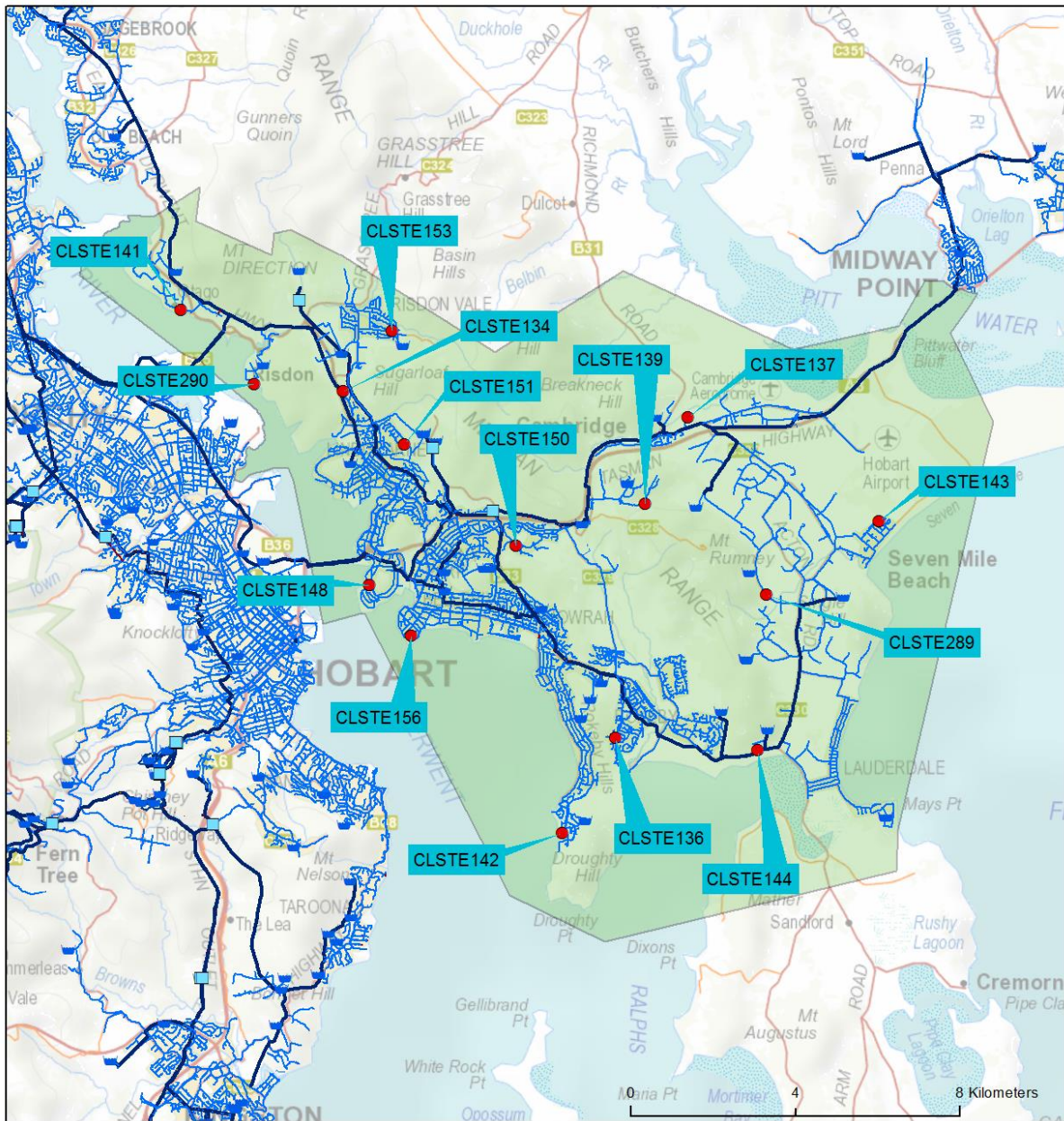
**Map 6.30.1–b Brighton monitoring zone**



BRSTE107 = 238 Old Beach rd – BRSTE108 = Tea Tree, Glen Rose Dr – BRSTE110 = Tea Tree, Merriworth rd –  
 BRSTE111 = Pontville, Old Council Chambers – BRSTE112 = Compton Downs St Annes – BRSTE114 = Jordan River, School

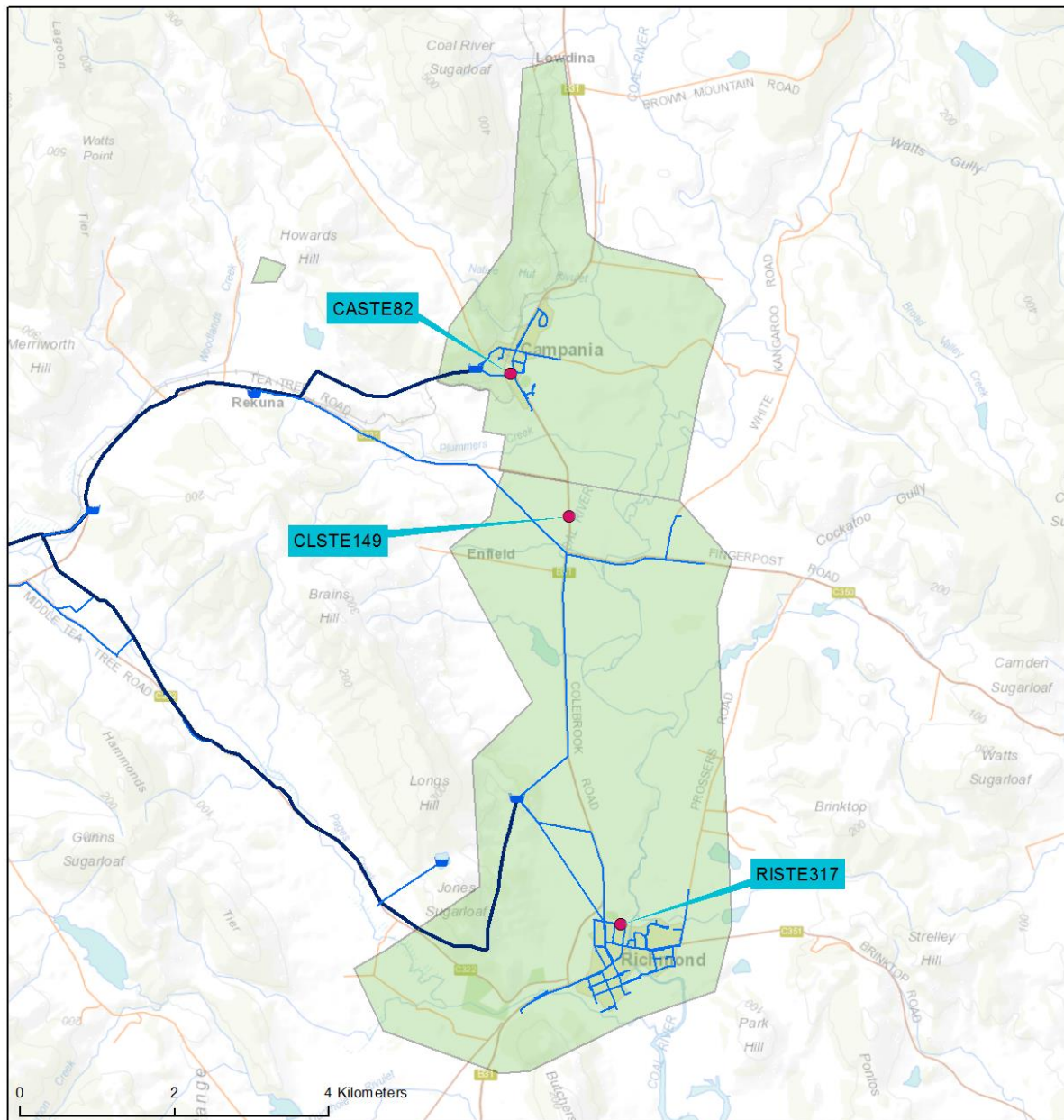


Map 6.30.1–c Clarence monitoring zone



CLSTE134 = Geilston bay, 101 Clinton Ave – CLSTE136 = Rokeyby 126 Tollard Drv – CLSTE137 = Cambridge 13 Maxwells Rd –  
 CLSTE139 = Mt Rumney, 193 Grahams Drv – CLSTE141= Otago, 21 Otago Bar Rd – CLSTE142 = Tranmere, 21 Vaughan St –  
 CLSTE143 = Seven Mile Beach 24 Leyton Ave – CLSTE144 = Lauderdale 320 Sth Arm rd – CLSTE148 = Rosny, 5 Heskett Cr –  
 CLSTE150 = Mornington, 54 Mornington rd – CLSTE153 = Risdon Vale, 87 Gardenia Rd – CLSTE156 = Bellerive / 20 Gunning St –  
 CLSTE289 = Acton Park, 222 Acton Park rd – CLSTE290 = Risdon, 26 Sanderson’s Rd

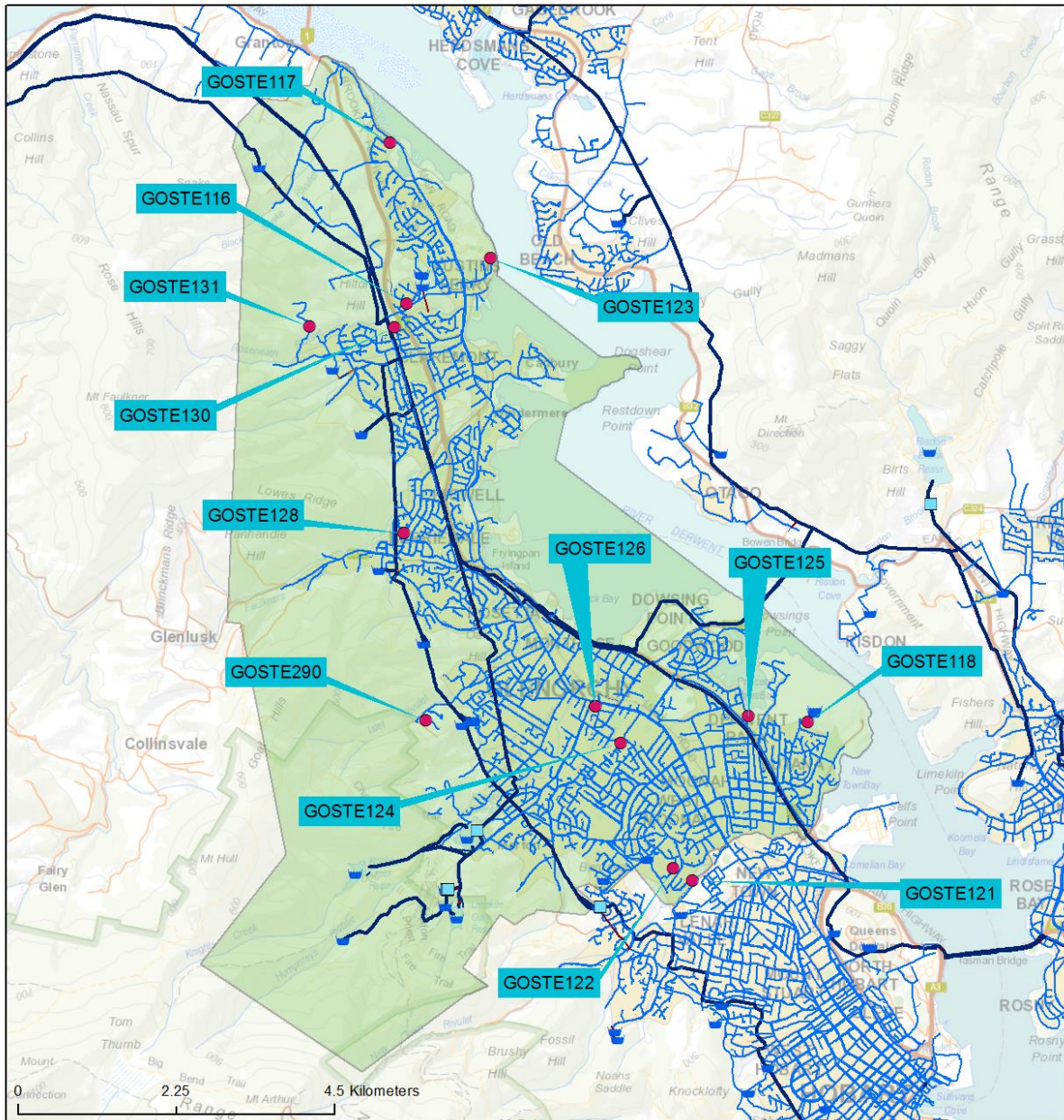
### Map 6.30.1–d Coal Valley monitoring zone



(1) CLSTE149 = 505 Colebrook rd – (2) RISTE317 = Fire Station sample – (3) CASTE82 = Campania Public toilet



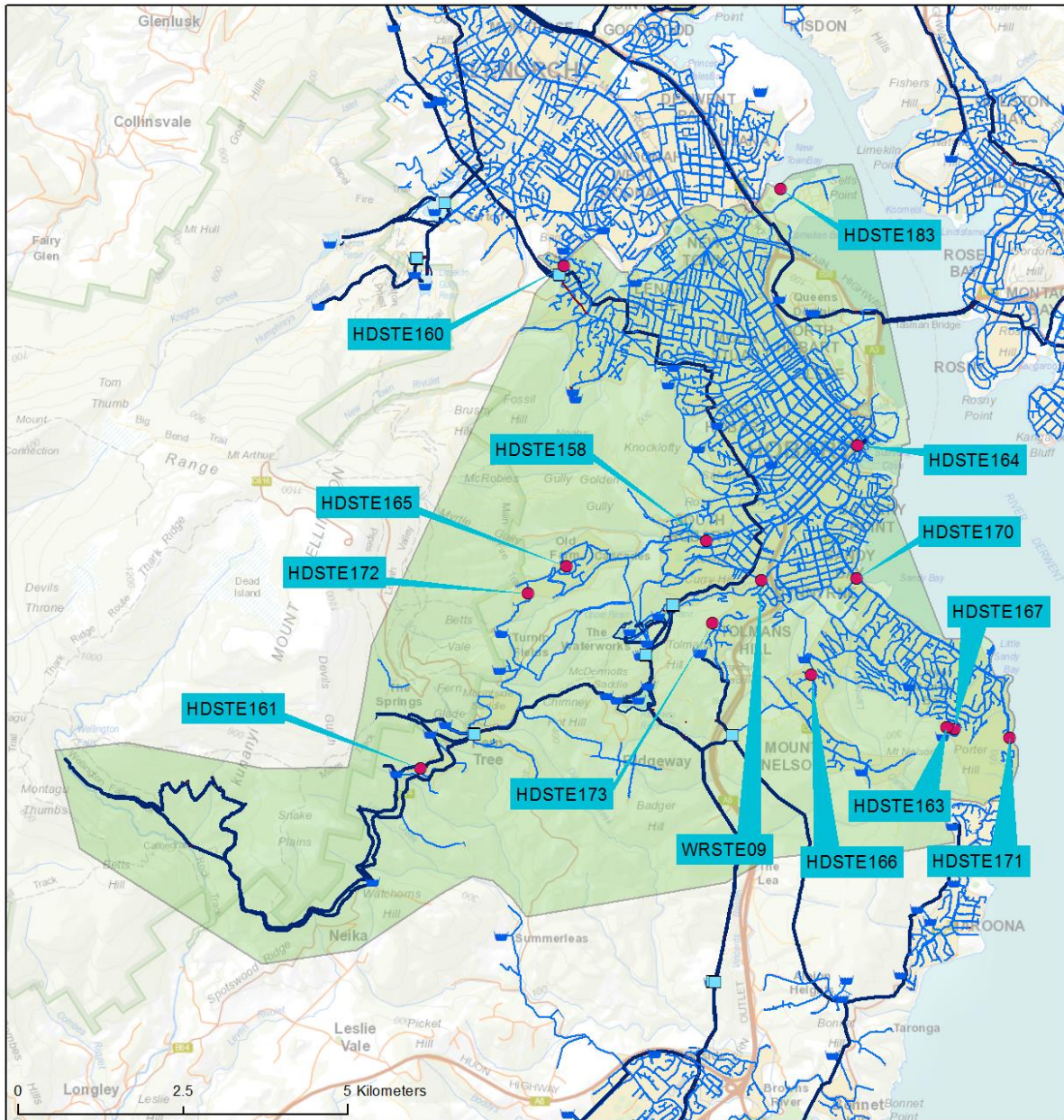
Map 6.30.1–e Glenorchy monitoring zone



GOSTE290 = Montrose, 1 Beneve Crt – GOSTE117 = Austins Ferry, 1 Sharon Drv – GOSTE118 = Lutana, 10 Birch Rd –  
 GOSTE123 = Austins Ferry, 17 Wendurie Parade – GOSTE116 = Claremont, 12 Chatterton Crt – GOSTE124 = Derwent Park, 49 Windsor St –  
 GOSTE131=Claremont, 59 Toffolis Rd – GOSTE130 = Austins Ferry, Primary Sch – GOSTE125 = Goodwood, Gepp Parade –  
 GOSTE121 = Moonah, 2 Gerrard – GOSTE122 = Moonah, 2/10 Dawkins Crt – GOSTE126 = Glenorchy city council chambers –  
 GOSTE128 = Chigwell, 2 Allunga Rd

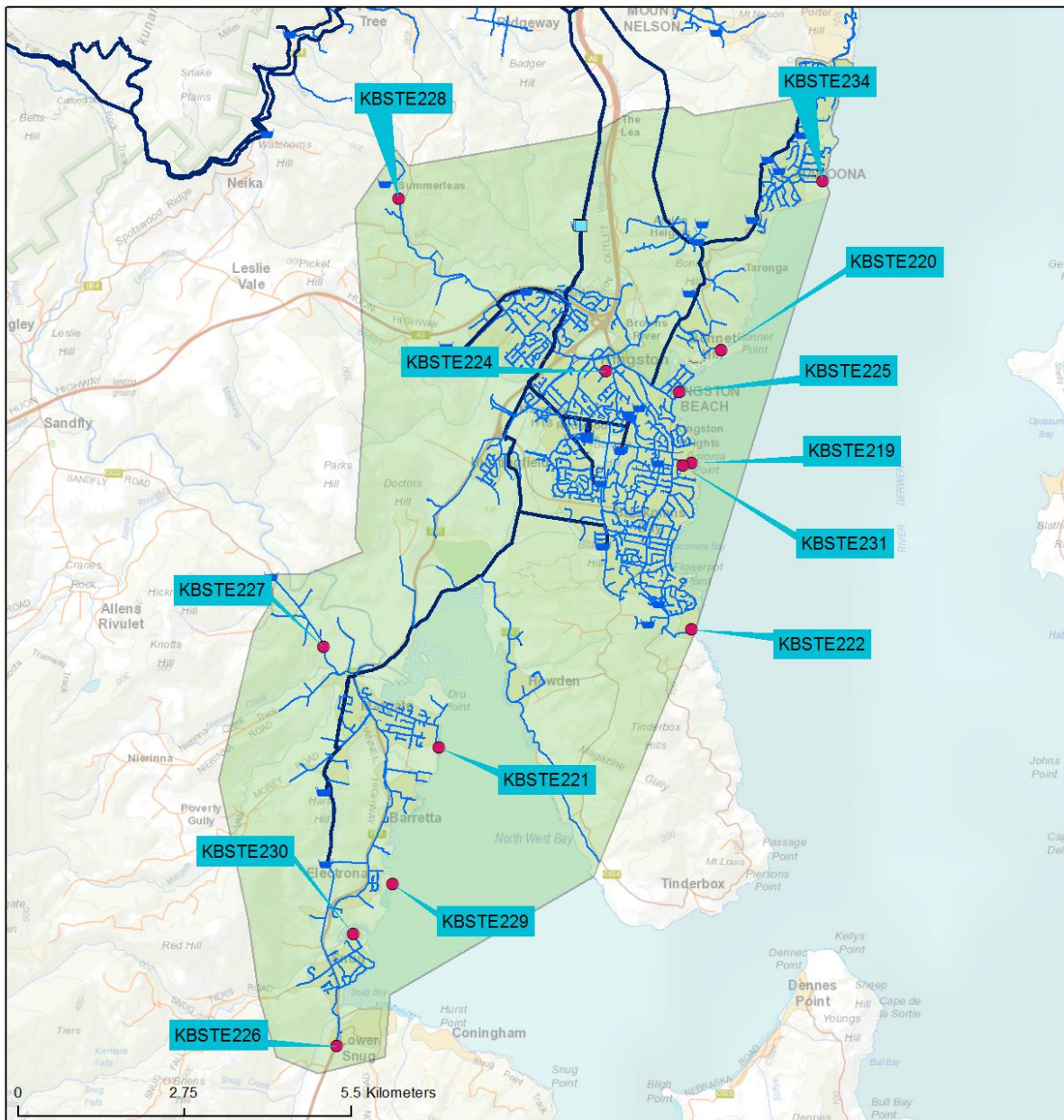


Map 6.30.1-f Hobart monitoring zone



HDSTE173 = Tolmans Hill, 10 Woodridge Rd – HDSTE165 = South Hobart, 114 Marilyn Rd – HDSTE167 = Sandy Bay, 26 Nicholas Drv –  
 HDSTE172 = South Hobart, 317 Strickland ave – HDSTE170 = Sandy Bay, 345 Sandy Bay Rd – HDSTE160 = Lenah Valley, 43 Girrabong Rd –  
 HDSTE158 = South Hobart, 56 Cascade Rd – HDSTE171 = Sandy Bay, 762 Sandy Bay Rd – HDSTE163 = Sandy Bay, 8 Lindeith Crt –  
 HDSTE161 = Fern Tree, 9 Grays Rd – HDSTE164 = Hobart, Macquarie St – HDSTE166 = Mt Nelson, Tangara Rd –  
 HDSTE183 = New Town Self's Point Lab

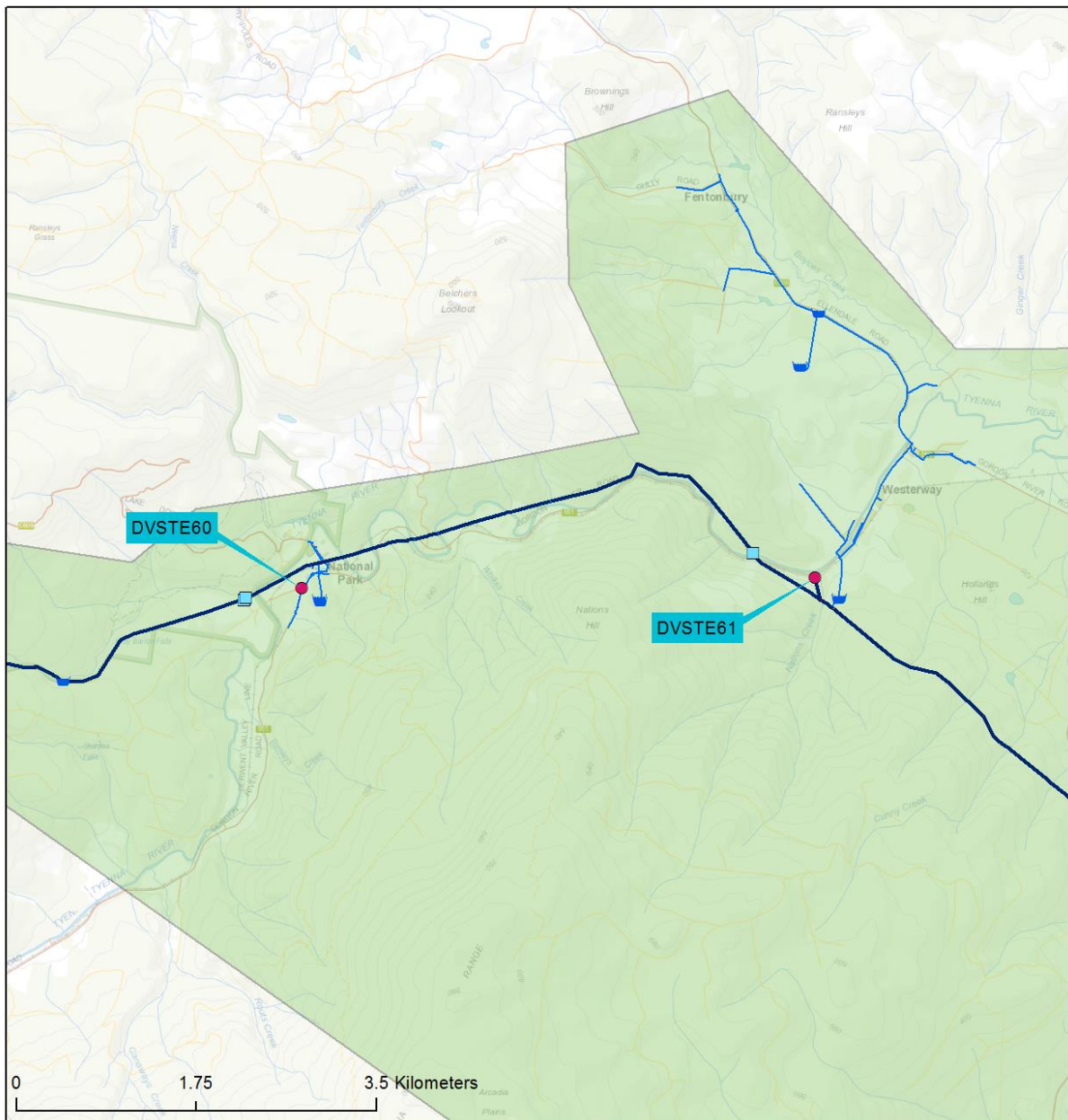
Map 6.30.1–g Kingborough monitoring zone



KBSTE230 = Snug, 22 Pybus st – KBSTE219 = Blackmans, 33 Aldinga st – KBSTE220 = Bonnet Hill, 55 Harpens Rd –  
 KBSTE225 = Blackmans Bay, Burwood Drv – KBSTE226 = Snug, Frost Rd – KBSTE221 = Margate, 90 Esplanade –  
 KBSTE227 = Margate, Sandfly Rd – KBSTE228 = Kingston, scotts rd – KBSTE231 = Kingston Beach, St Aloysius –  
 KBSTE224 = Kingston Primary Sch – KBSTE222 = Blackmans bay WWTP – KBSTE229 = Electrona, Slatteries Rd –  
 KBSTE234 = Taroon, Soccer Field

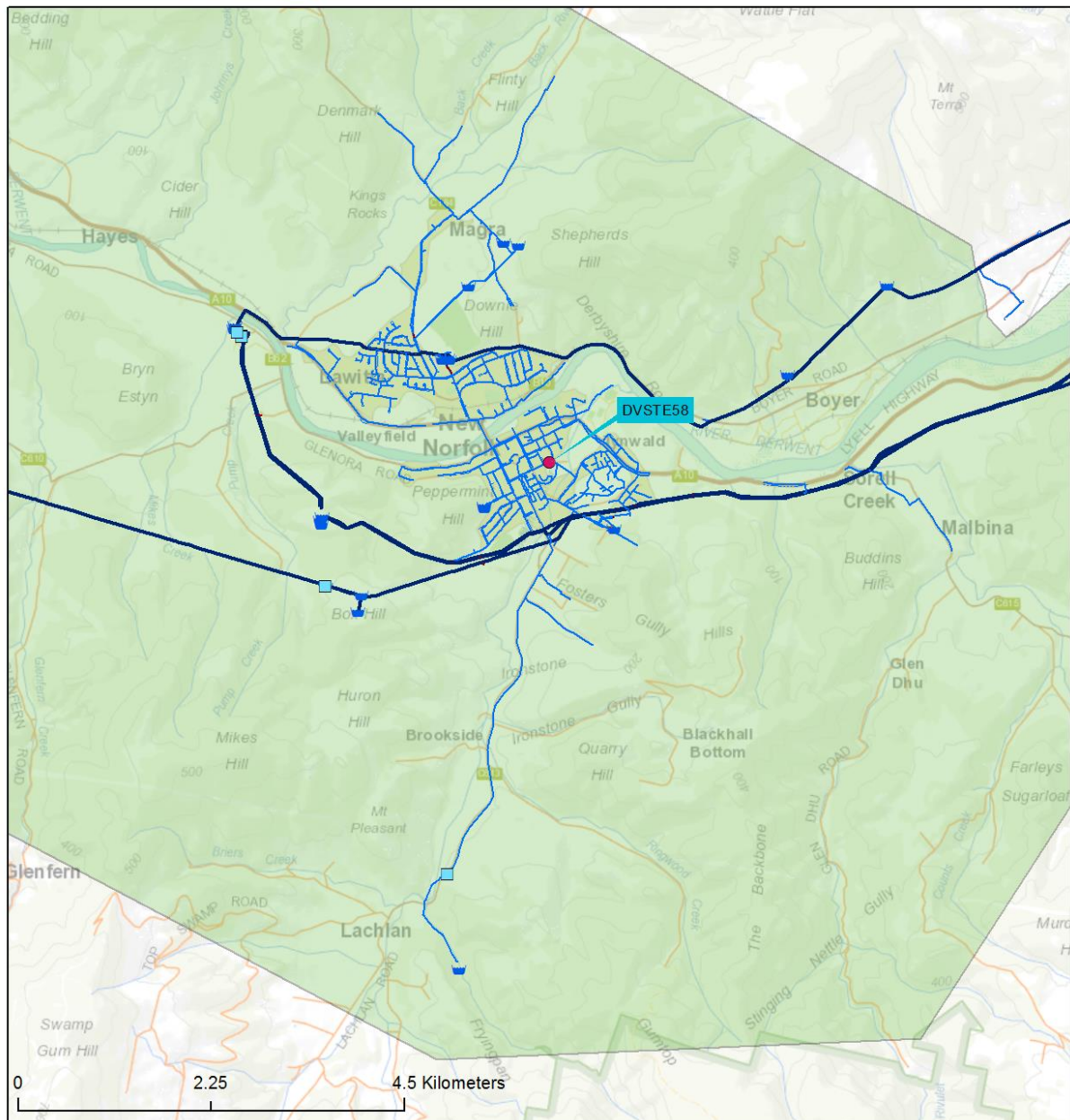


Map 6.30.1–h National Park monitoring zone



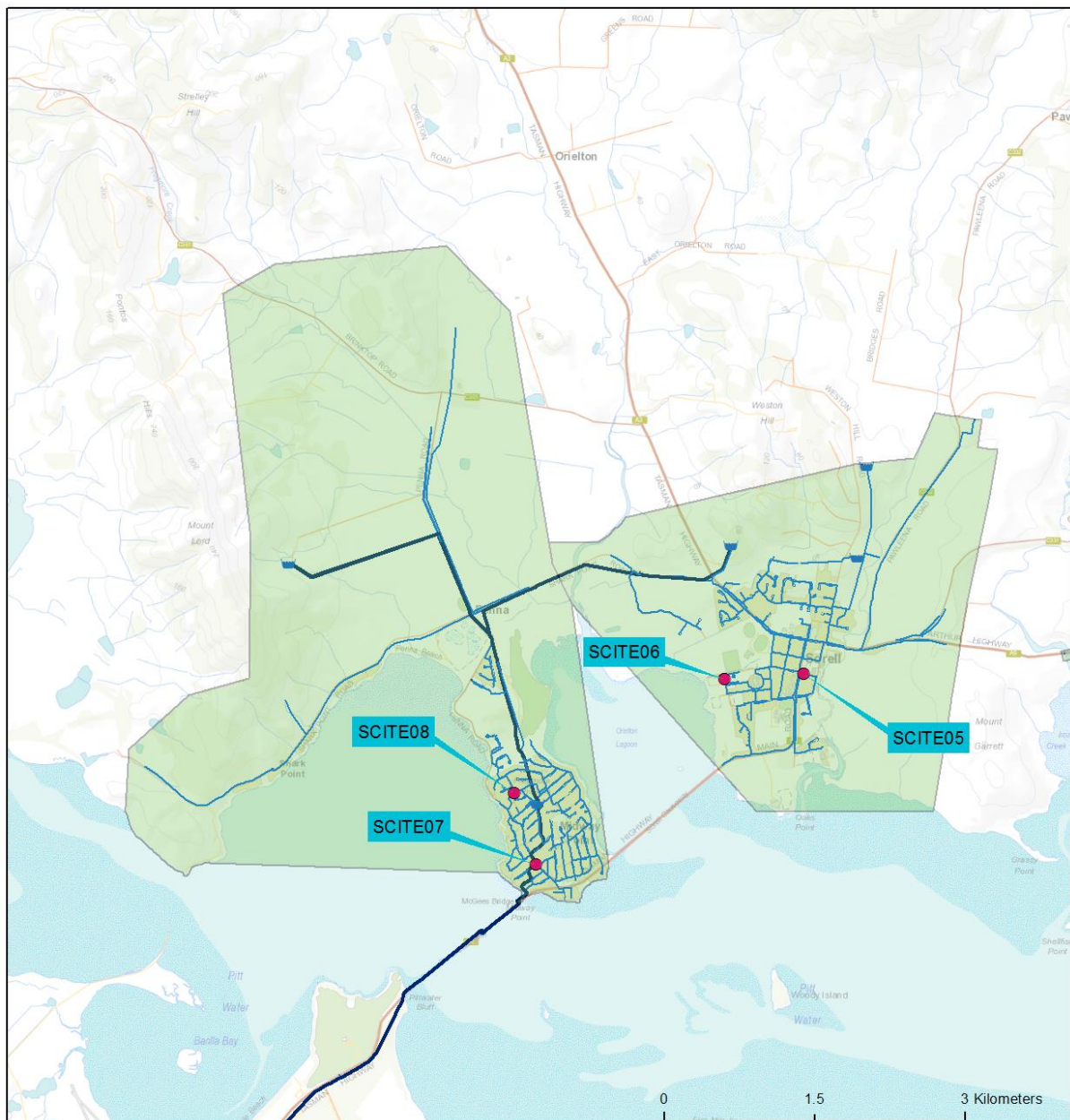
DVSTE60 = National Park – Hotel – LFSTE15 = Westerway Community

Map 6.30.1-i New Norfolk monitoring zone



DVSTE58 = New Norfolk, George St

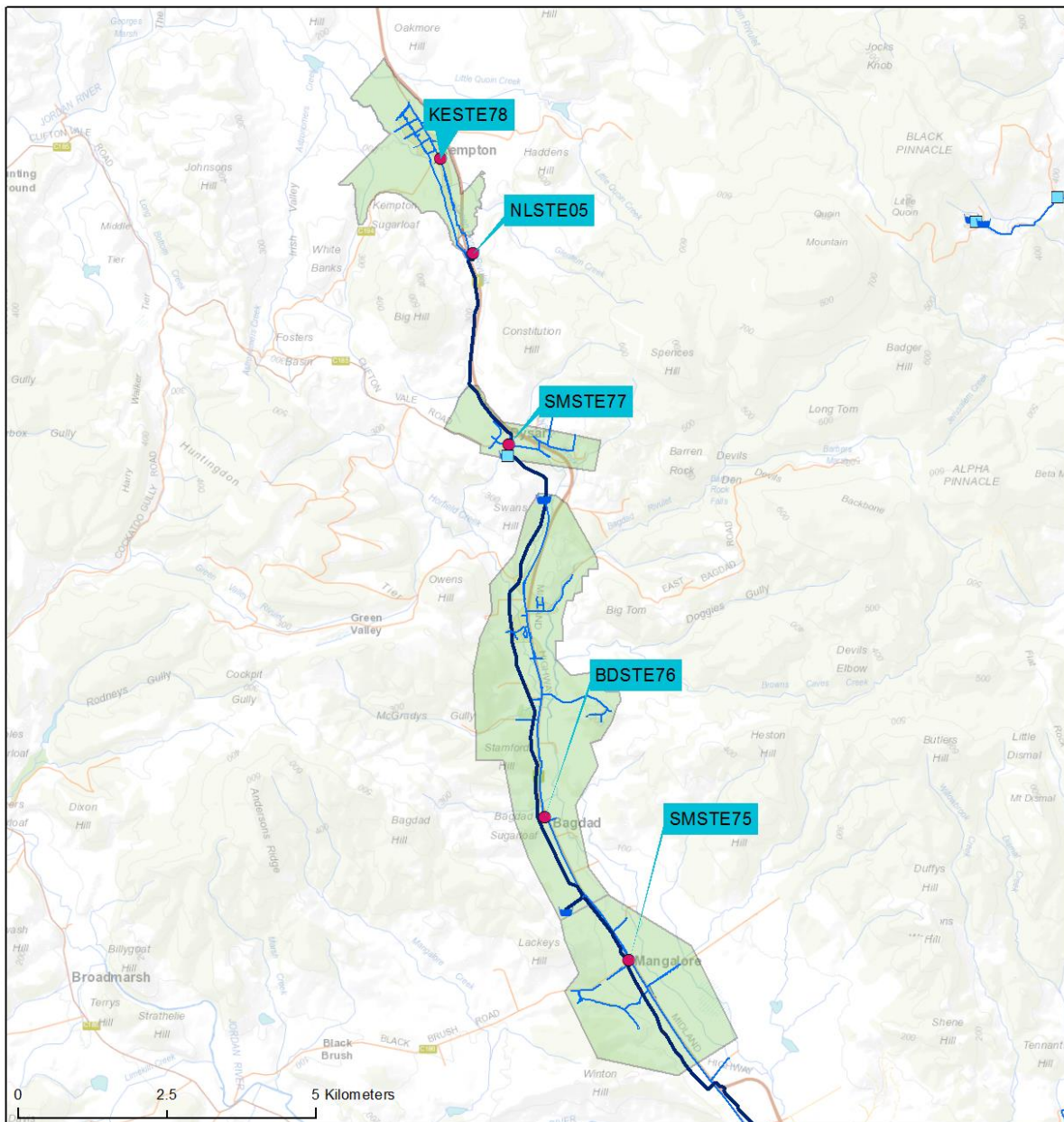
**Map 6.30.1-j Sorell monitoring zone**



**SCITE05** = Sorell, 10 Sommerville St – **SCITE08** = Midway Point 24 Honolulu St – **SCITE07** = Midway point, 24 Penna Rd –  
**SCITE06** = Sorell, William St



Map 6.30.1–k Southern Midlands monitoring zone



SMSTE77 = Dysart, 41 Ely St – BDSTE76 = Bagdad, Caltex Fuel Station – KESTE78 = Kempton, Caravan Bay –  
 SCITE06 = Mangalore, Park Sample point

## 6.30.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.30.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: <b>Potable</b>
Parameter group	Result	Compliant*		Test frequency	Sampling events	Non-conformance
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes	●	Weekly	3316	0
<b>Fluoride</b> <sup>(2)</sup>	100%	Yes	●	Weekly	424	0
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly	167	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	6 Monthly	64	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	–	3	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

Table 6.30.2-b Performance overview of individual monitoring zones (2015–16)

Monitoring zone performance (2015–16)						
Parameter group	Result	Compliant*		Test frequency	Sampling events	Non-conformance
<b>Brighton Monitoring Zone (6 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	312	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	24	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	6	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Clarence Monitoring Zone (17 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	467	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	20	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	5	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Coal Valley Monitoring Zone (3 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	154	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	8	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	3	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Glenorchy Monitoring Zone (13 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	676	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	26	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	13	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Hobart Monitoring Zone (16 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	606	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	26	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	6	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Kingborough Monitoring Zone (9 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	475	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	16	0

<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	5	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–		–	–	–
<b>National Park Monitoring Zone ( 3 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	158	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	14	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	8	0
<b>Pesticides</b> <sup>(5)</sup>	100%	–	●	Quarterly	3	0
<b>New Norfolk Monitoring Zone (1 Location)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	52	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–		–	–	–
<b>Southern Midlands Monitoring Zone (4 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	208	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	13	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	8	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–		–	–	–
<b>Sorell Monitoring Zone (4 Locations)</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	208	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	16	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	8	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–		–	–	–

Key – See key Error! Reference source not found. above for details. Fluoride compliance, pesticides, consumer complaints and public alerts have been excluded as these are representative of the systems as a whole and not unique to an individual monitoring zone.



### 6.30.3. Summary of historic total system performance

Table 6.30.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	–		100%	●	99.5%	●	> 99.9%	●	100%	●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational Fluoride Dosing – (Ferntree dosing station)</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	1	●	0	●
	within target range <sup>(b)</sup>	55.9%	●	63.8%	●	69.7%	●	83.1%	●	91.2%	●
	mean dose (mg/L) <sup>(c)</sup>	0.69	●	1.08	●	0.91	●	1.00	●	0.99	●
	<b>Operational Fluoride Dosing – (Merton dosing station)</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	69.6	●	40.8	●	81%	●	85.1%	●	86%	●
	mean dose (mg/L) <sup>(c)</sup>	0.91	●	0.97	●	0.98	●	0.97	●	0.97	●
	<b>Operational Fluoride Dosing – (National Park dosing station)</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	48.5	●	76.4	●	78.5%	●	72.2%	●	84.8%	●
	mean dose (mg/L) <sup>(c)</sup>	0.78	●	0.96	●	1.06	●	0.85	●	0.91	●
	<b>Operational Fluoride Dosing –(Bryn Estyn dosing station)</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	93.9	●	97.3	●	91.9%	●	95.3%	●	94.8%	●
	mean dose (mg/L) <sup>(c)</sup>	1.04	●	1.0	●	0.97	●	0.96	●	0.97	●
	<b>Distribution Fluoride Testing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Required		Not Required		Not reported		82.1%	●	92.2%	●
	mean dose (mg/L) <sup>(c)</sup>	Not Required		Not Required		Not reported		0.89	●	0.96	●
<b>Metals</b> <sup>(3)</sup>	–		100%	●	100%	●	100%	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	–		100%	●	100%	●	100%	●	100%	●	
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
<b>Complaints received</b> <sup>(5)</sup>	Not Recorded		Not Recorded		388		874		388		
<b>Public alerts issued</b> <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (●) = >98 per cent, (●) = >90 per cent, (●) = <90% – (2a) – based ADWG health limit of 1.5mg/L (● = 0, (●) = >0) – (2b) – (●) = >90 per cent, (●) = >80 per cent, (●) = <80% – (2c) – (●) = between 0.8 and 1.2, (●) = >1.2 or <0.8 – (3) – (●) = >95 per cent and/or 0 Failures, (●) = >90 per cent and/or 1–3 Failures, (●) = <90 per cent and/or >3 Failures – (4) – (●) = 0 Detections >MRL, (●) = 1–3 Detections >MRL, (●) = >3 Detections >MRL

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.30.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride dosing of the Greater Hobart System is conducted at four separate dosing stations (Bryn Estyn, Ferntree, Merton, and National Park). The performance of individual stations for the 2015/16 reporting period was varied, see below and section six of this individual system report for additional details
  1. Bryn Estyn was compliant with both of the DHHS key performance metrics. In this reporting period 94.8 per cent of daily samples were within the target range of 0.8–1.2 mg/L, which is compliant with the DHHS minimum goal of greater than 90 per cent. The average dose was also compliant with a mean of 0.97 mg/L. These figures demonstrate stable reliable fluoride dosing
  2. The Ferntree dosing station was compliant with both of the DHHS key performance metrics. In this reporting period 91.2 per cent of daily samples were within the target range. The average dose was also compliant with a mean of 0.99 mg/L. These figures demonstrate stable reliable fluoride dosing, and represent a significant improvement compared to previous years
  3. Merton fluoride dosing was compliant annually with the DHHS performance target for mean compliant dose, but failed to achieve 90 per cent of samples on target. In this reporting period 86 per cent of daily samples were within the target range of 0.8 – 1.2 mg/L
  4. National Park fluoride dosing was compliant annually with the DHHS' performance target for mean compliant dose, but failed to achieve 90 per cent of samples on target. In this reporting period only 72.2 per cent of daily samples were within the target range of 0.8 – 1.2 mg/L
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

### 6.30.5. Microbiological performance

Figure 6.30.5-a Microbiological compliance 2015–16

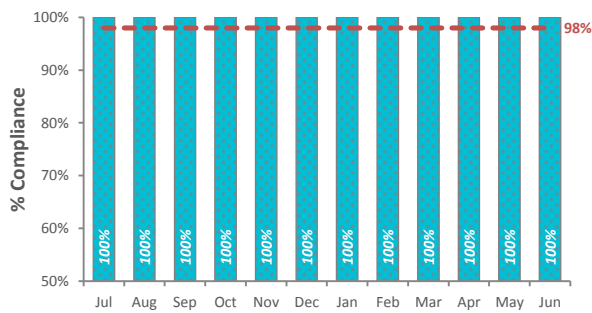
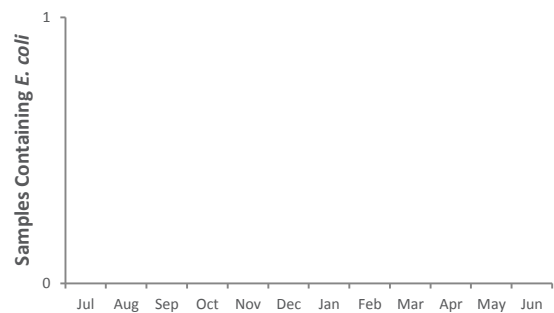


Figure 6.30.5-b Microbiological non-compliance 2015–16



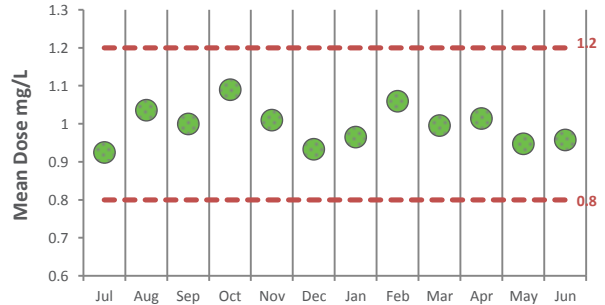
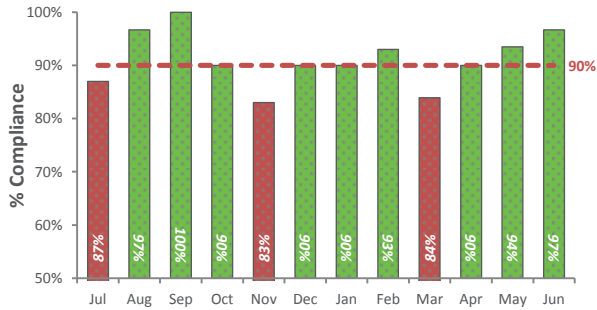
Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ Microbiological performance is measured at compliance sample points only. All compliance samples collected in 2015–16 were free from *E. coli* greater than 1 MPN/100 mL
- ❖ An *E. coli* detection (2 MPN/100 mL) occurred on 13 January 2016 in the Sorell Monitoring Zone. This sample was collected as part of an investigation into possible bird ingress into Penna Reservoir and was not part of the regular compliance monitoring program. Manual chlorine dosing and localised scouring were conducted and the subsequent resample was clear.

### 6.30.6. Fluoride performance

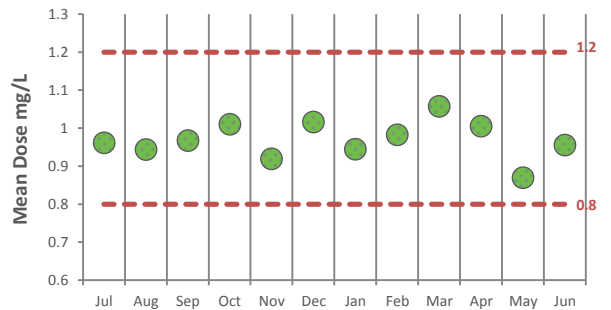
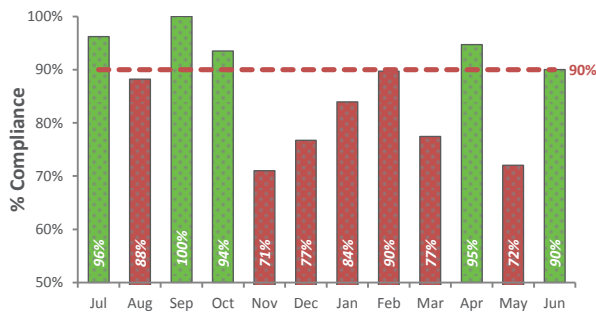
Seasonal performance Ferntree dosing station 2015–16

Figure 6.30.6-a Operational samples within target range Figure 6.30.6-b Operational samples mean monthly dose (mg/L)



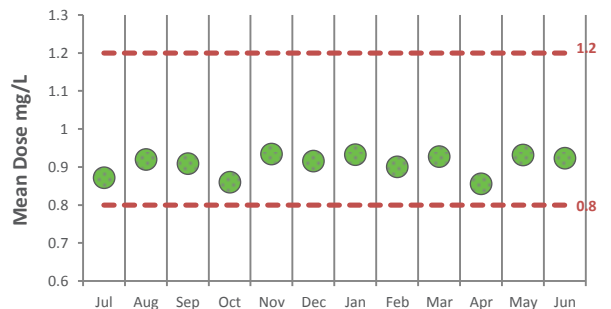
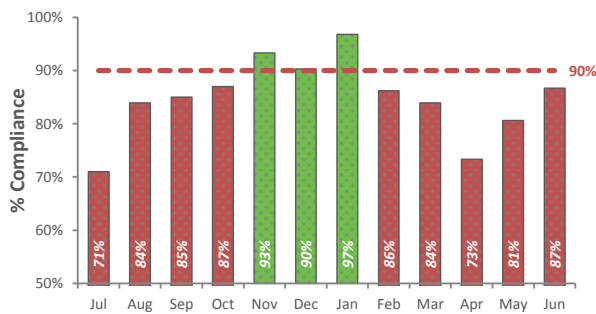
Seasonal performance Merton dosing station 2015–16

Figure 6.30.6-c Operational samples within target range Figure 6.30.6-d Operational samples mean monthly dose (mg/L)



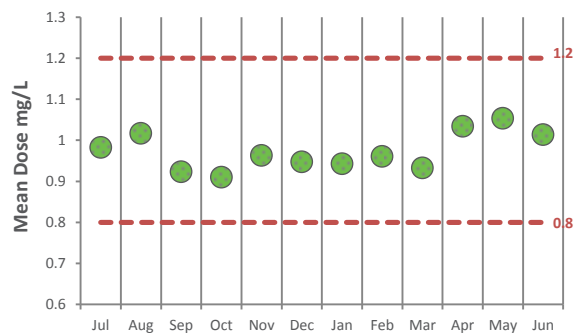
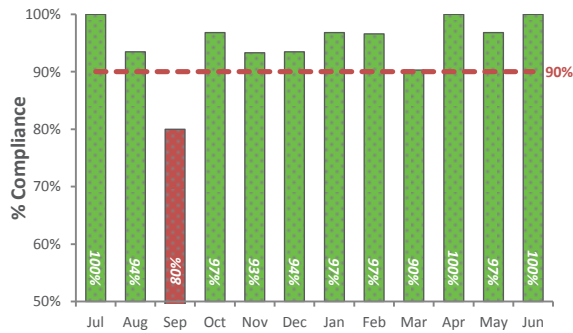
Seasonal performance National Park dosing station 2015–16

Figure 6.30.6-e Operational samples within target range Figure 6.30.6-f Operational samples mean monthly dose (mg/L)



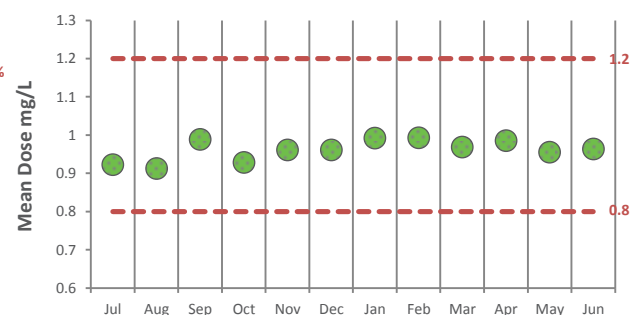
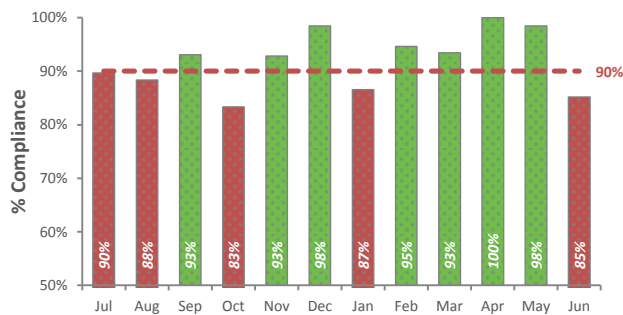
Seasonal performance Bryn Eystn dosing station 2015–16

Figure 6.30.6-g Operational samples within target range Figure 6.30.6-h Operational samples mean monthly dose (mg/L)



Seasonal performance Greater Hobart reticulation system performance 2015–16

Figure 6.30.6-i Reticulation samples within target range Figure 6.30.6-j Reticulation samples mean monthly dose (mg/L)



Note: (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (Operational) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ The operational fluoride performance delivered by the Bryn Estyn dosing system demonstrated consistent and reliable dosing. The system was compliant with all of the DHHS key performance metrics
- ❖ Operational fluoride performance delivered by the Merton dosing system appears extremely variable. The system is only operational when there is sufficient environmental flow in the catchment. This causes occasional results outside the target range to have a large impact on monthly statistics. When operational for prolonged periods the system is typically compliant
- ❖ The operational fluoride performance delivered by the Ferntree dosing system demonstrated consistent and reliable dosing. The system was compliant with all of the DHHS key performance metrics.
- ❖ The operational fluoride performance delivered by the National Park dosing system overall, was below expectation. Persistent problems with the powder dosing system account for the majority of the performance issues
- ❖ Fluoride performance recorded from the distribution network overall was variable. This result is primarily as a result of poor performance from the National Park dosing station.

## 6.30.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.30.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	64	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	64	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	64	0	100	5.58	1	10
<b>Cadmium</b>	2	µg/L	64	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	64	0	100	< 1	< 1	2
<b>Copper</b>	2000	µg/L	64	0	100	31.05	< 1	301
<b>Lead</b>	10	µg/L	64	0	100	< 0.5	< 0.5	1.8
<b>Manganese</b>	500	µg/L	64	0	100	3.55	0.7	28.6
<b>Mercury</b>	1	µg/L	64	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	64	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	64	0	100	< 0.5	< 0.5	1
<b>Selenium</b>	10	µg/L	64	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	167	0	100	10.09	< 1	55
<b>Monochloroacetic acid</b>	150	µg/L	167	0	100	< 5	< 5	8
<b>Trichloroacetic acid</b>	100	µg/L	167	0	100	20.87	< 2	68
<b>Total trihalomethanes</b>	250	µg/L	167	0	100	32.36	6	89

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (..) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.30.8. General physical parameters

**Table 6.30.8-a General physical performance**

General physical parameters (2015–16)		Samples	Mean	Min.	Max.
<b>Brighton Monitoring Zone</b>					
Chlorine residual (mg/L)		302	0.24	0.01	1
Turbidity (NTU)		309	0.45	0.1	14.2
pH		309	7.16	6.15	8.59
<b>Clarence Monitoring Zone</b>					
Chlorine residual (mg/L)		470	0.29	0.02	1.18
Turbidity (NTU)		476	0.15	0.43	8.01
pH		476	7.38	6.35	9.77
<b>Coal Valley Monitoring Zone</b>					
Chlorine residual (mg/L)		152	0.24	0.01	0.9
Turbidity (NTU)		156	0.34	0.1	2.5
pH		156	7.74	7	9.78
<b>Glenorchy Monitoring Zone</b>					
Chlorine residual (mg/L)		663	0.18	0	0.77
Turbidity (NTU)		674	0.57	0.16	3.5
pH		676	6.82	5.73	9
<b>Hobart Monitoring Zone</b>					
Chlorine residual (mg/L)		605	0.15	0	0.71
Turbidity (NTU)		610	0.65	0.2	6.5
pH		610	6.73	5.56	8.53
<b>Kingborough Monitoring Zone</b>					
Chlorine residual (mg/L)		457	0.26	0	0.8
Turbidity (NTU)		466	0.64	0.3	3.7
pH		467	6.85	5.85	9.49
<b>National Park Monitoring Zone</b>					
Chlorine residual (mg/L)		158	0.43	0	1.23
Turbidity (NTU)		158	0.9	0.3	7.4
pH		158	7.01	6.38	8.22
<b>New Norfolk Monitoring Zone</b>					
Chlorine residual (mg/L)		52	0.38	0.03	0.73
Turbidity (NTU)		52	0.36	0.2	0.8
pH		52	7.33	6.88	7.61
<b>Southern Midlands Monitoring Zone</b>					
Chlorine residual (mg/L)		208	0.31	0.01	0.91
Turbidity (NTU)		215	0.36	0.1	1.2
pH		215	8.92	7.62	9.67
<b>Sorell Midlands Monitoring Zone</b>					
Chlorine residual (mg/L)		204	0.13	0.01	0.64
Turbidity (NTU)		208	0.72	0.2	31
pH		209	6.88	5.56	8.31

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Due to the complex operational arrangement of the Greater Hobart treatment and distribution system, it is possible for most zones to receive treated water from a number of water sources. Due to this operating model, monitoring zones can receive water with different levels and methods of treatment. Several of these sources have no formal filtration barrier and as such have the potential to introduce spikes in turbidity following heavy rainfall in their catchments
- ❖ Turbidity levels observed in the distribution networks were typically low, below 1 NTU. Several isolated spikes were observed, some above the ADWG aesthetic limits and are likely to be related to interruptions and bursts disturbing sediments in water mains. It is also worth noting that due to the hydraulic operation of the network, pressure changes and flow reversals also have the potential to dislodge sediment and trigger isolated turbidity spikes
- ❖ Chlorine residuals in the distribution network when viewed as an average across all sample sites in a zone, are typically above the target of 0.1 mg/L. When these figures are viewed at a more granular level, by individual sample point location, it is evident that typically levels are considerably lower at the extremities of the zone. These levels often fall well below 0.1 mg/L. A strategic program identified in our DWQMP will aim to identify and address these issues
- ❖ pH levels vary considerably across the system as a whole. The levels are heavily influenced by the construction materials of the assets and the chemistry of the raw water supply. Due to the transport distances and subsequent elevated retention times, pH levels have a tendency to rise as they leach carbonates from concrete assets. Raw water sources with lower more acidic pH levels such as National Park have a tendency to accelerate this process
- ❖ In terms of disinfection performance at the point of primary disinfection, pH levels are typically slightly acidic, which is optimal for efficient disinfection. Secondary booster chlorination will typically receive water that is slightly alkaline and often greater than 8.5. This is less desirable for disinfection performance.

#### 6.30.9. Aesthetic issues

- ❖ In early September 2015 our raw water monitoring program picked up algal metabolites in the Derwent River at levels known to cause aesthetic taste and odour issues. In response powdered activated carbon (PAC) dosing was employed along with granular active carbon in the filter beds
- ❖ In late 2015 a permanent PAC dosing facility was commissioned and took over from the temporary system used throughout 2014 – 15. A number of taste complaints were received in relation to this issue but were significantly fewer than those of the previous year.



### 6.30.10. System incidents and issues

Table 6.30.10-a Identified incidents and issues

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
28/07/2015	Vandalism of the Olinda Grove chlorine dosing station, cause a temporary loss of disinfection on the 28/7/2015.	Internal procedures have been reviewed and improvements have been made	No	Yes
13/01/2016	Non routine investigation sample identified <i>E. coli</i> downstream of Penna reservoir.	Scouring of the distribution in the vicinity of hydrant. Miscommunication meant a hydrant that had minimal usage was sampled from, rather than the bulk as requested. Retest was clear.	Yes	Yes
8/06/2016	Flood event caused river water to ingress into Lawitta pump station, delivering raw (flood) water to the distribution network (parts of Brighton zone).	Sampling and flushing was undertaken. BWA issued.	Yes	Yes
8/06/2016	Due to significant rain fall in June 2016, turbidity increased in the Lake Fenton and National Park supply to levels which could compromise disinfection.	Discussions with the DHHS via the Incident Management Team led to the decision to introduce a temporary BWA.	Yes	Yes

Note: Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.30.11. Customer complaints

Figure 6.30.11-a Complaint classification

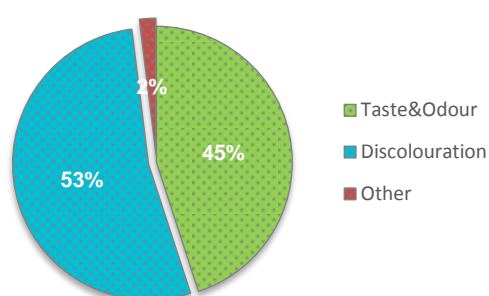
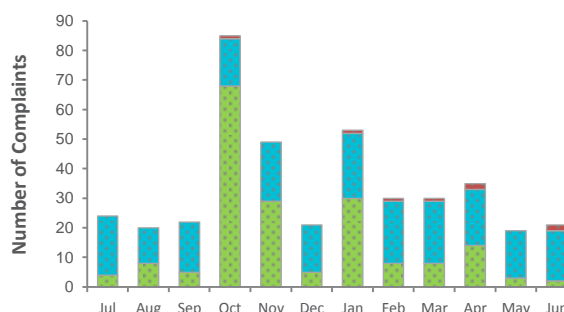


Figure 6.30.11-b Seasonal trend analysis



- ❖ In total 409 complaints were received in 2015–16. The spike of taste and odour related complaints received in October and November 2015 was a result of algal metabolites in the Derwent River. The discoloured water complaints generally align with planned and unplanned maintenance activities and flow / pressure reversal within hydraulic zones.

### 6.30.12. Catchment and source water issues

- ❖ The activities in the four catchments vary significantly; hence each will be considered and discussed below separately
- ❖ Lake Fenton/Lady Barron Creek catchment is situated within Mt Field National Park. Water quality is protected under catchment zoning in the park’s management plan. Activities within the catchment zone are limited to a few walking tracks for self-sufficient bush walkers. The Lake Dobson road also crosses the catchment at points. Based on land use in this catchment source water quality risks are likely to be limited to microbes from native fauna
- ❖ The Hobart and Glenorchy Mountain catchments are within Wellington Park. Water quality is protected under the Wellington Park Act and Management Plan, which establishes catchment protection zones and allows for limited use within these zones. Activities are limited to bushwalking and in some cases bike riding. Horses, dogs and motorbikes are excluded, although in some areas there are issues with illegal motorbike access. The Mt Wellington Road crosses the upper part of the Glenorchy Mountain catchment. Based on the land use within this catchment, source water quality risks are likely to be limited to microbes from native animals
- ❖ The Derwent catchment is a large (782,901 ha) open mixed use catchment. Activities in the catchment include intensive irrigated cropping, grazing, dairy farming, aquaculture, hydroelectric power generation, dwellings and townships with onsite wastewater management, a number of Level 1 wastewater treatment, mining, fishing, recreational boating and recreational activities. Based on the land use within this catchment, source water quality risks are likely to include: microbial, pesticides, turbidity, algal, and chemical
- ❖ The Hobart Derwent River supply experienced significant issues with taste and odour related to algal metabolites (MIB and Geosmin) in the 2014–15 and 2015–16 summer periods. Testing has shown the issue was constrained to the lower sections of the Derwent, Tyenna and Styx rivers. Although this issue had not been noted historically it must now be considered an (aesthetic) risk for this supply.

### 6.30.13. Infrastructure and operational changes

- ❖ A permanent PAC dosing plant to manage source water taste and odour issues was commissioned at the Bryn Estyn water treatment plant in late 2015.
- ❖ No other significant infrastructure or operational changes were made to either the treatment plants or distribution system during 2015–16.

### 6.30.14. Future planning

**Table 6.30.14-a Future planning for the system**

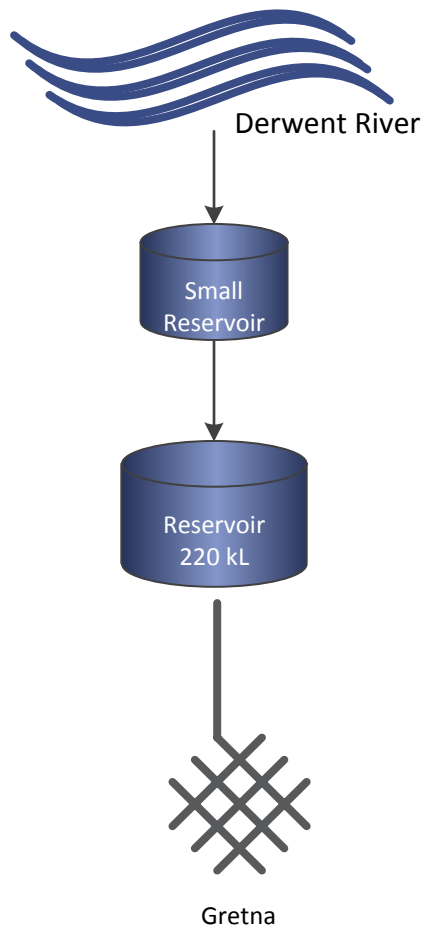
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Decommissioning of Tolosa Dam	Decommissioning of Tolosa Dam and installation of storage reservoirs	Construction of the two tanks under way. Design for respective pipework underway.	2017–18	\$23.9 million

### 6.31. Gretna drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	75
	<b>Catchment</b>	Derwent River
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Gretna.</li> </ul>		

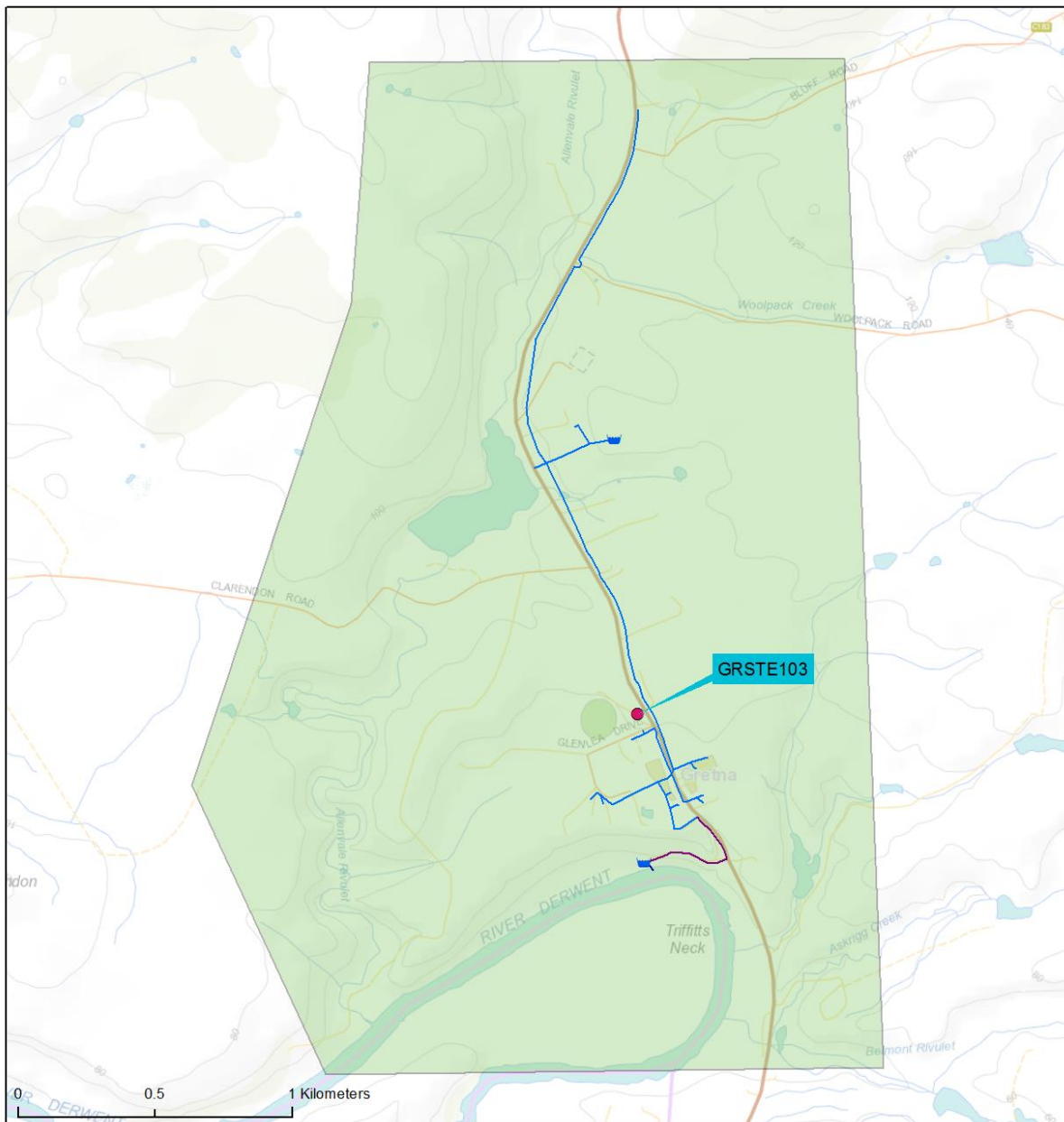
### 6.31.1. System description

Figure 6.31.1-a Gretna system schematic



- ❖ **Catchment**  
The Gretna drinking water system is supplied by the Derwent River
- ❖ **Treatment**  
The Gretna system is a raw water system, with no treatment. Customers receiving water from the Gretna system are subject to a Permanent BWA (prior July 2013)
- ❖ **Distribution**  
There are two small reservoirs prior to water being supplied to the residential properties. The Gretna water system supplies 75 connections.

Map 6.31.1—a Gretna monitoring zone



GRSTE103 = Gretna Picnic Grounds

## 6.31.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.31.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	2.1%	No	●	Weekly	48 <sup>#</sup>	47
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	–	–	–	–
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) sampling program changed to monthly in June 2016.

## 6.31.3. Summary of historic total system performance

Table 6.31.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	12%	●	0%	●	0%	●	7%	●	2.1%	●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	<b>Distribution fluoride testing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100% ^	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	N/A		N/A		
<b>Complaints received</b> <sup>(5)</sup>	Not Recorded		Not Recorded		0		0		0		
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

#### 6.31.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 2.1 per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not currently fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP are not measured as this system is not chlorinated.

#### 6.31.5. Microbiological performance

Figure 6.31.5-a Microbiological compliance 2015–16

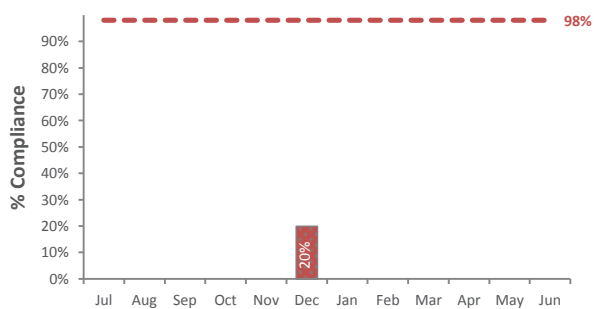
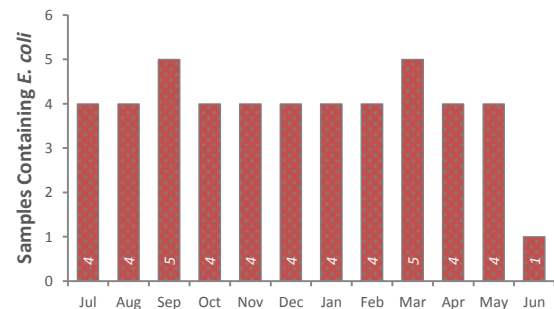


Figure 6.31.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Gretna system was 2.1per cent compliant in 2014–15. *E. coli* greater than 1 MPN/100 mL was detected in all but one of the samples collected in the reporting period
- ❖ The Gretna system is supplied directly from the Derwent River with no form of treatment prior to distribution to customers
- ❖ The installation of a new WTP is currently up for public tender and it is anticipated this will be completed in 2017.

#### 6.31.6. Fluoride performance

- ❖ The Gretna system is not currently fluoridated.

### 6.31.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

**Table 6.31.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	2.5	2	3
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	21.5	18	25
Lead	10	µg/L	2	0	100	1	0.9	1.1
Manganese	500	µg/L	2	0	100	4.6	4.2	5
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	N/A	N/A	—	—	—	—
Monochloroacetic acid	150	µg/L	N/A	N/A	—	—	—	—
Trichloroacetic acid	100	µg/L	N/A	N/A	—	—	—	—
Total trihalomethanes	250	µg/L	N/A	N/A	—	—	—	—

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (–) – Refers to compliance with current ADWG health limits. (–) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ DBPs are not measured due to the fact that the system is not disinfected.



### 6.31.8. General physical parameters

**Table 6.31.8-a General physical performance**

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		48	1.99	0.3	18.1
pH		48	7.21	6.74	7.67

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ This system is not chlorinated
- ❖ The average turbidity was 1.99 NTU, with spikes as high as 18.7 NTU. The ADWG aesthetic limit of 5 NTU was exceeded on three occasions. The lack of water treatment processes is the cause of these ongoing issues
- ❖ pH levels remained within the recommended optimal range.

### 6.31.9. Aesthetic issues

- ❖ Persistent aesthetic water quality issues associated with turbidity and colour were identified. See Table 6.31.10-a below for the planned resolution of this issue.

### 6.31.10. System incidents and issues

**Table 6.31.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
16/06/2016	Due to flood conditions, a large number of complaints were received regarding discoloured water.	Operators drained the reservoir and scoured the system when turbidity levels in the river dropped. Letters also delivered to customers informing them of the change in water quality.	No	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

#### 6.31.11. Customer complaints

- ❖ No complaints were received during this reporting period.

#### 6.31.12. Catchment and source water issues

- ❖ Gretna is supplied by the Derwent River. Activities in the Derwent catchment (above Gretna) include intensive irrigated cropping, grazing, dairy farming, aquaculture, hydroelectric power generation, dwellings and townships with onsite wastewater management, Level 1 wastewater treatment, mining, fishing, recreational boating and recreational activities
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.31.13. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to the system during 2015–16.

#### 6.31.14. Future planning

**Table 6.31.14-a Future planning for the system**

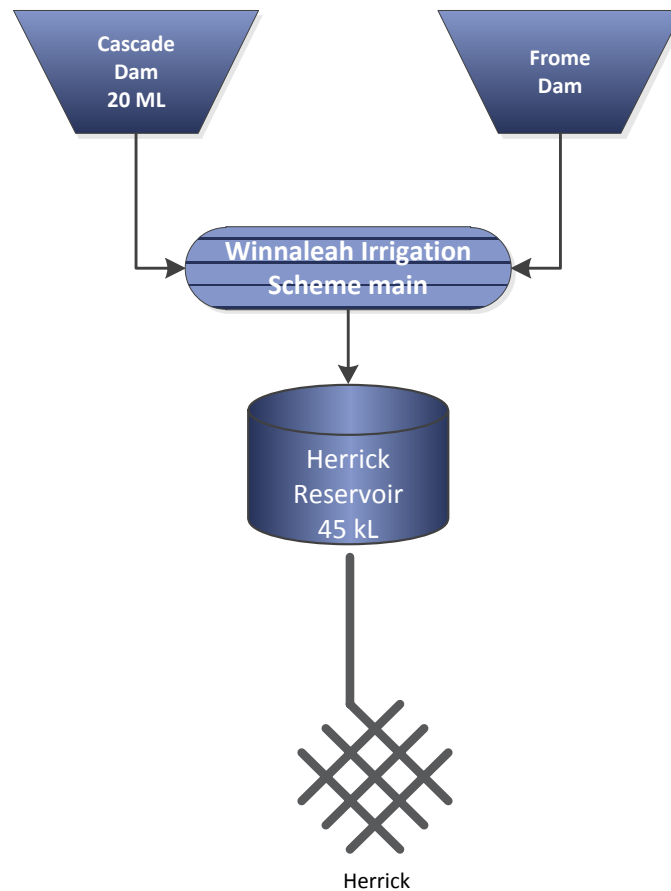
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Gretna water supply project	New WTP to supply treated water to Gretna	WTP designed and project at tender stage	2016–17	\$3.9 million

### 6.32. Herrick drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	27
	<b>Catchment</b>	Cascade and Frome Dams via Winnaleah Irrigation Scheme
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Herrick.</li> </ul>		

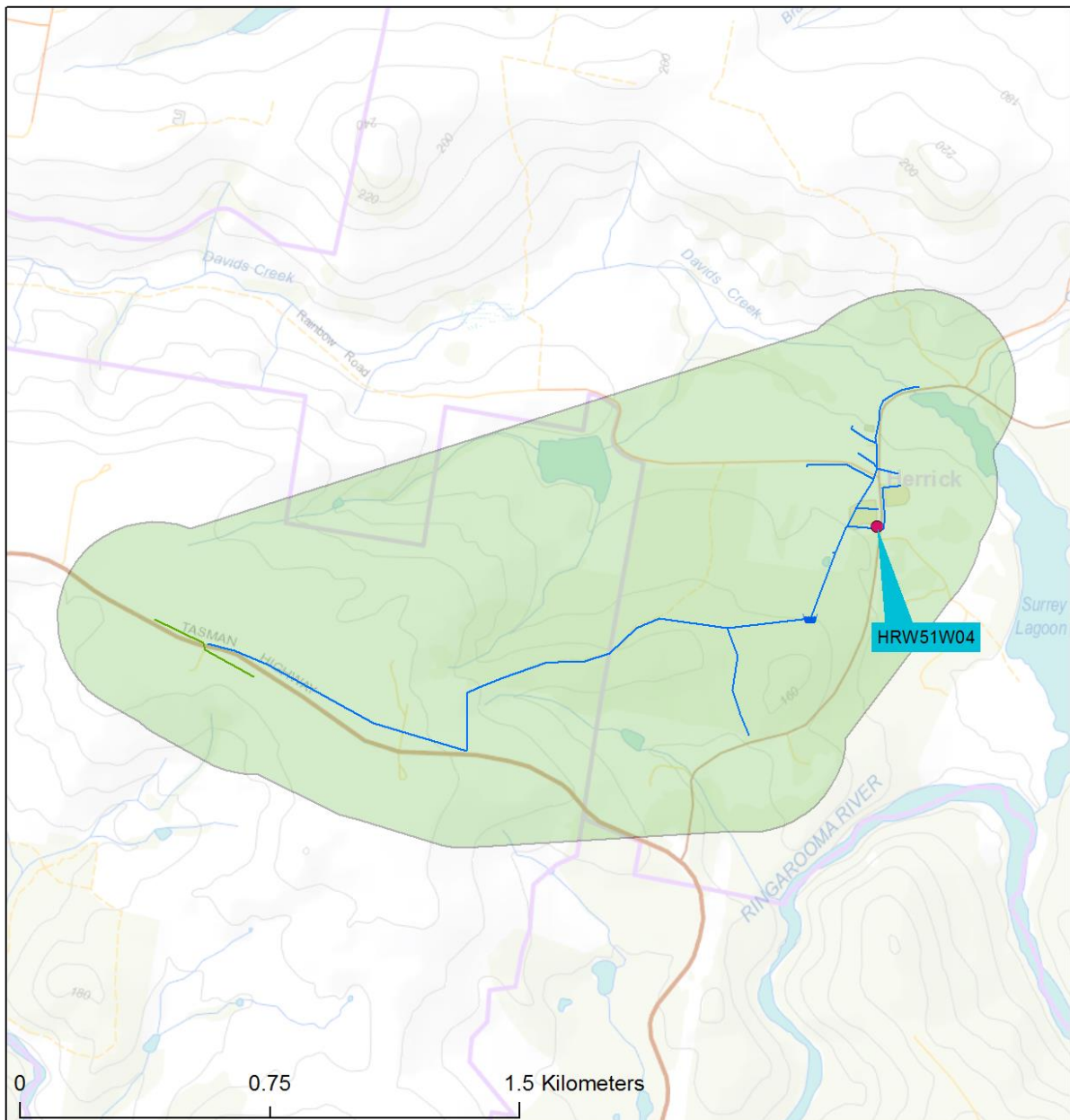
### 6.32.1. System description

Figure 6.32.1-a Herrick system schematic



- ❖ **Catchment**  
The Herrick drinking water system is supplied by Cascade Dam and Frome Dam
- ❖ **Treatment**  
The Herrick system is a raw water system, with no treatment. Customers receiving water from the Herrick system are subject to a Permanent BWA (prior July 2013)
- ❖ **Distribution**  
The system feeds the township of Herrick. There is one roofed reservoir in the distribution system supplying 27 connections.

Map 6.32.1—a Herrick monitoring zone



HRW51W04 = Old Service Station, Herrick

## 6.32.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.32.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	66.7%	No	●	Weekly	12	4
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	4	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting. # Routine DBP and Pesticide testing was removed from the reticulation sampling program in May 2016.

## 6.32.3. Summary of historic total system performance

Table 6.32.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)		Performance*								
Parameter group	2011–12	2012–13	2013–14	2014–15	2015–16					
<b>Microbiological</b> <sup>(1)</sup>	36%	●	50%	●	64%	●	64.7% <sup>#</sup>	●	66.7%	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		100%	●
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>	0		0		0		2		1	
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. # Samples were not taken as per sampling program in order to calculate compliance against the DHHS metrics.

#### 6.32.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 66.7 per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 achieved 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.32.5. Microbiological performance

Figure 6.32.5-a Microbiological compliance 2015–16

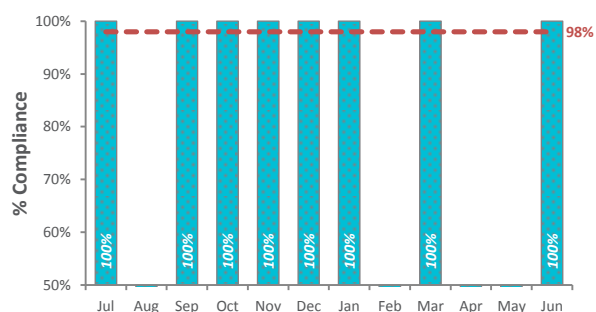
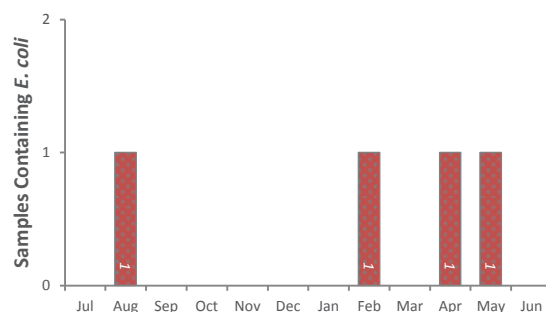


Figure 6.32.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Herrick system was 66.7 per cent compliant in 2015–16. *E. coli* greater than 1 MPN/100 mL was detected in four monthly samples during the reporting period
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality in Cascade Dam and Frome Dam
- ❖ The risk to public health is mitigated through the communication of the permanent BWA to customers.

#### 6.32.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.32.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.32.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	2.5	2	3
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	16	10	19
Lead	10	µg/L	4	0	100	2.37	1.8	2.7
Manganese	500	µg/L	4	0	100	9.75	2	24.4
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	3	0	100	< 4	< 1	< 4
Monochloroacetic acid	150	µg/L	3	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	3	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	3	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.



### 6.32.8. General physical parameters

Table 6.32.8-a General physical performance

General physical parameters (2015–16)					
Parameters		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		12	4.7	0.8	19.4
pH		12	6.07	5.74	6.29

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels are within the ADWG aesthetic limit of 5 NTU. Due to a lack of filtration barriers turbidity spiked above the ADWG aesthetic limit on three monthly samples, with the highest spike at 19.4 NTU
- ❖ This system is not chlorinated
- ❖ pH levels are below the recommended optimal range.

### 6.32.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.32.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.32.11. Customer complaints

Figure 6.32.11-a Complaint classification

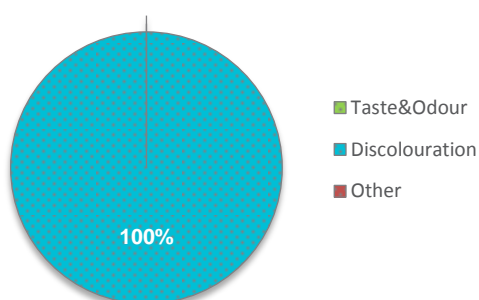
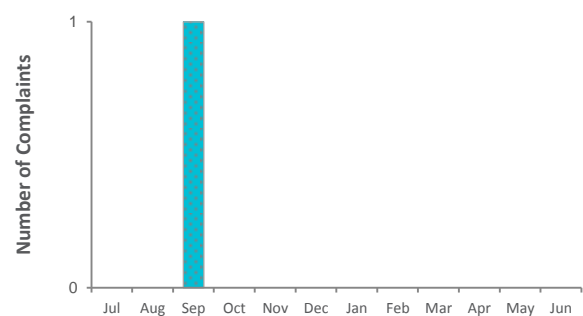


Figure 6.32.11-b Seasonal trend analysis



- ❖ One complaint was received relating to discoloured water issues.

### 6.32.12. Catchment and source water issues

- ❖ The Herrick drinking water system is supplied by the Winnaleah Irrigation Scheme which draws from the Cascade Dam and the Frome Dam. The Firth and Tinpot Creeks feed the dams. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.32.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.32.14. Future planning

**Table 6.32.14-a Future planning for the system**

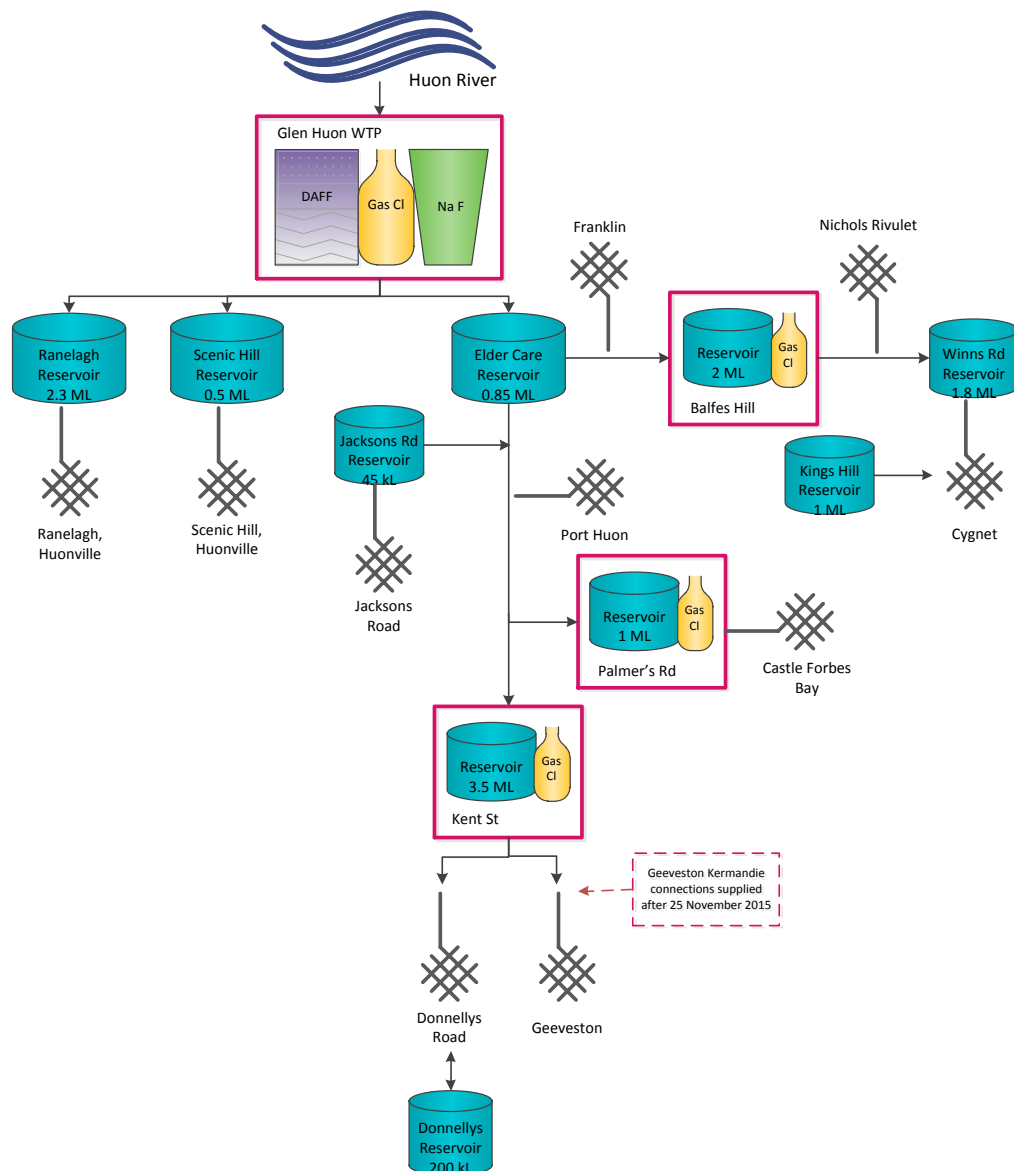
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Herrick supply options	Investigation into options to improve water quality supplied to Herrick	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

### 6.33. Huon Valley drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	4,664
	<b>Catchment</b>	Huon River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	Chlorine gas
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Glen Huon</li> <li>❖ Huonville</li> <li>❖ Ranelagh</li> <li>❖ Franklin</li> <li>❖ Port Huon</li> <li>❖ Geeveston</li> <li>❖ Cygnet.</li> </ul>		

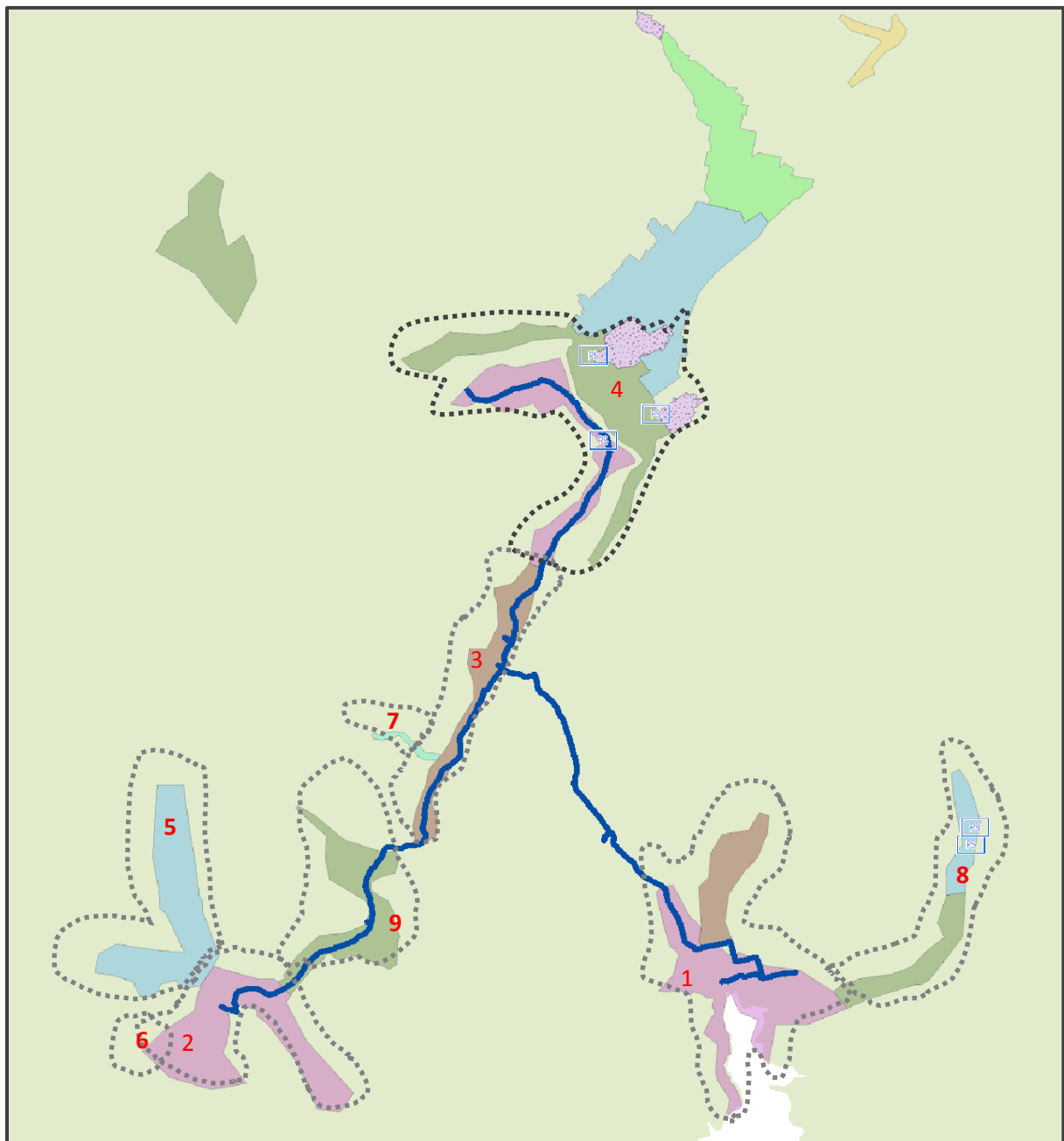
### 6.33.1. System description

Figure 6.33.1-a Huon Valley Regional Scheme System schematic



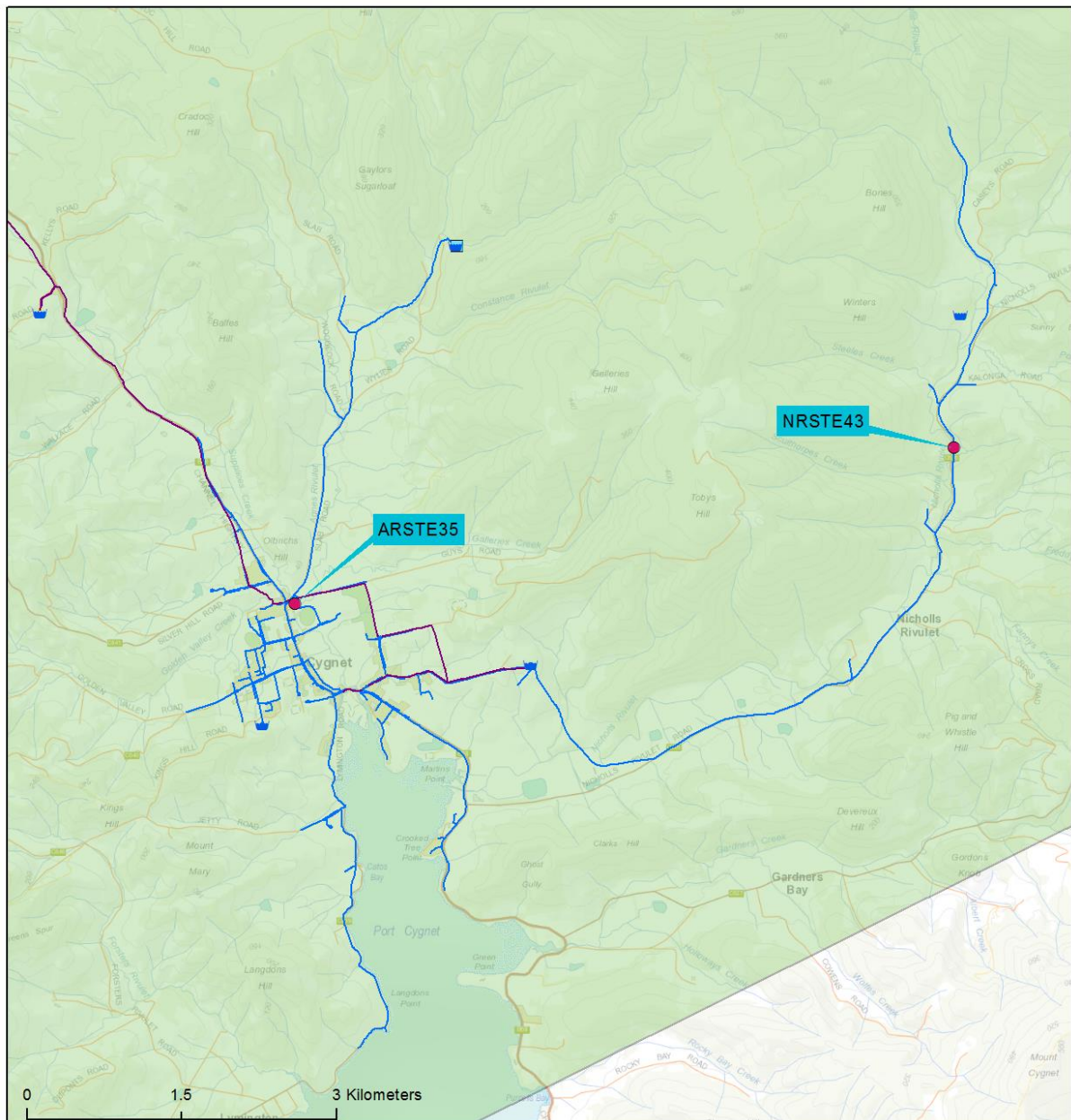
- ❖ **Catchment**  
The Huon Valley drinking water system is supplied by the Huon River
- ❖ **Treatment**  
The Glen Huon WTP employs DAFF, gas chlorine disinfection and fluoridation by sodium fluoride
- ❖ **Distribution**  
The system feeds the townships of the Huon Valley, including Geeverston, Cygnet, Franklin, Raneleigh, and Huonville. There are eight roofed reservoirs and three re-chlorination stations within the distribution system. The system supplies 4,664 connections.

Map 6.33.1—a Geographic layout of the Huon Valley supply area



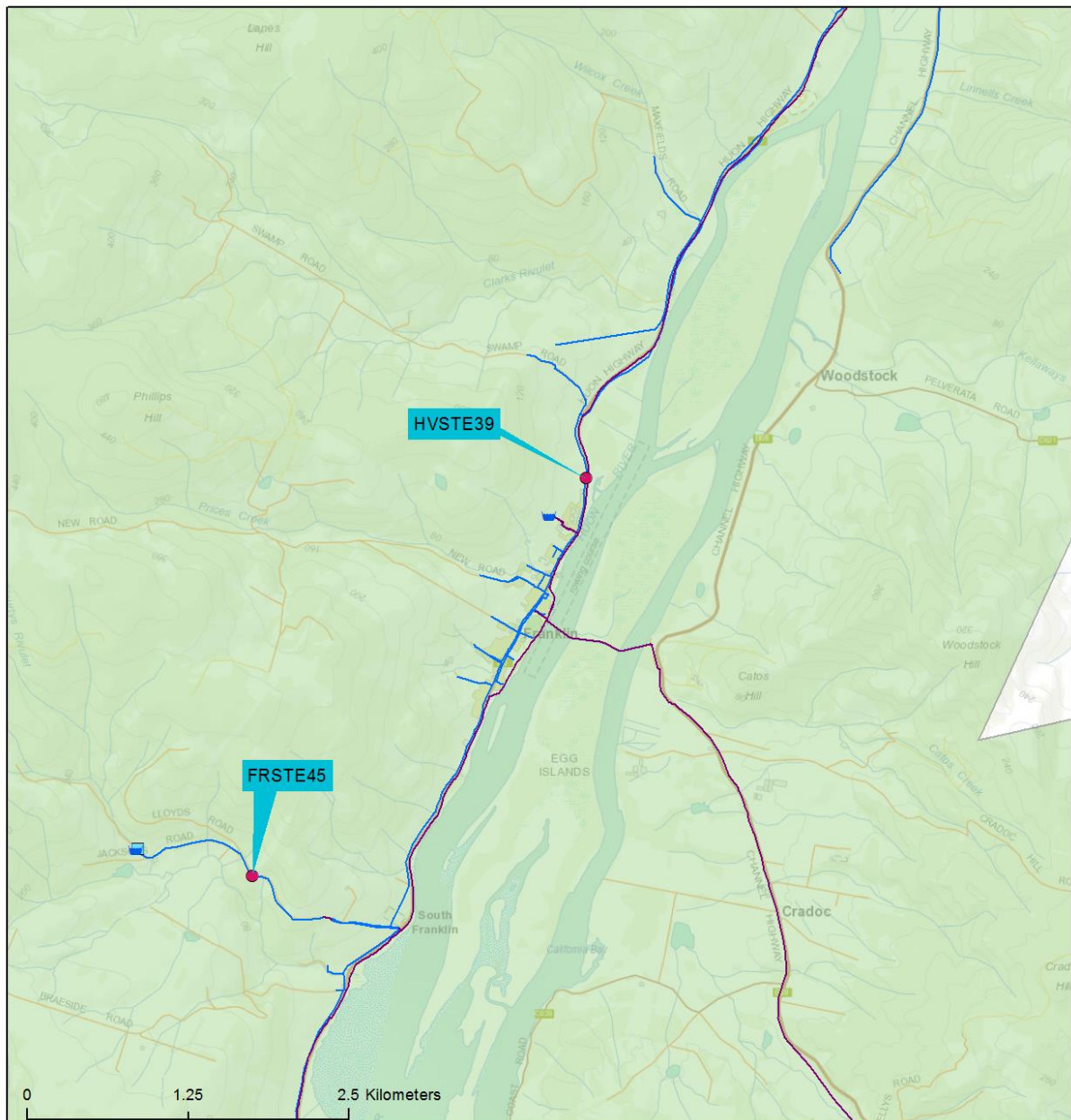
(1) Cygnet monitoring zone – (2) Geeveston monitoring zone – (3) Franklin monitoring zone – (4) Huonville monitoring zone – (5) Geeveston Donnellys road monitoring zone – (6) Kermandie road monitoring zone – (7) Franklin Jacksons road monitoring zone – (8) Cygnet Nicholls Rivulet monitoring zone – (9) Castle Forbes Bay monitoring zone

Map 6.33.1–b Cygnet and Cygnet Nicholls Rivulet monitoring zones



ARSTE35 = Football Ground, Bridge sample tap – NRSTE43 = Cygnet/Nicholls Rivulet, Sample Tap

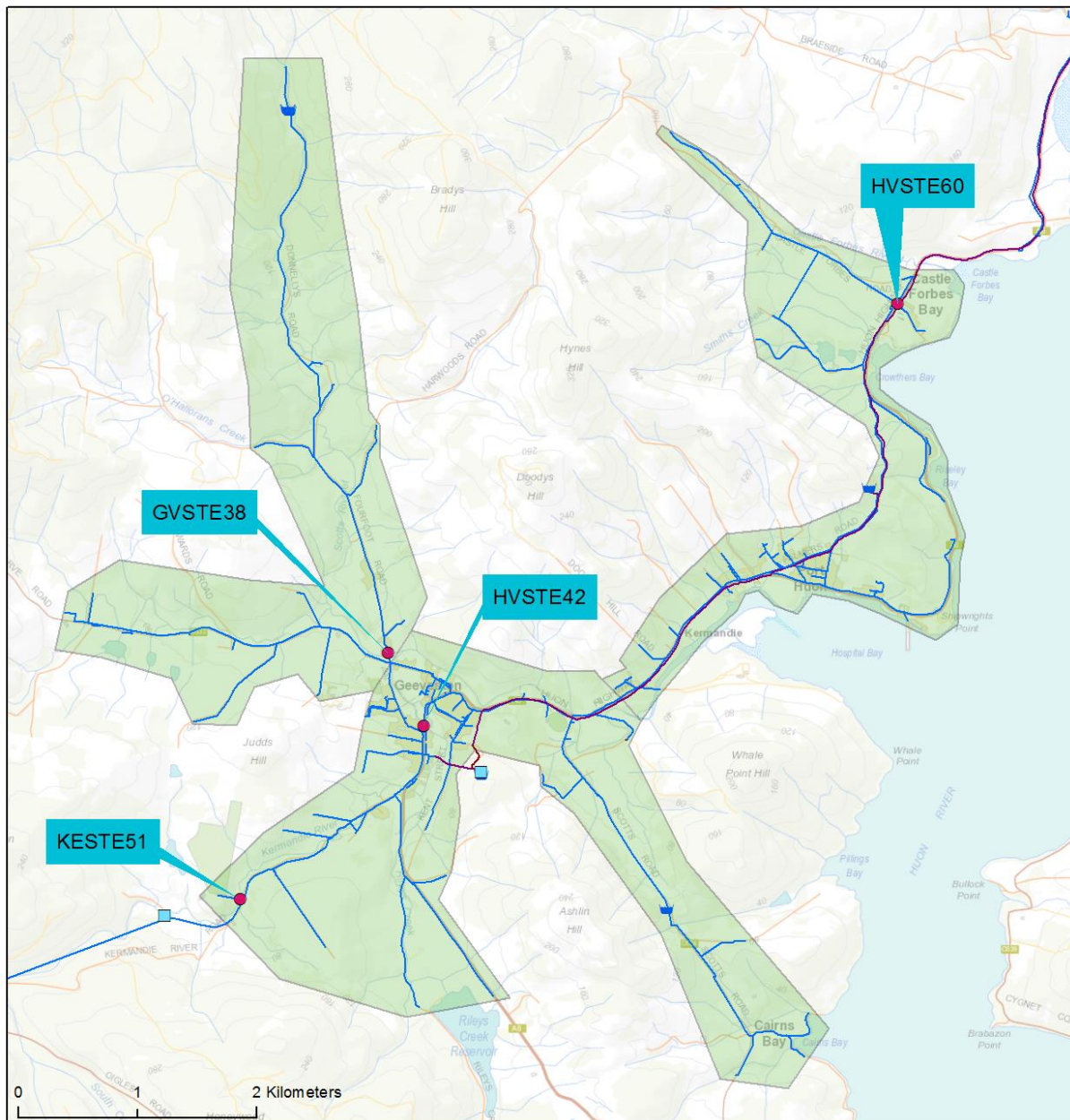
Map 6.33.1-c Franklin and Franklin Jacksons Road monitoring zones



HVSTE39 = Opposite No. 1 Pump Station – FRSTE45 = Jacksons Road



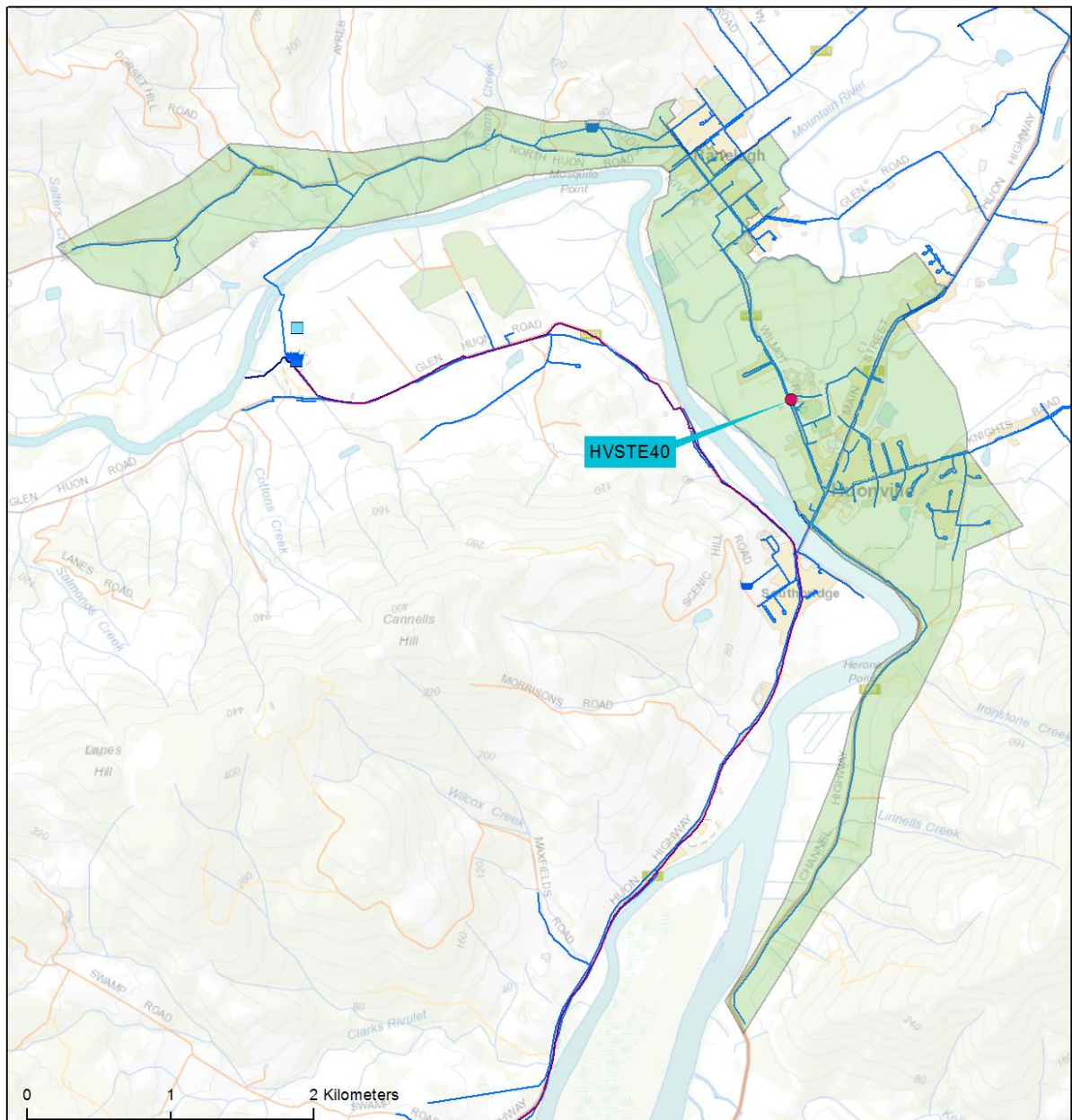
**Map 6.33.1–d Geeveston, Geeveston Donnellys Road, Geeveston Kermandie and Castle Forbes Bay monitoring zones**



**HVSTE42** = Intersection Bridge, School Road, Main Road – **KESTE51** = Geeveston / Bridge, corner Kermandie McKibens Rd – **GVSTE38** = Geeveston/Fourfoot Rd 1st Bridge, Sample Tap – **HVSTE60** Castle Forbes Bay



Map 6.33.1-e Huonville monitoring zone



HVSTE40 = Football club entrance, Wilmott Road

## 6.33.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.33.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: <b>Potable</b>
Parameter group	Result	Compliant*		Test frequency	Sampling events	Non-conformance
<b>Microbiological</b> <sup>(1)</sup>	99.7%	Yes	●	Weekly	377	1
<b>Fluoride</b> <sup>(2)</sup>	100%	Yes	●	Weekly	144	0
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly	28	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	6 Monthly	15	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

Table 6.33.2-b Performance overview of individual monitoring zones (2015–16)

Monitoring zone performance (2015–16)						
Parameter group	Result	Compliant*		Test frequency	Sampling events	Non-conformance
<b>Cygnets monitoring zone ARSTE35</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	53	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Franklin monitoring zone HVSTE39</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	53	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Geeveston monitoring zone HVSTE42</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	53	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Huonville monitoring zone HVSTE40</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	53	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Geeveston Donnelly's Road monitoring zone</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	47	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Geeveston Kermantie Road monitoring zone</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	25	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	2	0

<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	1	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Franklin Jacksons Road monitoring zone</b>						
<b>Microbiological</b> <sup>(1)</sup>	97.1%		●	Weekly	36	1
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	2	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–
<b>Cygnets Rivulet monitoring zone</b>						
<b>Microbiological</b> <sup>(1)</sup>	100%	–	●	Weekly	53	0
<b>DBPs</b> <sup>(3)</sup>	100%	–	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	–	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	–	–	–	–	–

Key – See key Error! Reference source not found. above for details. Fluoride compliance, pesticides, consumer complaints and public alerts have been excluded as these are representative of the systems as a whole and not unique to an individual monitoring zone. <sup>#</sup>Samples were not taken as per sampling program, therefore compliance cannot be calculated.

### 6.33.3. Summary of historic total system performance

Table 6.33.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance *										
	2011–12	2012–13	2013–14	2014–15	2015–16	2011–12	2012–13	2013–14	2014–15	2015–16	
<b>Microbiological</b> <sup>(1)</sup>	–	100%	●	99.5%	●	100%	●	99.7%	●	●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	–	0	●	0	●	0	●	0	●	
	within target range <sup>(b)</sup>	–	88.8%	●	100%	●	99.2%	●	97%	●	
	mean dose (mg/L) <sup>(c)</sup>	–	0.94	●	1.0	●	0.96	●	0.96	●	
	<b>Distribution fluoride testing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not required	Not required	Not reported	Not reported	78.8%	●	89.6%	●	●	
mean dose (mg/L) <sup>(c)</sup>	Not required	Not required	Not reported	Not reported	1.06	●	0.97	●	●		
<b>Metals</b> <sup>(3)</sup>	–	100%	●	100%	●	100%	●	100%	●	●	
<b>DBPs</b> <sup>(3)</sup>	–	100%	●	100%	●	100%	●	100%	●	●	
<b>Pesticides</b> <sup>(4)</sup>	N/A	0	●	0	●	N/A	●	N/A	●	●	
<b>Complaints received</b> <sup>(5)</sup>	Not recorded	Not recorded	8	2	15	Not recorded	Not recorded	8	2	15	
<b>Public alerts issued</b> <sup>(6)</sup>	–	0	●	0	●	0	●	0	●	●	

Key – (1) – (●) = >98 per cent, (●) = >90 per cent, (●) = <90% – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (●) = >90 per cent, (●) = >80 per cent, (●) = <80% – (2c) – (●) = between 0.8 and 1.2, (●) = >1.2 or <0.8 – (3) – (●) = >95 per cent and/or 0 Failures, (●) = >90 per cent and/or 1–3 Failures, (●) = <90 per cent and/or >3 Failures – (4) – (●) = 0 Detections >MRL, (●) = 1–3 Detections >MRL, (●) = >3 Detections >MRL

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.33.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ For the successful completion of verification testing the permanent BWAs covering Nicholls Rivulet and Franklin Jackson Road were removed in November 2015
- ❖ In the 2011 – 12 reporting period the Glen Huon treatment plant was not in operation. During this time the individual monitoring zones were supplied by separate drinking water systems
- ❖ Fluoride dosing maintains improved compliance since 2014 – 15, with compliance achieving greater than 90 per cent within target range. Performance was not consistent within the distribution network and is currently under review
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.33.5. Microbiological performance

Figure 6.33.5-a Microbiological compliance 2015–16

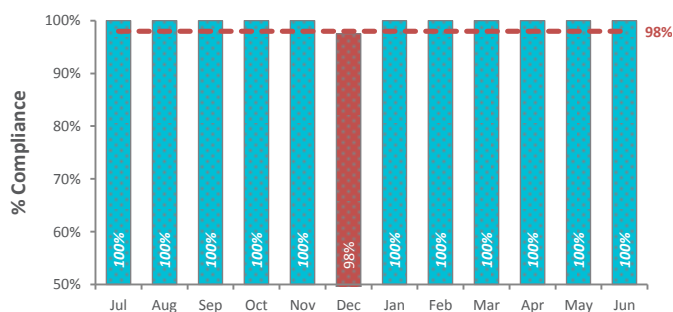
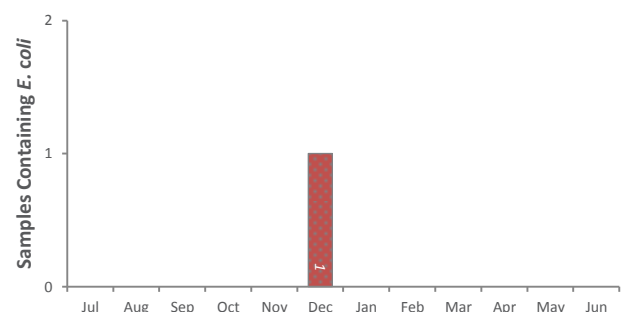


Figure 6.33.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ An *E. coli* detection occurred on 16 December 2015 from the Franklin Jacksons Road monitoring zone. Following localised scouring to improve residual chlorine levels the subsequent resample was clear
- ❖ Chlorine residuals have been below optimum levels since the system was added to the Huon Valley supply. This issue is caused by low usage and turnover, and a strategy to increase initial dose levels is currently being explored.

### 6.33.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.33.6-a Reticulation samples within target range

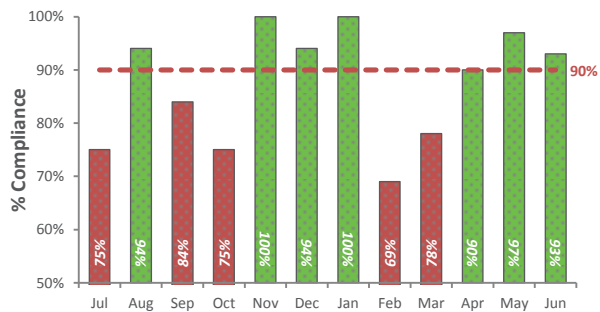


Figure 6.33.6-b Reticulation mean monthly dose (mg/L)

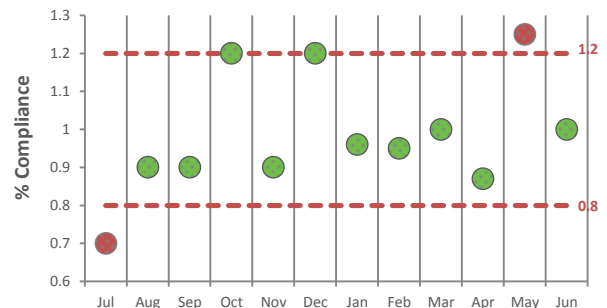
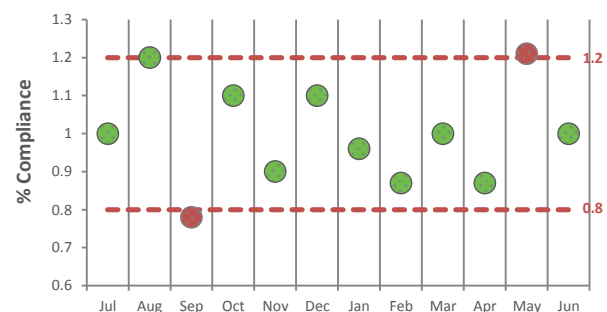
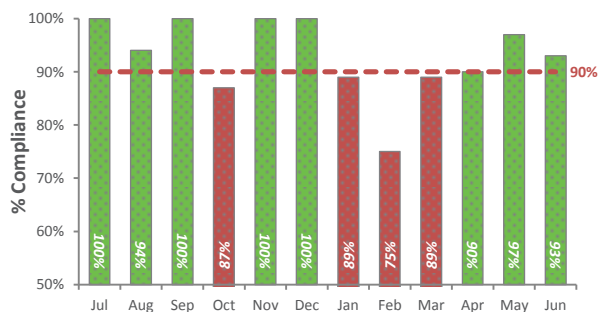


Figure 6.33.6-c Operational samples within target range Figure 6.33.6-d Operational samples mean monthly dose (mg/L)



**Note:** **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ Performance in the distribution network is variable and is currently under review
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

### 6.33.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

**Table 6.33.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	15	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	15	0	100	< 1	< 1	< 1
Barium	2000	µg/L	15	0	100	6.4	3	13
Cadmium	2	µg/L	15	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	15	0	100	< 1	< 1	< 1
Copper	2000	µg/L	15	0	100	3.2	< 1	6
Lead	10	µg/L	15	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	15	0	100	1.26	< 1	5.1
Mercury	1	µg/L	15	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	15	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	15	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	15	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	28	0	100	5.1	< 1	43
Monochloroacetic acid	150	µg/L	28	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	28	0	100	19.66	< 2	51
Total trihalomethanes	250	µg/L	28	0	100	51.28	14	120

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.33.8. General physical parameters

**Table 6.33.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
<b>Cygnnet monitoring zone</b>					
Chlorine residual (mg/L)		52	0.19	0.01	0.46
Turbidity (NTU)		52	0.39	0.1	1.1
pH		52	7.15	6.74	8.21
<b>Franklin monitoring zone</b>					
Chlorine residual (mg/L)		52	0.05	0.01	0.1
Turbidity (NTU)		52	0.52	0.1	3.3
pH		52	7.28	6.22	8.15
<b>Geeveston monitoring zone</b>					
Chlorine residual (mg/L)		53	0.33	0.1	0.6
Turbidity (NTU)		53	0.45	0.2	1.3
pH		53	7.25	6.19	7.84
<b>Huonville monitoring zone</b>					
Chlorine residual (mg/L)		52	0.04	0	0.1
Turbidity (NTU)		52	0.47	0.2	1.7
pH		52	7.01	6.1	8
<b>Geeveston Donnellys Road monitoring zone</b>					
Chlorine residual (mg/L)		46	0.14	0.02	0.4
Turbidity (NTU)		46	0.54	0.2	4.6
pH		46	7.38	6.66	8.08
<b>Geeveston Kermandie Road monitoring zone</b>					
Chlorine residual (mg/L)		25	0.07	0.01	0.7
Turbidity (NTU)		25	0.4	0.21	0.8
pH		25	7.44	6.82	8.47
<b>Franklin Jacksons Road monitoring zone</b>					
Chlorine residual (mg/L)		30	0.06	0.02	0.16
Turbidity (NTU)		34	0.68	0.3	2.4
pH		34	7.48	6.69	10.32
<b>Cygnnet Nicholls Rivulet monitoring zone</b>					
Chlorine residual (mg/L)		52	0.3	0.02	0.69
Turbidity (NTU)		52	0.77	0.1	14.4
pH		52	7.27	6.74	8.17

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Turbidity observed in the distribution network across all four monitoring zones are typically within optimum levels (less than 1 NTU)
- ❖ Chlorine residuals in zones supplied by the Huon Valley Regional Water Scheme (Cygnnet including Nicholls Rivulet, and Geeveston including Kermandie and Donnellys road) all receive a chlorine boost and are typically above the target minimum of 0.1 mg/L



- ❖ Low usage and turnover in the Franklin Jacksons road zone have caused problems with maintaining adequate residuals. This issue is being addressed via an increase in the initial chlorine dose
- ❖ Residuals in the Huonville and Franklin monitoring zones draw water directly from the treatment plant with no secondary chlorination. Subsequently disinfection residuals in these zones are more variable and generally below the minimum target of 0.1 mg/L. Dose control is limited by the aesthetic acceptability of supply to customers early in the distribution system
- ❖ pH levels are adjusted at the treatment plant and are maintained within the ADWG’s optimal range.

### 6.33.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.33.10. System incidents and issues

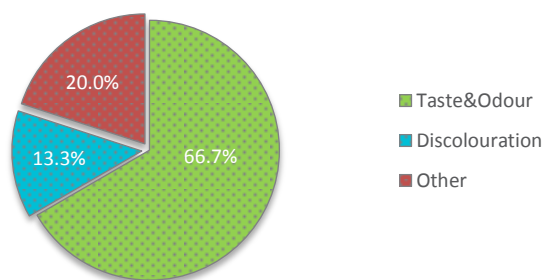
**Table 6.33.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
16/12/2015	<i>E. coli</i> 1MPN/100mL	Localised scouring was undertaken to elevate residual chlorine levels. The resample was clear, and a strategy increase initial dose levels is currently being explored	Yes	Yes

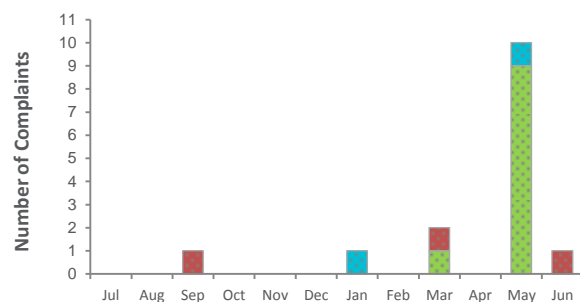
Note: Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.33.11. Customer complaints

**Figure 6.33.11-a Complaint classification**



**Figure 6.33.11-b Seasonal trend analysis**



- ❖ Two complaints were received relating to water discolouration issues.



#### 6.33.12. Catchment and source water issues

- ❖ The Huon River catchment covers an area of 224,004 ha. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

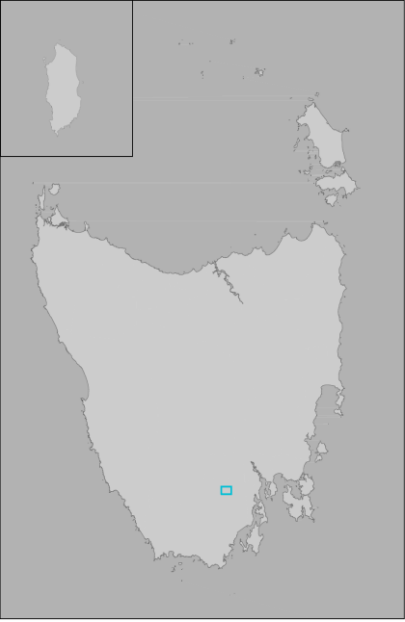
#### 6.33.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.33.14. Future planning

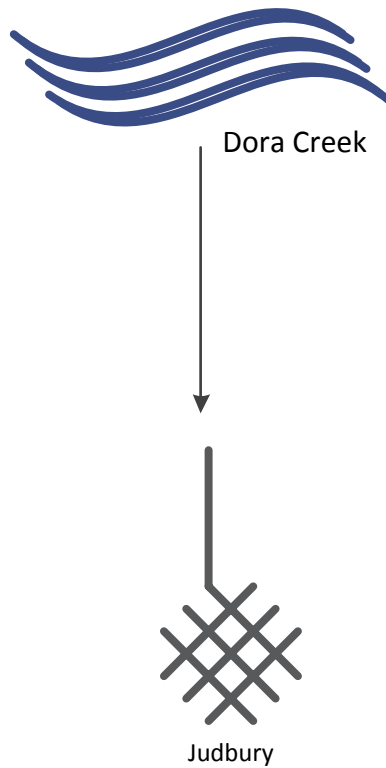
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

### 6.34. Judbury drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	105
	<b>Catchment</b>	Dora Creek
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Judbury.</li> </ul>		

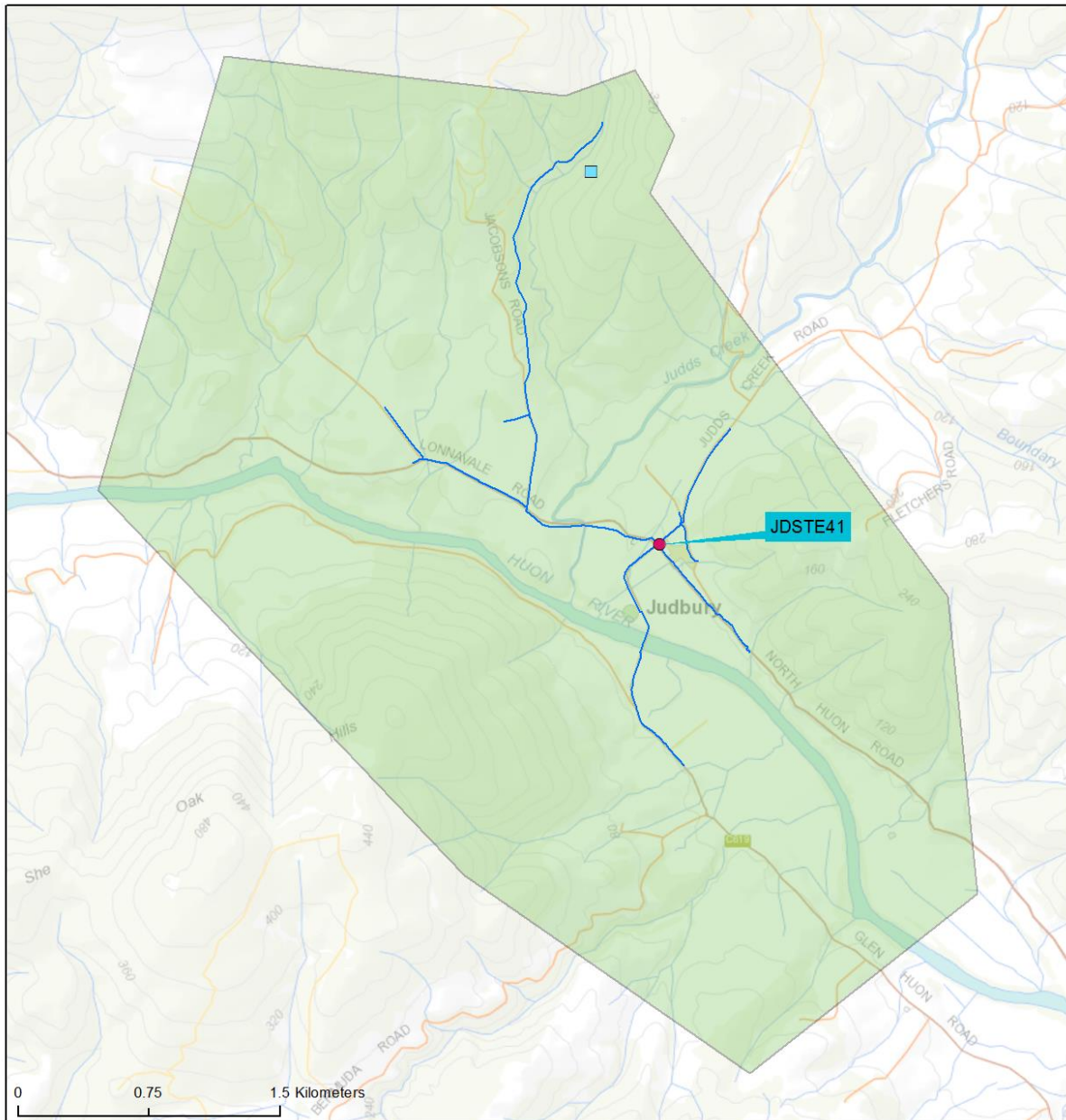
### 6.34.1. System description

Figure 6.34.1-a Judbury system schematic



- ❖ **Catchment**  
The Judbury drinking water system is supplied by Dora Creek.
- ❖ **Treatment**  
The Judbury system is a raw water supply with no treatment. Customers receiving water from the Judbury system are subject to a Permanent BWA (prior July 2013).
- ❖ **Distribution**  
The Judbury system supplies 105 connections.

Map 6.34.1—a Judbury monitoring zone



JDSTE41 = Hall Sample Tap

## 6.34.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.34.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	25.5%	No ●	Weekly	47 <sup>#</sup>	35	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	–	–	–	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) sampling program changed to monthly in June 2016.

## 6.34.3. Summary of historic total system performance

Table 6.34.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance *									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	41%	●	32%	●	41.7%	●	8.3%	●	25.5%	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100% ^	●	100%	●
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		N/A	
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	N/A	
<b>Complaints received</b> <sup>(5)</sup>	Not Recorded		Not Recorded		4		1		5	
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

#### 6.34.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 25.5 per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBPs are not measured as chlorination does not occur in this system.

#### 6.34.5. Microbiological performance

Figure 6.34.5-a Microbiological compliance 2015–16

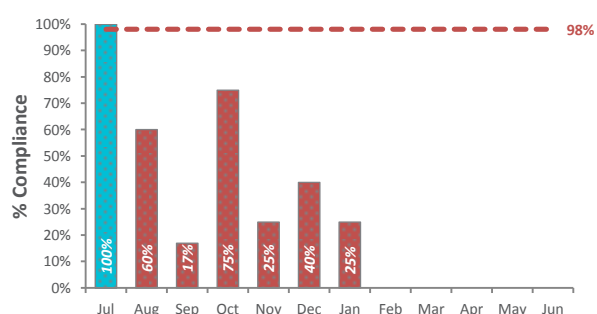
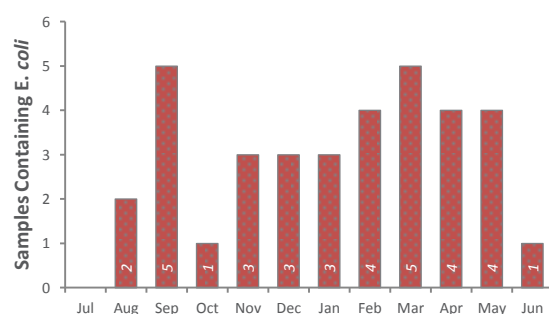


Figure 6.34.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Judbury system was 25.5 per cent compliant in 2015–16. *E. coli* was detected in every month during the reporting period with the exception of July 2015
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from Dora Creek
- ❖ The risk to public health is mitigated through the communication of the permanent BWA to customers.

#### 6.34.6. Fluoride performance

- ❖ This system is not fluoridated.

### 6.34.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

**Table 6.34.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	4.5	4	5
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	4.5	4	5
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	2	0	100	3.45	1.6	5.3
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Monochloroacetic acid	150	µg/L	N/A	N/A	–	–	–	–
Trichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Total trihalomethanes	250	µg/L	N/A	N/A	–	–	–	–

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ DBPs are not measured as chlorination does not occur in this system.

### 6.34.8. General physical parameters

Table 6.34.8-a General physical performance

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		47	1.94	0.4	8.9
pH		47	6.9	6.37	7.82

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU. Mean turbidity levels are above the optimal level for maintaining effective disinfection, however this system is not chlorinated
- ❖ pH levels are maintained within the recommended optimal range
- ❖ This system is not chlorinated.

### 6.34.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.34.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.34.11. Customer complaints

Figure 6.34.11-a Complaint classification

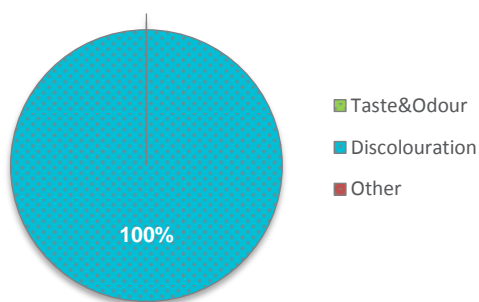
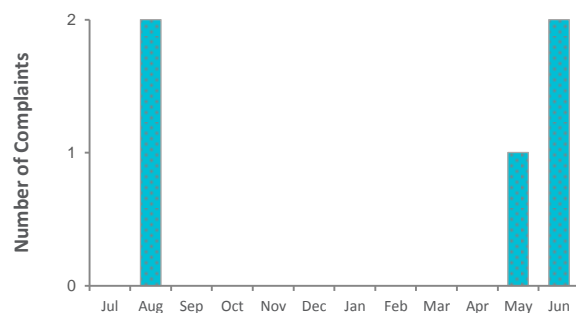


Figure 6.34.11-b Seasonal trend analysis



- ❖ Five complaints were received relating to water discolouration.



#### 6.34.12. Catchment and source water issues

- ❖ The Judbury system is supplied by Dora Creek, the catchment is primarily bushland, and mainly located within Wellington Park
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.34.13. Infrastructure and operational changes

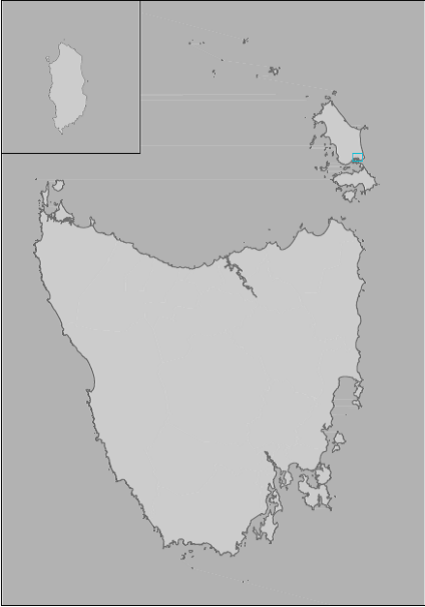
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.34.14. Future planning

**Table 6.34.14-a Future planning for the system**

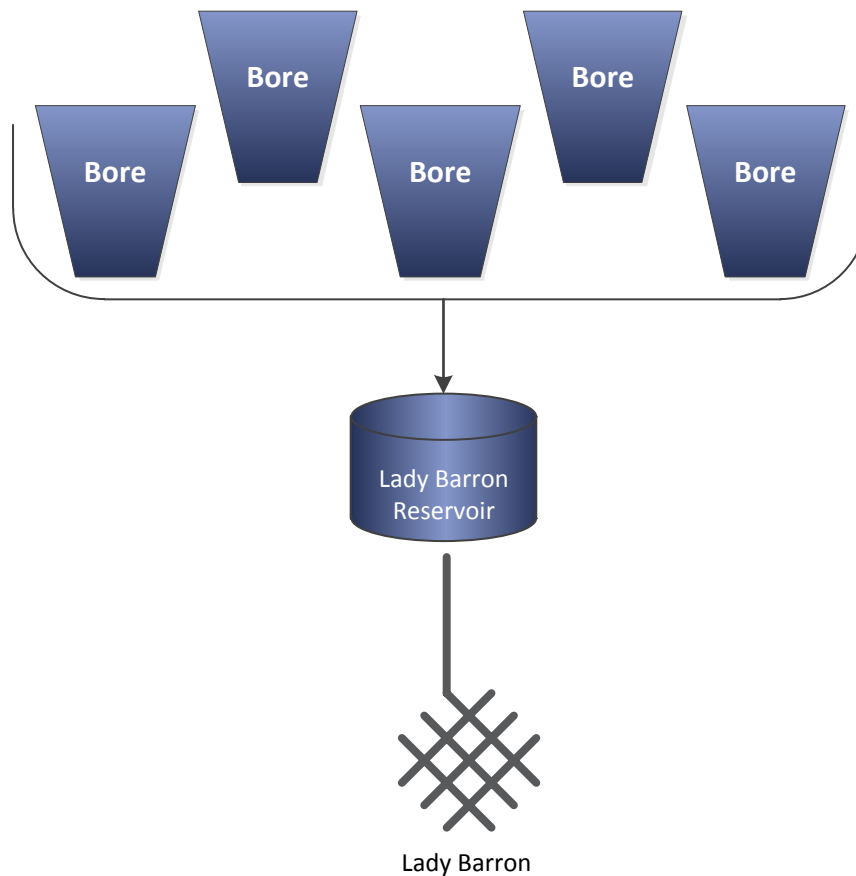
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Judbury supply options	Investigation into options to improve water quality supplied to Judbury	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

### 6.35. Lady Barron drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	168
	<b>Catchment</b>	Borefield
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Lady Barron.</li> </ul>		

### 6.35.1. System description

Figure 6.35.1-a Lady Barron system schematic



- ❖ **Catchment**  
The Lady Barron drinking water system is supplied by a shallow field of sand spears located to the north of the township
- ❖ **Treatment**  
The Lady Barron drinking water system is a raw water system with no treatment
- ❖ **Distribution**  
There is one roofed reservoir in the distribution system. The Lady Barron drinking water system supplies 168 connections.

Map 6.35.1—a Lady Barron monitoring zone



LBW51W01 = Police Station

## 6.35.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.35.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	91.7%	No	●	Monthly	12	1
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	–	–	–	–
<b>Metals</b> <sup>(4)</sup>	100%	UK ^	●	Quarterly	5	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Annual	2	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

## 6.35.3. Summary of historic total system performance

Table 6.35.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	94%	●	100%	●	100%	●	95%	●	91.7%	●
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A
	<b>Distribution fluoride testing</b>									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100% ^	UK
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		N/A	
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>	0		1		1		0		0	
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

#### 6.35.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 91.7 per cent. The microbiological risk to public health is mitigated through the communication of a permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP are not measured as this system is not chlorinated
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.35.5. Microbiological performance

Figure 6.35.5-a Microbiological compliance 2015–16

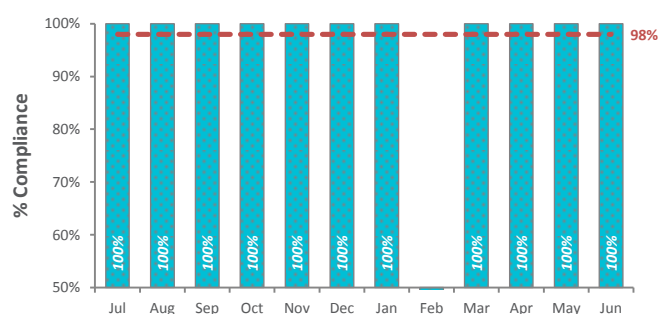
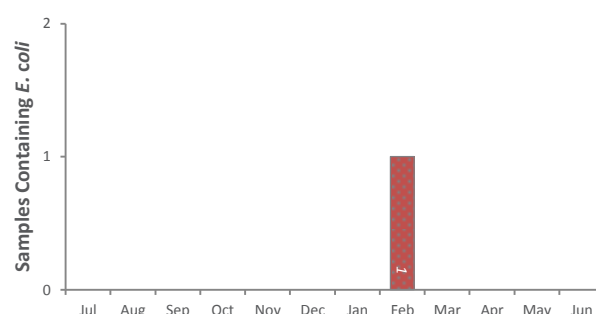


Figure 6.35.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Lady Barron System was 91.7 per cent compliant in 2015–16. *E. coli* was detected in one monthly sample for the reporting period
- ❖ The risk to public health is mitigated through the communication of a permanent BWA to customers
- ❖ Overall the microbiological performance for a system without treatment or chlorination indicates the raw water is generally free from contamination.

#### 6.35.6. Fluoride performance

- ❖ The Lady Barron system is not fluoridated.

## 6.35.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.35.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	5	0	100	1	< 1	2
Barium	2000	µg/L	5	0	100	26.8	26	28
Cadmium	2	µg/L	5	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	5	0	100	2	2	2
Copper	2000	µg/L	5	0	100	7.6	5	12
Lead	10	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	5	0	100	26.24	25.9	26.6
Mercury	1	µg/L	5	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	5	0	100	0.7	0.6	0.9
Selenium	10	µg/L	5	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Monochloroacetic acid	150	µg/L	N/A	N/A	–	–	–	–
Trichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Total trihalomethanes	250	µg/L	N/A	N/A	–	–	–	–

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (–) – Refers to compliance with current ADWG health limits. (–) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ No DBPs were tested as the system is not chlorinated.

## 6.35.8. General physical parameters

Table 6.35.8-a General physical performance

General physical parameters (2015–16)					
	Samples	Mean	Min.	Max.	
Chlorine residual (mg/L)	N/A	–	–	–	
Turbidity (NTU)	9	7.55	5.1	14.4	
pH	9	5.89	5.28	6.24	

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ This system is not chlorinated
- ❖ Turbidity levels recorded in the distribution network are generally above the ADWG aesthetic limit of 5 NTU due to the nature of the water source and lack of filtration barriers
- ❖ Mean pH readings tend to be slightly acidic, but not to a level that would be of aesthetic or health concern.

#### 6.35.9. Aesthetic issues

- ❖ The water supplied to Lady Barron is high in turbidity (iron) and has a distinctive odour. A new WTP is in commissioning phase, and aims to improve the microbial and aesthetic aspects of water quality.

#### 6.35.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

#### 6.35.11. Customer complaints

- ❖ There were no complaints raised during the reporting period.

#### 6.35.12. Catchment and source water issues

- ❖ The Lady Barron bores are located in a vegetated area, farming (grazing) land is within 100 m of the spears. There are aesthetic issues with colouration (iron) and odour from this water source.

#### 6.35.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16. A new WTP is due to be commissioned in early 2016–17 season.

#### 6.35.14. Future planning

Table 6.35.14-a Future Planning for the Lady Barron drinking water System

Project	Description	Progress	Anticipated Delivery	Estimated Spend
Flinders Island water supply project	New WTP to supply treated water to Lady Barron	Lady Barron WTP commissioning is expected late 2016	2016–17	\$6.4 million

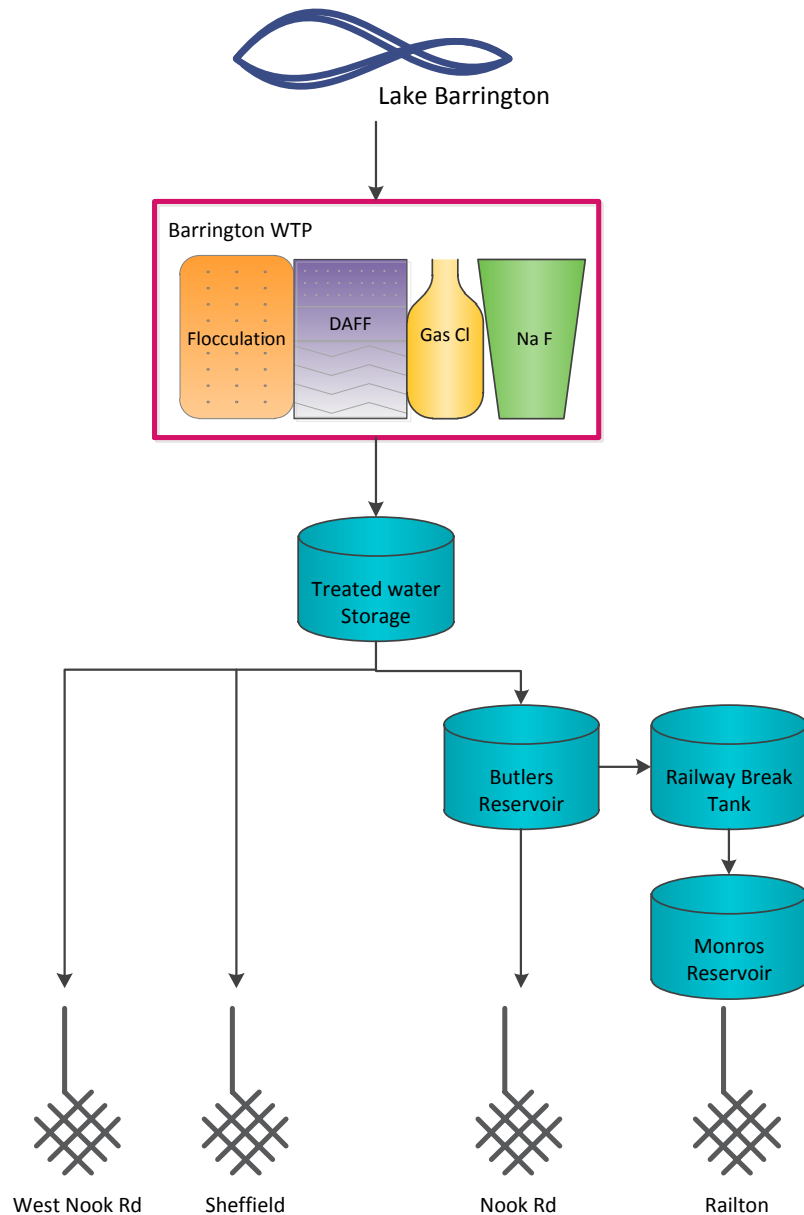


### 6.36. Lake Barrington drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	1,223
	<b>Catchment</b>	Lake Barrington
	<b>Primary treatment</b>	Dissolve air flotation and filtration (DAFF)
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Sheffield</li> <li>❖ Railton.</li> </ul>		

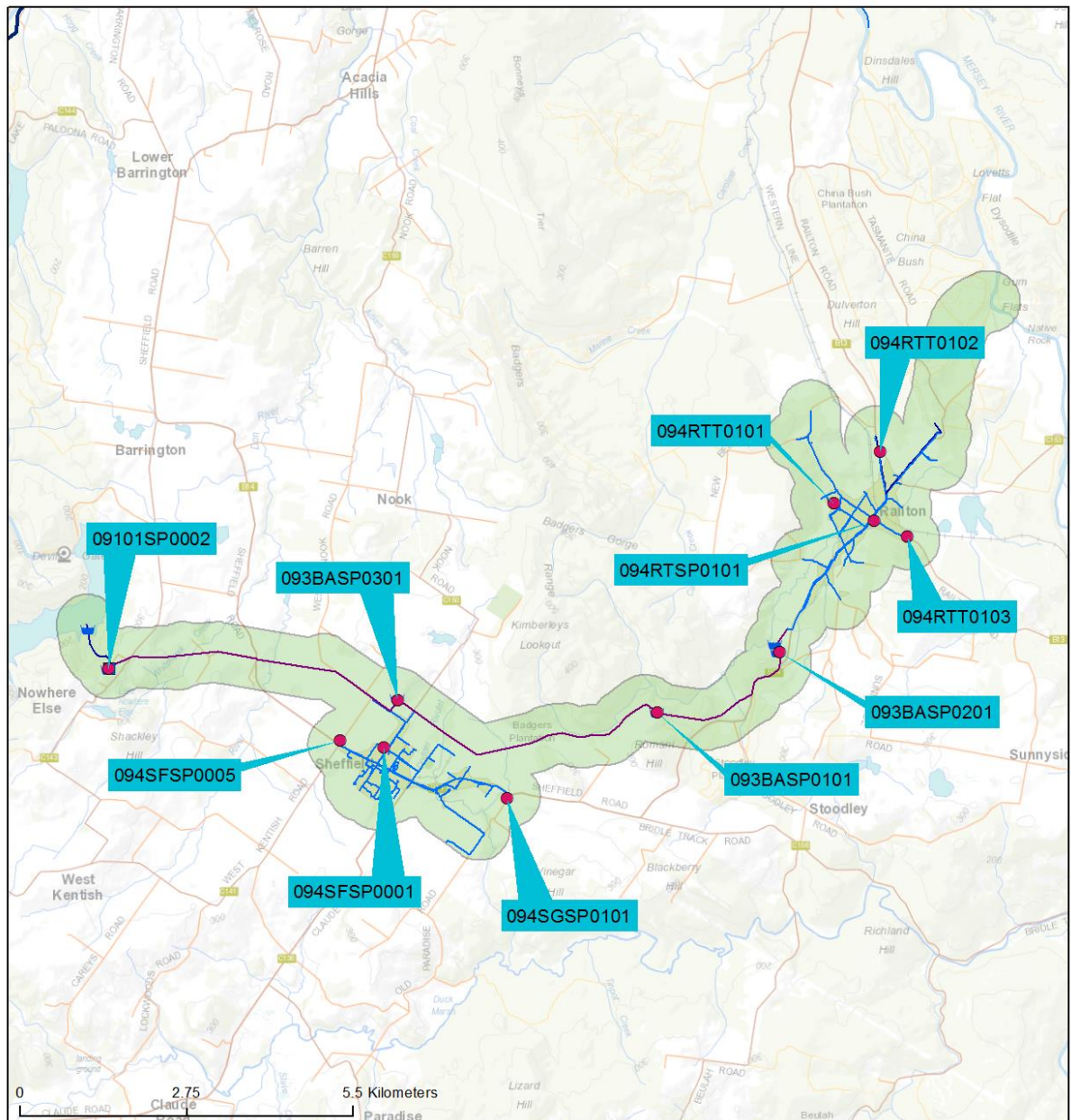
### 6.36.1. System description

Figure 6.36.1-a Lake Barrington system schematic



- ❖ **Catchment**  
The Lake Barrington drinking water system is supplied by the Forth River upstream of Hydro Tasmania's Devil's Gate Dam.
- ❖ **Treatment**  
The Lake Barrington WTP employs flocculation, DAFF, chlorine gas disinfection and fluoridation by sodium fluoride.
- ❖ **Distribution**  
There are three roofed reservoirs within the distribution system. The Lake Barrington system supplies 1,223 connections.

Map 6.36.1–a–b Lake Barrington monitoring zone



09101SP0002 = WTP Clear Water Outlet, 094SFSP0001 = Sheffield Council Office, 094SFSP0005 = West Nook Rd, 094SGSP0101 Kermode St,  
 094RTT0103 = Kimberly Rd, 094RTT0101 = Crockers Rd, 094RTT0102 = Latrobe St, 094RTSP0101 = Railton Park, 093BASP0301 = Butlers Res,  
 093BASP0201 = Munros Res, 093BASP0101 = Railway BP Tank.

## 6.36.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.36.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes	●	Weekly	267	0
Fluoride <sup>(2)</sup>	100%	Yes	●	Weekly	98	0
DBPs <sup>(3)</sup>	100%	Yes	●	Monthly	22	0
Metals <sup>(4)</sup>	99.9%	No	●	Monthly	83	1
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = <98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.36.3. Summary of historic total system performance

Table 6.36.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12	2012–13	2013–14	2014–15	2015–16					
Microbiological <sup>(1)</sup>	100%	●	100%	●	99.6%	●	100%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	0	●	1	●	0	●	
	within target range <sup>(b)</sup>	N/A	N/A	96%	●	98.7%	●	92.9%	●	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	0.95	●	1.00	●	0.95	●	
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	0	●	0	●	0	●
	within target range <sup>(b)</sup>	N/A	N/A	N/A	97%	●	85.7%	●	85.7%	●
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	1.0	●	0.91	●	0.91	●	
Metals <sup>(3)</sup>	N/A	N/A	100%	●	99.9%	●	99.9%	●	99.9%	●
DBPs <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●	100%	●
Pesticides <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Complaints received <sup>(5)</sup>	Not recorded	Not recorded	0	1	4					
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.36.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Lead was detected at levels exceeding the ADWG health limit reducing compliance to 99.9 per cent during 2015–16. Investigations and retests showed the system to be clear of metal contamination
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.36.5. Microbiological performance

Figure 6.36.5-a Microbiological compliance 2015–16

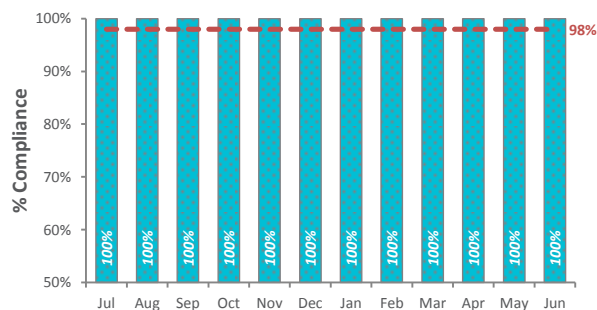


Figure 6.36.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.36.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.36.6-a Operational samples within target range

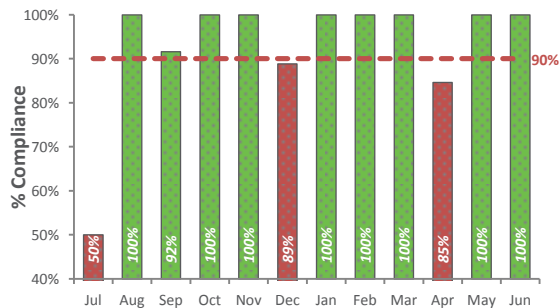


Figure 6.36.6-b Operational mean monthly dose (mg/L)

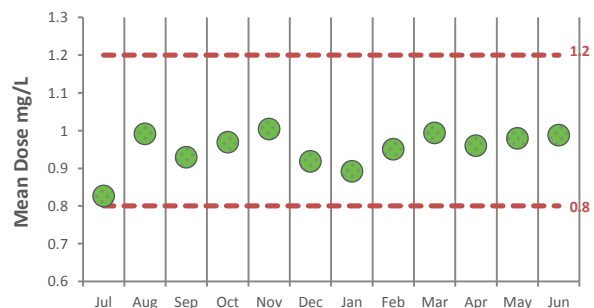


Figure 6.36.6-c Reticulation samples within target range

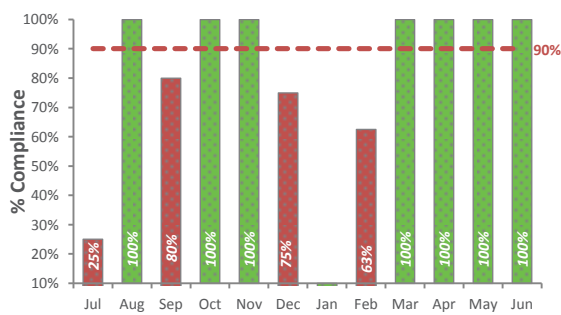
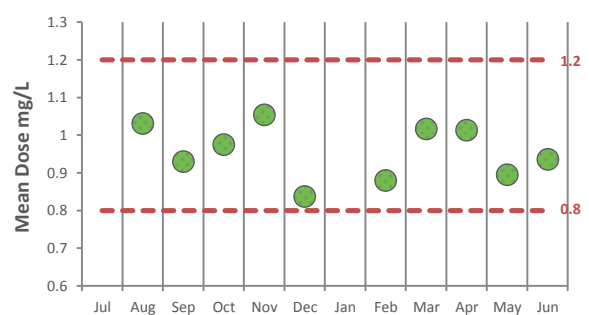


Figure 6.36.6-d Reticulation samples mean monthly dose (mg/L)



Note: **(Operational)** samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L
- ❖ The poor performance in July was caused by the reinstatement of the fluoride dosing station during the period
- ❖ The poor performance in December, January and February in the distribution system was caused by the reinstatement of the fluoride dosing station after plant maintenance.

### 6.36.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

**Table 6.36.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	82	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	83	0	100	< 1	< 1	< 1
Barium	2000	µg/L	83	0	100	8.15	6	13
Cadmium	2	µg/L	83	0	100	< 0.1	< 0.1	0.2
Chromium	50	µg/L	83	0	100	< 1	< 1	< 1
Copper	2000	µg/L	82	0	100	16.51	< 1	250
Lead	10	µg/L	83	1	98.9	< 0.5	< 0.5	10.6
Manganese	500	µg/L	83	0	100	3.77	< 0.5	33.7
Mercury	1	µg/L	83	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	82	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	83	0	100	< 0.5	< 0.5	3.3
Selenium	10	µg/L	83	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	22	0	100	8.95	< 1	42
Monochloroacetic acid	150	µg/L	22	0	100	< 5	< 5	23
Trichloroacetic acid	100	µg/L	22	0	100	23.23	< 1	58
Total trihalomethanes	250	µg/L	22	0	100	31.91	20	43

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ During the reporting period one result for lead exceeded the ADWG health limit. The sampling was on 4 November 2015, the result was 10.6 µg/L against the limit of 10 µg/L. The immediate area was flushed prior to resample. Resampling occurred immediately after the initial notification and returned a result below the ADWG limit
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.36.8. General physical parameters

**Table 6.36.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		265	0.26	0.01	0.92
Turbidity (NTU)		265	0.41	0.1	3
pH		265	7.46	6.16	9.75

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Sheffield distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation in Railton generally do not meet the target of greater than 0.1 mg/L. Re-chlorination does not occur in these zones and subsequently residuals are variable. A flushing program commenced during the year to improve the turnover of water within the Railton reticulation
- ❖ Mean pH levels are maintained within the recommended optimal range. There were some outlying results which can potentially be attributed to laboratory error.

### 6.36.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.36.10. System incidents and issues

**Table 6.36.10-a Identified incidents and issues.**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
17/11/2015	Lead exceedance of 10.6µg/L	Immediate area flushed, the sample point is at the end of the reticulation in Railton. Additional weekly sampling and testing has been carried out, no issues detected. No issues have been identified in the raw water or the treated water.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.



### 6.36.11. Customer complaints

Figure 6.36.11-a Complaint classification

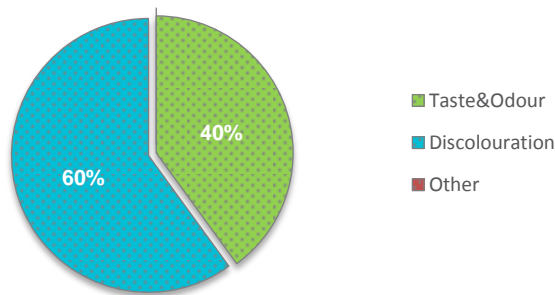
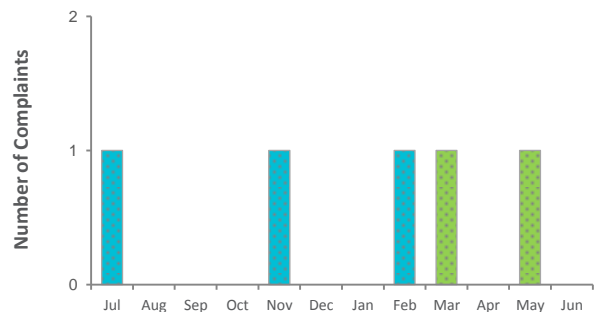


Figure 6.36.11-b Seasonal trend analysis



- ❖ Five complaints were received in this reporting period. Two complaints related to taste and odour issues and three related to discoloured water issues.

### 6.36.12. Catchment and source water issues

- ❖ The Lake Barrington drinking water system is supplied by the Forth River upstream of Hydro Tasmania's Devil's Gate Dam. The catchment is predominantly bushland and agricultural land. Activities in the catchment include animal husbandry, cropping and some residential properties with septic tanks. Based on catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected from the raw water monitoring program.


### 6.36.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.36.14. Future planning

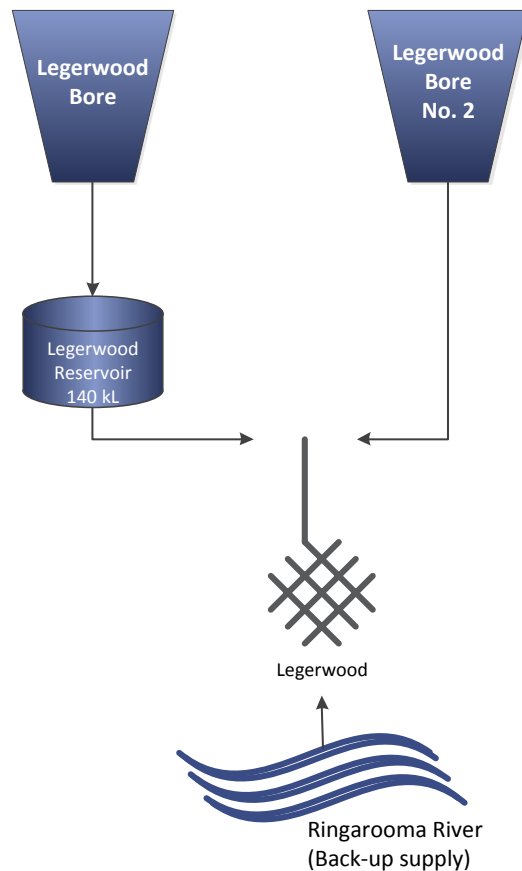
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

### 6.37. Legerwood drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	95
	<b>Catchment</b>	Bore & Ringarooma River
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Legerwood</li> </ul>		

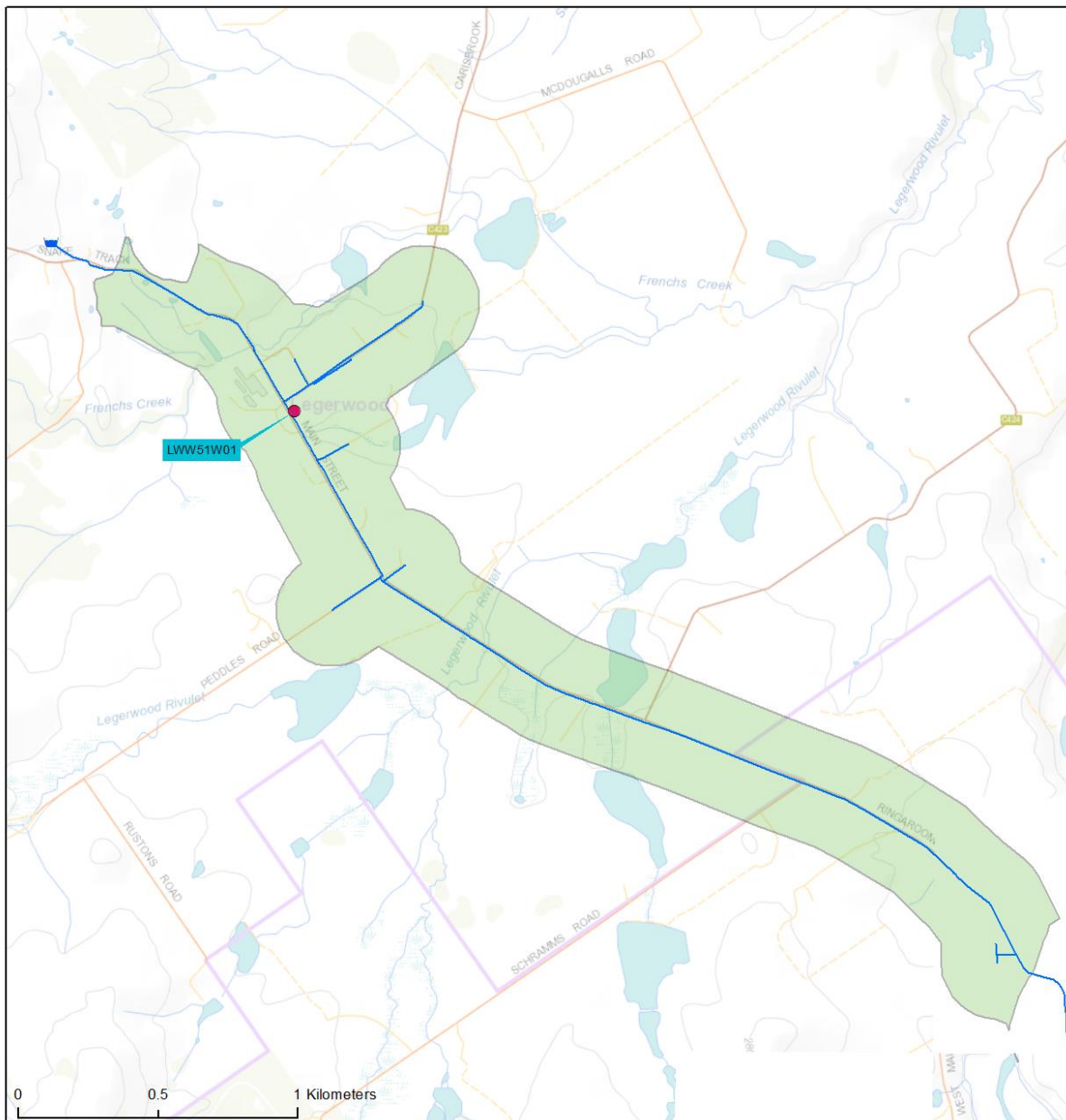
### 6.37.1. System description

Figure 6.37.1-a Legerwood system schematic



- ❖ **Catchment**  
The Legerwood drinking water system is supplied by a bore. The Ringarooma River is a backup supply
- ❖ **Treatment**  
The Legerwood drinking water scheme is a raw water system with no treatment
- ❖ **Distribution**  
The Legerwood drinking water system supplies 95 connections.

Map 6.37.1—a Legerwood monitoring zone



LWW51W01 = Public Hall

## 6.37.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.37.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes	●	Monthly	12	0
<b>Fluoride</b> <sup>(2)</sup>	N/A	–		–	–	–
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	4	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

\*DBP and Pesticide testing were removed from the sampling program in June 2016.

## 6.37.3. Summary of historic total system performance

Table 6.37.3-a Historic trends

Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	100%	●	100%	●	100%	●	100% <sup>#</sup>	●	100%	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		100%	●
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>	0		0		0		0		4	
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. # Samples were not taken as per sampling program to calculate compliance against DHHS targets.

#### 6.37.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve 100 per cent, however a lack of filtration barriers requires the microbiological risk to public health be mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ This system is not chlorinated and DBP testing was not required. The monitoring program was amended in June 2016
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.37.5. Microbiological performance

Figure 6.37.5-a Microbiological compliance 2015–16

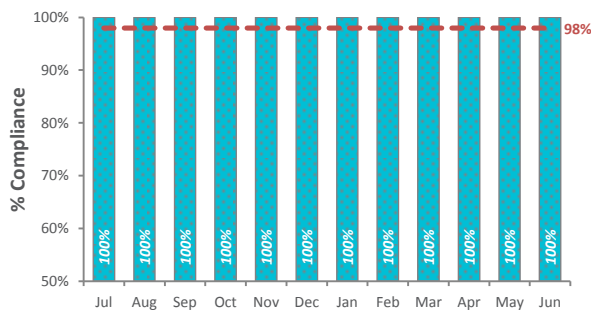


Figure 6.37.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.37.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.37.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.37.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	23.25	23	24
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	15	3	50
Lead	10	µg/L	4	0	100	1.3	0.6	2.9
Manganese	500	µg/L	4	0	100	16.65	16.1	17.4
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	3	0	100	< 4	< 1	< 4
Monochloroacetic acid	150	µg/L	3	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	3	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	3	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.37.8. General physical parameters

Table 6.37.8-a General physical performance

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		12	0.49	0.2	2.1
pH		12	5.29	5.17	5.53

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU
- ❖ This system is not chlorinated
- ❖ pH levels are below the recommended optimal range.

### 6.37.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.37.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.37.11. Customer complaints

Figure 6.37.11-a Complaint classification

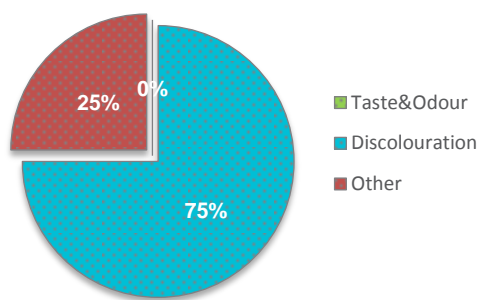
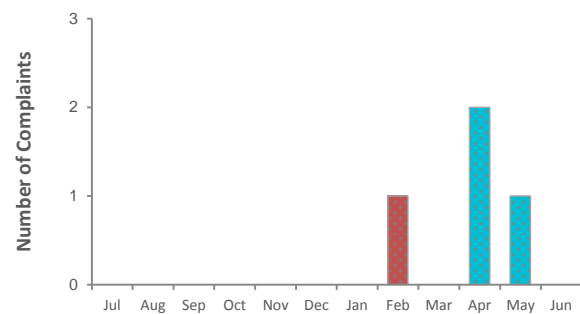


Figure 6.37.11-b Seasonal trend analysis



- ❖ Four complaints were received in this reporting period. Three complaints were relating to discoloured water issues and the other complaint was a customer dissatisfied with paying for water while a BWA is in place.



### 6.37.12. Catchment and source water issues

- ❖ The bore source water quality risks include:
  - Microbial
- ❖ The Ringarooma catchment and source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.37.13. Infrastructure and operational changes

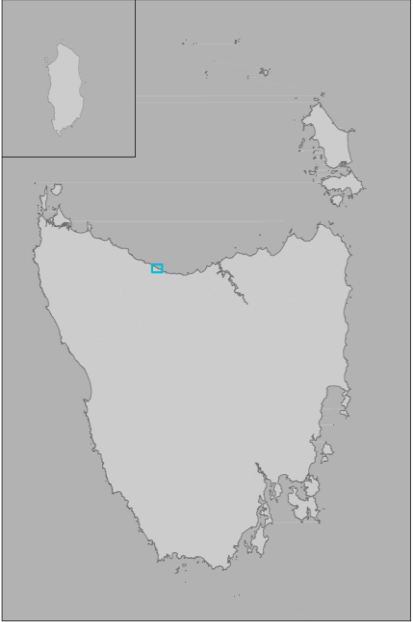
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.37.14. Future planning

**Table 6.37.14-a Future planning for the system**

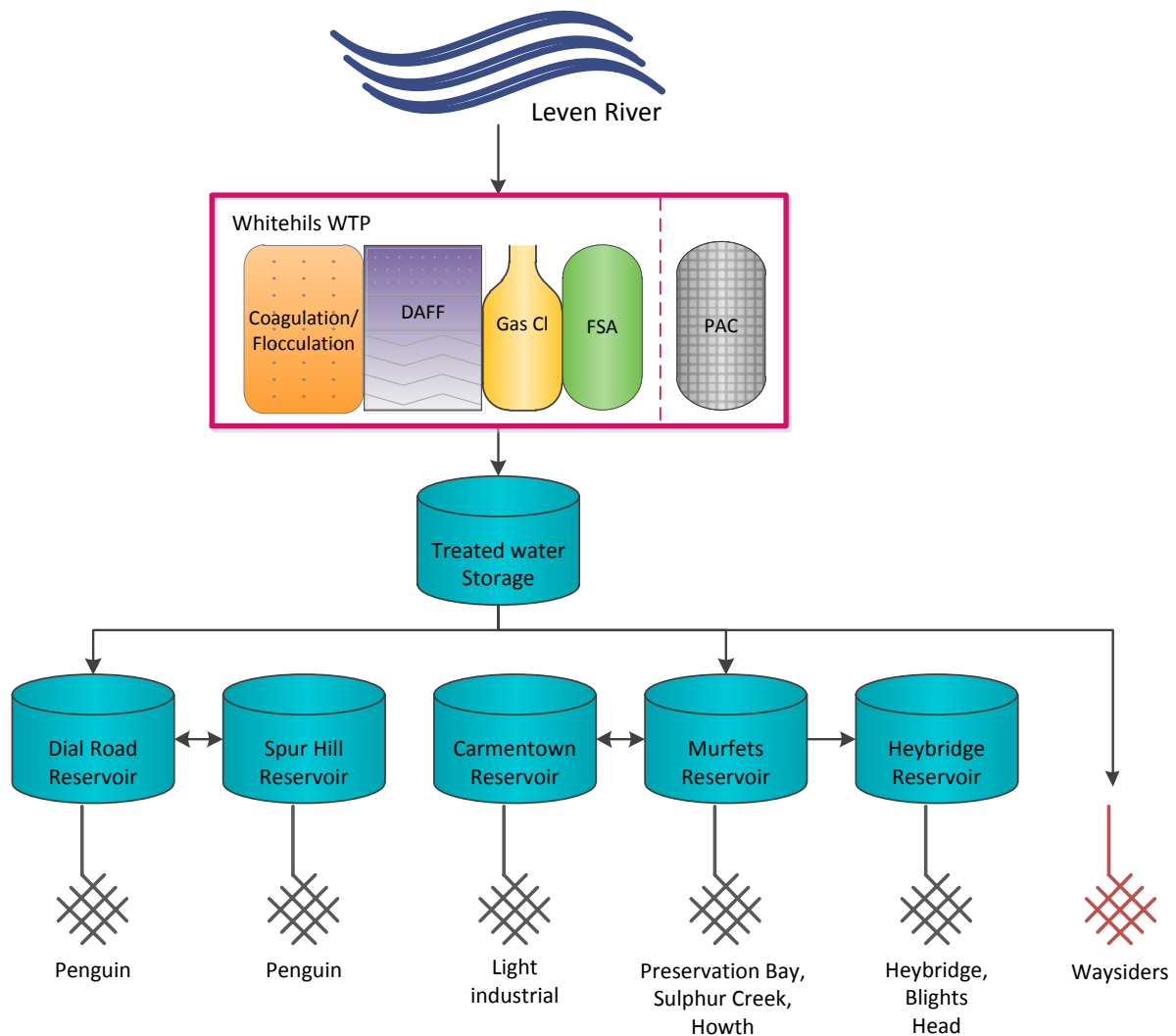
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Ringarooma Valley scheme	New WTP to supply the Branxholm, Legerwood, Derby and Ringarooma distribution systems	Pipeline construction is complete and WTP to be commissioned in early 2017.	2016–17	\$4.6 million

### 6.38. Leven River drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	2,160
	<b>Catchment</b>	Leven River
	<b>Primary treatment</b>	Dissolved air flotation & flocculation (DAFF)
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine Gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Penguin</li> <li>❖ Sulphur Creek</li> <li>❖ Heybridge.</li> </ul>		

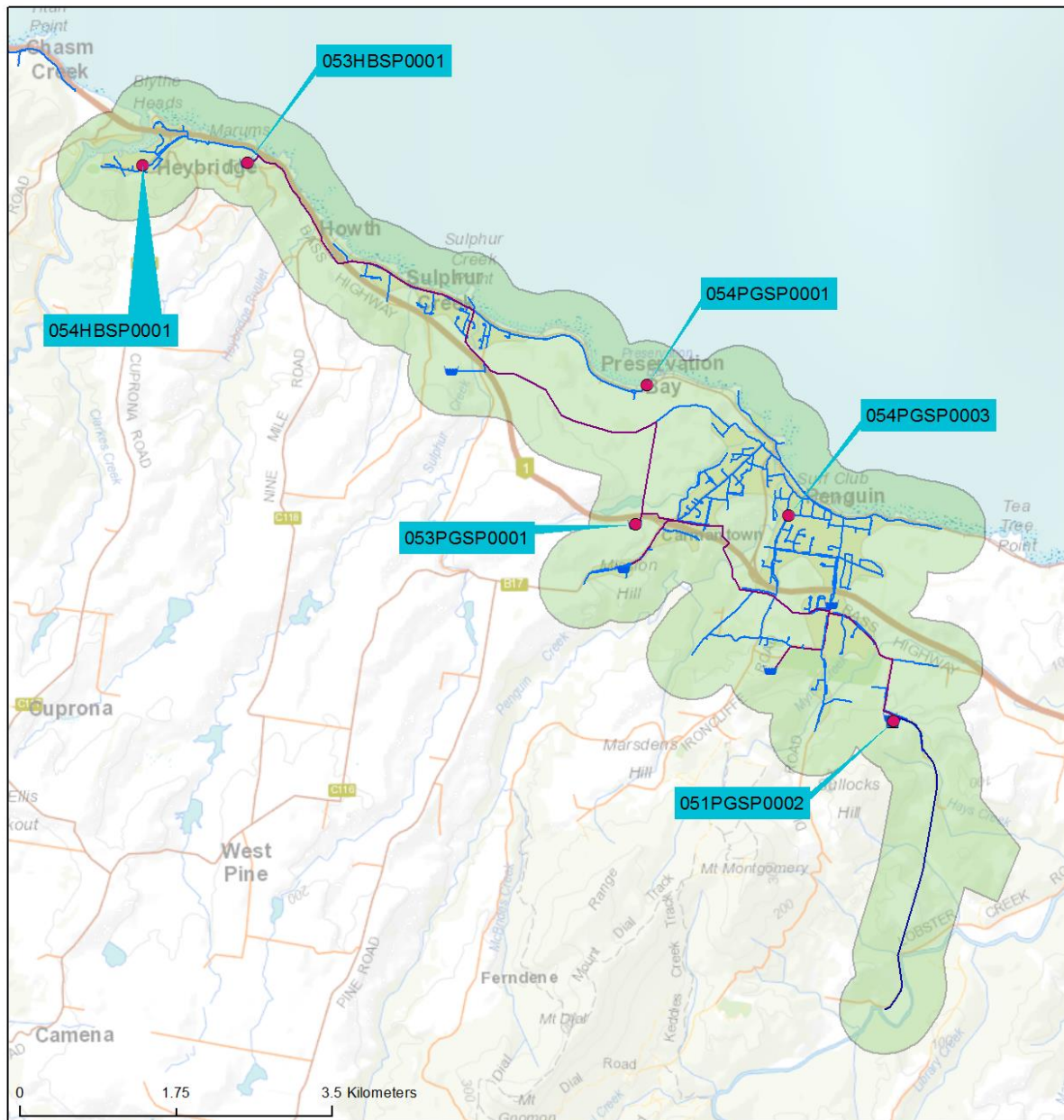
### 6.38.1. System description

Figure 6.38.1-a Leven River system schematic



- ❖ Catchment  
The Leven River drinking water system is supplied by the Leven River
- ❖ Treatment  
The Leven River WTP employs coagulation, flocculation, DAFF, chlorine gas disinfection and fluoridation by fluorosilicic acid
- ❖ Distribution  
There are six roofed reservoirs in the distribution system. The Leven River system supplies 2,160 connections.

Map 6.38.1—a Leven River monitoring zone



054HBSP0001 = Heybridge Fire Station, 053HBSP0001 = Heybridge Res, 053PGSP0001 = Murfets Res, 054PGSP0003 = Patrick St Clinic, 054PGSP0001 = Penguin Surf Club, 051PGSP0002 = WTP Storage

## 6.38.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.38.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99.6%	Yes	●	Weekly	264	1
Fluoride <sup>(2)</sup>	100%	Yes	●	Weekly	97	0
DBPs <sup>(3)</sup>	100%	Yes	●	Quarterly	10	0
Metals <sup>(4)</sup>	100%	Yes	●	Monthly & Quarterly	21	0
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.38.3. Summary of historic total system performance

Table 6.38.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	100%	●	100%	●	99.6%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		0	●	0	●	0	●
	within target range <sup>(b)</sup>	N/A		N/A		89%	●	69%	●	69.2%	●
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		0.88	●	0.78	●	0.86	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		0	●	0	●
	within target range <sup>(b)</sup>	N/A		N/A		N/A		55	●	47.7%	●
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		0.80	●	0.76	●	
Metals <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	N/A		N/A		N/A		N/A		N/A		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		6		21		14		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.38.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 was less than 90 per cent and not consistently within target range at the dosing point or distribution system. The performance of the fluoride dosing station is compromised by the number of days the plant runs combined with reliability issues with the dosing equipment
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.38.5. Microbiological performance

Figure 6.38.5-a Microbiological compliance 2015–16

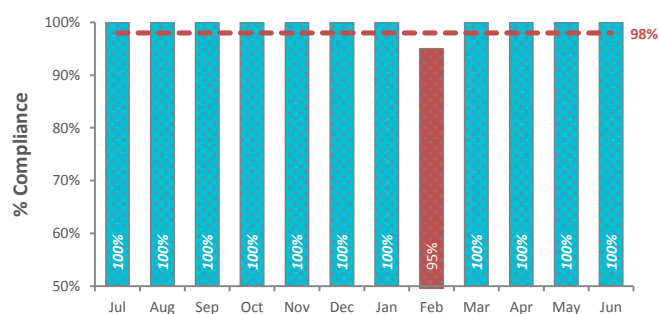
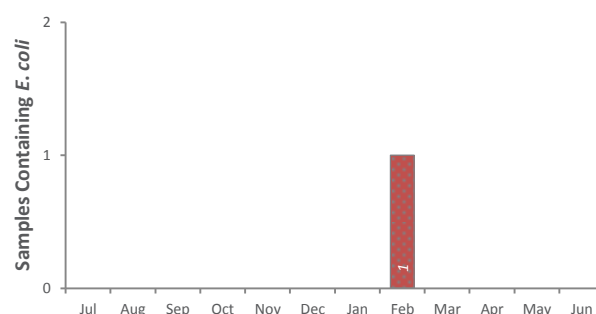


Figure 6.38.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Leven River system was 99.6 per cent compliant. *E. coli* was detected in one weekly sample during the reporting period
- ❖ An *E. coli* strike occurred in February 2016 with a detection of 1 MPN/100 mL. Low chlorine residuals were also recorded at the time. Immediate flushing and resampling were conducted which confirmed the system was free of *E. coli* and microbiological contamination.

## 6.38.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.38.6-a Operational samples within target range

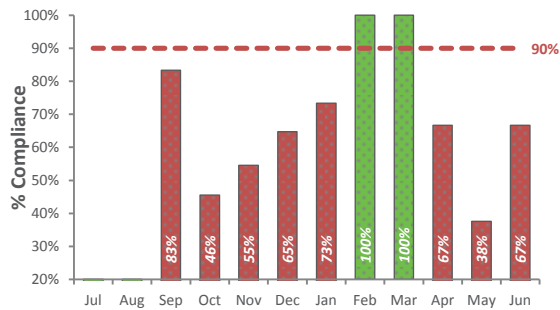


Figure 6.38.6-b Operational mean monthly dose (mg/L)

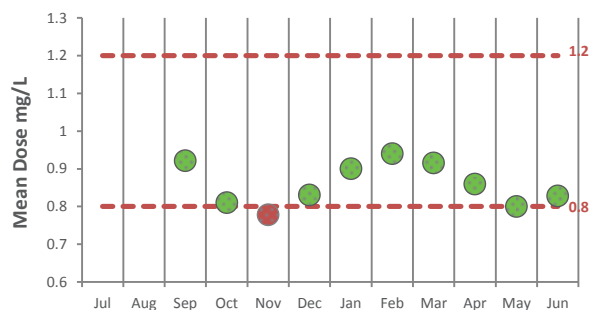


Figure 6.38.6-c Reticulation samples within target range

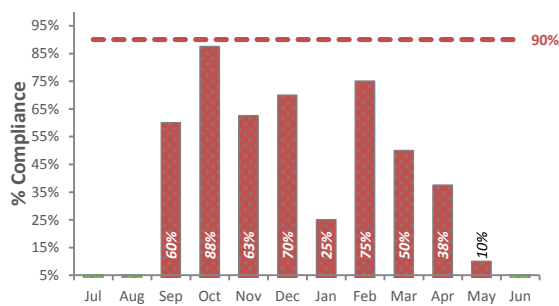
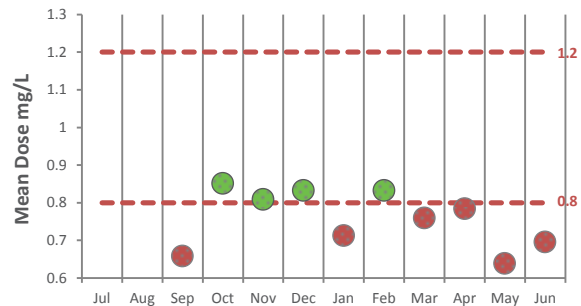


Figure 6.38.6-d Reticulation samples mean monthly dose (mg/L)



Note: (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station failed to achieve the regulatory target of greater than 90 per cent for the reporting period
- ❖ The performance of the fluoride dosing station is compromised by the number of days the plant runs combined with reliability issues with the dosing equipment. Fluoride dosing was off during July and August 2015
- ❖ Performance in the network is variable and is currently under review
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.38.7. Other Australian Drinking Water Guidelines ADWG health regulated parameters

**Table 6.38.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	20	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	21	0	100	< 1	< 1	< 1
Barium	2000	µg/L	21	0	100	19.7	12	27
Cadmium	2	µg/L	21	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	21	0	100	< 1	< 1	< 1
Copper	2000	µg/L	20	0	100	3.9	< 1	24
Lead	10	µg/L	21	0	100	< 0.5	< 0.5	1.1
Manganese	500	µg/L	21	0	100	4.61	< 0.5	25.9
Mercury	1	µg/L	21	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	20	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	21	0	100	< 0.5	< 0.5	0.8
Selenium	10	µg/L	21	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	22	0	100	8.95	< 1	36
Monochloroacetic acid	150	µg/L	22	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	22	0	100	21.61	< 2	58
Total trihalomethanes	250	µg/L	22	0	100	40.45	12	63

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.



### 6.38.8. General physical parameters

**Table 6.38.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		258	0.35	0	1.46
Turbidity (NTU)		259	0.5	0.1	7.2
pH		259	7.47	6.2	8.77

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution system are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Leven distribution system were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation generally do not meet the target of greater than 0.1 mg/L. Re-chlorination does not occur in these zones and subsequently residuals are variable.
- ❖ pH levels are maintained within the recommended optimal range.

### 6.38.9. Aesthetic issues

- ❖ The Leven River supply experienced aesthetic issues related to algal metabolites (MIB and Geosmin) during the 2015–16 summer period. The metabolites do not pose a health risk however they significantly impact on customers through poor taste and odour and this was reflected in an increase in complaints. PAC was utilised at the plant to remove the compounds that contribute to the earthy/musty taste and odour.

### 6.38.10. System incidents and issues

**Table 6.38.10-a Identified Incidents and Issues.**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
7/10/2015	A TasWater employee reported poor tasting water.	Sampling for MIB & Geosmin was undertaken, with MIB detected at 18ng/L at the river, and 12ng/L in the treated water storage (detection limit is typically around 10ng/L). PAC dosing commenced.	No	No
18/02/2016	<i>E. coli</i> detection of 1 MPN/100mL occurred at the Surf Club sample point	Manual chlorine dosing of the reservoir was conducted and flushing initiated to ensure turnover of water within the system. Immediate resampling was free from contamination and an investigation determined the possible cause was contamination during sampling/analysis.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.

### 6.38.11. Customer complaints

Figure 6.38.11-a Complaint classification

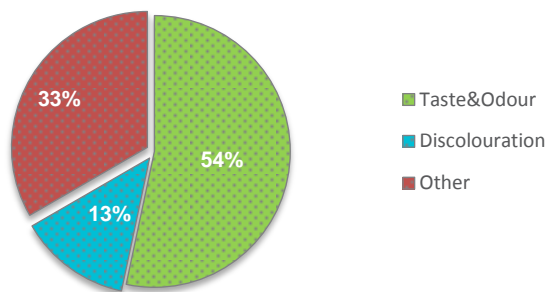
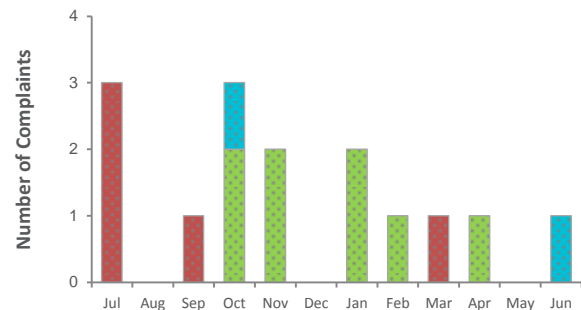


Figure 6.38.11-b Seasonal trend analysis



- ❖ Fifteen complaints were received in this reporting period. Eight complaints received related to an earthy / musty taste and/or odour. PAC dosing of the water significantly reduced the levels of the odorous compounds in the treated water. Two complaints related to discolouration issues. Five other complaints related to four cloudy water issues and one related to an illness complaint.

### 6.38.12. Catchment and source water issues

- ❖ The Leven River drinking water system is supplied by the Leven River. The catchment is predominantly bushland and agricultural land. Activities in the catchment include animal husbandry, cropping and some residential properties with septic tanks. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

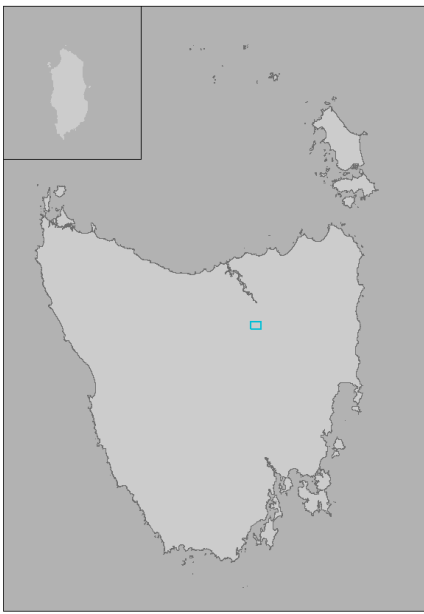
### 6.38.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.38.14. Future planning

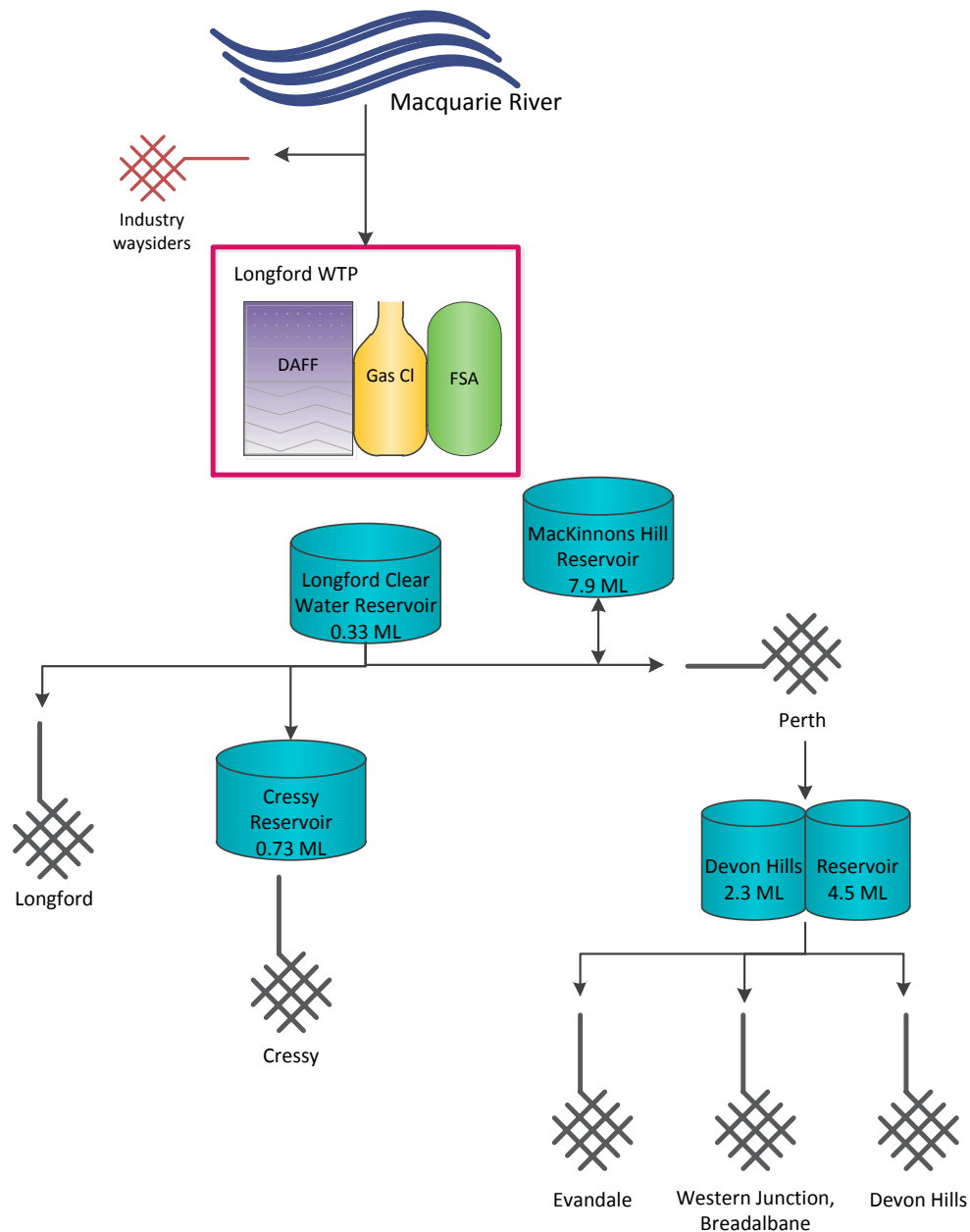
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

### 6.39. Longford drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	4,515
	<b>Catchment</b>	Macquarie River
	<b>Primary treatment</b>	Dissolved air, flotation and filtration (DAFF)
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Longford</li> <li>❖ Perth</li> <li>❖ Evandale</li> <li>❖ Devon Hills</li> <li>❖ Cressy</li> <li>❖ Western Junction</li> <li>❖ Breadalbane.</li> </ul>		

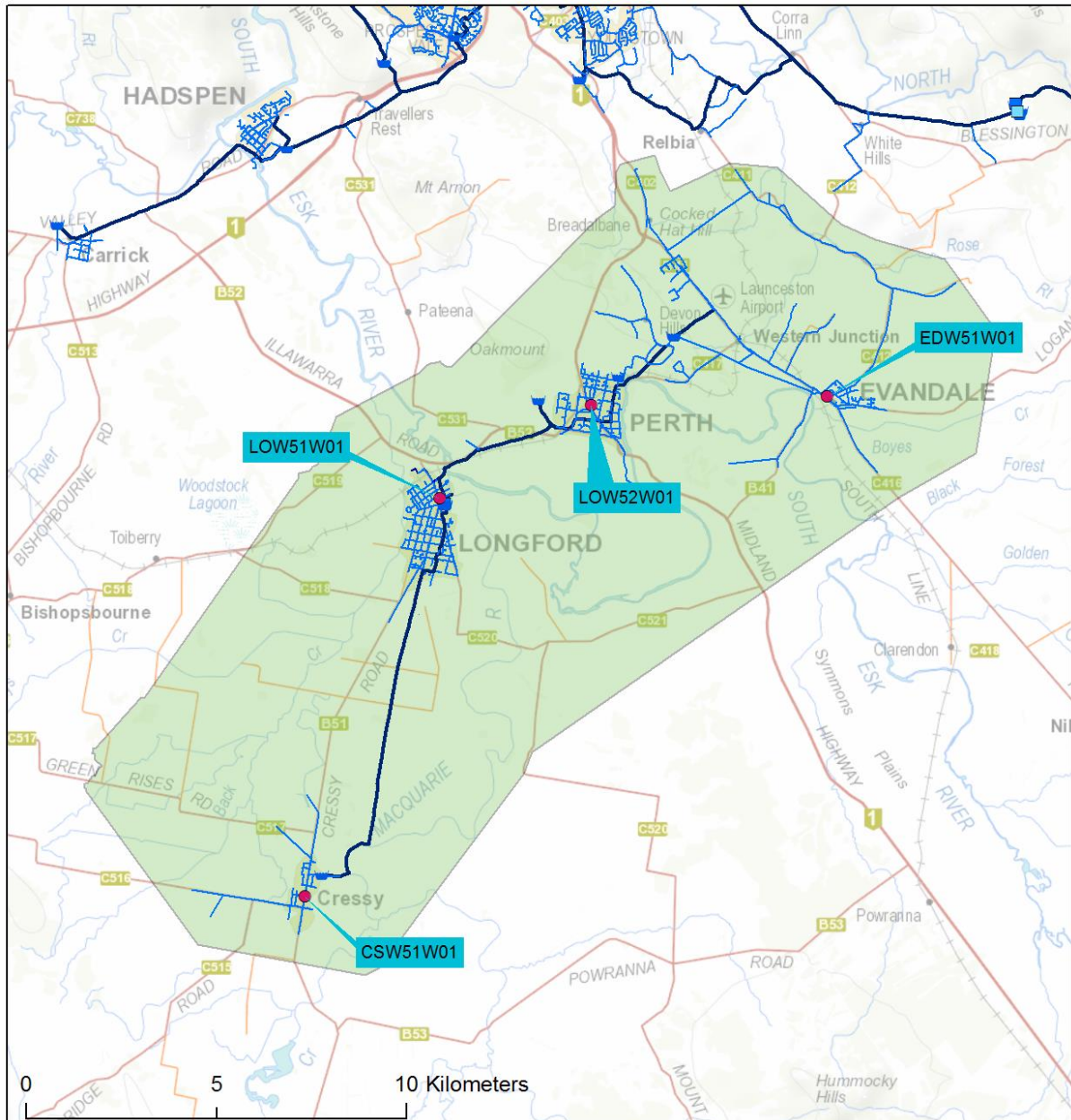
### 6.39.1. System description

Figure 6.39.1-a Longford system schematic



- ❖ **Catchment**  
The Longford drinking water system is supplied by the Macquarie River.
- ❖ **Treatment**  
The Longford drinking water scheme employs DAFF, chlorine gas disinfection and fluoridation by fluorosilicic acid.
- ❖ **Distribution**  
There are five roofed reservoirs in the distribution system. The Longford drinking water system supplies 4,515 connections in Cressy, Longford, Perth and Evandale.

Map 6.39.1—a Longford monitoring zone



CSW51W01 = Cressy Public Toilets, EDW51W01 = Evandale History Centre, High St, LOW51W01 = Lyttleton St Toilets, LOW52W01 = Perth, Little Mulgrave St

## 6.39.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.39.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes	●	Weekly	211	0
<b>Fluoride</b> <sup>(2)</sup>	100%	Yes	●	Weekly	106	0
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly	5	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	5	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly	4	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.39.3. Summary of historic total system performance

Table 6.39.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12	2012–13		2013–14		2014–15		2015–16			
<b>Microbiological</b> <sup>(1)</sup>	98%	●	100%	●	100%	●	99.5%	●	100%	●	
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0%	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		91%		97%	●	89.4%	●
	mean dose (mg/L) <sup>(c)</sup>	0.90	●	0.87	●	0.90	●	0.94	●	0.96	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0%	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		Not Recorded		94%	●	77.4%	●
mean dose (mg/L) <sup>(c)</sup>	Not Recorded		Not Recorded		Not Recorded		0.93	●	0.78	●	
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	4	●	0	●	
<b>Complaints received</b> <sup>(5)</sup>	26		38		25		11		20		
<b>Public alerts issued</b> <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.39.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 did not achieve the regulatory target of greater than 90 per cent within range. Maintenance and protected action prevented the residual from maintaining adequate levels
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.39.5. Microbiological performance

Figure 6.39.5-a Microbiological compliance 2015–16

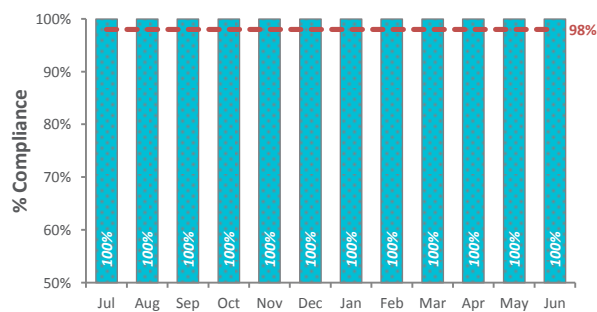


Figure 6.39.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

### 6.39.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.39.6-a Reticulation samples within target range

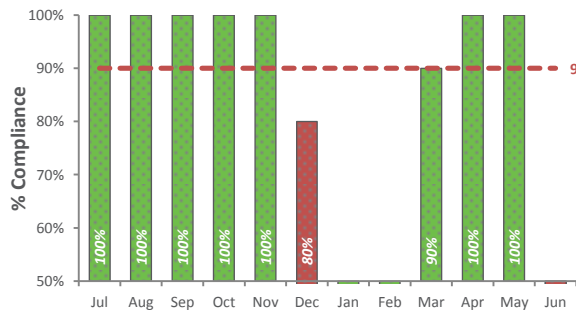


Figure 6.39.6-b Reticulation mean monthly dose (mg/L)

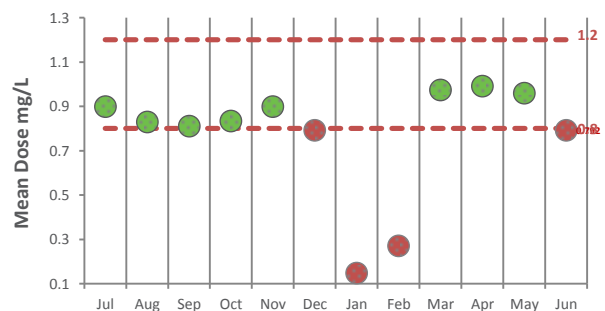


Figure 6.39.6-c Operational samples within target range

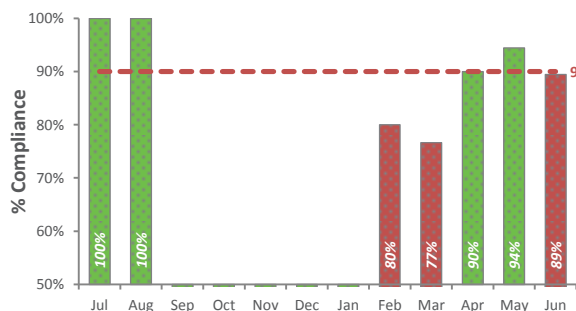
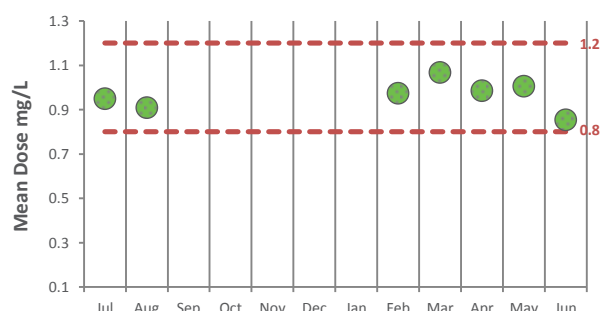


Figure 6.39.6-d Operational samples mean monthly dose (mg/L)



Note: **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station did not consistently achieve the regulatory target of greater than 90 per cent and is reflected in the distribution system
- ❖ From September 2015 to early February 2016, daily testing at the dosing station was undertaken but results were not recorded due to protected action. Following the protected action the system was shut down for maintenance. Dosing resumed and gradually increased to the residuals to meet the target of 1 mg/L. Periods of time when the residual was low affected compliance.
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.



## 6.39.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.39.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	5	0	100	< 1	< 1	< 1
Barium	2000	µg/L	5	0	100	7.6	4	14
Cadmium	2	µg/L	5	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	5	0	100	< 1	< 1	< 1
Copper	2000	µg/L	5	0	100	2.7	< 1	8
Lead	10	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	5	0	100	11.24	2.7	15.9
Mercury	1	µg/L	5	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	5	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	5	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	5	0	100	13.9	< 1	36
Monochloroacetic acid	150	µg/L	5	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	5	0	100	15.3	< 7	35
Total trihalomethanes	250	µg/L	5	0	100	37.4	15	77

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (..) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.39.8. General physical parameters

Table 6.39.8-a General physical performance

General physical parameters (2015–16)					
Cygnet monitoring zone		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		209	0.61	0	1.71
Turbidity (NTU)		210	0.33	0.1	4.4
pH		209	7.59	6.21	9.35

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations, and demonstrate protection against re-contamination.
- ❖ pH levels are variable due to an instrumentation error. Once field instruments were calibrated and replaced, pH levels fell within range. There were 12 results above 8.5 which occurred mainly in July–September 2015.

### 6.39.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.39.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.39.11. Customer complaints

Figure 6.39.11-a Complaint classification

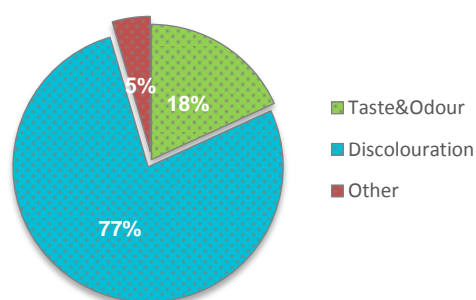
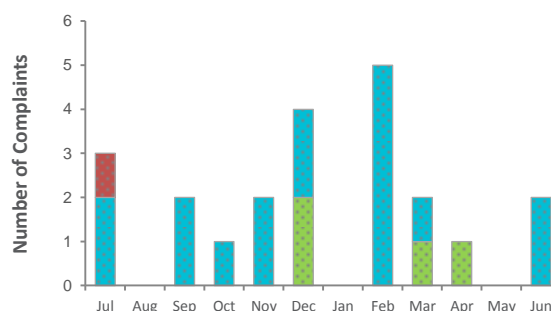


Figure 6.39.11-b Seasonal trend analysis



- ❖ Twenty-two complaints were received in this reporting period. Four of the five complaints received in February were on the same day, for discoloured water from a main requiring maintenance.

#### 6.39.12. Catchment and source water issues

- ❖ The Longford drinking water system is supplied by the Macquarie River. The catchment covers an area of 397,148ha. Major land uses include irrigated cropping, grazing, dairy farming and forestry. Based on land uses the key risks are;
  - Microbial
  - Turbidity issues
  - Pesticides
- ❖ Trace levels of pesticides were detected in the Huon catchment. Investigations were conducted in the distribution system of which all results were at levels well below the ADWG health limits

#### 6.39.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.39.14. Future planning

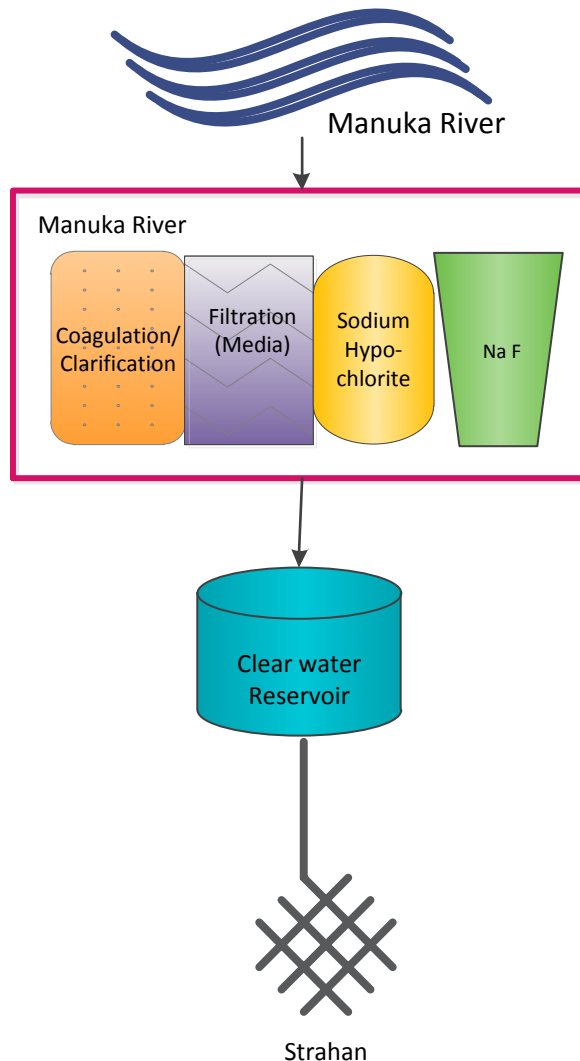
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.40. Manuka River drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	634
	<b>Catchment</b>	Manuka River
	<b>Primary treatment</b>	Coagulation/clarification
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Strahan.</li> </ul>		

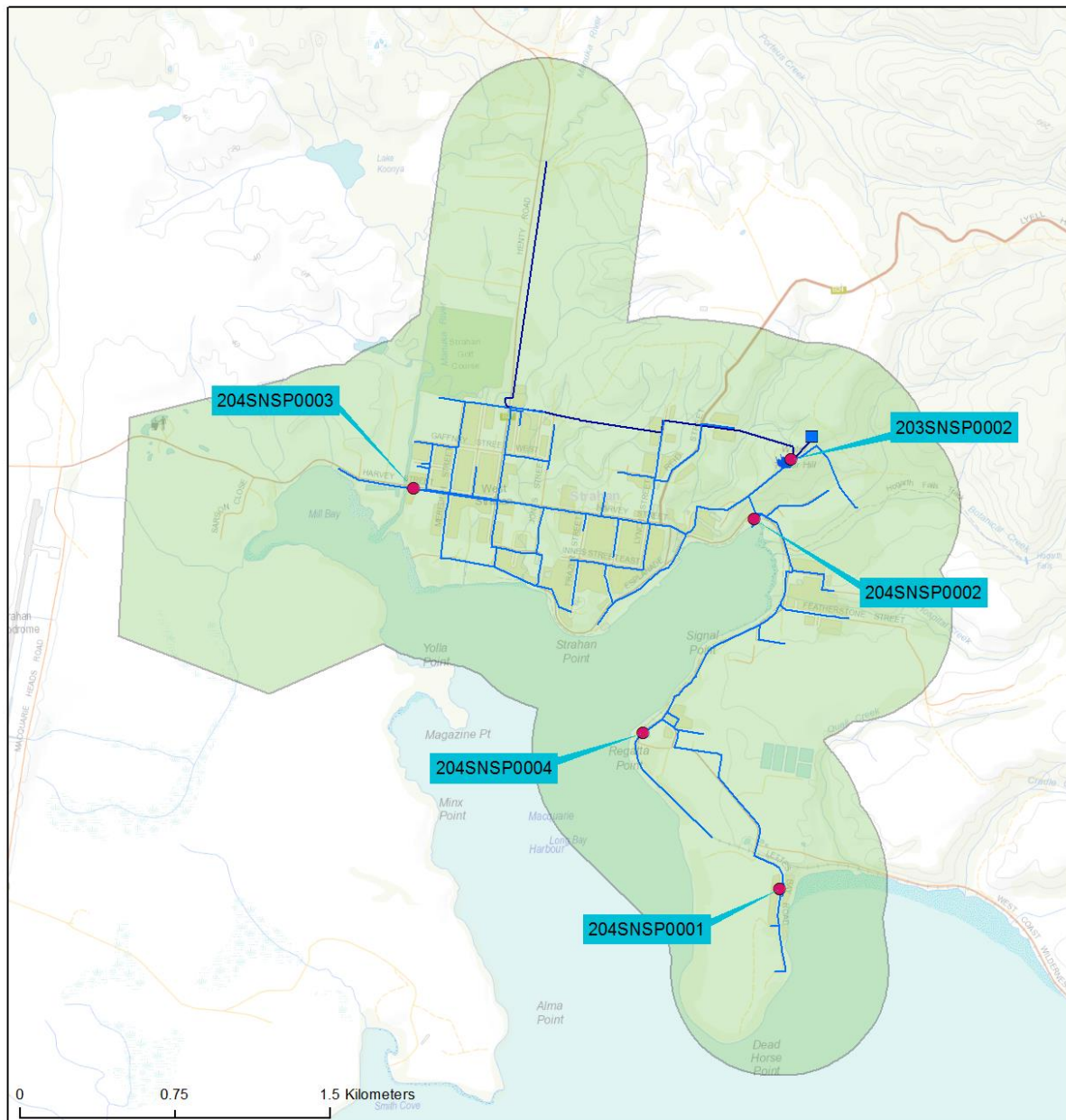
### 6.40.1. System description

Figure 6.40.1-a Manuka River system schematic



- ❖ **Catchment**  
The Manuka River drinking water system is supplied by the Manuka River
- ❖ **Treatment**  
The Manuka River WTP employs coagulation, clarification, media filtration, sodium hypochlorite disinfection and fluoridation by sodium fluoride
- ❖ **Distribution**  
There are three reservoirs in the distribution system, two of which are un-roofed (two unroofed reservoirs were taken offline this year). The Manuka River drinking water system supplies 634 connections.

Map 6.40.1—a Manuka River monitoring zone



204SNSP0002= Esplanade, 204SNSP0003 = Harvey St, 204SNSP0001 = Letts Bay, 204SNSP0004 = Regatta Point,  
203SNSP0002 =Treated Water Storage

## 6.40.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.40.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99.3%	Yes	●	Weekly	269	2
Fluoride <sup>(2)</sup>	100%	Yes	●	Weekly	107	0
DBPs <sup>(3)</sup>	100%	Yes	●	Quarterly	44	0
Metals <sup>(4)</sup>	100%	Yes	●	Quarterly + Monthly	18	0
Pesticides <sup>(5)</sup>	N/A	N/A		–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.40.3. Summary of historic total system performance

Table 6.40.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	100%	●	99.6%	●	99.3%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		0	●	0	●	0	●
	within target range <sup>(b)</sup>	N/A		N/A		43.8%	●	83.4%	●	89.8%	●
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		0.66	●	0.89	●	0.92	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		0	●	0	●
	within target range <sup>(b)</sup>	N/A		N/A		N/A		76%	●	75%	●
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		0.83	●	0.91	●	
Metals <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	N/A		N/A		N/A		N/A		N/A		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		3		2		2		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	1	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.40.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free from *E. coli*
- ❖ One *E. coli* detection in February 2016 resulted in a temporary BWA for the system between 28 February and 2 March 2016
- ❖ Fluoride compliance for 2015–16 was less than 90 per cent, performance was not consistent in the distribution network and is currently under review
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.40.5. Microbiological performance

Figure 6.40.5-a Microbiological compliance 2015–16

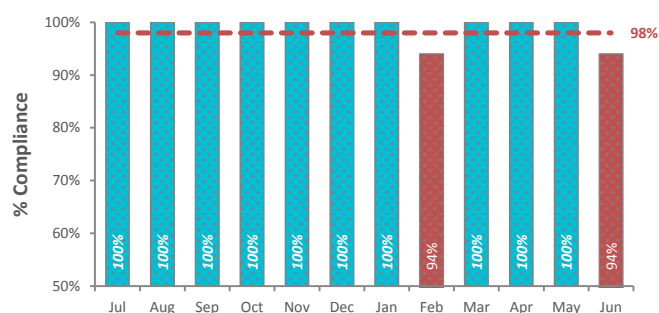
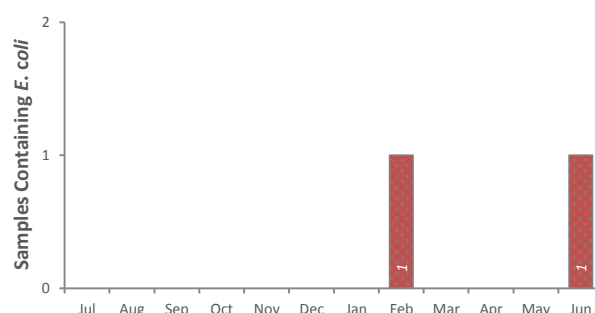


Figure 6.40.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Manuka system was 99.3 per cent compliant in 2015–16. *E. coli* was detected in two weekly samples during the reporting period
- ❖ An *E. coli* strike occurred in February 2016 with a detection of 167.4 MPN/100 mL and the system was placed on a temporary BWA by DHHS on 28 February 2016. An intensive resampling program was initiated prior to the removal of the alert. The two uncovered reservoirs were taken offline. Flushing was initiated across the whole reticulation to ensure turnover of water within the system. Following two clear *E. coli* results the temporary BWA was lifted on 2 March 2016. Daily monitoring of the extremities of the system was initiated and continues to ensure ongoing compliance
- ❖ An *E. coli* strike occurred in June 2016 with a detection of 3 MPN/100mL at the clear water storage sample tap. Water quality characteristics indicated good chlorine residual and low turbidity. All reticulation samples were negative from the same sample run. The immediate resample confirmed the system was free of *E. coli* and microbiological contamination.



## 6.40.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.40.6-a Operational samples within target range

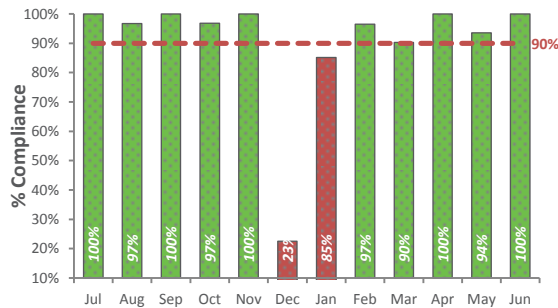


Figure 6.40.6-b Operational mean monthly dose (mg/L)

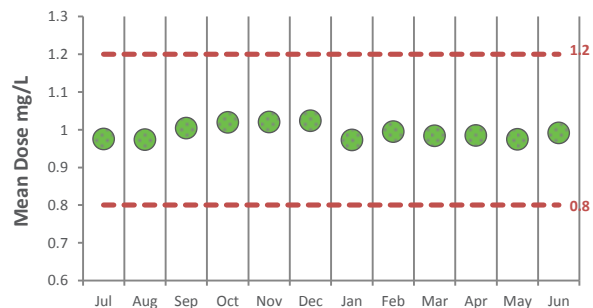


Figure 6.40.6-c Reticulation samples within target range

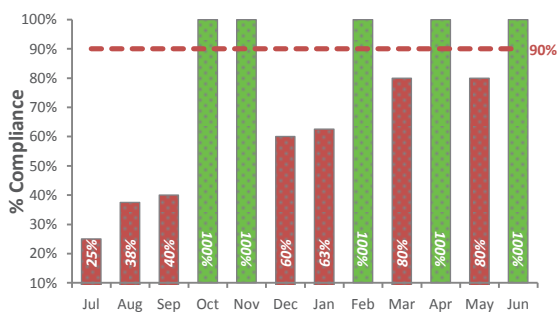
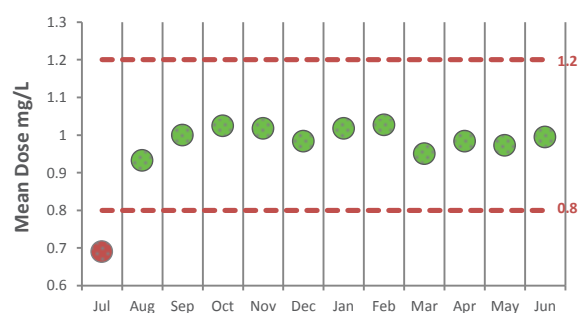


Figure 6.40.6-d Reticulation samples mean monthly dose (mg/L)



**Note:** (**Operational**) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (**Reticulation**) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station was 89.8 per cent. This did not achieve the regulatory target of greater than 90 per cent. Mean dose was consistently within target range of 0.8–1.2 mg/L, however, performance in the distribution network was variable
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L
- ❖ Ongoing plant reliability issues with the dosing station hampered the results at the beginning of the reporting period. There was improved performance toward the end of the reporting period which is directly linked with better dosing station operation.

## 6.40.7. Other Australia Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.40.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	18	0	100	< 1	< 1	< 1
Barium	2000	µg/L	18	0	100	7.22	6	9
Cadmium	2	µg/L	18	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	18	0	100	< 1	< 1	< 1
Copper	2000	µg/L	8	0	100	5.5	< 1	14
Lead	10	µg/L	18	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	18	0	100	5.01	0.5	14.1
Mercury	1	µg/L	18	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	18	0	100	1.33	0.8	2.1
Selenium	10	µg/L	18	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	44	0	100	11.89	< 1	54
Monochloroacetic acid	150	µg/L	44	0	100	< 5	< 5	24
Trichloroacetic acid	100	µg/L	44	0	100	26.07	< 1	86
Total trihalomethanes	250	µg/L	44	0	100	75.52	45	130

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.40.8. General physical parameters

**Table 6.40.8-a General physical performance**

General physical parameters (2015–16)					
	Samples	Mean	Min.	Max.	
Chlorine residual (mg/L)	211	0.2	0.01	1.05	
Turbidity (NTU)	212	0.49	0.1	9	
pH	208	7.35	6.65	9.96	

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Manuka Creek distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation generally did not meet the target of greater than 0.1 mg/L for the first part of the reporting period. A weekly program of flushing together with daily monitoring of the residuals has continued since late February when the system was placed on a BWA. Chlorine residuals have been consistently above 0.2 mg/L since February 2016
- ❖ pH levels are maintained within the recommended optimal range.

## 6.40.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

## 6.40.10. System incidents and issues

**Table 6.40.10-a Identified Incidents and Issues.**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
25/02/2016	<i>E. coli</i> detection of 167.4 MPN/100mL occurred at the Regatta Point sample point	A BWA was initiated and an intensive resampling program was initiated prior to the removal of the alert. The two uncovered reservoirs were taken offline. Flushing was initiated across the whole reticulation to ensure turnover of water within the system. Daily monitoring of the extremities of the system was initiated to ensure ongoing compliance.	Yes	Yes
23/06/2016	<i>E. coli</i> detection of 3 MPN/100mL occurred at the Tank 3 sample point	Chlorine Ct calculations were >50 mg.min/l and the plant operation was well in control as far as turbidity. All reticulation samples were negative from the same sample run. The immediate resample was negative. May have been a sampling / analysis issue.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.

### 6.40.11. Customer complaints

Figure 6.40.11-a Complaint classification

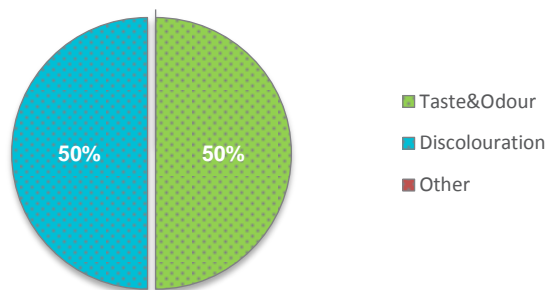
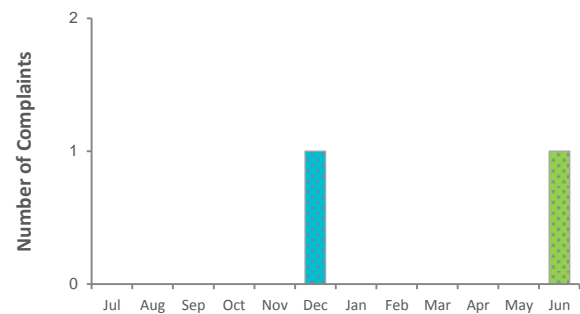


Figure 6.40.11-b Seasonal trend analysis



- ❖ Two complaints were received during the reporting period. One related to discolouration issues and the other related to an odour issue.

### 6.40.12. Catchment and source water issues

- ❖ The Manuka drinking water system is supplied by the Manuka River. The catchment covers 3,113 ha, and is predominantly bushland (Crown land). Based on the catchment land uses, source water quality risks include:
  - Colour
  - Turbidity
  - Microbial
  - Pesticides.
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

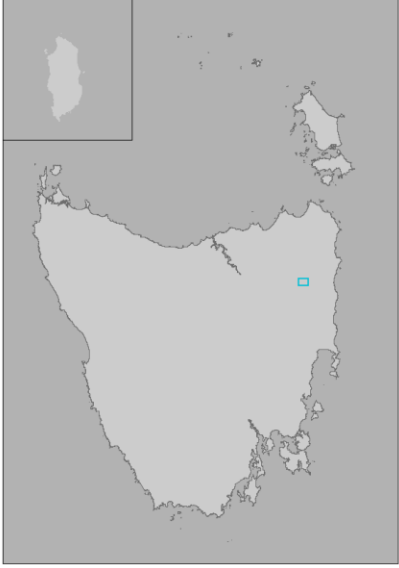
### 6.40.13. Infrastructure and operational changes

- ❖ Two unroofed reservoirs were taken offline during the year. These will be converted into raw water tanks to ensure continuity of raw water supply to the plant in the future.

### 6.40.14. Future planning

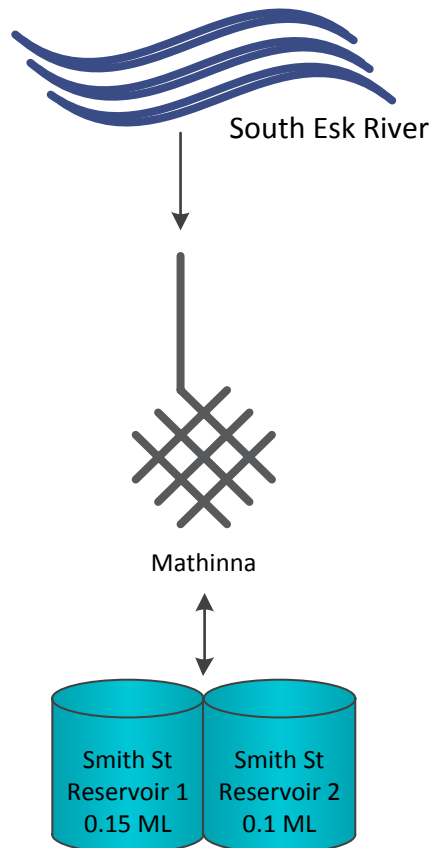
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

### 6.41. Mathinna drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	86
	<b>Catchment</b>	South Esk River
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Mathinna.</li> </ul>		

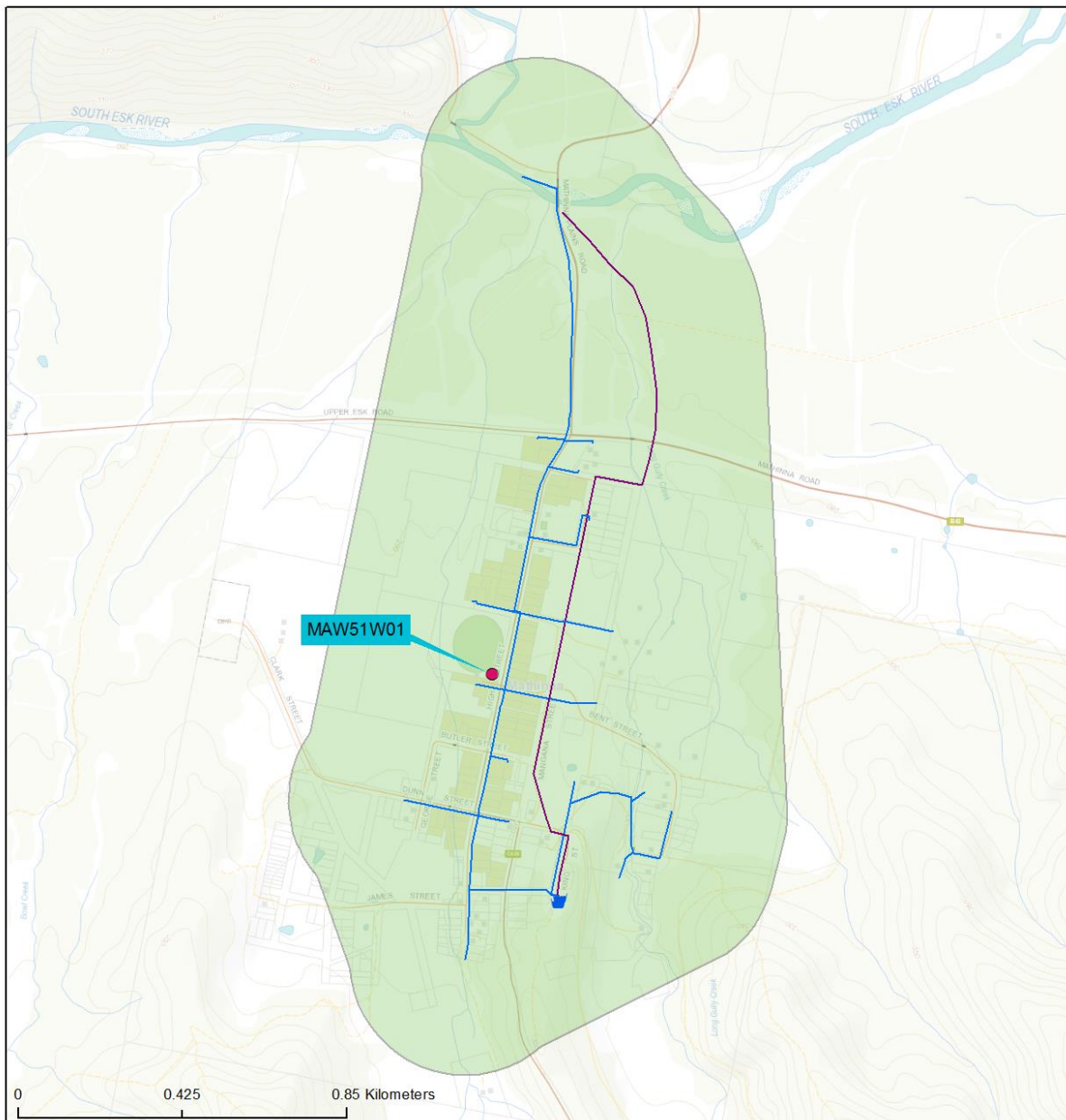
### 6.41.1. System description

Figure 6.41.1-a Mathinna system schematic



- ❖ **Catchment**  
The Mathinna drinking water system is supplied by the South Esk River.
- ❖ **Treatment**  
There is no treatment in this system. Customers receiving water from the Mathinna system are subject to a Permanent BWA (prior July 2013).
- ❖ **Distribution**  
The system feeds the township of Mathinna. There are two roofed reservoirs within the distribution system. The system supplies 86 connections.

Map 6.41.1-a Mathinna monitoring zone



MAW51W01 = Recreation Ground, Mathinna

## 6.41.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.41.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>	
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance
<b>Microbiological</b> <sup>(1)</sup>	33%	Unknown^	Monthly	12	8
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–
<b>DBPs</b> <sup>(3)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (•) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) DBP and Pesticide testing was removed from the reticulation sampling program in May 2016 (^) – Samples were not taken as per sampling program, therefore compliance cannot be calculated.

## 6.41.3. Summary of historic total system performance

Table 6.41.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	73%	●	38%	●	21%	●	17%	●	33% <sup>^</sup>	●	
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		100%	●	
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
<b>Complaints received</b> <sup>(5)</sup>	1		5		0		5		4		
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. (^) – Samples were not taken as per sampling program, therefore compliance cannot be calculated.



#### 6.41.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 33 per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ Sufficient microbiological samples were collected during 2015–16 to meet ADWG minimum testing requirements; however these samples were not taken in line with the required frequency to calculate compliance against DHHS targets
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 achieved 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.41.5. Microbiological performance

Figure 6.41.5-a Microbiological compliance 2015–16

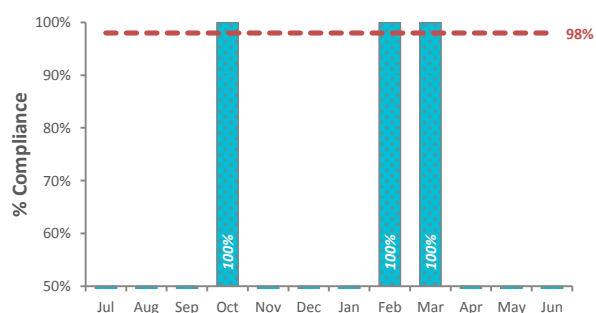
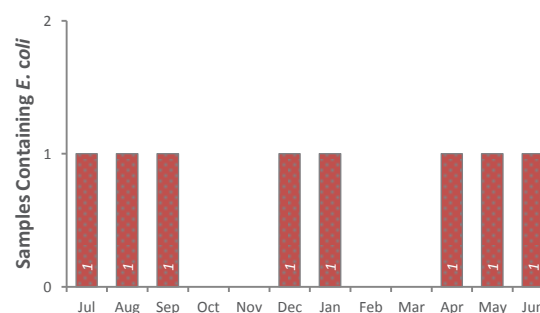


Figure 6.41.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Mathinna system was 33 per cent compliant in 2015–16. *E. coli* greater than 1 MPN/100 mL was detected in eight monthly samples during the reporting period
- ❖ A total of 12 *E. coli* samples were taken over the reporting period, however sampling in November was missed. Sufficient microbiological samples were collected during 2015–16 to meet ADWG minimum testing requirements; however these samples were not taken in line with the required frequency to calculate compliance against DHHS targets
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from the South Esk River
- ❖ The risk to health is mitigated through the communication of the Permanent BWA to customers.

#### 6.41.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.41.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.41.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	4.75	4	6
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	14.25	12	16
Lead	10	µg/L	4	0	100	0.68	< 0.5	1.3
Manganese	500	µg/L	4	0	100	4.38	0.9	8.4
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	3	0	100	< 4	< 1	< 4
Monochloroacetic acid	150	µg/L	3	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	3	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	3	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.41.8. General physical parameters

Table 6.41.8-a General physical performance

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		11	2.48	0.8	5
pH		11	7.46	6.6	8.88

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are below the ADWG aesthetic limit of 5 NTU. Due to lack of filtration barriers seven monthly samples spiked above the optimal level of 1 NTU, with the highest spike at 5 NTU
- ❖ This system is not chlorinated
- ❖ pH levels are generally within the recommended optimal range. One monthly sample spiked above the recommended range at pH 8.88.

### 6.41.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.41.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.41.11. Customer complaints

Figure 6.41.11-a Complaint classification

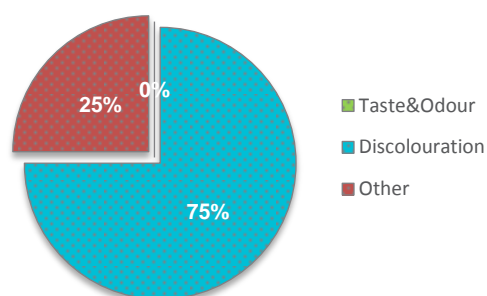
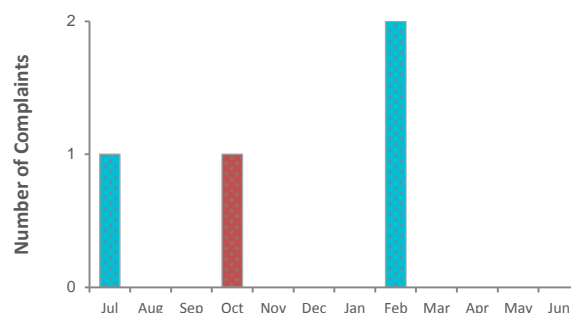


Figure 6.41.11-b Seasonal trend analysis



- ❖ Four complaints were received in this reporting period. Three related to discolouration issues and one related to an algal issue.

### 6.41.12. Catchment and source water issues

- ❖ The Mathinna drinking water system is supplied by the South Esk River. The drinking water catchment consists of grazing, forestry, historic mining and aquaculture. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.41.13. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.41.14. Future planning

Table 6.41.14-a Future planning for the system

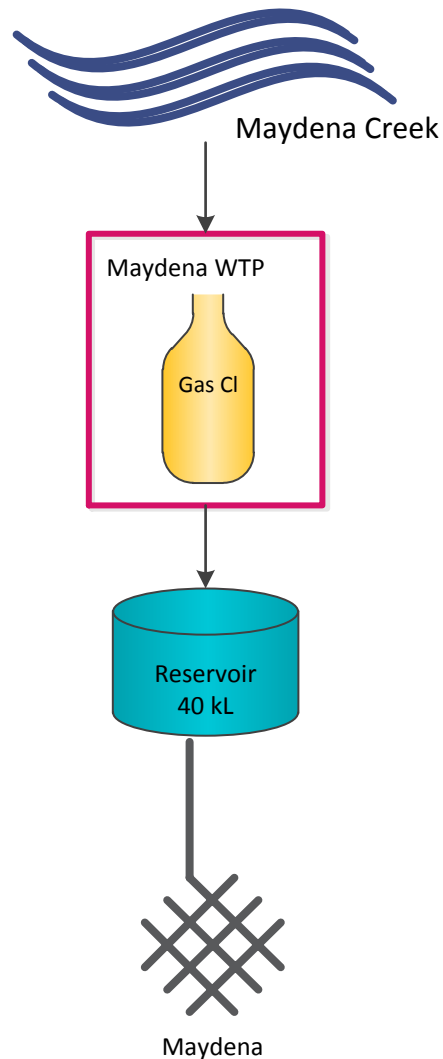
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Mathinna supply options	Investigation into options to improve water quality supplied to Mathinna	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

## 6.42. Maydena drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	169
	<b>Catchment</b>	Maydena Creek
	<b>Primary treatment</b>	Disinfection only
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Maydena.</li> </ul>		

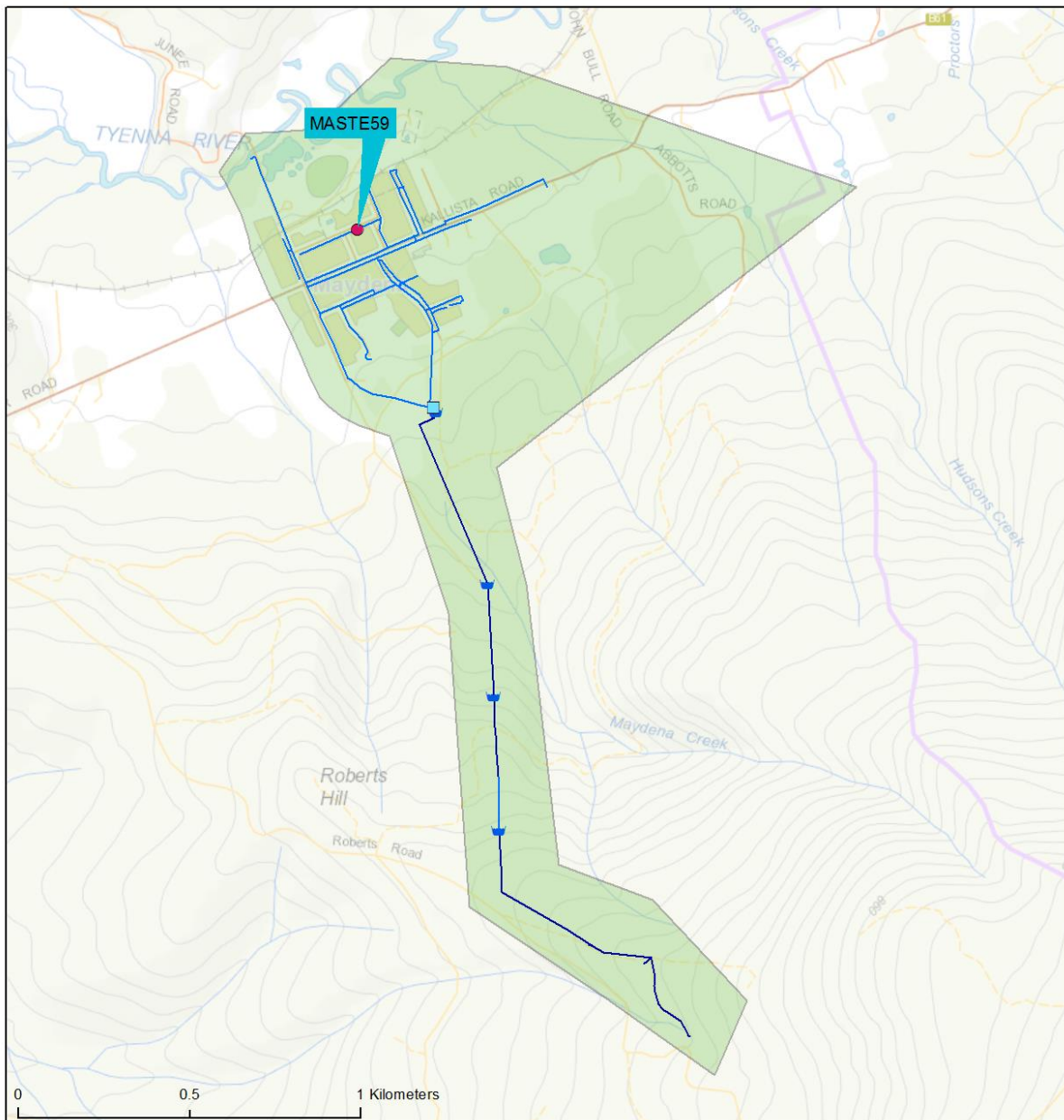
### 6.42.1. System description

Figure 6.42.1-a Maydena system schematic



- ❖ **Catchment**  
The Maydena drinking water system is supplied by Maydena Creek.
- ❖ **Treatment**  
Coarse screens provide primary screening of large particles at the raw water intake point. Gas chlorine disinfection occurs prior to entry to a covered reservoir.
- ❖ **Distribution**  
The Maydena system services approximately 169 connections.

Map 6.42.1-a Maydena monitoring zone



MASTE59 = Community Hall (Regular Compliance Point)

## 6.42.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.42.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance
<b>Microbiological</b> <sup>(1)</sup>	98%#	Unknown	Weekly	51	1
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–
<b>DBPs</b> <sup>(3)</sup>	100%	Yes ●	Quarterly	5	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) – Samples were not taken as per sampling program, therefore compliance cannot be calculated.

## 6.42.3. Summary of historic total system performance

Table 6.42.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	100%	●	100%	●	98%	●	100%	●	98%#	●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	<b>Distribution fluoride testing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	N/A		
<b>Complaints received</b> <sup>(5)</sup>	Not Recorded		Not recorded		8		2		0		
<b>Public alerts issued</b> <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. (#) – Samples were not taken as per sampling program, therefore compliance cannot be calculated..



#### 6.42.4. Analysis of current performance and historic trends

- ❖ Microbiological performance for 2015–16 achieved 98 per cent of samples free of *E. coli* based on 51 sampling events
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.42.5. Microbiological performance

Figure 6.42.5-a Microbiological compliance 2015–16

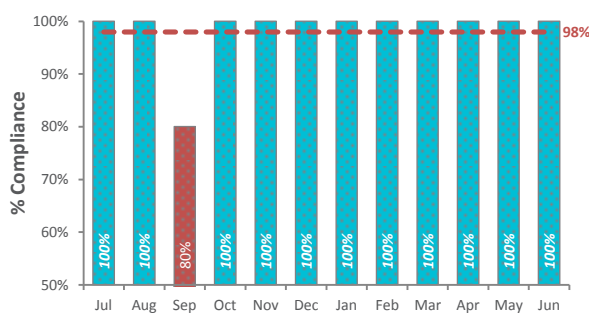
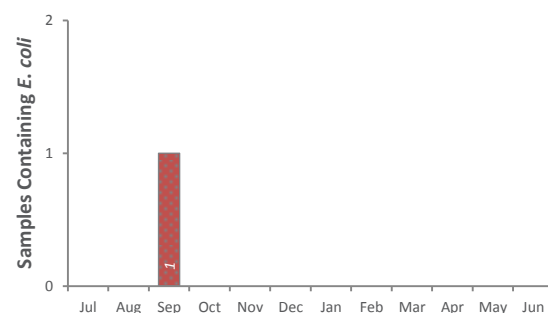


Figure 6.42.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ An *E. coli* strike occurred in September 2015 with a detection of 1 MPN/100 mL. This was attributed to a failure of dosing equipment. The dosing equipment was repaired and the system flushed. A re-test was conducted which confirmed the system was free of *E. coli* and microbial contamination
- ❖ During the reporting period 51 samples were taken. Compliance cannot be calculated in line with DHHS targets as one sampling event was missed in July 2015 due to a frozen sampling tap.

#### 6.42.6. Fluoride performance

- ❖ The Maydena water system is not fluoridated.

## 6.42.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.42.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	2.5	2	3
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	1
Copper	2000	µg/L	2	0	100	3.5	3	4
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	2	0	100	3.4	3.2	3.6
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	5	0	100	16.87	< 1	37
Monochloroacetic acid	150	µg/L	5	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	5	0	100	29.2	17	51
Total trihalomethanes	250	µg/L	5	0	100	35.8	17	65

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (+) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.42.8. General physical parameters

Table 6.42.8-a General physical performance

General physical parameters (2015–16)					
	Samples	Mean	Min.	Max.	
Chlorine residual (mg/L)	51	0.25	0	0.66	
Turbidity (NTU)	51	0.72	0.2	2.3	
pH	51	7.38	6.89	7.78	

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

#### 6.42.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

#### 6.42.10. System incidents and issues

Table 6.42.10-a Identified incidents and issues

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
10/09/2015	<i>E. coli</i> 1 MPN/100mL	Detection attributed to a failure of dosing equipment. The equipment was repaired and the system flushed. A re-test was conducted which confirmed the system was free of <i>E. coli</i> and microbial contamination.	Yes	Yes

Note: Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

#### 6.42.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

#### 6.42.12. Catchment and source water issues

- ❖ The Maydena drinking water catchment is approximately 0.25 km<sup>2</sup> in size, and is heavily forested. Forestry is the main activity in the catchment
- ❖ No health regulated pesticides were detected in the raw water monitoring program.


#### 6.42.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.42.14. Future planning

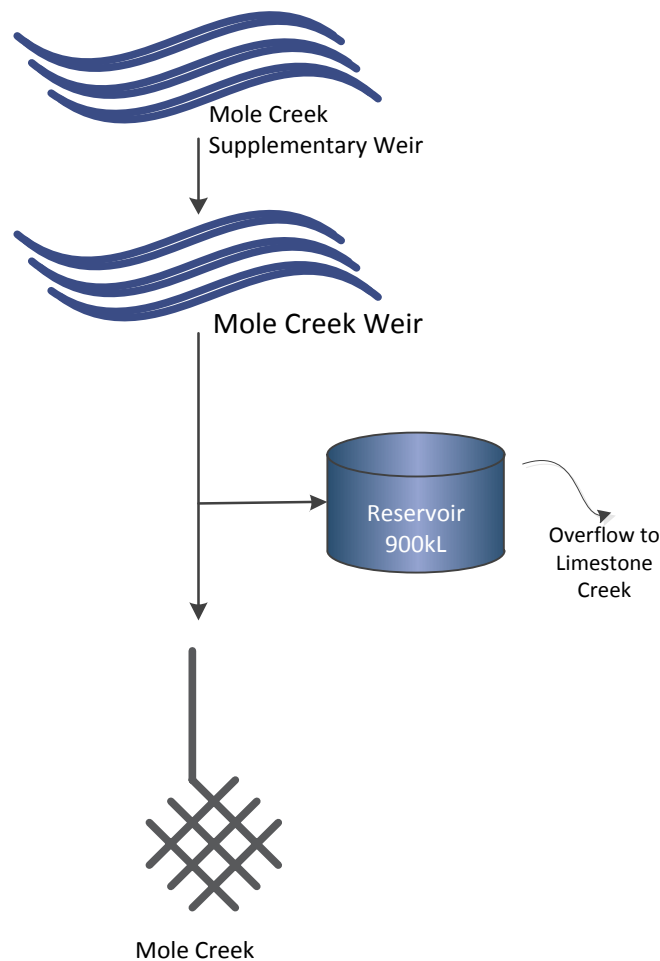
- ❖ No water quality improvement projects are planned during the current PSP period.

### 6.43. Mole Creek drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	270
	<b>Catchment</b>	Mole Creek
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Mole Creek.</li> </ul>		

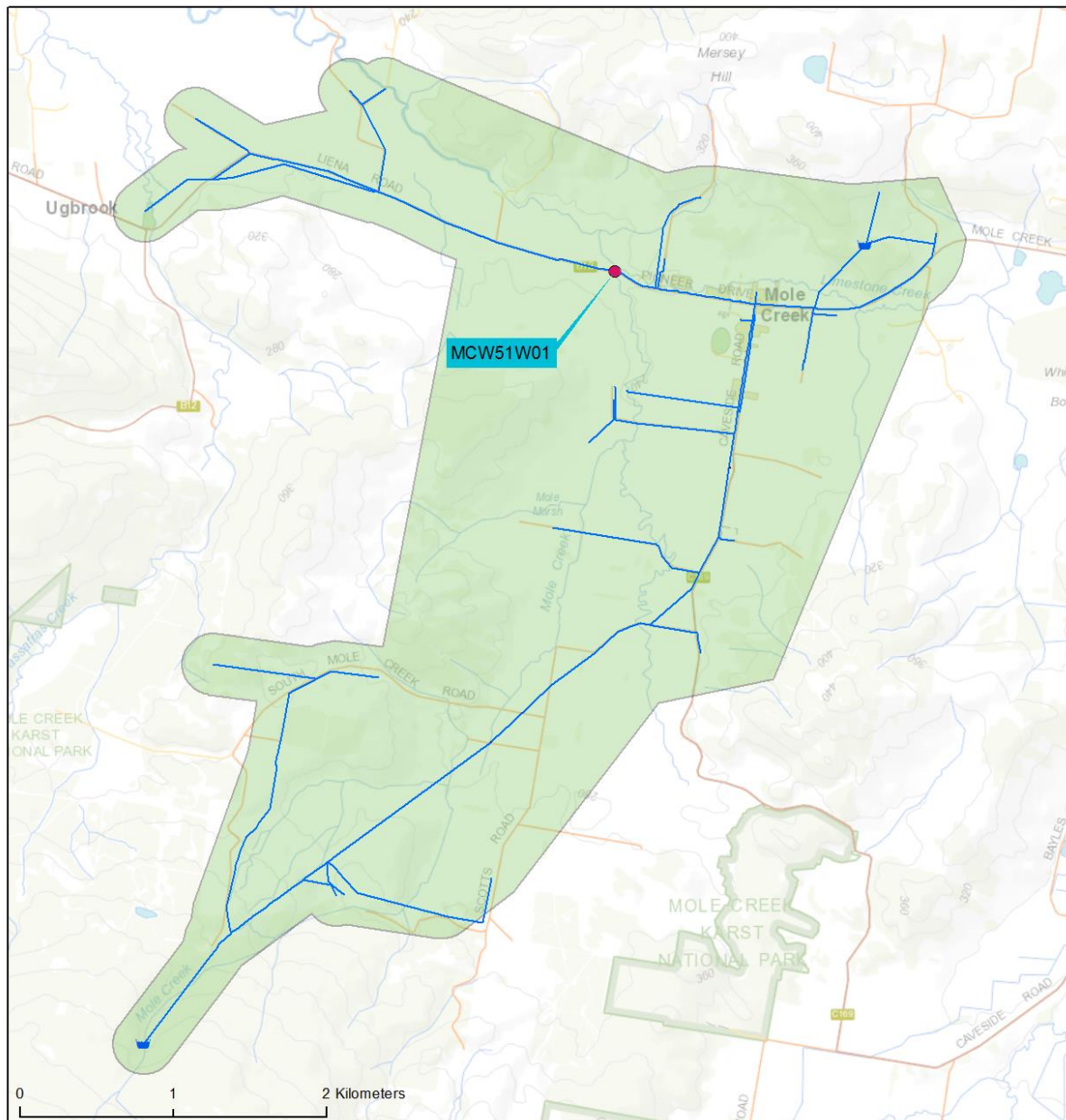
### 6.43.1. System description

Figure 6.43.1-a Mole Creek system schematic



- ❖ **Catchment**  
The Mole Creek drinking water system is supplied by Mole Creek
- ❖ **Treatment**  
The Mole Creek drinking water scheme is a raw water supply with no treatment. Customers receiving water from the Mole Creek system are subject to a Permanent BWA (prior July 2013)
- ❖ **Distribution**  
The system feeds the township of Mole Creek. There is one roofed reservoir within the distribution system. The system supplies 270 connections.

Map 6.43.1—a Mole Creek monitoring zone



MCW51W01 = Pioneer Drive, Mole Creek

## 6.43.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.43.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	17.4%	No	●	Monthly	46	38
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	4	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. <sup>#</sup>DBP and Pesticide testing were removed from the reticulation sampling program in May 2016.

## 6.43.3. Summary of historic total system performance

Table 6.43.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	8%	●	21%	●	10%	●	7%	●	17.4%	●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	<b>Distribution fluoride testing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		100%	●	
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
<b>Complaints received</b> <sup>(5)</sup>	2		4		3		4		5		
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2013 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.43.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 was 17 per cent. The microbiological risk to public health is mitigated through the communication of a permanent BWA
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 achieved 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.43.5. Microbiological performance

Figure 6.43.5-a Microbiological compliance 2015–16

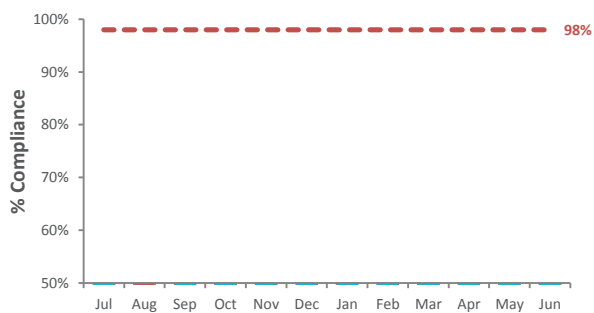
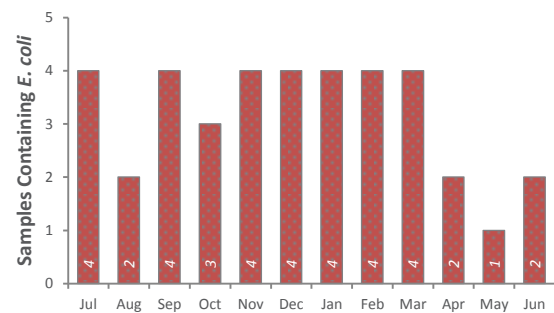


Figure 6.43.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Mole Creek system was 17 per cent compliant in 2015–16. *E. coli* greater than 1 MPN/100 mL was detected in 38 samples for the reporting period
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from Mole Creek
- ❖ The risk to public health is mitigated through the communication of a Permanent BWA.

#### 6.43.6. Fluoride performance

- ❖ This system is not fluoridated.



## 6.43.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.43.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	3.75	3	5
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	< 1	< 1	2
Lead	10	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	4	0	100	9.55	4	21.8
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	3	0	100	< 4	< 1	< 4
Monochloroacetic acid	150	µg/L	3	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	3	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	3	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.43.8. General physical parameters

**Table 6.43.8-a General physical performance**

General physical parameters (2015–16)					
Parameters		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		45	7.04	0.3	30.3
pH		44	7.02	6.43	7.64

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Due to a lack of filtration processes for this system mean turbidity levels recorded in the distribution network are above the ADWG aesthetic limit of 5 NTU. Spikes above the limit occurred in 25 samples with the highest up to 30.3 NTU during the reporting period
- ❖ This system is not chlorinated
- ❖ pH levels are within the recommended optimal range.

### 6.43.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.43.10. System incidents and issues

**Table 6.43.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
8/06/2016	A landslip in the supply creek blocked the inlet and diverted flow around the northern abutment of the weir, causing water outage to the reticulation.	Contractor engaged to remove debris to restore water supply. Further follow up works required to repair natural banks. Dam Engineers to review the weir because of the erosion created from the water flow.	No	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.43.11. Customer complaints

Figure 6.43.11-a Complaint classification

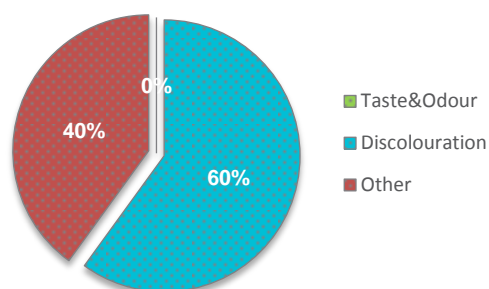
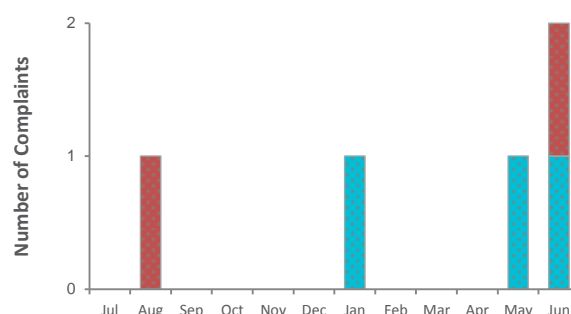


Figure 6.43.11-b Seasonal trend analysis



- ❖ Five complaints were received in this reporting period. Three complaints related to discolouration issues and two complaints were not related to water quality.

### 6.43.12. Catchment and source water issues

- ❖ The upper Mole Creek catchment lies within a conservation area, the lower catchment is managed by forestry. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.43.13. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.43.14. Future planning

Table 6.43.14-a Future planning for the system

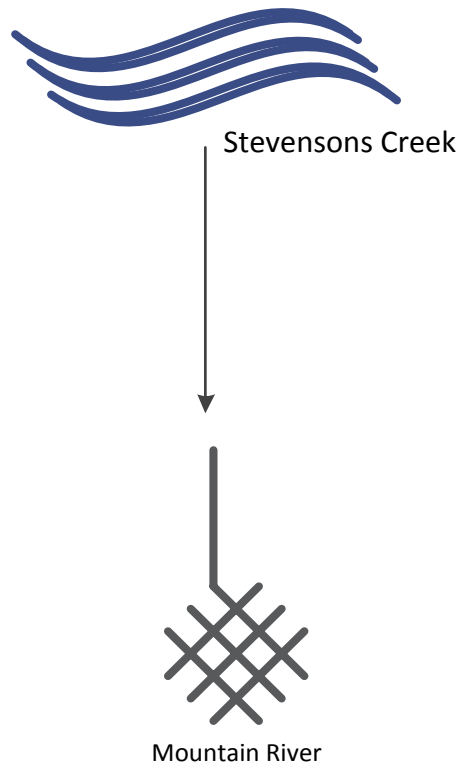
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Mole Creek WTP	New WTP to supply Mole Creek distribution system	WTP under construction with completion expected late 2016. BWA expected to be lifted in 2017.	2016–17	\$4.1 million

#### 6.44. Mountain River drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	2
	<b>Catchment</b>	Stevensons Creek
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Mountain River</li> <li>❖ The Mountain River system is currently in the process of conversion by individual contract to rain water tanks. The original non-potable untreated supply will remain in place for these connections as irrigation supply only.</li> </ul>		

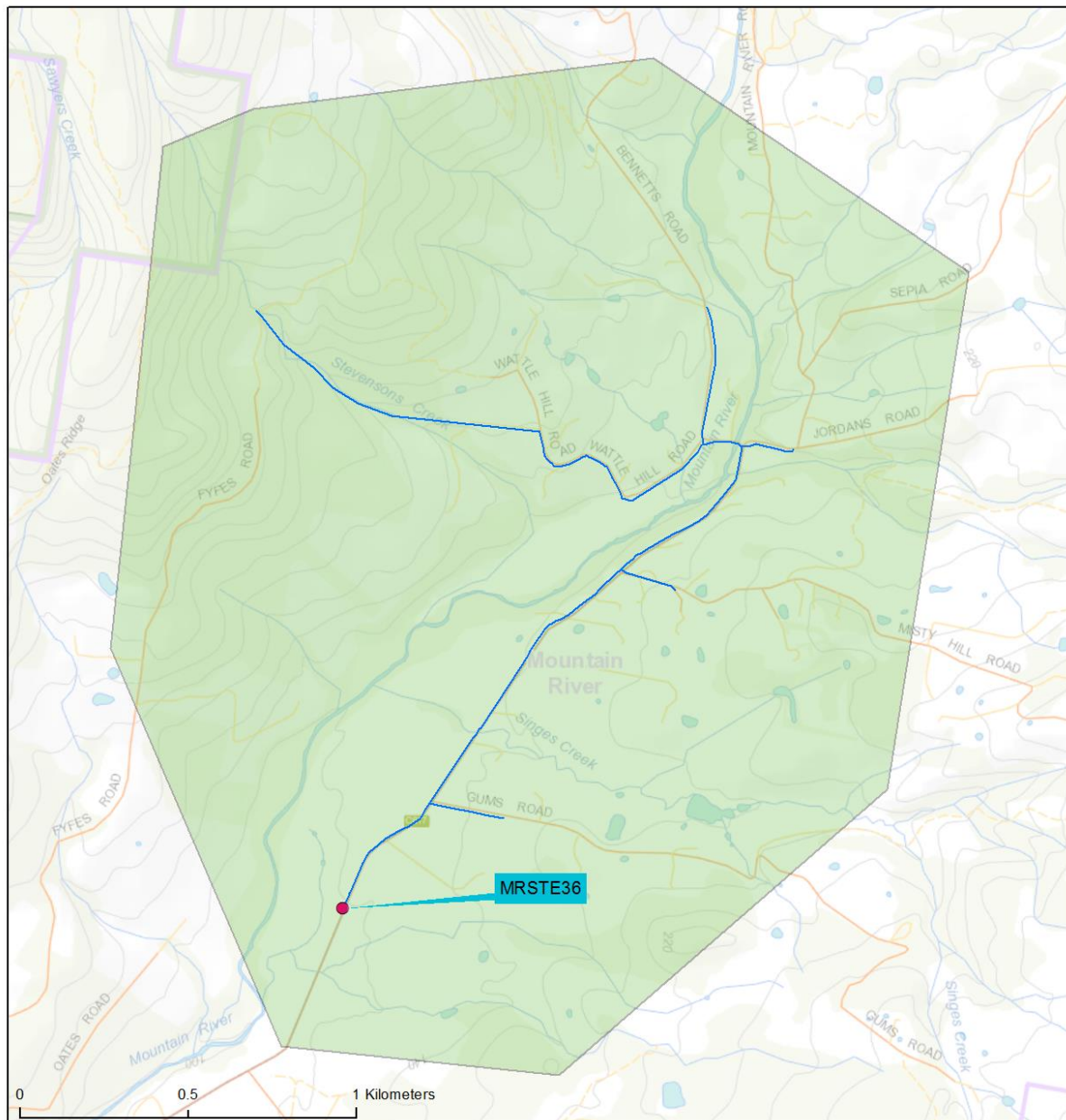
### 6.44.1. System description

Figure 6.44.1-a Mountain River system schematic



- ❖ Catchment  
The Mountain River drinking water system is supplied by Stevenson's Creek
- ❖ Treatment  
The Mountain River system is a raw water system with no treatment. Customers, receiving water from the Mountain River system, are subject to a permanent boil water alert (prior July 2013)
- ❖ Distribution  
The Mountain River water system supplies two connections.

Map 6.44.1-a Mountain River monitoring zone



MRSTE36 = 431 Mountain River Rd, Sample tap

## 6.44.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.44.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent Boil Water Alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	23.4%	No	●	Weekly	47 <sup>#</sup>	36
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	–	–	–	–
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. (#) sampling program changed to monthly in June 2016.

## 6.44.3. Summary of historic total system performance

Table 6.44.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)		Performance*									
Parameter group		2011–12	2012–13	2013–14	2014–15	2015–16					
<b>Microbiological</b> <sup>(1)</sup>		46%	●	33%	●	8.3%	●	42%	●	23.4%	●
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	<b>Distribution fluoride testing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Metals</b> <sup>(3)</sup>		100%	●	100%	●	100%	●	100% ^	●	100%	●
<b>DBPs</b> <sup>(3)</sup>		N/A		N/A		N/A		N/A		N/A	
<b>Pesticides</b> <sup>(4)</sup>		0	●	0	●	0	●	0	●	N/A	
<b>Complaints received</b> <sup>(5)</sup>		Not Recorded		Not Recorded		1		0		0	
<b>Public alerts issued</b> <sup>(6)</sup>		1	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1–7–2013 collected at a frequency determined by a risk based methodology. Post 1–7–2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

#### 6.44.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 23.4 per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBPs are not measured as chlorination does not occur in this system.

#### 6.44.5. Microbiological performance

Figure 6.44.5-a Microbiological compliance 2015–16

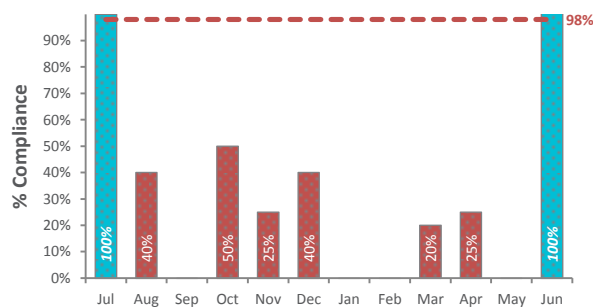
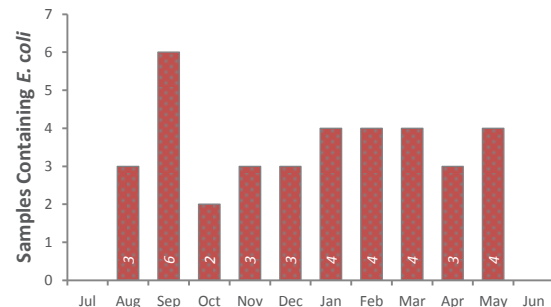


Figure 6.44.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Mountain River system was 23.4 per cent compliant in 2015–16
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from Stevensons Creek
- ❖ The risk to public health is mitigated through the communication of a permanent BWA to customers.

#### 6.44.6. Fluoride performance

- ❖ This system is not fluoridated.



## 6.44.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.44.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	7.5	6	9
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	3	2	4
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	2	0	100	11.7	4.2	19.2
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Monochloroacetic acid	150	µg/L	N/A	N/A	–	–	–	–
Trichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Total trihalomethanes	250	µg/L	N/A	N/A	–	–	–	–

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (–) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ DBPs are not measured as chlorination does not occur in this system.

## 6.44.8. General physical parameters

Table 6.44.8-a General physical performance

General physical parameters (2015–16)					
	Samples	Mean	Min.	Max.	
Chlorine residual (mg/L)	N/A	N/A	N/A	N/A	
Turbidity (NTU)	46	7.74	0.6	123	
pH	47	7.07	6.28	8.11	

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity is above ADWG aesthetic limit of 5 NTU, there are no treatment barriers to mitigate turbidity fluctuations in the source water
- ❖ pH levels are maintained within the recommended optimal range
- ❖ This system is not chlorinated.

#### 6.44.9. Aesthetic issues

- ❖ Due to the lack of a filtration barrier the Mountain River system has consistent aesthetic issues with turbidity and colour.

#### 6.44.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

#### 6.44.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

#### 6.44.12. Catchment and source water issues

- ❖ The drinking water catchment is primarily bushland and is largely located within Wellington Park
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.44.13. Infrastructure and operational changes

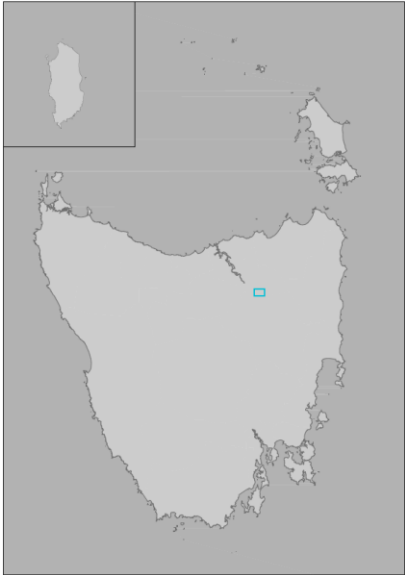
- ❖ This system is currently in the process of conversion by individual contract to rain water tanks. The original non-potable untreated supply will remain in place for these connections as irrigation supply only.

#### 6.44.14. Future planning

**Table 6.44.14-a Future planning for the system**

Project	Description	Progress	Anticipated Delivery	Estimated Spend
Service replacement	Replacement of service with rainwater tanks	All but three residents have signed up for service replacement	To be determined	\$270,000

#### 6.45. North Esk drinking water system

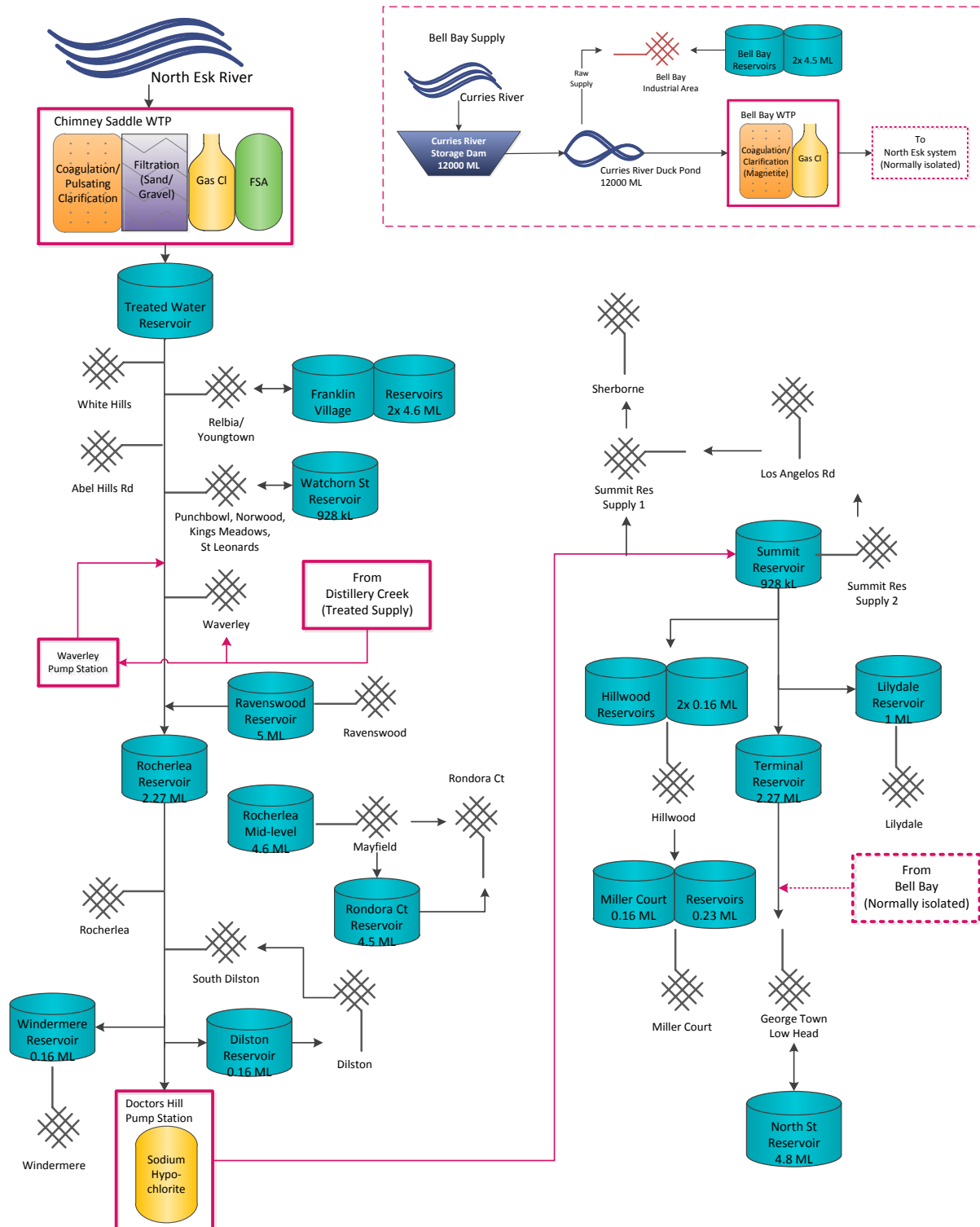
	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	15,537
	<b>Catchment</b>	North Esk
	<b>Primary treatment</b>	Conventional filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	Sodium hypochlorite
	<b>Fluoridation agent</b>	Fluorosilicic acid

#### Towns serviced:

- ❖ White Hills
- ❖ Relbia
- ❖ Youngtown
- ❖ Punchbowl
- ❖ Norwood
- ❖ Kings Meadows (part)
- ❖ St Leonards
- ❖ Waverley
- ❖ Ravenswood
- ❖ Rocherlea
- ❖ Mayfield
- ❖ Hillwood
- ❖ Windermere
- ❖ Dilston
- ❖ George Town
- ❖ Bell Bay
- ❖ Low Head.

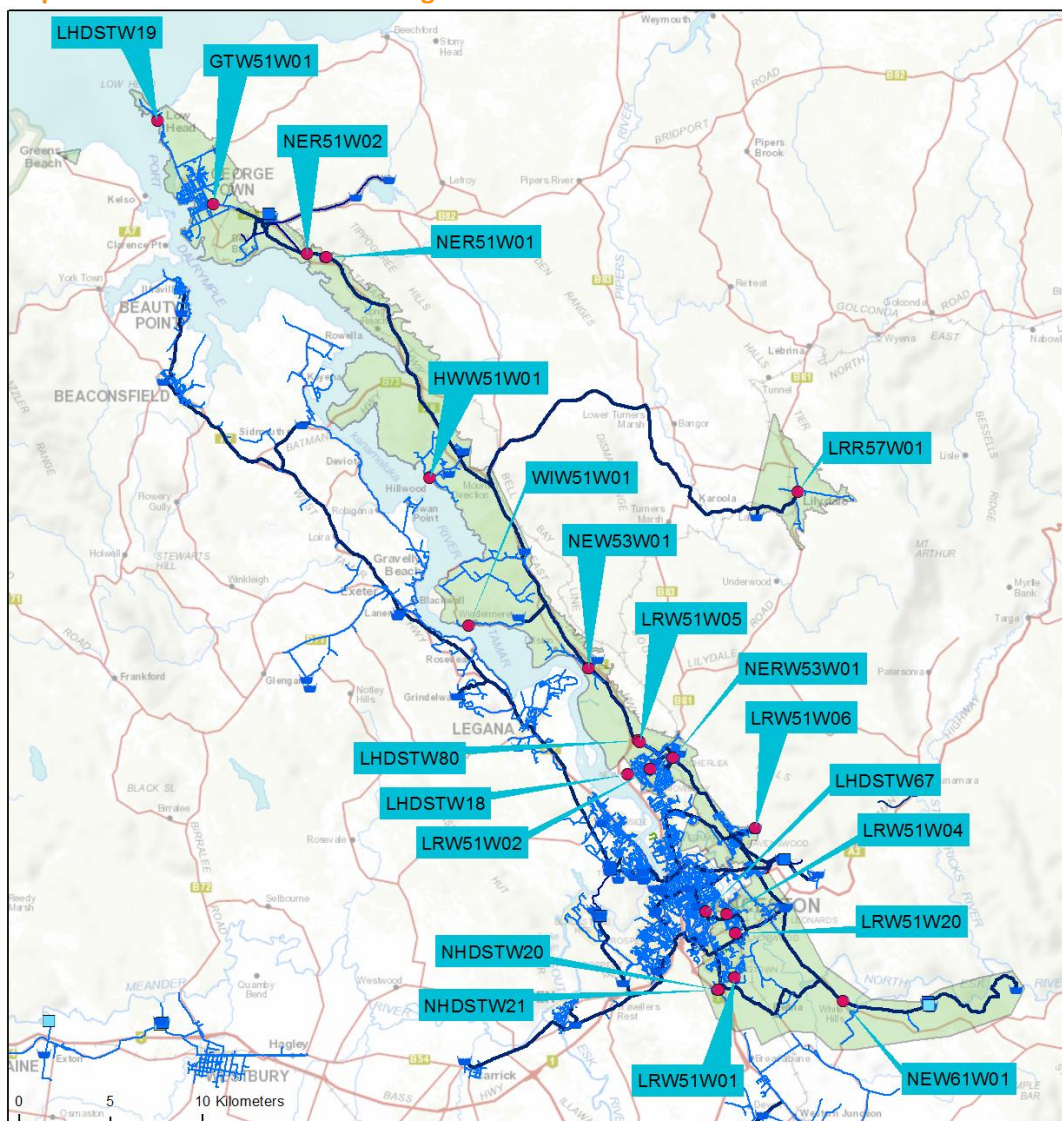
### 6.45.1. System description

Figure 6.45.1-a North Esk system schematic



- ❖ **Catchment**  
The North Esk drinking water system is supplied by the North Esk River.
- ❖ **Treatment**  
The North Esk WTP employs screening, coagulation and flocculation, clarification (pulsating clarifier), conventional filtration, chlorine gas disinfection, and fluoridation via fluorosilicic acid.
- ❖ **Distribution**  
There are 17 roofed reservoirs servicing the large reticulated network in the Launceston area and several smaller networks down the East Tamar region. The reservoirs and networks are connected via a trunk main which extends from White Hills to George Town. The North Esk drinking water system supplies 15,537 connections.

**Map 6.45.1—a North Esk monitoring zone**



GTW51W01 = George Town Information Centre, HWW51W01 = Hillwood Jetty; LHDSTW18 = Newnham Camira Street Pump Station, LHDSTW19 = Low Head Park Toilet, LHDSTW67 = Watchorn Street Reservoir, LHDSTW80 = Rocherlea Australis Drive, LRR57W01 = Lilydale Public Toilets, LRW51W01 = Youngtown Poplar Parade, LRW51W02 = Newnham Fran Maree Street, LRW51W04 = Norwood Leith Street, LRW51W05 = TasWater Depot Rocherlea, LRW51W06 = Ravenswood Reservoir, LRW51W20 = Norwood Charlton Park, NER51W01 = Bell Bay Terminal Reservoir, NER51W02 = Bell Bay Interconnector, NERW53W01 = Rocherlea Reservoir, NEW53W01 = Dilston Hall, NEW61W01 = White Hills Pressure Reducing Valve, NHDSTW20 = Franklin Village Reservoir 1, NHDSTW21 = Franklin Village Reservoir 2, WIW51W01 = Windermere Church

## 6.45.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.45.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99%	Yes	● Weekly	416	1	
Fluoride <sup>(2)</sup>	100%	Yes	● Weekly	101	0	
DBPs <sup>(3)</sup>	100%	Yes	● Quarterly	8	0	
Metals <sup>(4)</sup>	100%	Yes	● Quarterly	8	0	
Pesticides <sup>(5)</sup>	100%	Yes	● Quarterly	9	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.45.3. Summary of historic total system performance

Table 6.45.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12	2012–13		2013–14		2014–15		2015–16			
Microbiological <sup>(1)</sup>	100%	●	100%	●	99%	●	99%	●	99%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		93%	●	97%	●	96%	●
	mean dose (mg/L) <sup>(c)</sup>	0.95	●	0.94	●	0.94	●	0.99	●	0.96	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	1	●	0	●	0	●	0	●
within target range <sup>(b)</sup>	Not Recorded		Not Recorded		Not Recorded		100%	●	83%	●	
mean dose (mg/L) <sup>(c)</sup>	Not Recorded		Not Recorded		Not Recorded		1.07	●	0.88	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
Complaints received <sup>(5)</sup>	20		21		36		114		50		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.45.4. Analysis of current performance and historic trends

- ❖ Dry weather conditions dropped the North Esk River levels to concerning levels in March. The Bell Bay system, normally on standby, was required to supplement demand to the George Town and Low Head areas. The system ran for two days and a monitoring was conducted to ensure water quality met relevant guidelines
- ❖ A re-chlorination station was constructed at Doctors Hill Pump Station to boost residuals in the system extremities
- ❖ Microbiological compliance for 2015/16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride dosing maintained compliance achieving greater than 90 per cent within target range. Performance was not consistent within the distribution network due to low residuals during maintenance periods
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015/16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015/16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.45.5. Microbiological performance

Figure 6.45.5-a Microbiological compliance 2015–16

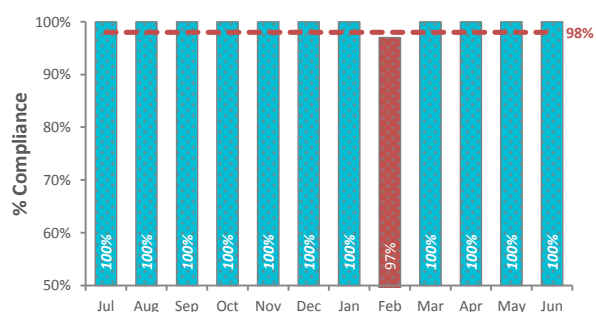
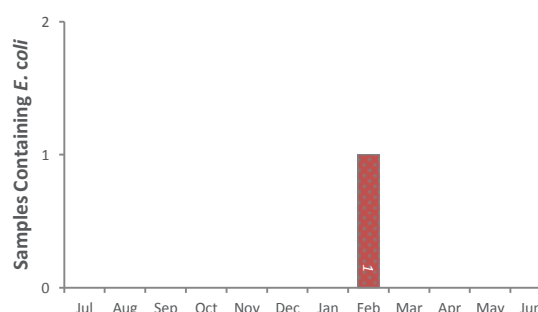


Figure 6.45.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ Microbiological compliance for 2015–16 achieved 99 per cent and complies with the TDWQG
- ❖ An *E. coli* strike occurred in February 2016 with a detection of 1 MPN/100 mL. Watchorn Reservoir was isolated from the distribution system, and divers were contracted to clean the interior. The reservoir was refilled and a re-test was conducted which confirmed the system was free of *E. coli* and microbial contamination. The reservoir was then brought online.



## 6.45.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.45.6-a Operational samples within target range

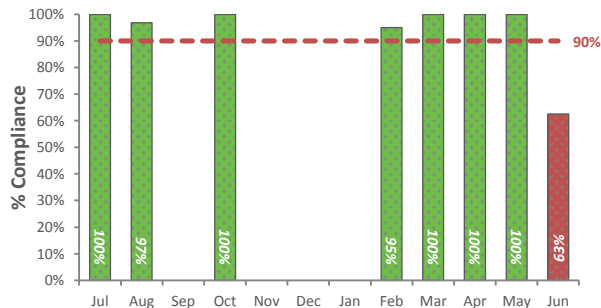


Figure 6.45.6-b Operational mean monthly dose (mg/L)

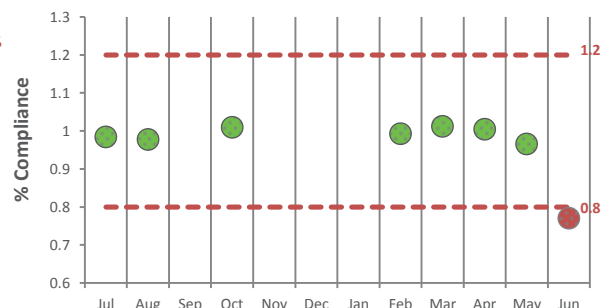


Figure 6.45.6-c Reticulation samples within target range

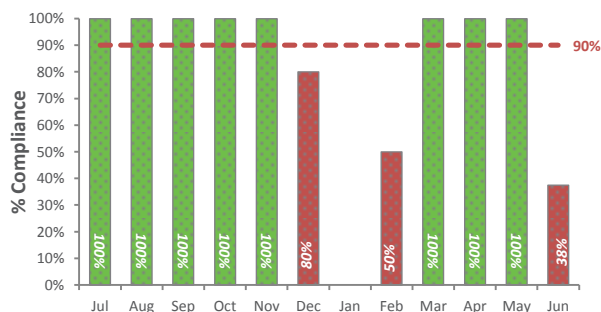
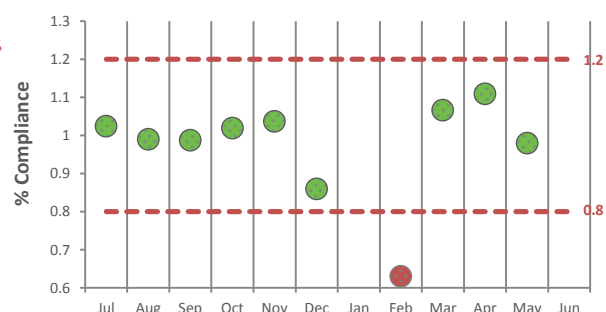


Figure 6.45.6-d Reticulation samples mean monthly dose (mg/L)



**Note: (Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Operational mean fluoride compliance did not consistently achieve the regulatory target of greater than 90 per cent and is reflected in the distribution system
- ❖ From September 2015 to early February 2016, daily testing at the dosing station was undertaken but results were not recorded due to protected action
- ❖ The fluoride system was shut down in June due to a leak and remains under maintenance
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.



## 6.45.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.45.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	8	0	100	< 1	< 1	< 1
Barium	2000	µg/L	8	0	100	12	10	22
Cadmium	2	µg/L	8	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	8	0	100	< 1	< 1	< 1
Copper	2000	µg/L	8	0	100	7.37	2	14
Lead	10	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	8	0	100	6.21	0.5	15
Mercury	1	µg/L	8	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	8	0	100	< 0.5	< 0.5	0.7
Selenium	10	µg/L	8	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	8	0	100	14.5	3	29
Monochloroacetic acid	150	µg/L	8	0	100	< 5	< 5	> 5
Trichloroacetic acid	100	µg/L	8	0	100	20.75	11	32
Total trihalomethanes	250	µg/L	8	0	100	25.93	6.5	51

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.45.8. General physical parameters

**Table 6.45.8-a General physical performance**

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		439	0.39	0	1.88
Turbidity (NTU)		442	0.22	0.08	1.9
pH		442	7.07	6.45	8.68

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.45.9. Aesthetic issues

- ❖ The North Esk River is susceptible to algal blooms during extended dry weather periods. Elevated levels of algal metabolites such as MIB and Geosmin are present and impact on the aesthetic quality of the supply. These aesthetic contaminants are adsorbed from the raw water using PAC, dosed prior to any treatment processes. The PAC, metabolites and other impurities are then removed during the flocculation and filtration processes.

### 6.45.10. System incidents and issues

**Table 6.45.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
November – February	Taste and odour complaints	Significant taste and odour complaints were received. PAC dosing was initiated and mitigated the aesthetic problem within a week. Dosing remained in place until MIB and Geosmin levels in the North Esk River dropped below the average taste threshold of 10 µg/L.	No	Yes
10/02/2016	<i>E. coli</i> 1 MPN/100mL	Microbiological detection in Watchorn Reservoir. Reservoir was isolated, drained and cleaned by divers. Reservoir was filled, brought back online and retested on 25/02/2016. Retest was clear of contamination.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.45.11. Customer complaints

Figure 6.45.11-a Complaint classification

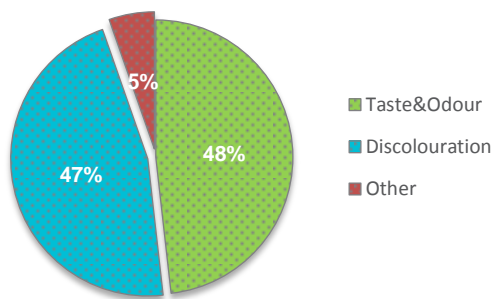
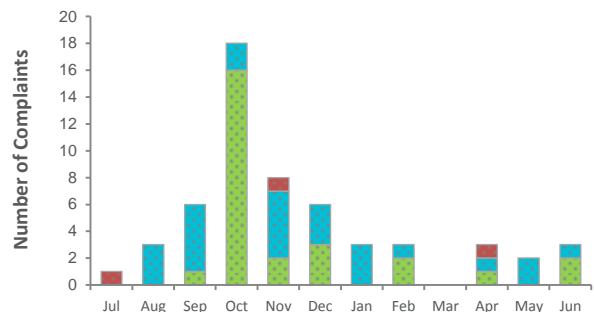


Figure 6.45.11-b Seasonal trend analysis



- ❖ Fifty six complaints were received in this reporting period. Sixteen complaints were received in October, and can be attributed to a taste and odour event.

### 6.45.12. Catchment and source water issues

- ❖ The North Esk drinking water system is supplied by the North Esk River. The catchment covers an area of 39,191 ha. Major land uses include forestry, national parks and grazing. Other relevant land uses include cropping and intensive grazing. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

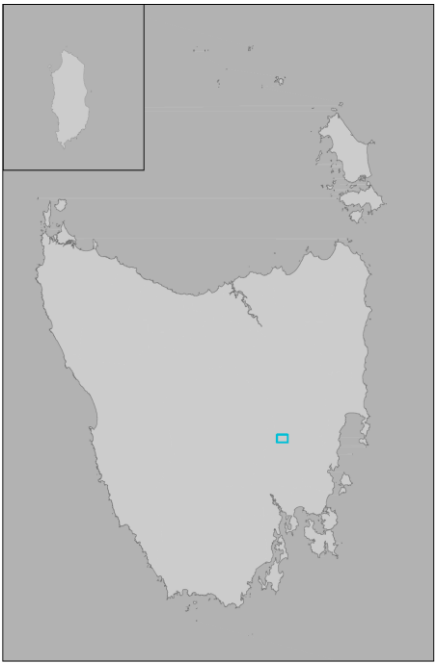
### 6.45.13. Infrastructure and operational changes

- ❖ A re-chlorination facility was implemented at the Doctors Hill pump station, along the trunk main down the East Tamar Highway. The facility has successfully improved the management of chlorine residuals in the extremities of the system.

### 6.45.14. Future planning

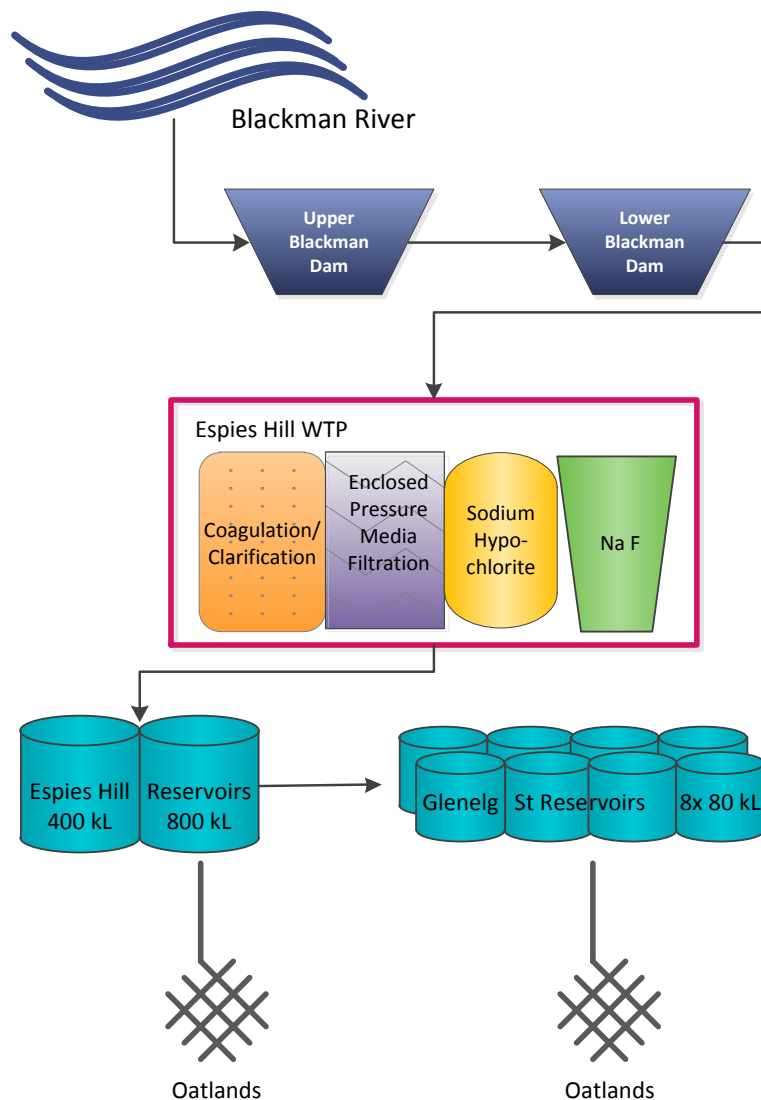
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.46. Oatlands drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	487
	<b>Catchment</b>	Blackman River
	<b>Primary treatment</b>	Coagulation, flocculation, filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Oatlands.</li> </ul>		

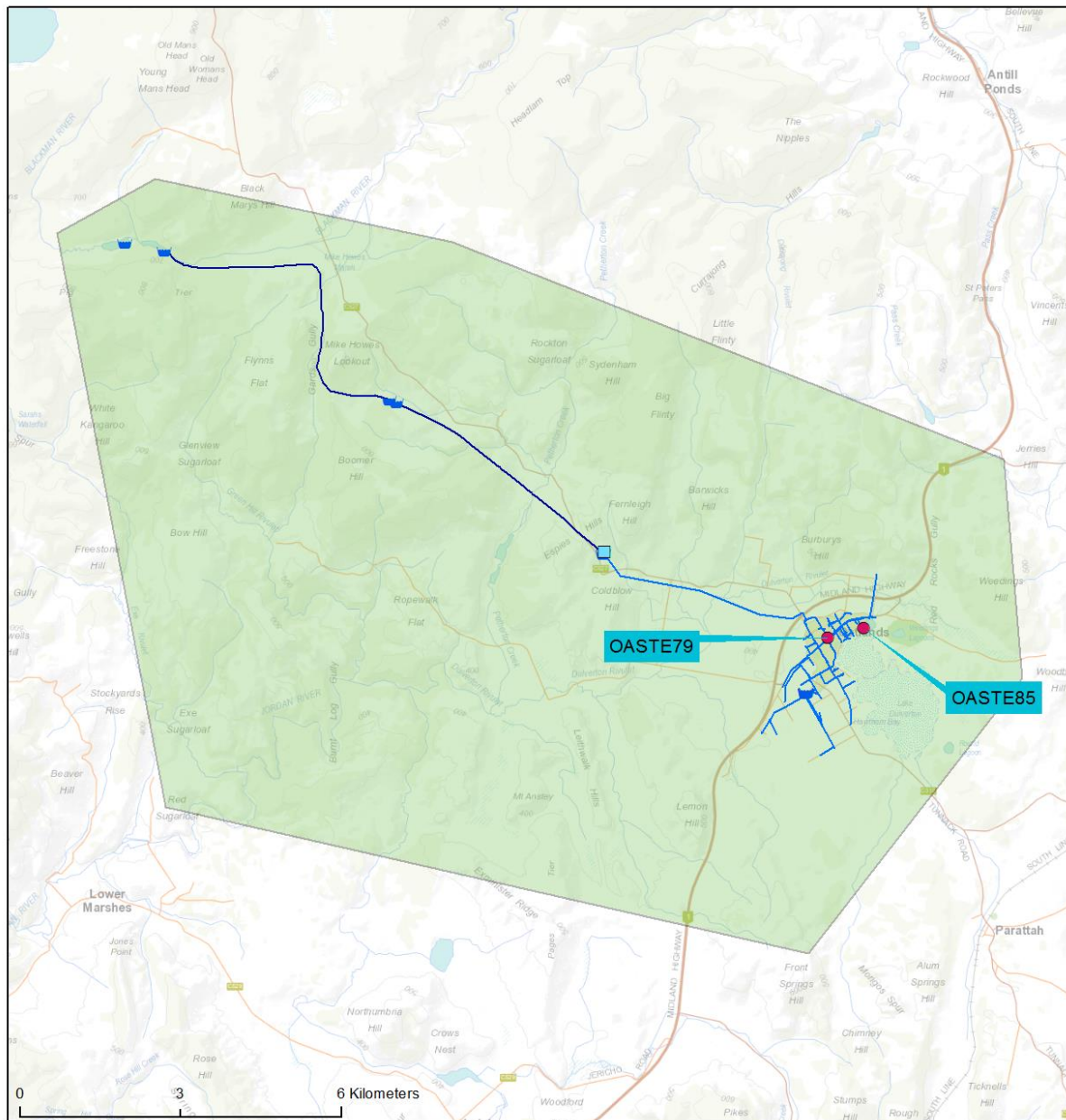
### 6.46.1. System description

Figure 6.46.1-a Oatlands system schematic



- ❖ **Catchment**  
The Oatlands drinking water system is supplied by the Blackman River. Water is drawn from two on-river storage dams, and is then gravity fed along a 17 km pipeline to the Espies Hill WTP. Two break pressure tanks are located along the gravity fed line to the treatment plant
- ❖ **Treatment**  
The Espies Hill WTP employs coagulation, flocculation, clarification, enclosed pressure filtration, sodium hypochlorite disinfection and fluoridation via sodium fluoride dosing
- ❖ **Distribution**  
Treated water is stored in two roofed reservoirs and then gravity fed to the Oatlands township. The Oatlands drinking water system supplies 487 connections.

Map 6.46.1—a Oatlands monitoring zone



OASTE79 = Wellington St (Regular Compliance Point) – OASTE85 = Sewer Pump Station Tap (fluoride site only)

## 6.46.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.46.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes	●	Weekly	52	0
<b>Fluoride</b> <sup>(2)</sup>	100%	Yes	●	Weekly	106	0
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly	4	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	6 Monthly	2	0
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.46.3. Summary of historic total system performance

Table 6.46.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	67.9%	●	58.9%	●	83.4%	●	98.4%	●	99.7%	●
	mean dose (mg/L) <sup>(c)</sup>	0.89	●	0.82	●	1.06	●	1.0	●	1.04	●
	<b>Distribution fluoride testing</b>										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Required		Not Required		Not Reported		95.1%	●	91.7%	●
mean dose (mg/L) <sup>(c)</sup>	Not Required		Not Required		Not Reported		1.01	●	1.03	●	
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
<b>Pesticides</b> <sup>(4)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Complaints received</b> <sup>(5)</sup>	Not recorded		Not recorded		0		0		0		
<b>Public alerts issued</b> <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.46.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent.

#### 6.46.5. Microbiological performance

Figure 6.46.5-a Microbiological compliance 2015–16

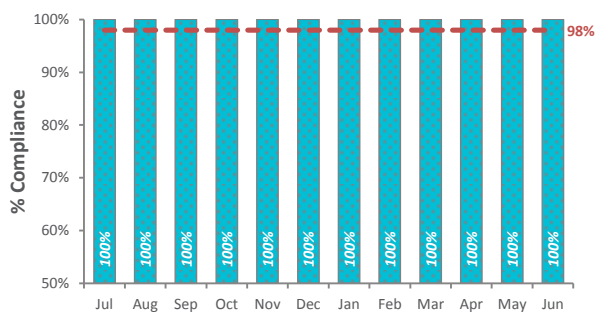


Figure 6.46.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.



## 6.46.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.46.6-a Operational samples within target range

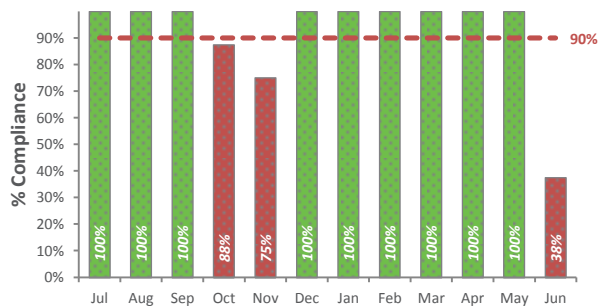


Figure 6.46.6-b Operational mean monthly dose (mg/L)

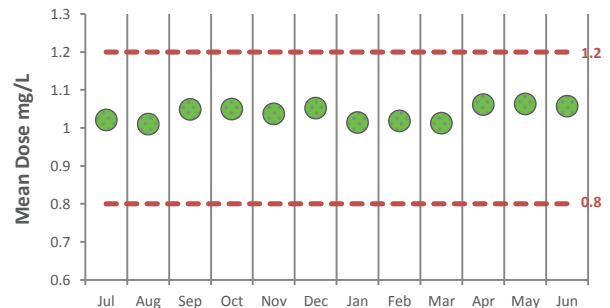


Figure 6.46.6-c Reticulation samples within target range

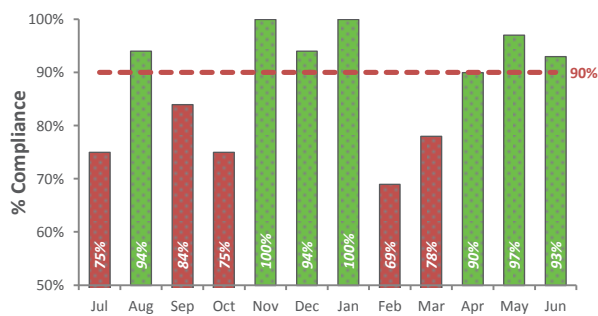
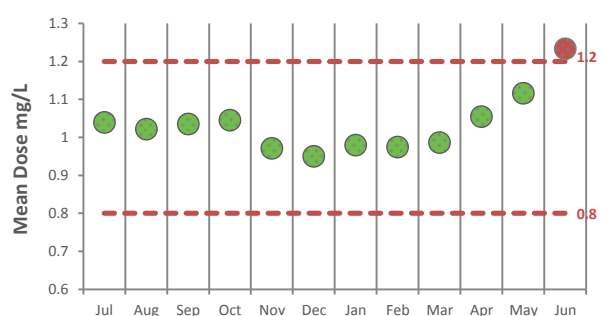


Figure 6.46.6-d Reticulation samples mean monthly dose (mg/L)



**Note:** (**Operational**) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (**Reticulation**) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.46.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.46.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	5.5	4	7
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	2.5	2	3
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	2	0	100	11.75	10	13.5
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	21	2	35
Monochloroacetic acid	150	µg/L	4	0	100	7.37	< 5	13
Trichloroacetic acid	100	µg/L	4	0	100	34	23	44
Total trihalomethanes	250	µg/L	4	0	100	41.5	23	63

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.46.8. General physical parameters

Table 6.46.8-a General physical performance

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		52	0.31	0.03	0.57
Turbidity (NTU)		52	0.45	0.1	4.8
pH		52	7.13	6.84	7.68

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ pH levels are maintained within the recommended optimal range.

### 6.46.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.46.10. System incidents and issues

- ❖ No water quality issues were identified.

### 6.46.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

### 6.46.12. Catchment and source water issues

- ❖ The Blackman River (Oatlands) catchment area covers 1,900 ha, and is mostly in state forest. Activities in the catchment include forestry and limited recreation
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

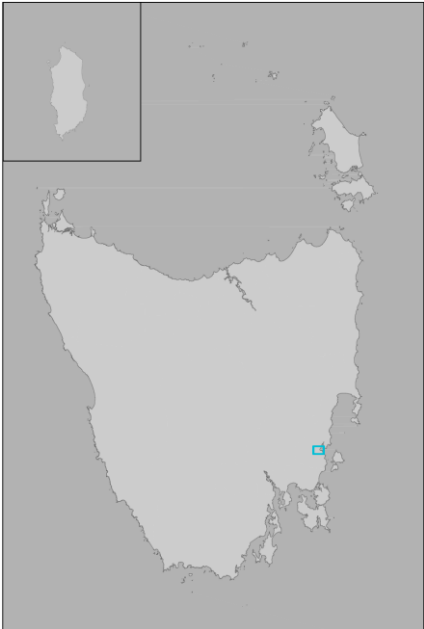
### 6.46.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.46.14. Future planning

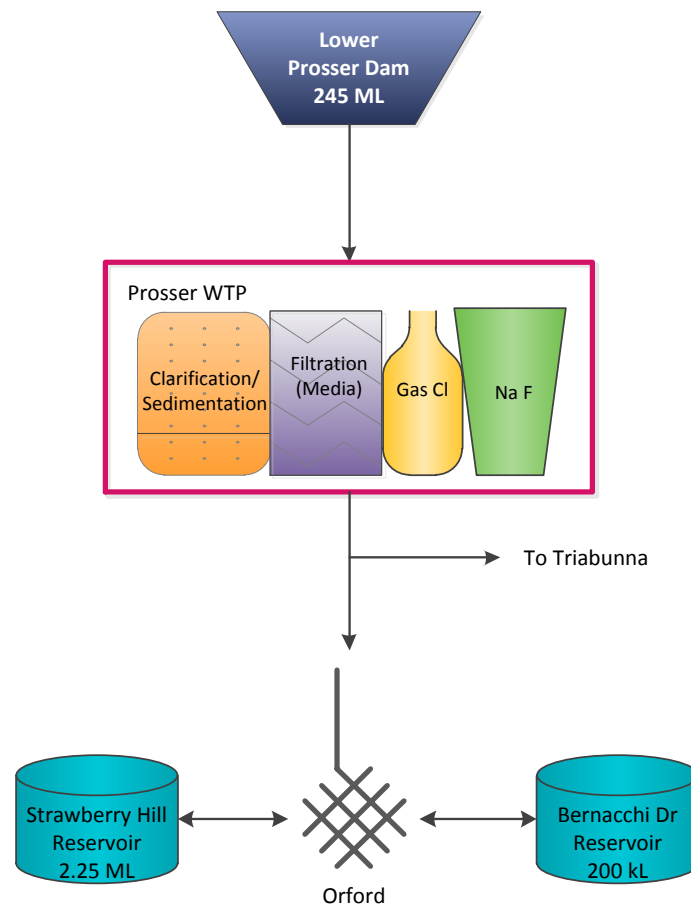
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.47. Orford drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	1,120
	<b>Catchment</b>	Prosser River
	<b>Primary treatment</b>	Clarification, filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Orford</li> <li>❖ Triabunna (seasonally).</li> </ul>		

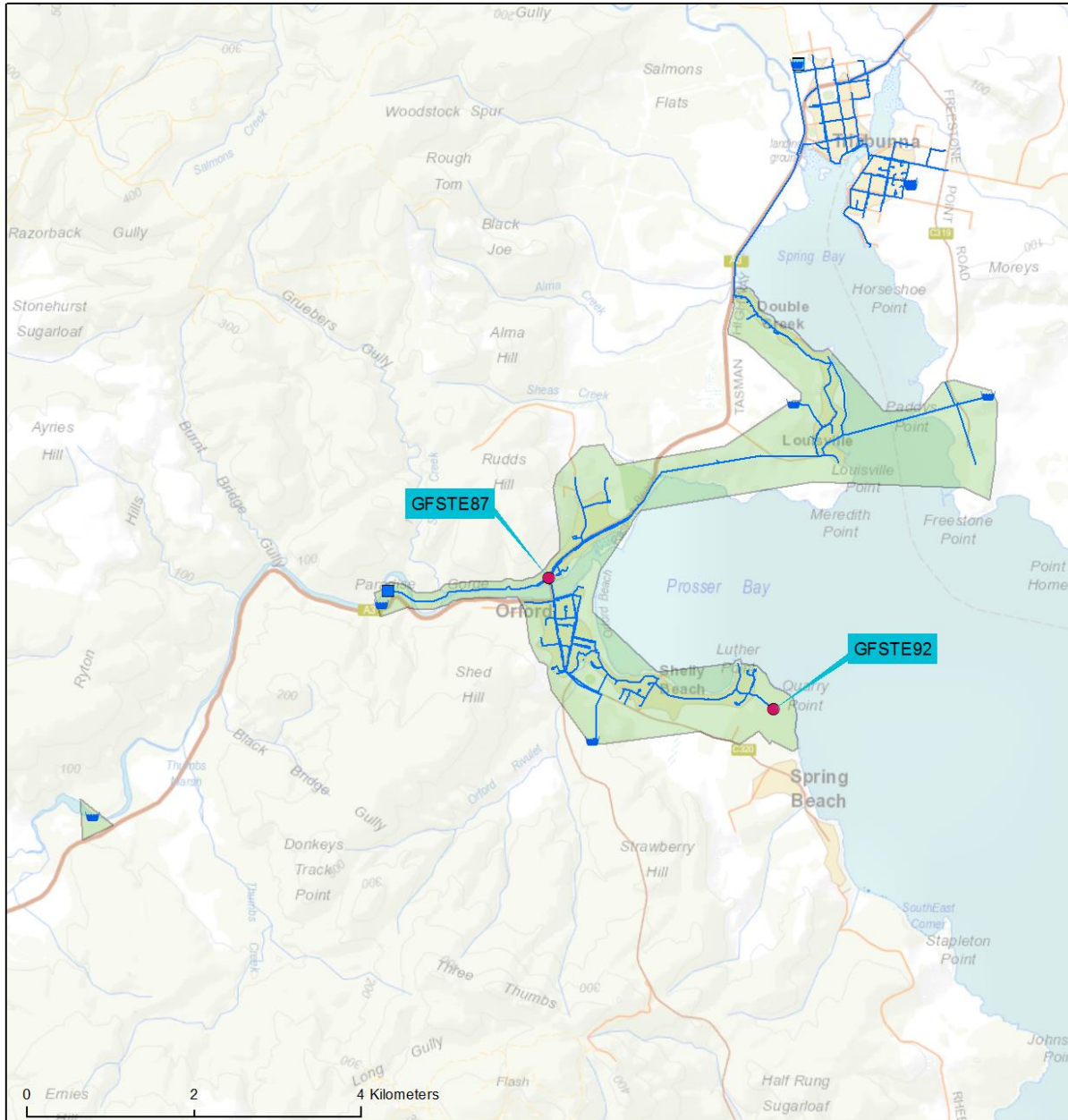
### 6.47.1. System description

Figure 6.47.1-a Orford System schematic



- ❖ **Catchment**  
The Orford drinking water system is supplied by the Prosser River.
- ❖ **Treatment**  
The Orford WTP employs clarification, sedimentation, media filtration, chlorine gas disinfection and fluoridation via sodium fluoride.
- ❖ **Distribution**  
Treated water is stored in three roofed reservoirs. The Orford system currently supplies services via 1,068 connections. The Orford drinking water system can also supply the Triabunna system if required.

Map 6.47.1-a Orford monitoring zone



GFSTE87 = Old Convict rd (Regular Compliance Point) – GFSTE92 = Manning rd (fluoride site only)

## 6.47.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.47.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes	●	Weekly	53	0
Fluoride <sup>(2)</sup>	100%	Yes	●	Weekly	106	0
DBPs <sup>(3)</sup>	100%	Yes	●	Quarterly	4	0
Metals <sup>(4)</sup>	100%	Yes	●	6 Monthly	2	0
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.47.3. Summary of historic total system performance

Table 6.47.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	94%	●	100%	●	100%	●	100%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	78.9%	●	84.1%	●	94.7%	●	96.4%	●	92.8%	●
	mean dose (mg/L) <sup>(c)</sup>	0.95	●	0.91	●	0.97	●	0.98	●	0.95	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Required		Not Required		Not Reported		100%	●	90.6%	●
mean dose (mg/L) <sup>(c)</sup>	Not Required		Not Required		Not Reported		0.99	●	1.06	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	N/A		N/A		
Complaints received <sup>(5)</sup>	Not Recorded		Not Recorded		0		0		2		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.47.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits

#### 6.47.5. Microbiological performance

Figure 6.47.5-a Microbiological compliance 2015–16

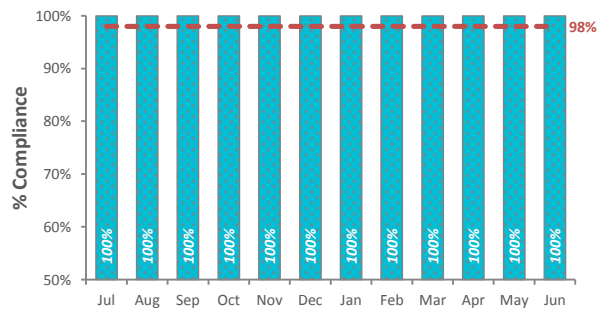


Figure 6.47.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.



## 6.47.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.47.6-a Reticulation samples within target range

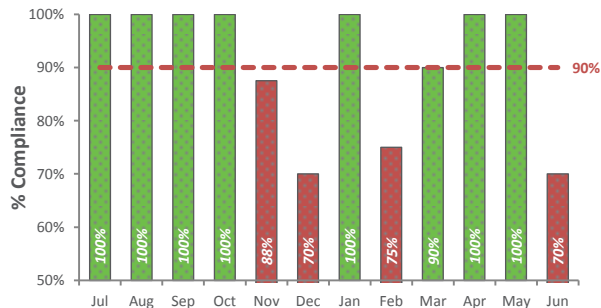


Figure 6.47.6-b Reticulation mean monthly dose (mg/L)

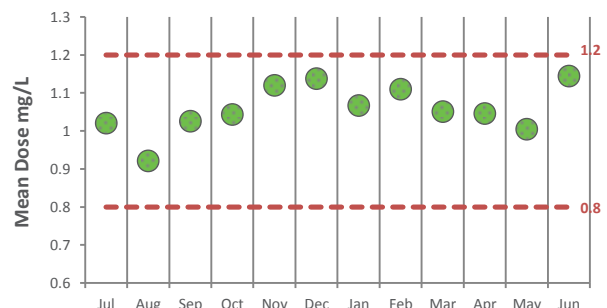


Figure 6.47.6-c Operational samples within target range

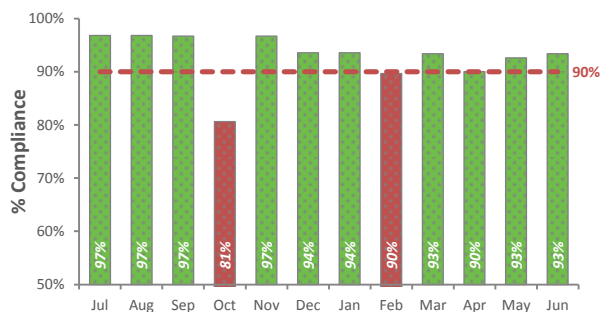
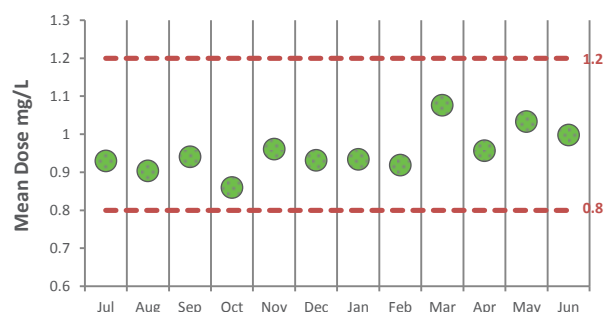


Figure 6.47.6-d Operational samples mean monthly dose (mg/L)



**Note:** **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.47.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.47.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	17.5	12	23
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	10	9	11
Lead	10	µg/L	2	0	100	1.7	0.5	2.9
Manganese	500	µg/L	2	0	100	2.35	0.8	3.9
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	0.5	< 0.5	0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	11.25	< 4	29
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	14.25	< 7	29
Total trihalomethanes	250	µg/L	4	0	100	89.5	56	120

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (..) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.47.8. General physical parameters

Table 6.47.8-a General physical performance

General physical parameters (2015–16)					
Cygnet monitoring zone		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		53	0.69	0.02	1.84
Turbidity (NTU)		53	0.44	0.1	1.4
pH		53	7.15	6.73	8.72

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.47.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.47.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.47.11. Customer complaints

Figure 6.47.11-a Complaint classification

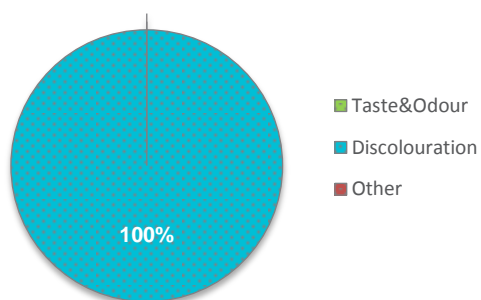
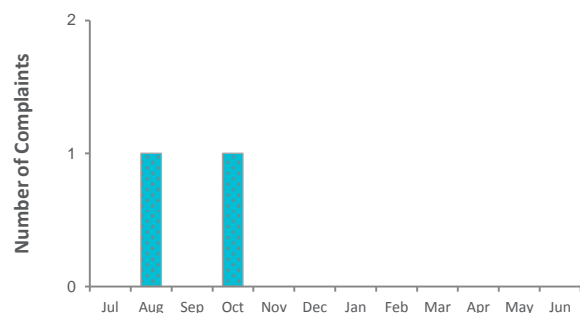


Figure 6.47.11-b Seasonal trend analysis



- ❖ Two complaints were received relating to discolouration issues.

#### 6.47.12. Catchment and source water issues

- ❖ The Orford system is supplied by the Prosser River, via the Upper and Lower Prosser Dams. The catchment covers an area of 68,385 ha. Activities in the drinking water catchment include forestry, agriculture, grazing, recreation, and significant road infrastructure. There are also rural properties and small settlements utilising onsite wastewater management systems
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.47.13. Infrastructure and operational changes

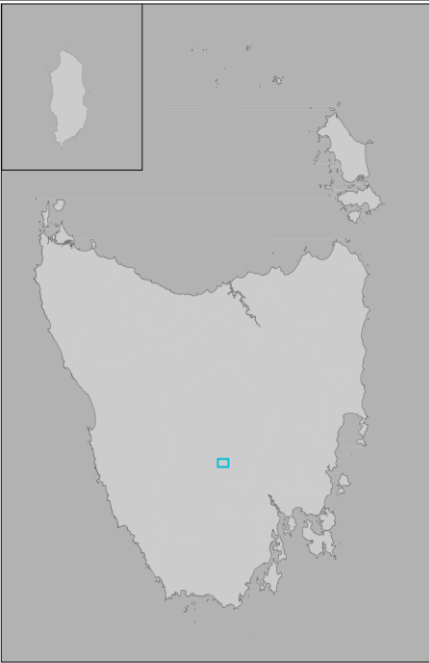
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.47.14. Future planning

**Table 6.47.14-a Future planning for the system**

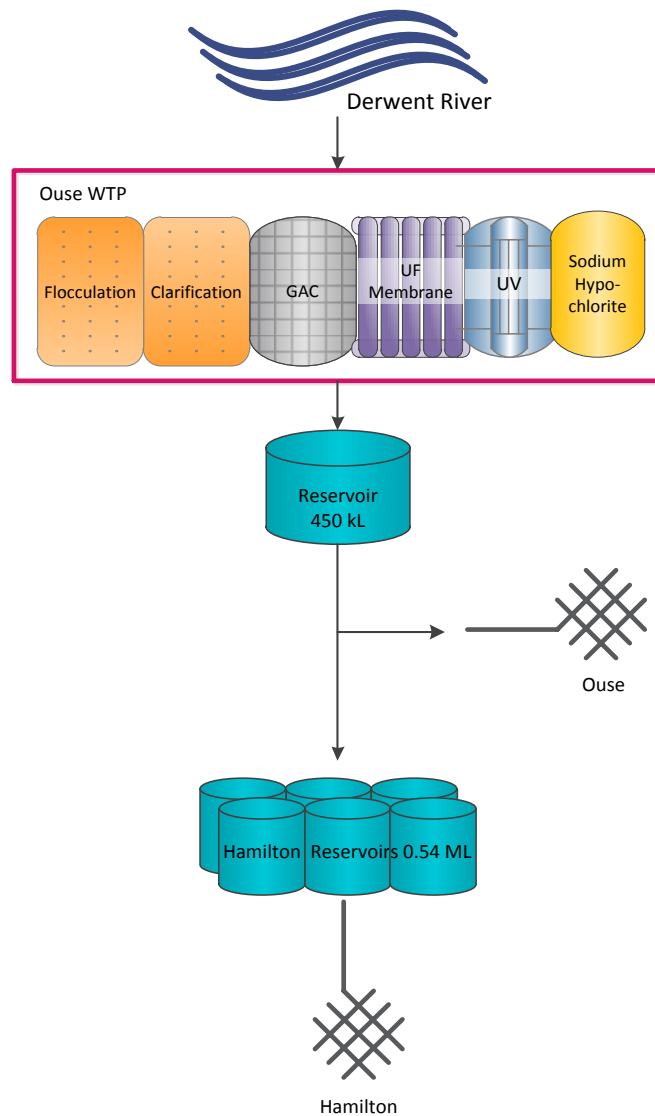
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Orford WTP Improvements	Upgrade infrastructure to improve safety and water quality	Improvements to the clarifier, filter performance and other safety works in progress	2017–18	\$2.9 million

#### 6.48. Ouse–Hamilton drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	137
	<b>Catchment</b>	Derwent River
	<b>Primary treatment</b>	Conventional, GAC
	<b>Advanced treatment</b>	UF membrane
	<b>Primary disinfection</b>	UV, sodium hypochlorite
	<b>Secondary disinfection</b>	Sodium hypochlorite (Hamilton)
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Ouse</li> <li>❖ Hamilton.</li> </ul>		

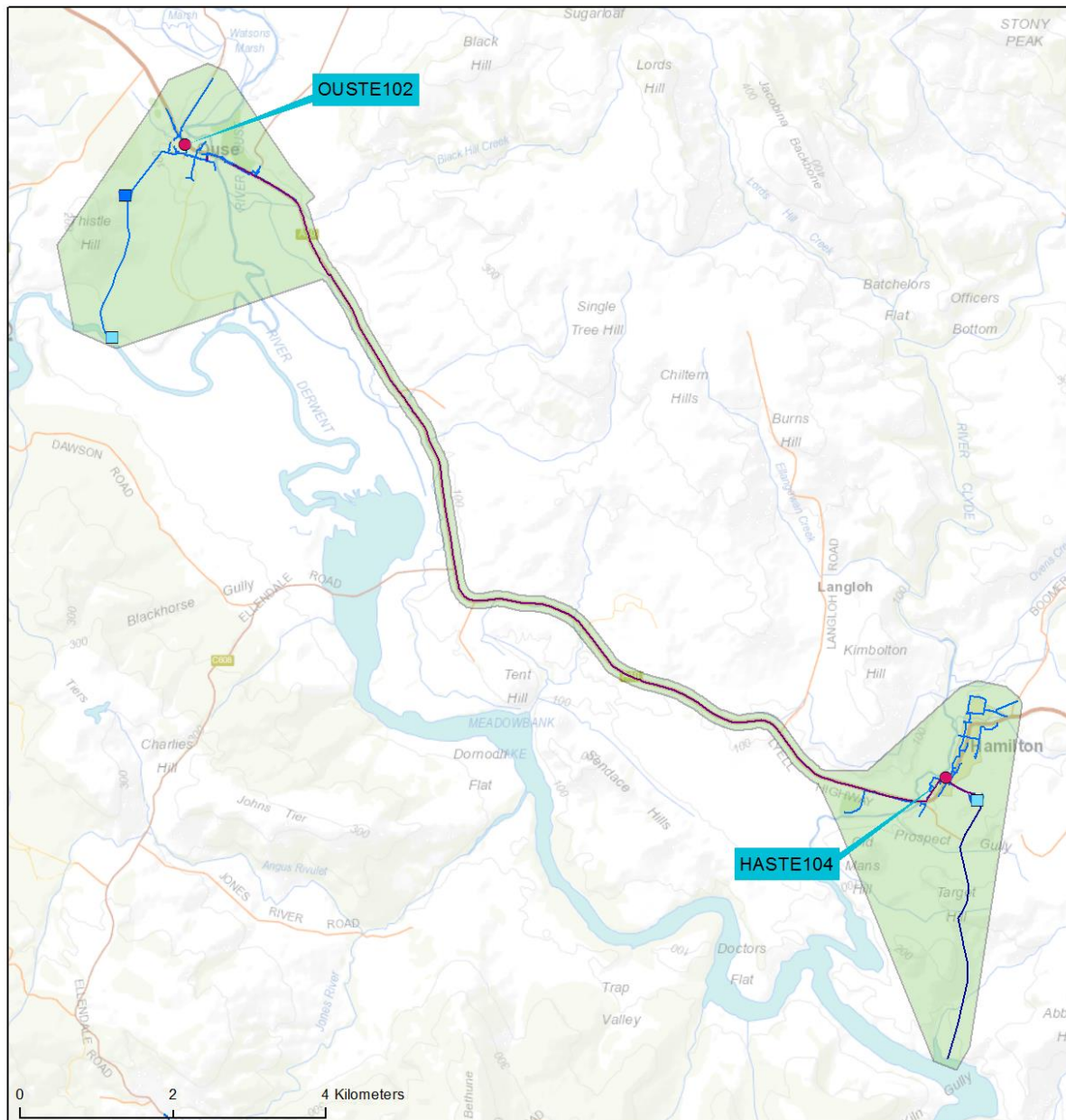
### 6.48.1. System description

Figure 6.48.1-a Ouse – Hamilton system schematic



- ❖ **Catchment**  
The Ouse – Hamilton drinking water system is supplied by the Derwent River.
- ❖ **Treatment**  
The Ouse WTP employs conventional flocculation and clarification followed by GAC and ultra-membrane filtration. Primary disinfection is by means of UV radiation and Sodium Hypochlorite.
- ❖ **Distribution**  
The system feeds the townships of Ouse and Hamilton. There is one roofed reservoir at Ouse and six roofed reservoirs and a re-chlorination station at Hamilton. The system supplies 137 connections.

Map 6.48.1-a Ouse – Hamilton monitoring zones



OUSTE102 = Public Toilets (Regular Compliance Point) – HASTE104 = Park sample tap

## 6.48.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.48.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes	●	Weekly	104	0
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–	–
DBPs <sup>(3)</sup>	100%	Yes	●	Monthly/ Bi-monthly/ Quarterly <sup>#</sup>	30	1
Metals <sup>(4)</sup>	100%	Yes	●	6 Monthly	4	0
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting. #Total trihalomethanes tested quarterly.

## 6.48.3. Summary of historic total system performance

Table 6.48.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)									
Parameter group	Performance*								
	2011–12	2012–13	2013–14	2014–15	2015–16				
Microbiological <sup>(1)</sup>	–	100%	●	99.5%	●	100%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing								
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Distribution fluoride testing								
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Metals <sup>(3)</sup>	–	100%	●	100%	●	100%	●	100%	●
DBPs <sup>(3)</sup>	–	100%	●	100%	●	100%	●	100%	●
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	N/A	N/A	
Complaints received <sup>(5)</sup>	Not recorded	Not recorded	8	2	0				
Public alerts issued <sup>(6)</sup>	–	0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.



#### 6.48.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits. The one DBP failure in the Ouse network was related to an investigation and hence has not been considered in compliance data.

#### 6.48.5. Microbiological performance

Figure 6.48.5-a Microbiological compliance 2015–16

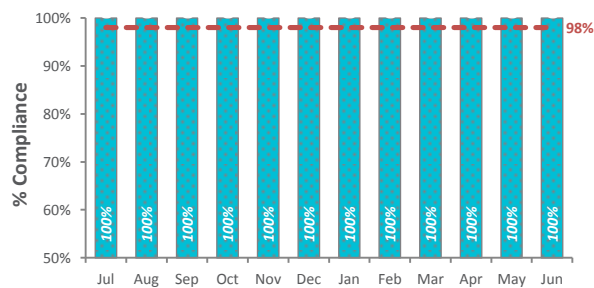


Figure 6.48.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.48.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.48.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

**Table 6.48.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	2.5	2	3
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	6.75	3	11
Lead	10	µg/L	4	0	100	0.5	< 0.5	0.6
Manganese	500	µg/L	4	0	100	0.51	< 0.5	1.3
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	30	0	100	10.86	2	36
Monochloroacetic acid	150	µg/L	30	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	30	0	100	10.56	4	61
Total trihalomethanes	250	µg/L	8	0	100	9.13	5.8	18

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.48.8. General physical parameters

**Table 6.48.8-a General physical performance**

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		100	0.34	0	1.01
Turbidity (NTU)		102	0.25	0.1	1.2
pH		102	7.03	6.41	9.62

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Ouse and Hamilton distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are generally maintained within the recommended optimal range.

### 6.48.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.48.10. System incidents and issues

**Table 6.48.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
16/07/2015	Trichloroacetic acid 314 µg/L Dichloroacetic acid 145µg/L	Ongoing monitoring. Chlorine residuals are monitored daily to maintain a consistent residual due to current supply arrangements. Continue to adjust chlorine dosing to a level where disinfection is not compromised, and DBPs are minimised as much as is practical.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.48.11. Customer complaints

- ❖ No water quality complaints were received in this reporting period.

#### 6.48.12. Catchment and source water issues

- ❖ The Derwent River catchment (above Ouse) covers 583,000 ha. Activities in the catchment include agriculture, aquaculture, hydroelectricity generation, forestry, sparse dwellings/ townships with on-site wastewater management, fishing, boating and other recreational activities. Raw water risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
  - Algae and algal metabolites
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

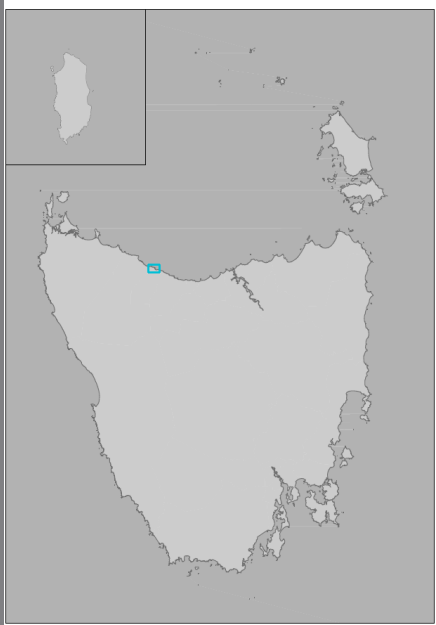
#### 6.48.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.48.14. Future planning

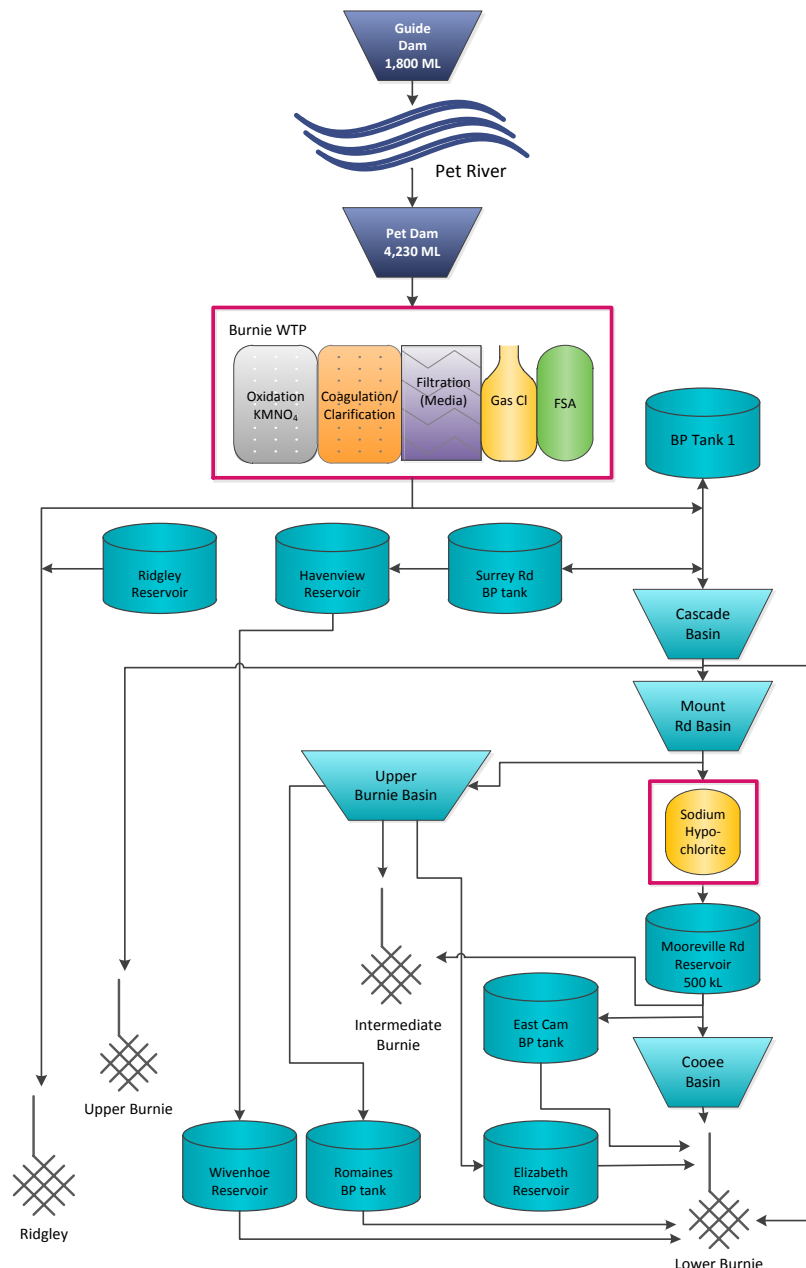
- ❖ No water quality improvement projects are planned for the current 2016–2018 PSP period.

#### 6.49. Pet River drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	7,961
	<b>Catchment</b>	Pet River
	<b>Primary treatment</b>	Direct filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	Sodium hypochlorite
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Ridgley</li> <li>❖ Burnie (all suburbs).</li> </ul>		

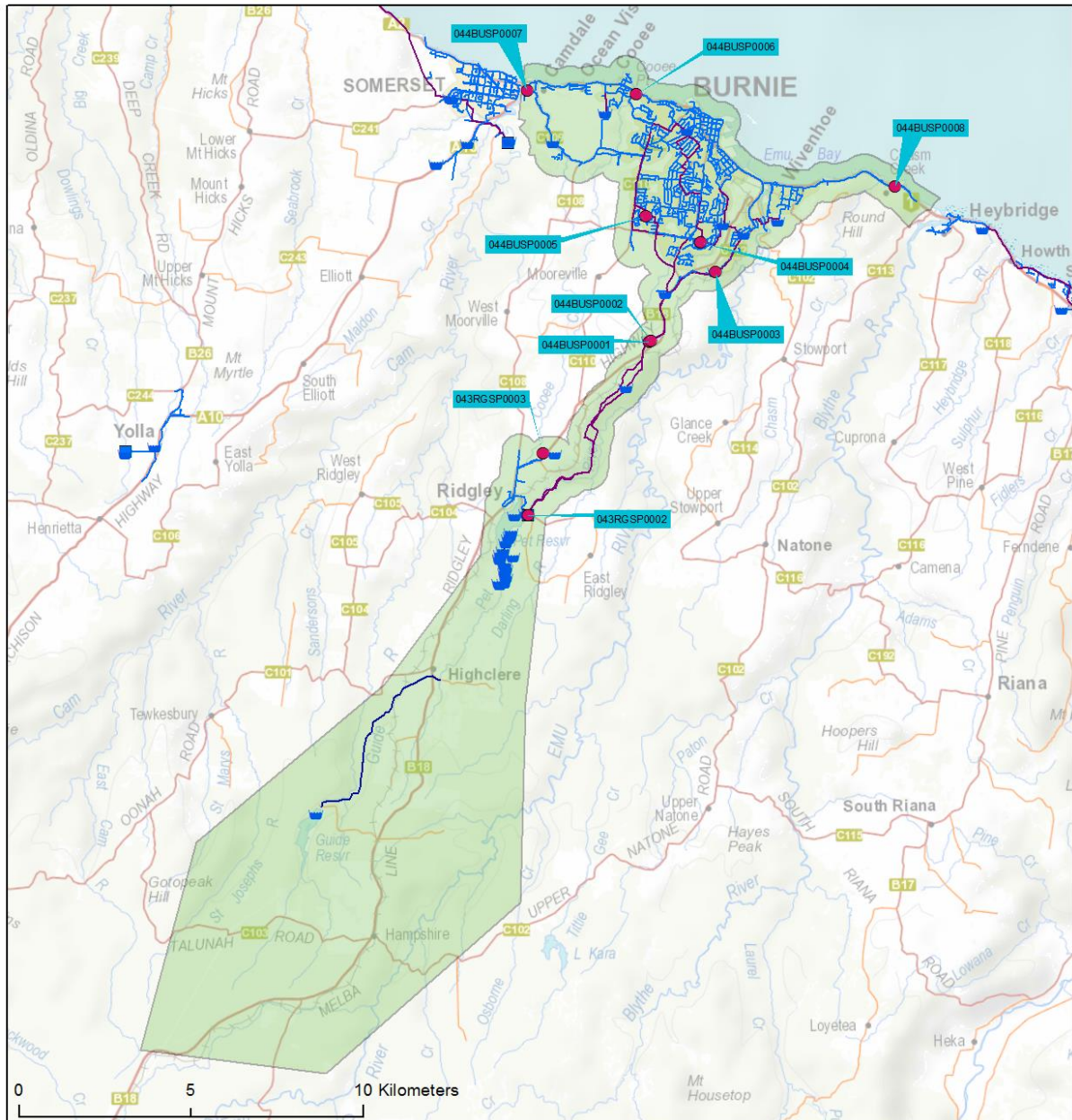
## 6.49.1. System description

Figure 6.49.1-a Pet River system schematic



- ❖ **Catchment**  
The Pet River drinking water system is supplied by the Pet Dam and is supplemented with flows from the Guide Dam
- ❖ **Treatment**  
The Pet River WTP employs coagulation, direct filtration, chlorine gas disinfection and fluoridation by fluorosilicic acid
- ❖ **Distribution**  
The distribution system has several roofed storages and four storage basins. The Pet River drinking water system supplies 7,961 connections.

Map 6.49.1—a Pet River monitoring zone



043RGSP0003 = Ridgley Mount Road, 043RGSP0002 = C.W.S Outlet, 044BUSP0001 = Cascade Inlet, 044BUSP0002 = Cascade Outlet, 044BUSP0006 = Cadburys, 044BUSP0008 = Chasm Creek, 044BUSP0003 = Lactos, 044BUSP0005 = Moorville Rd Outlet, 044BUSP0007 = Scarfe St, 044BUSP0004 = Upper Outlet

## 6.49.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.49.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99.8%	Yes ●	Weekly	468	1	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	102	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Monthly#	66	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	37	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting. # Sampling programme changed to quarterly in May 2016.

## 6.49.3. Summary of historic total system performance

Table 6.49.3-a Historic trends

Parameter group	Performance <sup>*</sup>									
	2011–12		2012–13		2013–14		2014–15		2015–16	
Microbiological <sup>(1)</sup>	98%	●	99.5%	●	100%	●	100%	●	99.8%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	0	●	0	●	0	●	0
	within target range <sup>(b)</sup>	N/A	N/A	91.7%	●	95%	●	97.1%	●	●
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	0.90	●	0.95	●	0.97	●	●
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	0	●	0	●	0	●
	within target range <sup>(b)</sup>	N/A	N/A	N/A	84.6%	●	96.9%	●	96.9%	●
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	0.93	●	0.97	●	0.97	●	
Metals <sup>(3)</sup>	N/A	N/A	100%	●	99.8%	●	100%	●	100%	●
DBPs <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●	100%	●
Pesticides <sup>(4)</sup>	N/A	N/A	N/A	●	N/A	●	N/A	●	N/A	●
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		11		13		76	
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2013 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.



#### 6.49.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 achieved 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.49.5. Microbiological performance

Figure 6.49.5-a Microbiological compliance 2015–16

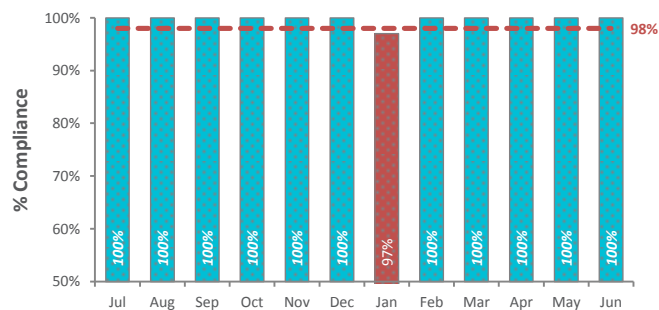
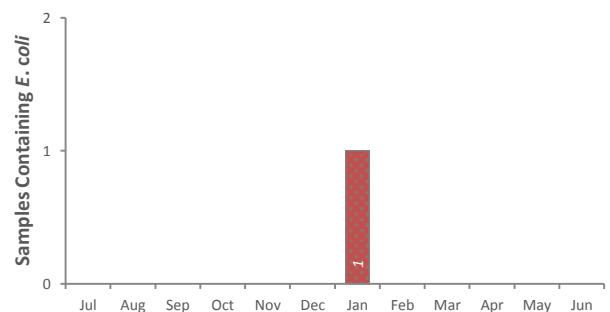


Figure 6.49.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Pet River system was 99.8 per cent compliant in 2015–16. *E. coli* was detected in one weekly sample in the reporting period
- ❖ An *E. coli* strike occurred in January 2016 with a detection of 1 MPN/100 mL. Water quality characteristics indicated good chlorine residual and low turbidity. A re-test was conducted which confirmed the system was free of *E. coli* and microbiological contamination. The investigation determined the likely cause to be related to a sampling or analysis issue.

## 6.49.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.49.6-a Operational samples within target range

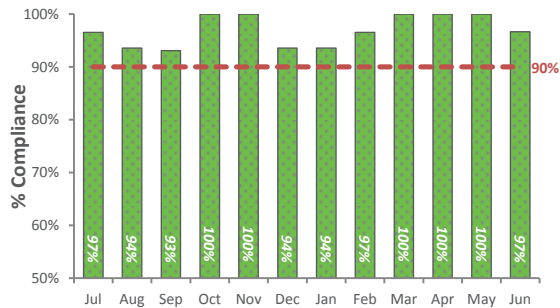


Figure 6.49.6-b Operational mean monthly dose (mg/L)

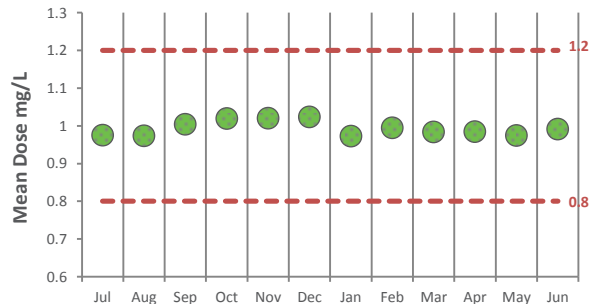


Figure 6.49.6-c Reticulation samples within target range

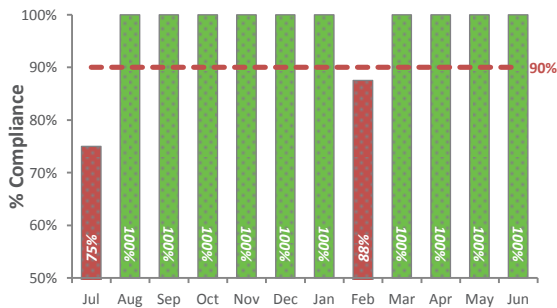
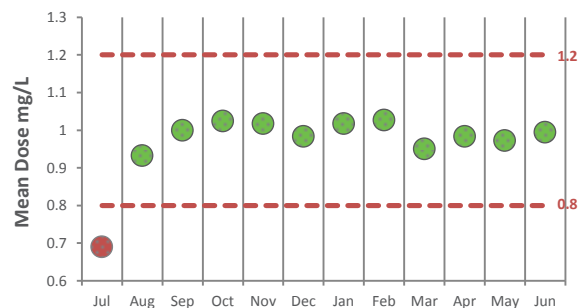


Figure 6.49.6-d Reticulation samples mean monthly dose (mg/L)



**Note: (Operational)** samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.49.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

**Table 6.49.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	29	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	39	0	100	< 1	< 1	< 1
Barium	2000	µg/L	39	0	100	8.53	5	12
Cadmium	2	µg/L	39	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	39	0	100	< 1	< 1	< 1
Copper	2000	µg/L	29	0	100	64	< 1	1050
Lead	10	µg/L	39	0	100	< 0.5	< 0.5	0.8
Manganese	500	µg/L	39	0	100	11.28	1	151
Mercury	1	µg/L	39	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	29	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	39	0	100	0.59	< 0.5	2.8
Selenium	10	µg/L	39	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	66	0	100	< 4	< 1	11
Monochloroacetic acid	150	µg/L	66	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	66	0	100	< 7	< 2	11
Total trihalomethanes	250	µg/L	66	0	100	29.45	6.3	61

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.49.8. General physical parameters

**Table 6.49.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		467	0.19	0	6.1
Turbidity (NTU)		468	0.46	0	3
pH		458	7.91	6.05	9.72

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Pet River distribution network were close to minimum expectations and demonstrate a good level of protection against re-contamination in the upper parts of the reticulation. Chlorine residuals toward the end of the distribution network generally do not meet the target of greater than 0.1 mg/L. Re-chlorination does not occur in these zones and subsequently residuals are variable
- ❖ pH figures measured across the network vary considerably, ranging from pH 6.05 to 9.72. The variability in pH is due to known alkalinity issues from source water. At the outer extremities of the reticulation pH levels can be consistently above pH 8.5. At Chasm Creek sample point 90 per cent of the pH samples taken over the year were greater than pH 8.5.

### 6.49.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified for the system.

### 6.49.10. System incidents and issues

**Table 6.49.10-a Identified incidents and issues**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
7/01/2016	<i>E. coli</i> detection	Immediate resampling was free from contamination and an investigation determined the possible cause was contamination during sampling/analysis.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.

### 6.49.11. Customer complaints

Figure 6.49.11-a Complaint classification

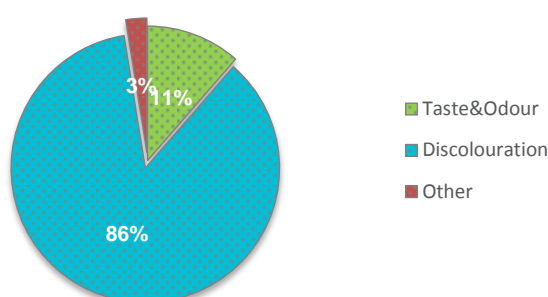
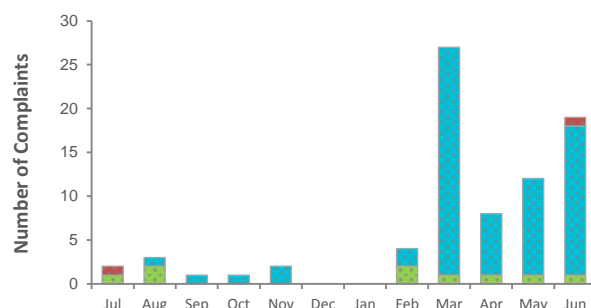


Figure 6.49.11-b Seasonal trend analysis



- Seventy nine complaints were received in this reporting period. There was a significant increase in the number of complaints within the system compared to previous reporting periods. Sixty eight complaints related to water discolouration in March, May and June 2016 which were associated to major outages and main breaks within parts of the system. There is currently no periodic flushing program of the system. Nine complaints related to taste and odour issues and two complaints related to illness issues.

### 6.49.12. Catchment and source water issues

- The Pet River drinking water system is supplied by the Pet River via Guide Dam. The catchment covers an area of 1,571 ha. Major land use activities in the catchment include cattle grazing, dairy, forestry and rural residential properties with septic tanks. Raw water risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- No health regulated pesticides were detected in the raw water monitoring program.

### 6.49.13. Infrastructure and operational changes

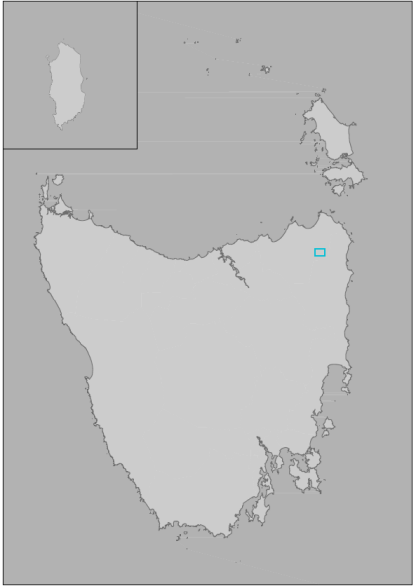
- No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.49.14. Future planning

Table 6.49.14-a Future Planning for the Rosebery drinking water system

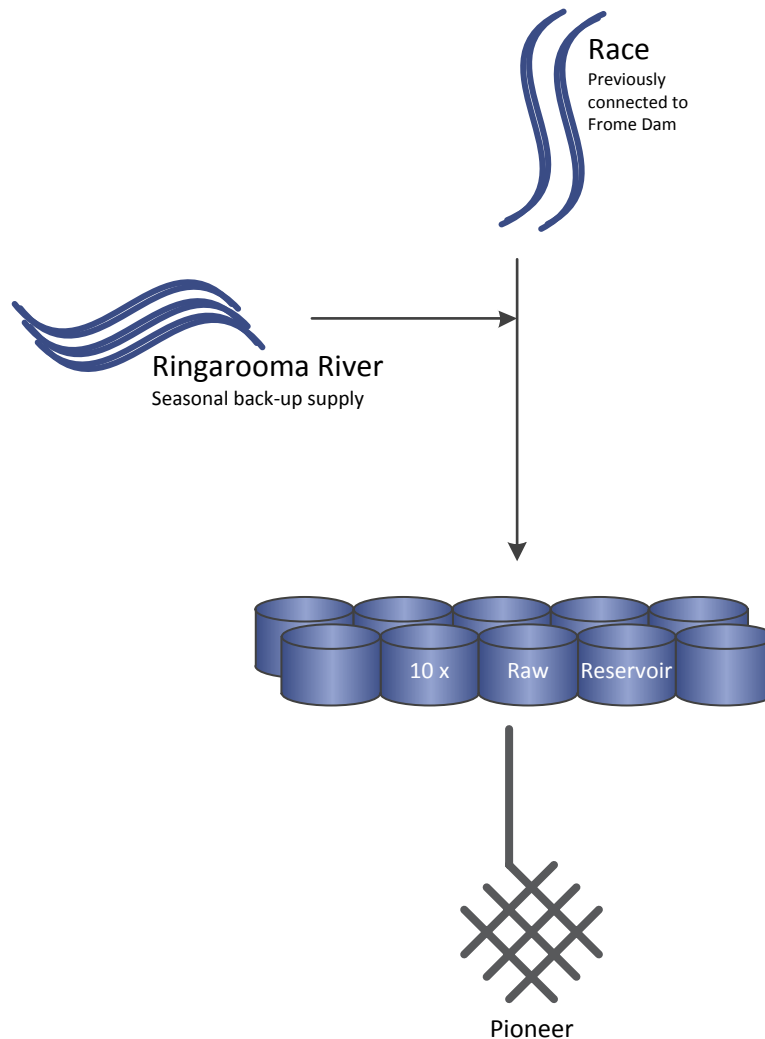
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Drinking water system extensions	Provide drinking water to Cam River system from the Pet River WTP	Business case	2018 – 19	\$2.8 million
Alkalinity management program	Investigations and options identification into the management of alkalinity issues within the system, pH correction	Justification required	2020+	> \$1.0 million

### 6.50. Pioneer drinking water system

	<b>Current status</b>	<b>Do not consume</b>
	<b>Total connections</b>	11
	<b>Catchment</b>	None
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Pioneer</li> </ul>		

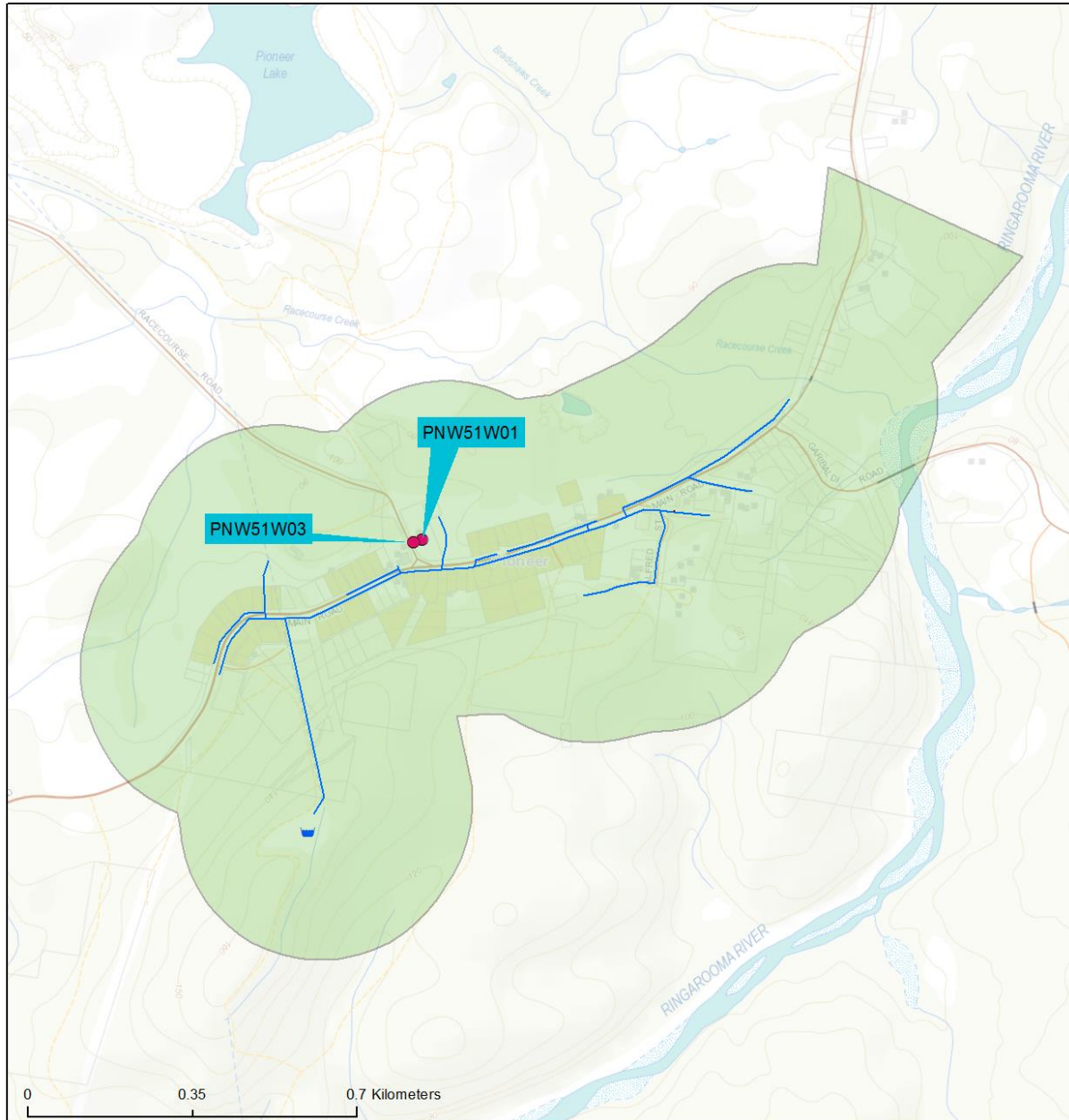
### 6.50.1. System description

Figure 6.50.1-a Pioneer system schematic



- ❖ **Catchment**  
The Pioneer drinking water system is supplied by the sub catchment of the Pioneer Race.
- ❖ **Treatment**  
The Pioneer drinking water scheme is a raw water system with no treatment.
- ❖ **Distribution**  
There is one roofed service reservoir, connected via a common line in the distribution system. The Pioneer drinking water system supplies 11 connections.

Map 6.50.1—a Pioneer monitoring zone



PNW51W01 = Pioneer Public Hall, PNW51W03 = Racecourse Road Tank



## 6.50.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.50.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	33.3%	No	●	Weekly	12	8
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–	–
DBPs <sup>(3)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0
Metals <sup>(4)</sup>	92%	No	●	Quarterly	4	4
Pesticides <sup>(5)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

<sup>#</sup>DBP and Pesticide testing were removed from the sampling program in June 2016.

## 6.50.3. Summary of historic total system performance

Table 6.50.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	57%	●	91%	●	86%	●	83% ^	●	33.3%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
Metals <sup>(3)</sup>	97%	●	76%	●	97%	●	100%	●	92%	●	
DBPs <sup>(3)</sup>	N/A		N/A		N/A		N/A		100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
Complaints received <sup>(5)</sup>	0		1		2		1		2		
Public alerts issued <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

#### 6.50.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 33.3 per cent. The microbiological risk to public health is mitigated through the communication of a DNC to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance achieved 92 per cent with three lead detections exceeding ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.50.5. Microbiological performance

Figure 6.50.5-a Microbiological compliance 2015–16

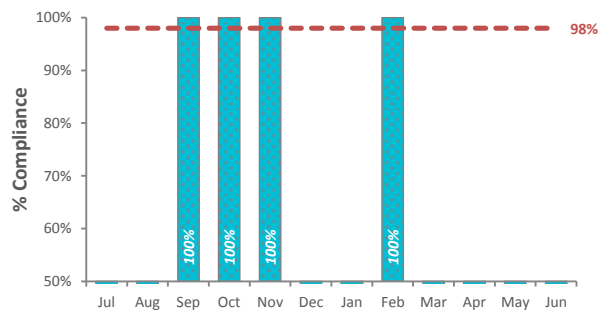
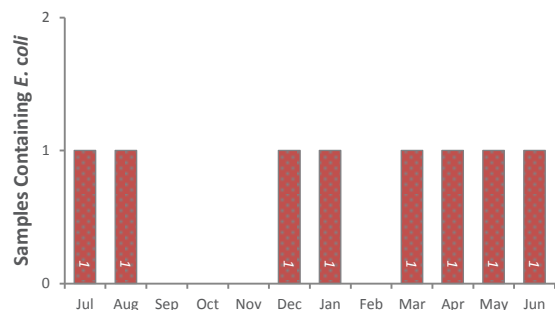


Figure 6.50.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from the Pioneer Race. The risk to public health is mitigated through the communication of the DNC notice to customers.

#### 6.50.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.50.7. Other Australian Drinking water Guidelines (ADWG) health regulated parameters

Table 6.50.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	13	8	17
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	91	38	144
Lead	10	µg/L	4	3	25	11.05	5.5	16.6
Manganese	500	µg/L	4	0	100	63.92	9.7	134
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	1.3	0.7	1.9
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	3	0	100	< 4	< 1	< 4
Monochloroacetic acid	150	µg/L	3	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	3	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	3	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ Levels of lead exceeding the ADWG health limits of 10 µg/L were present on three occasions with a maximum detection of 16.6 µg/L
- ❖ Lead has been a persistent contaminant in the supply. The risk to public health is mitigated by the DNC notice issued in November 2012. A tank of potable water sourced from Scottsdale WTP is currently supplied to the town with disinfection indicators monitored weekly
- ❖ The system is undergoing service replacement with rainwater tanks made available to all connections. At the time of reporting, forty three properties were available and twenty four installations are complete
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.50.8. General physical parameters

**Table 6.50.8-a General physical performance**

General physical parameters (2015–16)					
Parameter		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		N/A	–	–	–
Turbidity (NTU)		12	6.47	1.3	13.8
pH		12	6.1	5.46	6.46

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Turbidity levels recorded in the distribution network frequently exceed the ADWG aesthetic limit of 5 NTU
- ❖ This system is not chlorinated
- ❖ pH levels are below the recommended optimal range.

### 6.50.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.50.10. System incidents and issues

**Table 6.50.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
17/11/2015	Lead 16.6 µg/L	Lead levels exceeding the ADWG health limits are persistent in the supply. The supply operates under a PHA (DNC). Notification from the testing agency is provided to TasWater and DHHS. Service replacement with rainwater tanks is currently underway.	No	No
22/03/2016	Lead 11.3 µg/L		No	No
21/06/2016	Lead 10.8 µg/L		No	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.50.11. Customer complaints

Figure 6.50.11-a Complaint classification

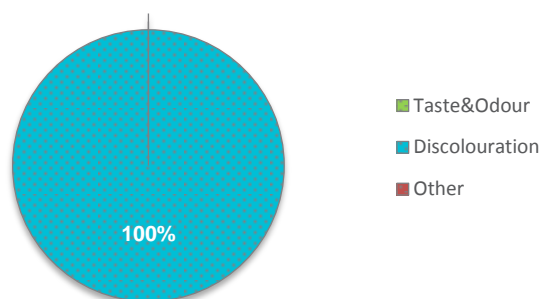
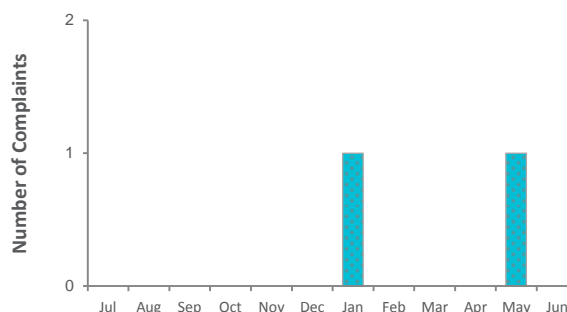


Figure 6.50.11-b Seasonal trend analysis



- ❖ Two complaints were received relating to discolouration.

### 6.50.12. Catchment and source water issues

- ❖ The predominant land uses in the catchment are native forest and forestry. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ In addition, elevated levels of lead have been detected in the catchment soils and source water
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.50.13. Infrastructure and operational changes

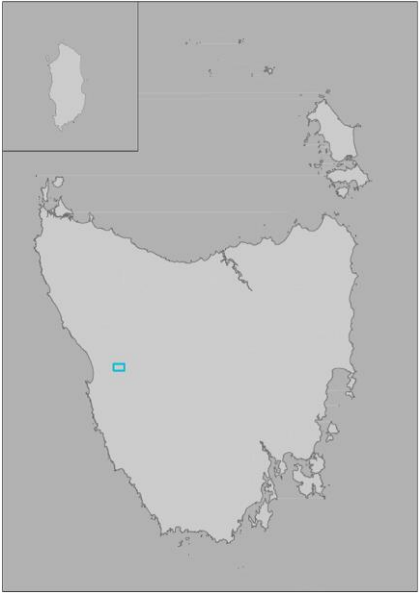
- ❖ Service replacement is currently underway.

### 6.50.14. Future planning

Table 6.50.14-a Future planning for the system

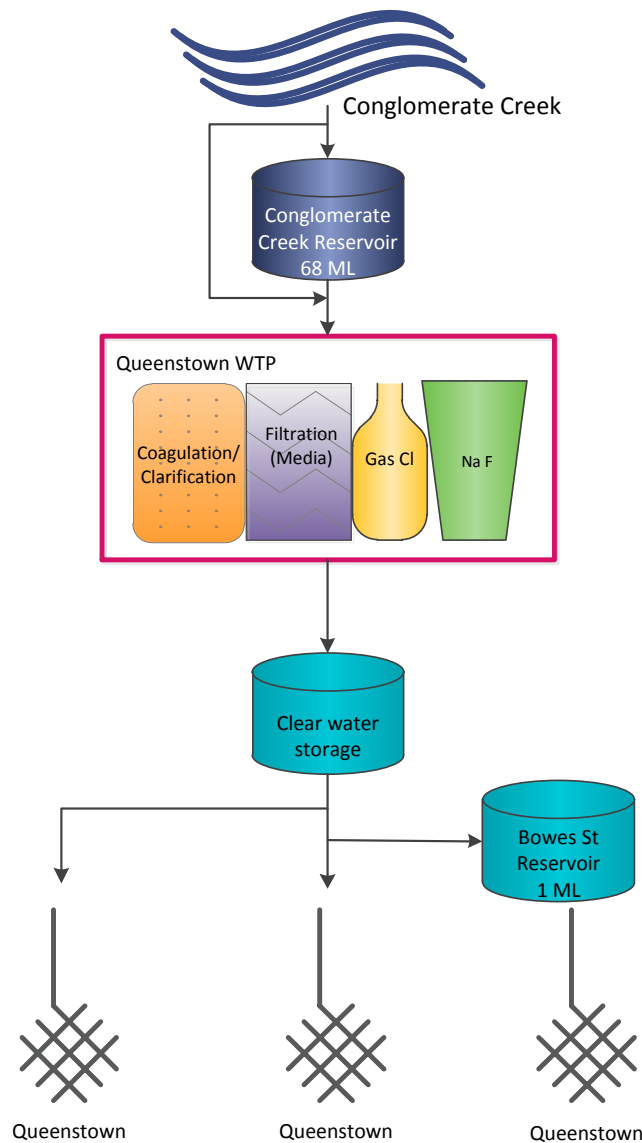
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Pioneer service replacement	Service replacement with rainwater tanks	Tank installation in progress with 24 tanks completed	2014–17	\$936,000

### 6.51. Queenstown drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	1,614
	<b>Catchment</b>	Conglomerate Creek
	<b>Primary treatment</b>	Coagulation/Clarification
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Queenstown.</li> </ul>		

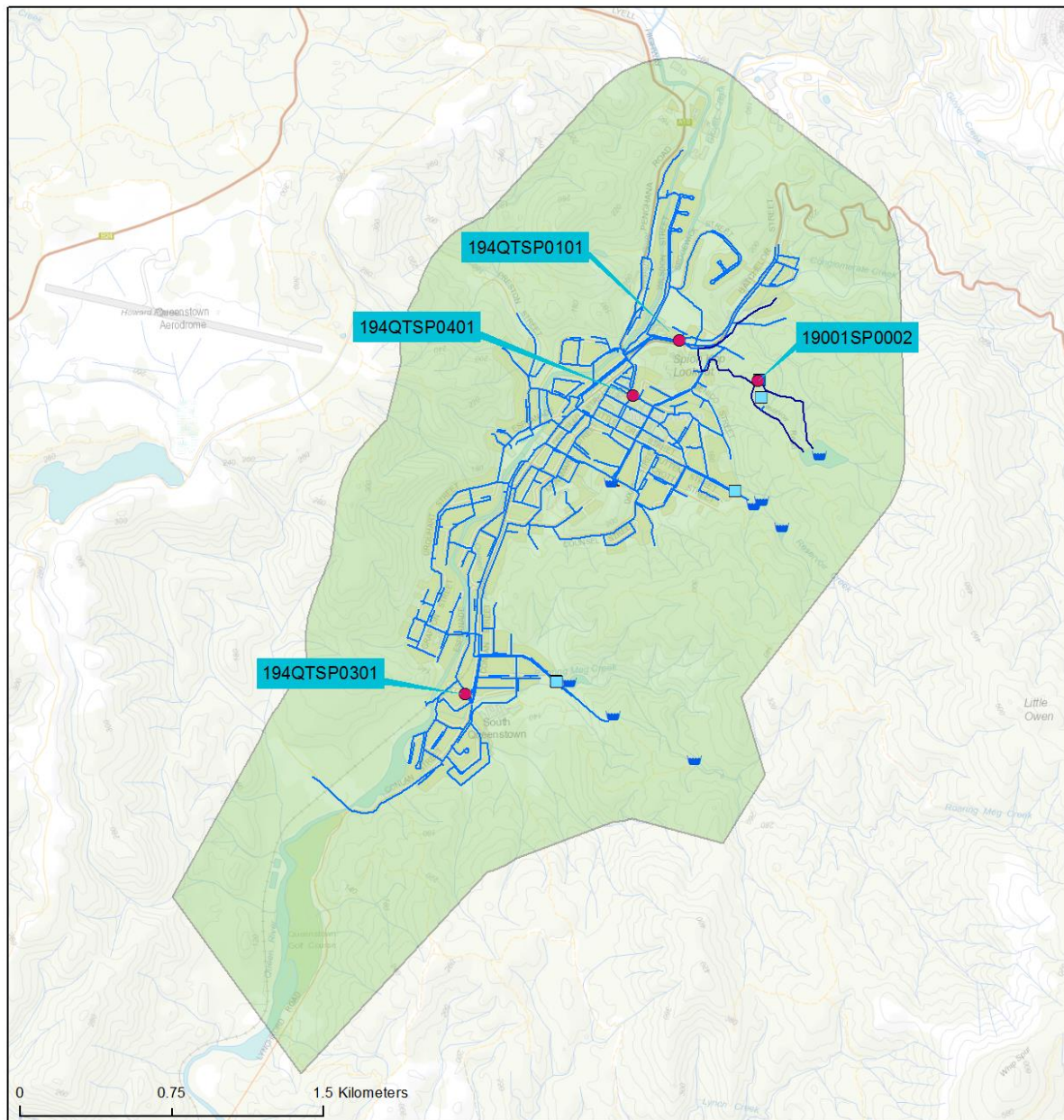
### 6.51.1. System description

Figure 6.51.1-a Queenstown system schematic



- ❖ **Catchment**  
The Queenstown drinking water system is supplied by Conglomerate Creek via Conglomerate Dam. Conglomerate Dam can be bypassed if required. The Queenstown drinking water catchment is predominantly bushland with limited vegetation cover.
- ❖ **Treatment**  
The Queenstown WTP employs coagulation, clarification, media filtration, chlorine gas disinfection and fluoridation by sodium fluoride.
- ❖ **Distribution**  
There are two roofed storage reservoirs in the distribution system. The Queenstown drinking water system supplies 1,614 connections.

### Map 6.51.1—a Queenstown monitoring zone



194QTSP0101 = Batchelor St Sample Point, 194QTSP0301 = Murray St Sample Point, 194QTSP0401 = Sticht St Sample Point, 19001SP0002 = WTP Treated Storage



## 6.51.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.51.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes	●	Weekly	208	0
Fluoride <sup>(2)</sup>	100%	Yes	●	Weekly	104	0
DBPs <sup>(3)</sup>	100%	Yes	●	Quarterly	10	0
Metals <sup>(4)</sup>	100%	Yes	●	Monthly	22	0
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	–

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.51.3. Summary of historic total system performance

Table 6.51.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12	2012–13		2013–14		2014–15		2015–16			
Microbiological <sup>(1)</sup>	99.5%	●	99.5%	●	99.5%	●	99.5%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		0	●	1	●	0	●
	within target range <sup>(b)</sup>	N/A		N/A		72%	●	78.4%	●	96.9%	●
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		0.93	●	0.91	●	0.98	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		0	●	0	●
	within target range <sup>(b)</sup>	N/A		N/A		N/A		84.6%	●	97.1%	●
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		0.93	●	1.0	●	
Metals <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	N/A		N/A		100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	N/A		N/A		N/A		N/A		N/A		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		3		5		6		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.51.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range.
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.51.5. Microbiological performance

Figure 6.51.5-a Microbiological compliance 2015–16

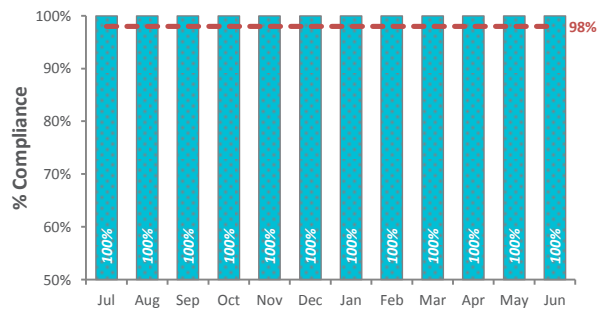


Figure 6.51.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.51.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.51.6-a Reticulation samples within target range

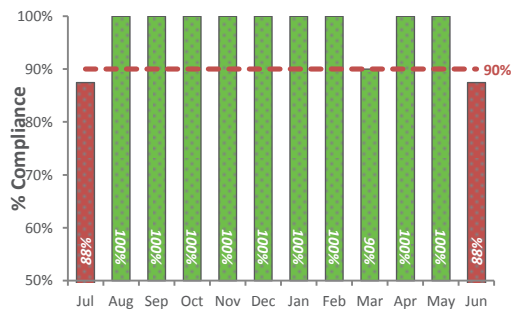


Figure 6.51.6-b Reticulation mean monthly dose (mg/L)

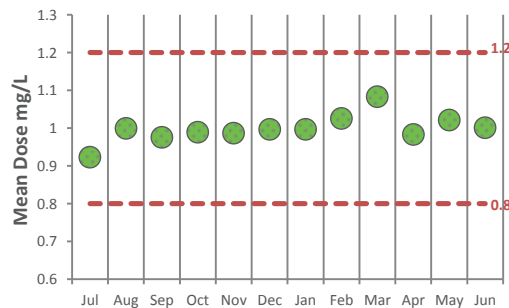


Figure 6.51.6-c Operational samples within target range

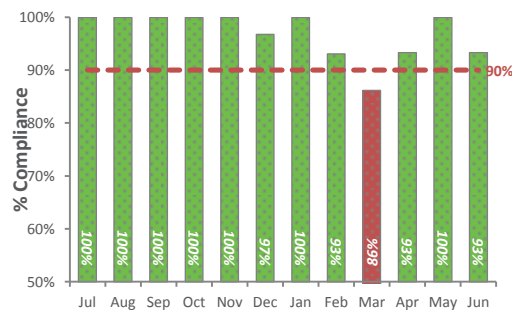
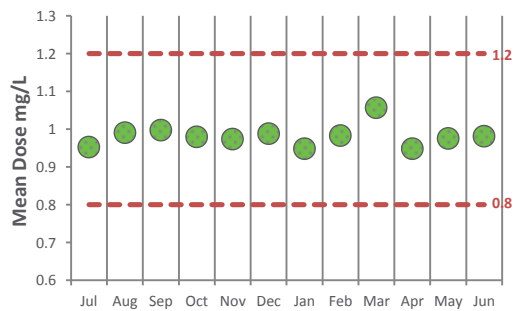


Figure 6.51.6-d Operational samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.51.7. Other Australian Drinking Water Guideline (ADWG) health regulated parameters

**Table 6.51.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	21	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	22	0	100	< 1	< 1	< 1
Barium	2000	µg/L	22	0	100	24.5	19	30
Cadmium	2	µg/L	22	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	22	0	100	< 1	< 1	< 1
Copper	2000	µg/L	21	0	100	12.4	6	32
Lead	10	µg/L	22	0	100	< 0.5	< 0.5	0.8
Manganese	500	µg/L	22	0	100	12.7	4.4	33.4
Mercury	1	µg/L	22	0	100	< 0.5	< 0.5	< 0.5
Molybdenum	50	µg/L	21	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	22	0	100	0.65	< 0.5	7.4
Selenium	10	µg/L	22	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	12	0	100	53.7	7	92
Monochloroacetic acid	150	µg/L	12	0	100	6.8	< 5	41
Trichloroacetic acid	100	µg/L	12	0	100	42.1	5	80
Total trihalomethanes	250	µg/L	12	0	100	76.8	45	110

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.51.8. General physical parameters

**Table 6.51.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		207	0.31	0.01	0.85
Turbidity (NTU)		208	0.8	0.1	5.4
pH		208	7.48	7.06	8.11

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Queenstown distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation generally do not meet the target of greater than 0.1 mg/L. Re-chlorination does not occur in these zones and subsequently residuals are variable.
- ❖ pH levels are maintained within the recommended optimal range.

### 6.51.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.51.10. System incidents and issues

**Table 6.51.10-a Identified incidents and issues**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
18/12/2015	Non potable water supply	Two residences in an elevated part of Queenstown were found to be connected to a historical raw water supply. Both residences were immediately informed of the requirement to boil the water. A temporary connection to the fully treated supply was made, flushing and verification testing of the connection allowed the removal of the BWA.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.

### 6.51.11. Customer complaints

Figure 6.51.11-a Complaint classification

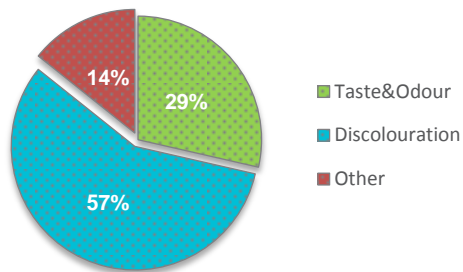
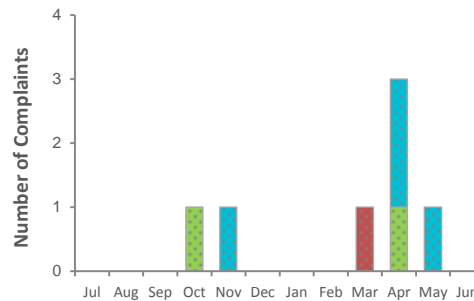


Figure 6.51.11-b Seasonal trend analysis



- ❖ Seven complaints were received in this reporting period. Four related to discolouration issues and two for taste and odour issues. The other complaint related to the request for water quality data.

### 6.51.12. Catchment and source water issues

- ❖ The Queenstown drinking water system is supplied by Conglomerate Creek via Conglomerate Dam. Conglomerate Dam can be bypassed if required. The Queenstown drinking water catchment is predominantly bushland with limited vegetation cover. Raw water risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected from the raw water monitoring program.


### 6.51.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.51.14. Future planning

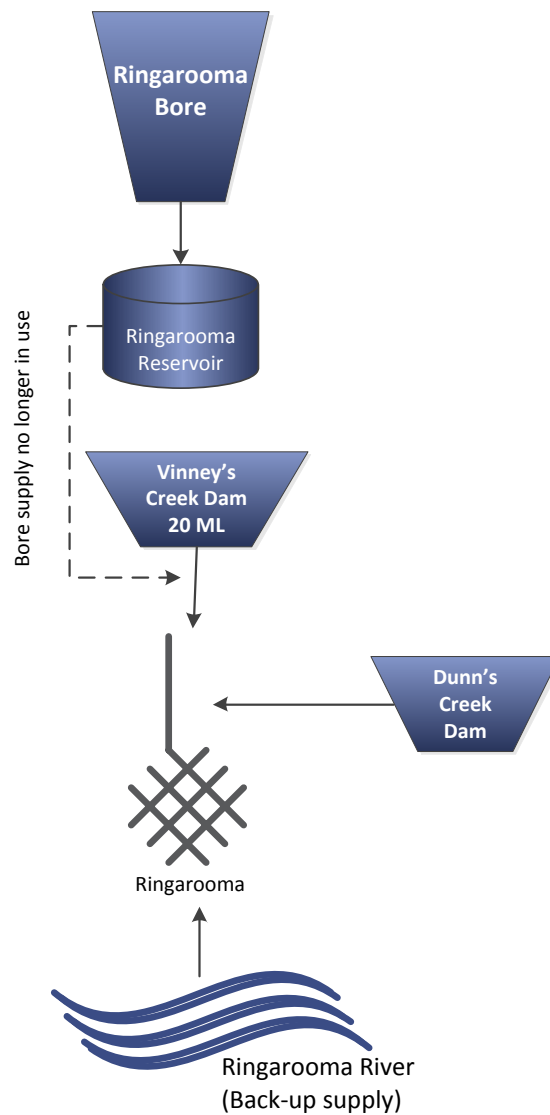
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.52. Ringarooma drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	184
	<b>Catchment</b>	Dunns Creek Dam
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Ringarooma.</li> </ul>		

### 6.52.1. System description

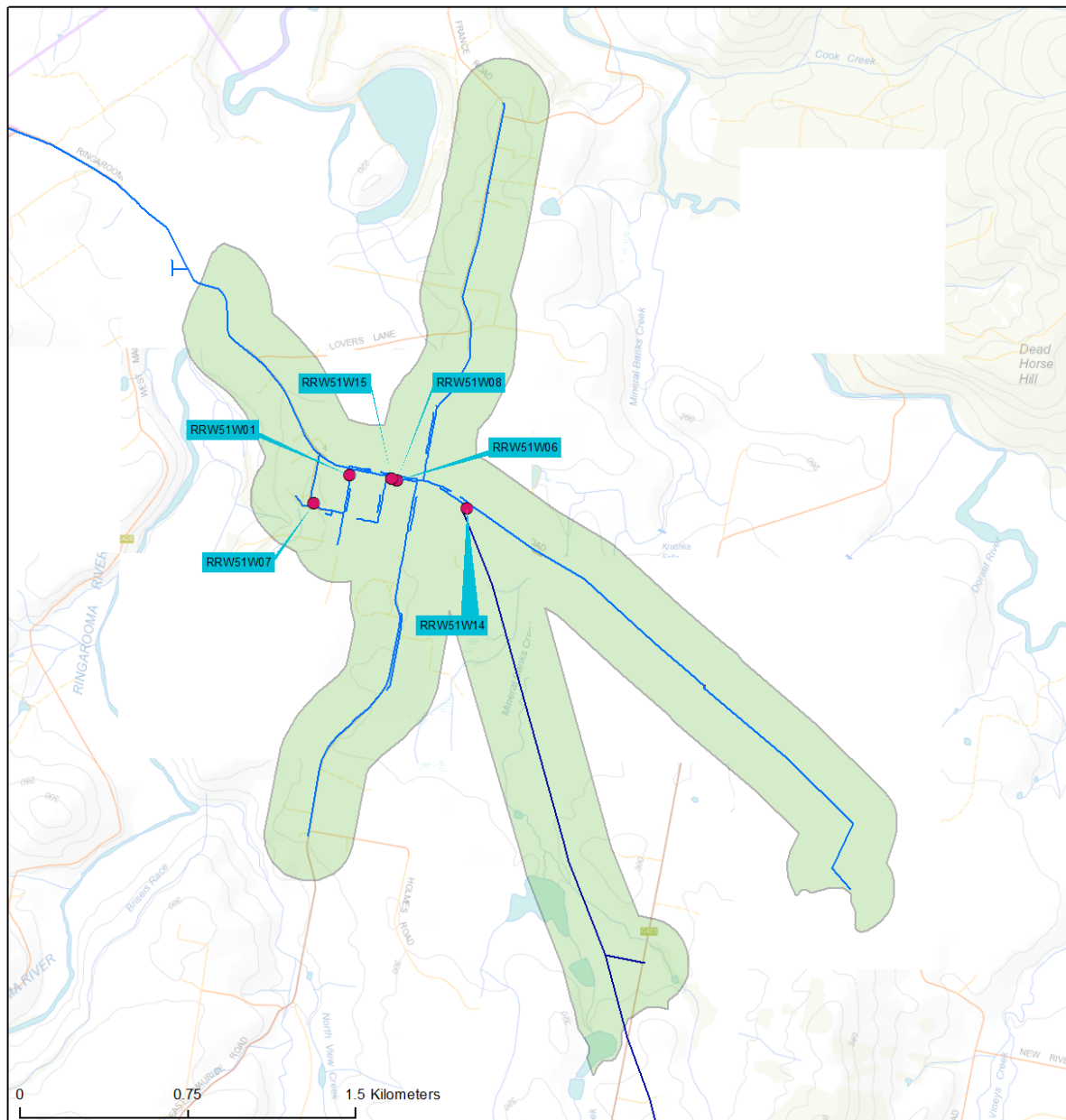
Figure 6.52.1-a Ringarooma System schematic



- ❖ **Catchment**  
The Ringarooma drinking water system is supplied by Dunns Creek Dam.
- ❖ **Treatment**  
The Ringarooma drinking water scheme is a raw water system with no treatment.
- ❖ **Distribution**  
The Ringarooma drinking water system supplies 184 connections.



Map 6.52.1—a Ringarooma monitoring zone



RRW51W01 = Opposite Police Station, RRW51W06 = Recreation Ground Tank, RRW51W07 = School Tank, RRW51W08 = Pub Tank, RRW51W14 = PRV Main Street, RRW51W15 = Ringarooma Butchery Tank

## 6.52.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.52.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	0%	No	●	Monthly	16	16
<b>Fluoride</b> <sup>(2)</sup>	N/A	–	–	–	–	–
<b>DBPs</b> <sup>(3)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	3	0
<b>Metals</b> <sup>(4)</sup>	100%	Yes	●	Quarterly	7	0
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes	●	Quarterly <sup>#</sup>	4	0

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

<sup>#</sup>DBP and Pesticide testing were removed from the sampling program in May 2016.

## 6.52.3. Summary of historic total system performance

Table 6.52.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
<b>Microbiological</b> <sup>(1)</sup>	93%	●	33%	●	14%	●	0% <sup>#</sup>	●	0%	●	
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A	
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A		N/A		N/A		N/A		N/A	
	within target range <sup>(b)</sup>	N/A		N/A		N/A		N/A		N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Metals</b> <sup>(3)</sup>	100%	●	95%	●	98%	●	100%	●	100%	●	
<b>DBPs</b> <sup>(3)</sup>	N/A		N/A		N/A		N/A		N/A		
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
<b>Complaints received</b> <sup>(5)</sup>	0		3		17		7		18		
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2013 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. # Samples were not taken as per sampling program to calculate compliance against DHHS targets.

#### 6.52.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015/16 achieved zero per cent. The microbiological risk to public health is mitigated through the communication of a Permanent BWA to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.52.5. Microbiological performance

Figure 6.52.5-a Microbiological compliance 2015–16

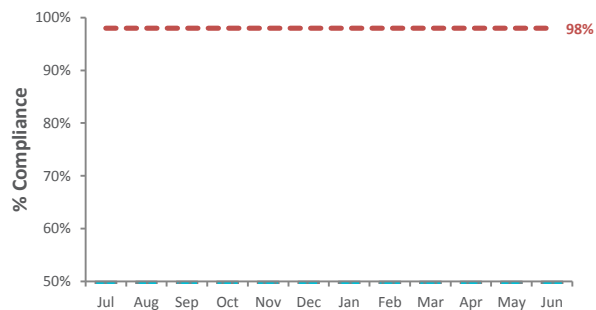
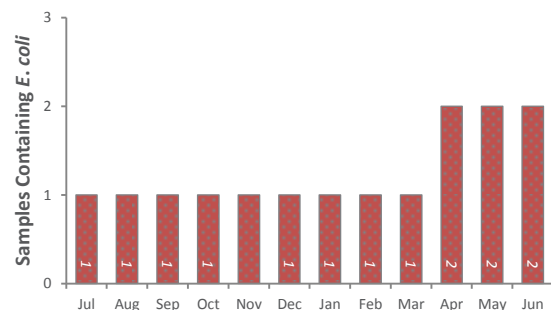


Figure 6.52.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Ringarooma system was zero per cent compliant in 2015–16. *E. coli* was detected in every monthly sample for the reporting period
- ❖ Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from Vineys Creek Dam and Dunns Creek Dam
- ❖ The risk to public health is mitigated through the communication of the permanent BWA to customers.

#### 6.52.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.52.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.52.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	7	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	7	0	100	< 1	< 1	< 1
Barium	2000	µg/L	7	0	100	5.64	< 1	9
Cadmium	2	µg/L	7	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	7	0	100	< 1	< 1	< 1
Copper	2000	µg/L	7	0	100	24.71	2	62
Lead	10	µg/L	7	0	100	2.51	0.7	5.7
Manganese	500	µg/L	7	0	100	31.9	< 1	98.2
Mercury	1	µg/L	7	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	7	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	7	0	100	1.12	< 0.5	1.7
Selenium	10	µg/L	7	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	3	0	100	< 4	< 1	< 4
Monochloroacetic acid	150	µg/L	3	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	3	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	3	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.52.8. General physical parameters

**Table 6.52.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	N/A	–	–	–
Turbidity (NTU)	11	8.57	0.57	41.8
pH	10	6.17	5.8	6.56

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Due to a lack of filtration barriers, mean turbidity levels are above the ADWG aesthetic limit of 5 NTU, with some spikes as high as 41.8 NTU
- ❖ pH levels are outside of the recommended optimal range
- ❖ This system is not chlorinated.

### 6.52.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.52.10. System incidents and issues

**Table 6.52.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
1/04/2016	Alternative water source	Source water was changed from Vineys Creek Dam to Dunns Creek Dam, improving aesthetic quality and water surety during dry weather conditions.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.52.11. Customer complaints

Figure 6.52.11-a Complaint classification

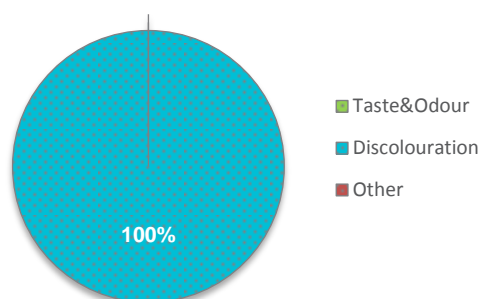
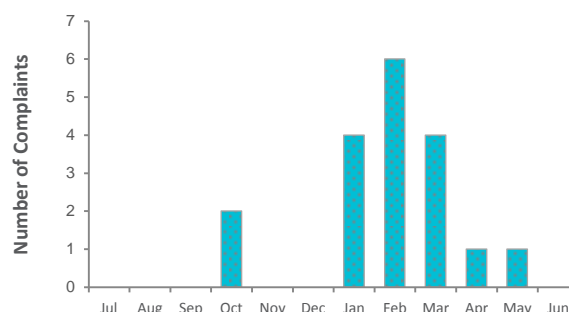


Figure 6.52.11-b Seasonal trend analysis



- ❖ Nineteen complaints were received in this reporting period. All complaints were relating to discoloured water issues. The system is a raw water supply with no filtration and aesthetic quality cannot be mitigated.

### 6.52.12. Catchment and source water issues

- ❖ Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ Trace levels of pesticides were detected in the Dunns Creek catchment. Investigations showed all results were at levels well below the ADWG health limits.

### 6.52.13. Infrastructure and operational changes


- ❖ The source water was changed from Vineys Creek Dam to Dunns Creek Dam, improving aesthetic quality and water surety during dry weather conditions.

### 6.52.14. Future planning

Table 6.52.14-a Future planning for the system

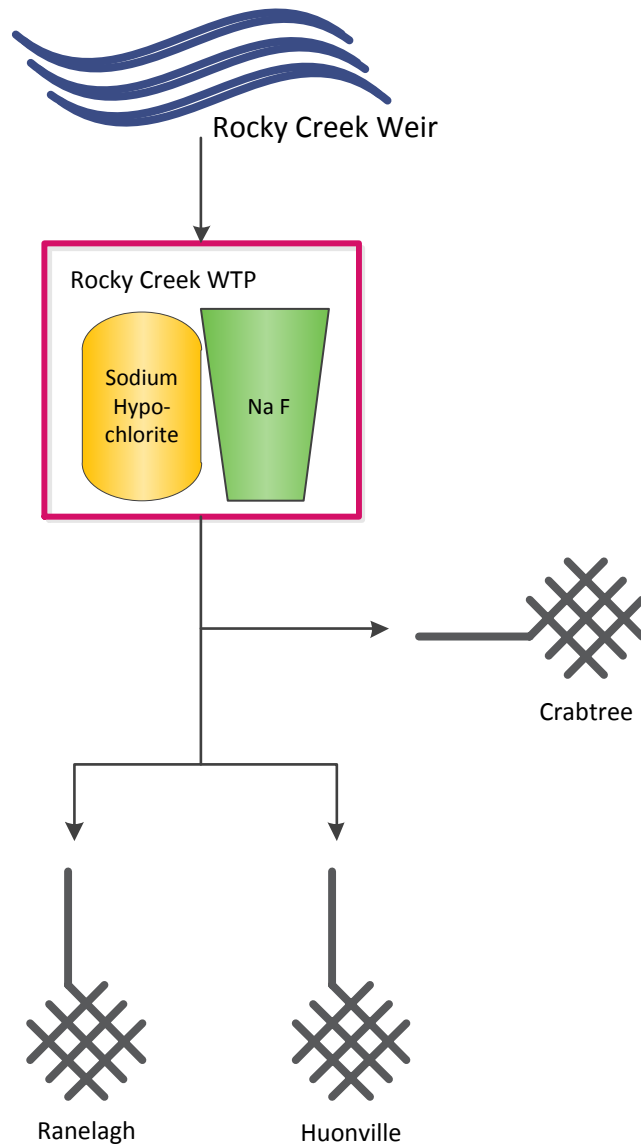
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Ringarooma Valley scheme	New WTP to supply the Branxholm, Legerwood, Derby and Ringarooma distribution systems	Pipeline construction is complete and WTP to be commissioned in early 2017.	2016–17	\$4.6 million

### 6.53. Rocky Creek drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	188
	<b>Catchment</b>	Rocky Creek
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Ranelagh</li> <li>❖ Huonville</li> <li>❖ Grove</li> <li>❖ Crabtree</li> <li>❖ Rocky Creek.</li> </ul>		

### 6.53.1. System description

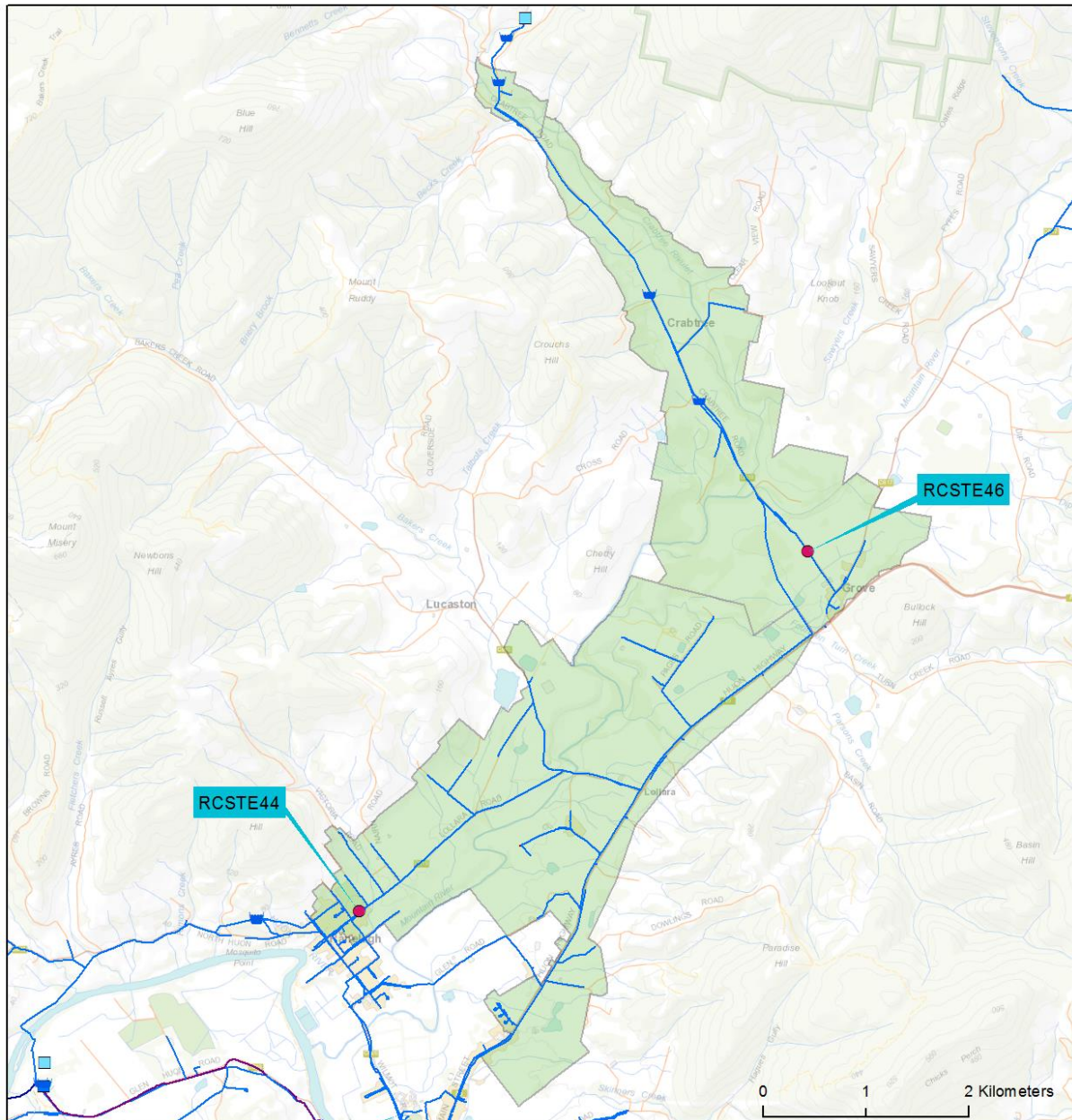
Figure 6.53.1-a Rocky Creek system schematic



- ❖ **Catchment**  
The Rocky Creek drinking water system is supplied by Rocky Creek
- ❖ **Treatment**  
The Rocky Creek system employs sodium hypochlorite disinfection and fluoridation by sodium fluoride
- ❖ **Distribution**  
The system feeds 630 connections within the townships of Crabtree, Grove, Ranelagh and some areas of Huonville. There is a small roofed reservoir at the dosing station site.



Map 6.53.1—a Rocky Creek monitoring zone



RSTE44 = Ranelagh show Ground (Regular Compliance Point) RCSTE46 = Grove Fire Station

## 6.53.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.53.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	98.1%	Yes ●	Weekly	53	1	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	106	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly*	5	0	
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.53.3. Summary of historic total system performance

Table 6.53.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)									
Parameter group	Performance*								
	2011–12	2012–13	2013–14	2014–15	2015–16				
Microbiological <sup>(1)</sup>	–	100% ●	99.5% ●	100% ●	98.1% ●				
Fluoride <sup>(2)</sup>	Operational fluoride dosing								
	Exceeding 1.5mg/L <sup>(a)</sup>	–	0 ●	0 ●	0 ●	0 ●			
	within target range <sup>(b)</sup>	–	88.8% ●	100% ●	99.2% ●	94% ●			
	mean dose (mg/L) <sup>(c)</sup>	–	0.94 ●	1.0 ●	0.96 ●	0.94 ●			
	Distribution fluoride testing								
	Exceeding 1.5mg/L <sup>(a)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●			
	within target range <sup>(b)</sup>	Not required	Not required	Not reported	78.8% ●	84% ●			
mean dose (mg/L) <sup>(c)</sup>	Not required	Not required	Not reported	1.06 ●	0.93 ●				
Metals <sup>(3)</sup>	–	100% ●	100% ●	100% ●	100% ●				
DBPs <sup>(3)</sup>	–	100% ●	100% ●	100% ●	100% ●				
Pesticides <sup>(4)</sup>	0 ●	0 ●	0 ●	0 ●	N/A				
Complaints received <sup>(5)</sup>	Not recorded	Not recorded	8	2	18				
Public alerts issued <sup>(6)</sup>	–	0 ●	0 ●	0 ●	1 ●				

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.53.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ The Rocky Creek system was placed on a Temporary BWA from June 6 to June 16 2016, due to heavy rain and high intake turbidity. No *E. coli* were detected during this period
- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent however only 84 per cent of samples within the distribution were in target range
- ❖ No sample exceeded the ADWG health limit of 1.5 mg/L
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.53.5. Microbiological performance

Figure 6.53.5-a Microbiological compliance 2015–16

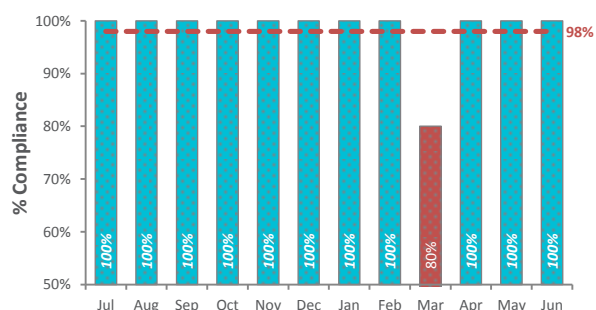
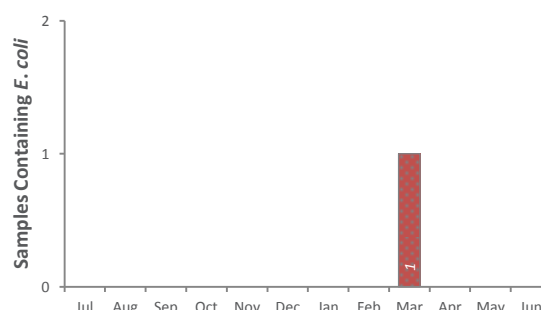


Figure 6.53.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Rocky Creek system was 98.1 per cent compliant in 2015–16
- ❖ An *E. coli* strike occurred in March 2016 with a detection of 1 MPN/100 mL. The system was flushed and the resampling result was all clear of *E. coli*. The failure was attributed to increased turbidity following a high rainfall event which saw minimal chlorine residuals. Dosing was increased at the raw water injection point. This is a disinfection only system with no treatment barriers to mitigate turbidity fluctuations in the catchment
- ❖ The Rocky Creek system was placed on a Temporary BWA from June 6 to June 16 2016 due to heavy rain and high intake turbidity. No *E. coli* was detected during this period.

## 6.53.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.53.6-a Reticulation samples within target range

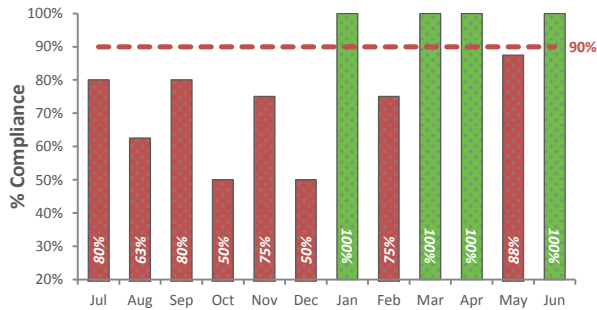


Figure 6.53.6-b Reticulation mean monthly dose (mg/L)

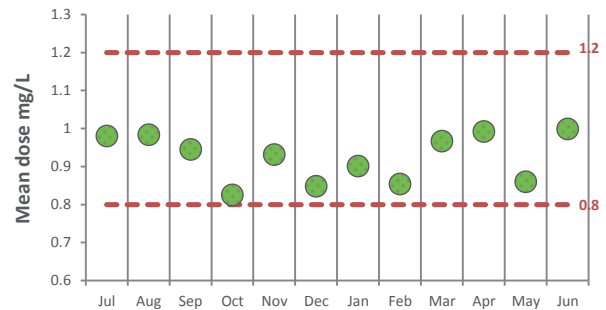


Figure 6.53.6-c Operational samples within target range

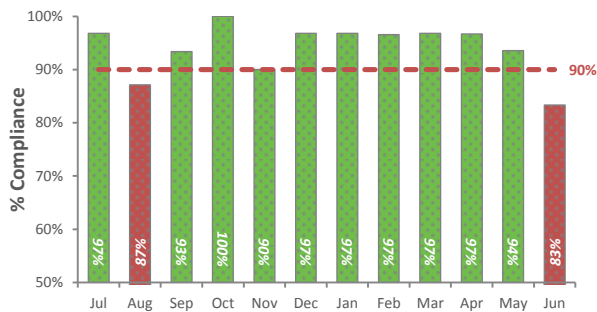
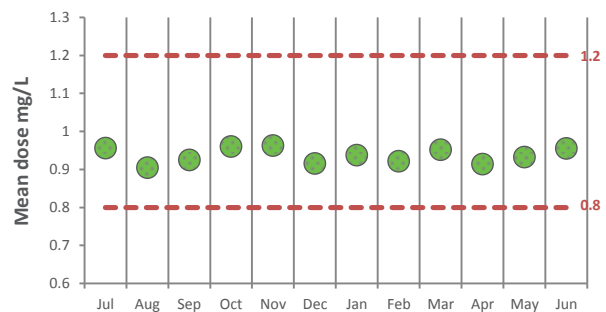


Figure 6.53.6-d Operational samples mean monthly dose (mg/L)



Note: **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ Performance in the distribution network is variable and is currently under review
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.53.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.53.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	1.25	< 1	2
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	3.5	2	5
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	2	0	100	0.6	0.5	0.7
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	5	0	100	< 4	2	< 4
Monochloroacetic acid	150	µg/L	5	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	5	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	5	0	100	27.8	17	53

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.53.8. General physical parameters

**Table 6.53.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	52	0.04	0.01	0.08
Turbidity (NTU)	52	0.83	0.4	3.3
pH	52	7.02	6.31	8.38

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU. Due to the lack of filtration barriers in this system spikes exceeding 1 NTU occurred in 12 samples during the reporting period
- ❖ Mean chlorine residuals in the distribution network generally do not meet the target of greater than 0.1 mg/L. Chlorine residuals have historically been very poor in this system. In 2015–16 average results were again significantly below 0.1 mg/L. Poor performance is believed to be due to high chlorine demands driven by elevated turbidity and organic carbon levels. Long transit times and low demand are also a significant influencing factor
- ❖ pH levels are generally maintained within the recommended optimal range.

### 6.53.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.53.10. System incidents and issues

**Table 6.53.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
23/03/2016	<i>E. coli</i> 1 MPN/100mL	Disinfection system operation checked, reticulation flushed then resampled. Resample clear.	Yes	Yes
06/06/2016 to 15/06/2016	Temporary BWA Issued	TBWA issued in association with DHHS due to high rainfall event and associated high turbidity in raw water source.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.53.11. Customer complaints

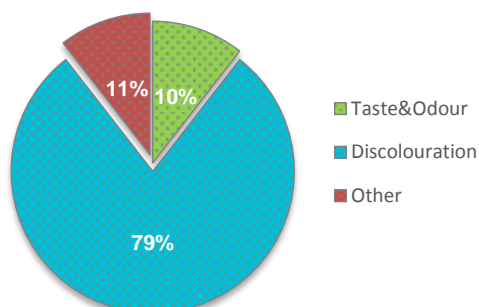


Figure 6.53.11-a Complaint classification

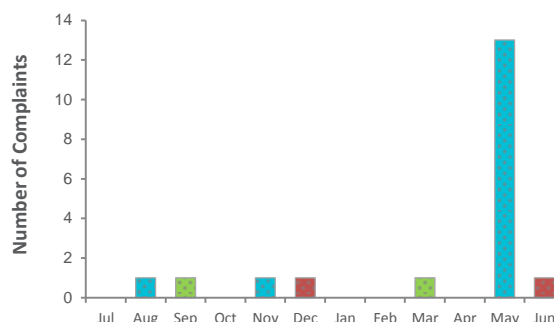


Figure 6.53.11-b Seasonal trend analysis

- ❖ Nineteen complaints were received in this reporting period. Thirteen complaints were received in May relating to discolouration issues, and can be attributed to a significant rain event. Two complaints related to taste and odour issues and two were dissatisfaction relating to the BWA.

### 6.53.12. Catchment and source water issues

- ❖ The Rocky Creek drinking water catchment covers 1485 ha, and is primarily bushland located within Wellington Park. There is one residential property with on-site wastewater management upstream of the intake. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity
- ❖ No health regulated pesticides were detected in the raw water monitoring program

### 6.53.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.53.14. Future planning

Table 6.53.14-a Future planning for the system

Project	Description	Progress	Anticipated Delivery	Estimated Spend
Rocky Creek supply options	Investigation into options to improve water quality supplied to Rocky Creek	Strategic planning and assessment	2018	To be determined



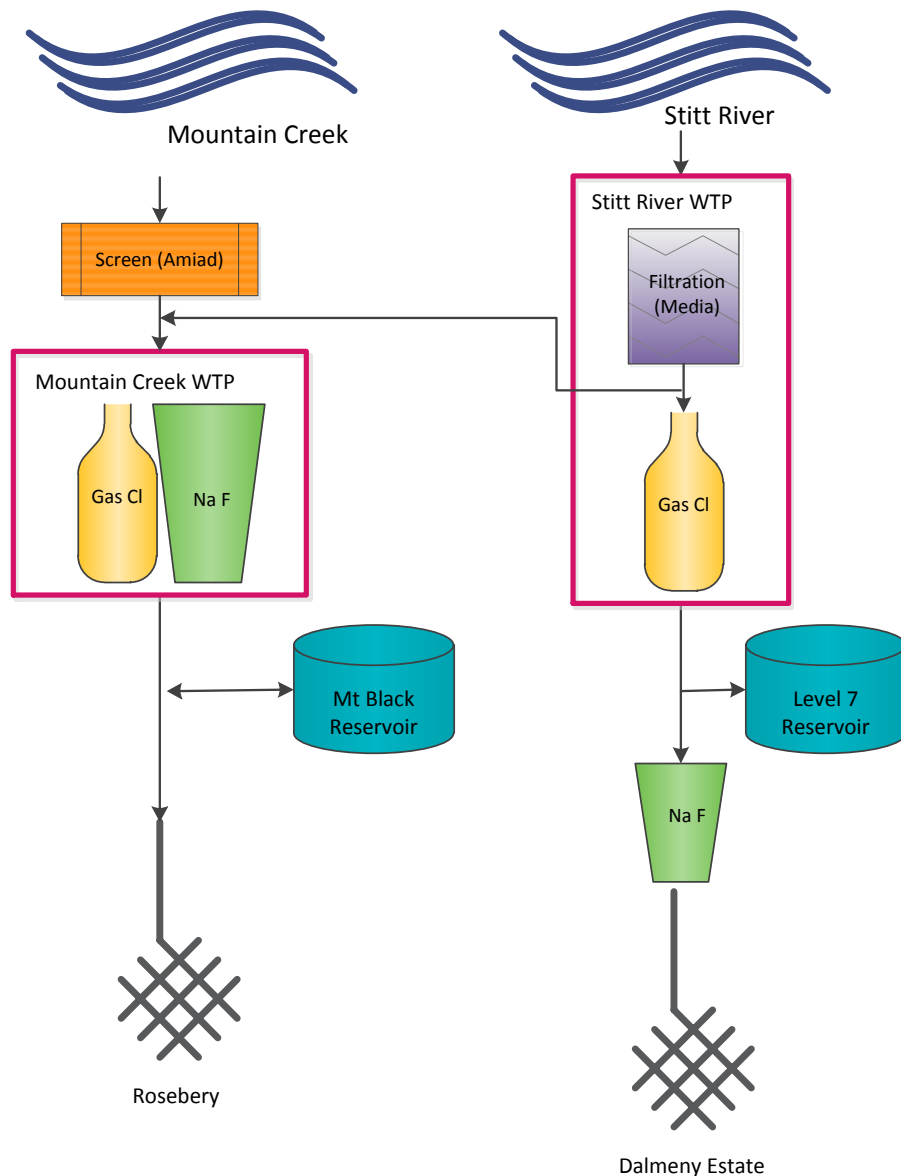
### 6.54. Rosebery drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	680
	<b>Catchment</b>	Mt Creek and Stitt River
	<b>Primary treatment</b>	Mt Creek – filtration (screen) Stitt – filtration (media)
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Rosebery.</li> </ul>		



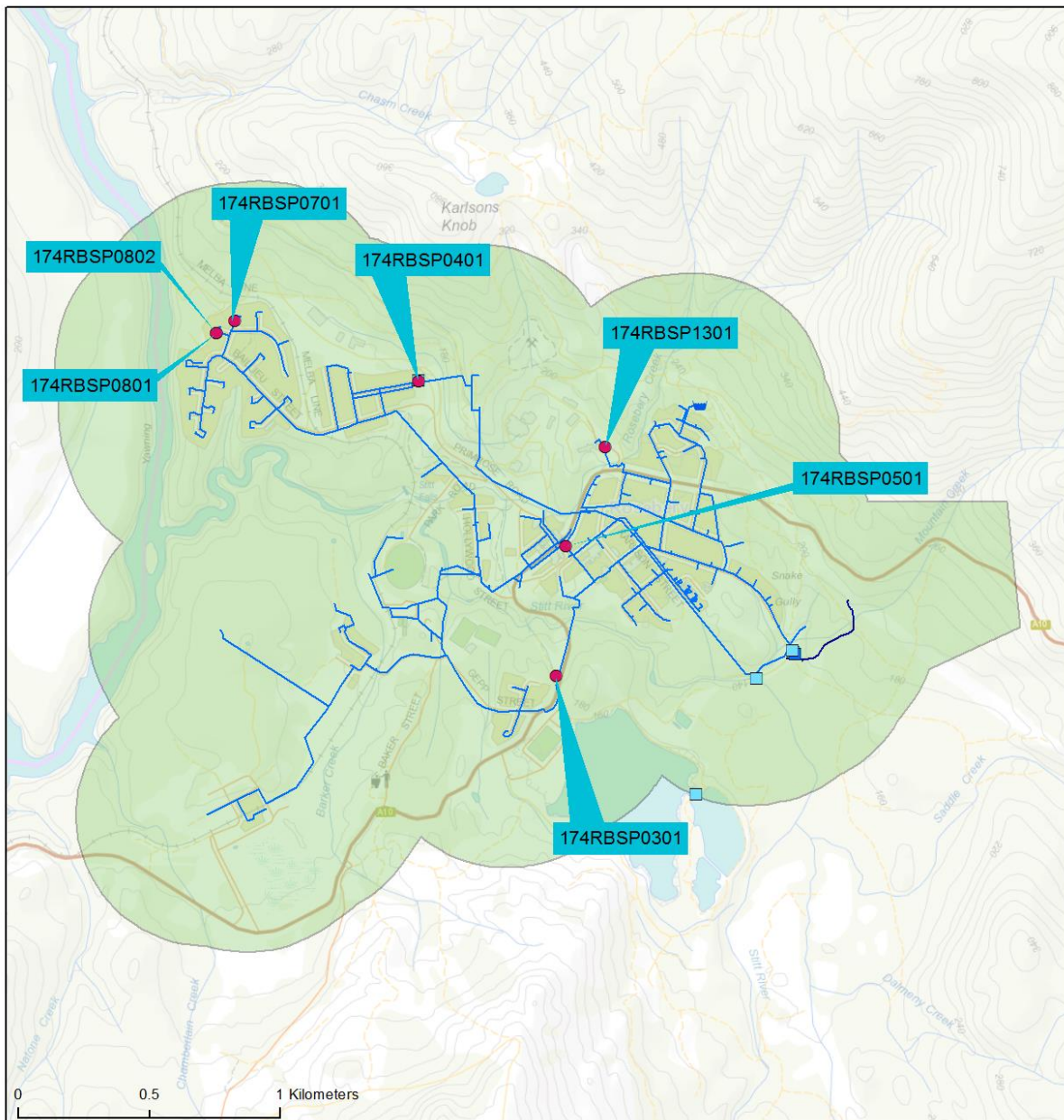
### 6.54.1. System description

Figure 6.54.1-a Rosebery system schematic



- ❖ **Catchment**  
The Rosebery drinking water system is supplied by Mountain Creek and the Stitt River.
- ❖ **Treatment**  
The Mountain Creek WTP employs chlorine gas disinfection and fluoridation by sodium fluoride. The Stitt River WTP employs media filtration, chlorine gas disinfection and fluoridation by sodium fluoride.
- ❖ **Distribution**  
There are two uncovered storages in the distribution system. The Rosebery drinking water system supplies 680 connections.

**Map 6.54.1—a Rosebery monitoring zone**



**174RBSP0501** = Agnes St Sample Point, **174RBSP0701** = Blackwood St Sample Point, **174RBSP0401** = Howard St Sample Point, **174RBSP0801** = Huon Crt Hydrant, **174RBSP0802** = Huon Crt tap, **174RBSP0301** = Murchison Highway Tap Behind Public Toilets, **174RBSP1301** = Rear of Hospital.

## 6.54.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.54.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: <b>Potable</b>	
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	99.1%	Yes ●	Weekly	211	2	
<b>Fluoride</b> <sup>(2)</sup>	100%	Yes ●	Weekly	100	0	
<b>DBPs</b> <sup>(3)</sup>	97.1%	No ●	Monthly	26	3	
<b>Metals</b> <sup>(4)</sup>	99.9%	No ●	Weekly	196	2	
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	

**Key** – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

**Note** – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

### 6.54.3. Summary of historic total system performance

Table 6.54.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance *									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	99%	●	100%	●	100%	●	99.6%	●	99.1%	●
<b>Fluoride</b> <sup>(2)</sup> (Stirling Valley)	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	0	●	0	●	0	●	
	within target range <sup>(b)</sup>	N/A	N/A	53.1%	●	82%	●	93%	●	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	0.78	●	0.94	●	1.0	●	
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	●	0	●	0	●	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	●	79%	●	73.7%	●	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	●	0.81	●	0.91	●		
<b>Fluoride</b> <sup>(2)</sup> (Howard St)	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	Off	●	0	●	0	●	
	within target range <sup>(b)</sup>	N/A	N/A	Off	●	93%	●	96.9%	●	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	Off	●	0.93	●	0.99	●	
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	●	0	●	0	●	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	●	80%	●	79.4%	●	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	●	0.84	●	0.89	●		
<b>Metals</b> <sup>(3)</sup>	N/A	N/A	99%	●	99.6%	●	99.9%	●		
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	97%	●	95.4%	●	97.1%	●		
<b>Pesticides</b> <sup>(4)</sup>	N/A	N/A	N/A	●	N/A	●	N/A	●		
<b>Complaints received</b> <sup>(5)</sup>	Not recorded	Not recorded	9	●	7	●	20	●		
<b>Public alerts issued</b> <sup>(6)</sup>	0	●	0	●	0	●	0	●		

**Key – (1)** – (● = >98 per cent, ● = >90 per cent, ● = <90%) – **(2a)** – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – **(2b)** – (● = >90 per cent, ● = >80 per cent, ● = <80%) – **(2c)** – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – **(3)** – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – **(4)** – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

**Note – (1)** – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. **(2)** – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1–7–2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 **(3)** – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year’s report. **(4)** – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – **(5)** – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. **(6)** – Covers all “Boil Water”, “Do Not Consume” or “Do Not Use” public health alerts issued by DHHS. **(\*)** – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.54.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16, within both of the distribution systems, was less than 90 per cent and not consistently within target range at the dosing point or distribution system. It is anticipated the new WTP at Rosebery will see an improvement in the reliability of fluoride dosing
- ❖ Lead was detected at levels exceeding the ADWG health limits reducing compliance to 99.9 per cent during 2015–16. An intensive weekly scouring and sampling schedule was put in place to assist with controlling and quantifying the risk of metal exceedances associated with this system. Ice pigging of the Rosebery distribution network took place in July 2015 which greatly reduced the detection of metals within the system for the rest of the reporting period
- ❖ DBP compliance for 2015–16 was 97.1 per cent and does not comply with the ADWG. Three detections above ADWG health limits were recorded during this reporting period. It is anticipated the new WTP at Rosebery will remove the precursors and improve performance.

#### 6.54.5. Microbiological performance

Figure 6.54.5-a Microbiological compliance 2015–16

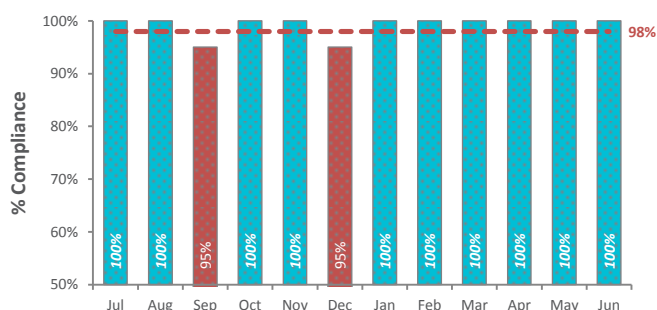
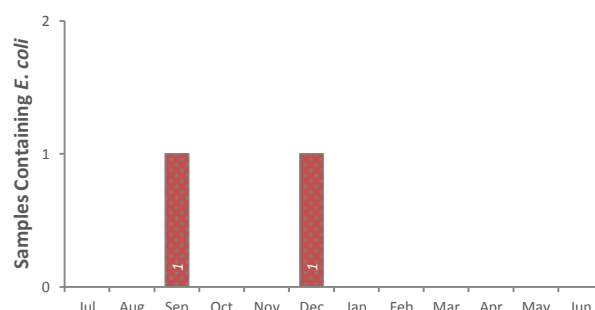


Figure 6.54.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Rosebery system was 99.1 per cent compliant in 2015–16. *E. coli* was detected in two samples during the reporting period
- ❖ An *E. coli* strike occurred in September 2015 with a detection of 1 MPN/100 mL. Water quality characteristics indicated good chlorine residuals and low turbidities. A retest was conducted which confirmed the system was free of *E. coli* and microbiological contamination
- ❖ An *E. coli* strike occurred in December 2015 with a detection of 5.2 MPN/100 mL. Water quality characteristics indicated good chlorine residuals and low turbidities. A retest was conducted which confirmed the system was free of *E. coli* and microbiological contamination.

## 6.54.6. Fluoride performance – Stirling Valley

Seasonal performance 2015–16

Figure 6.54.6-a Operational samples within target range



Figure 6.54.6-b Operational mean monthly dose (mg/L)

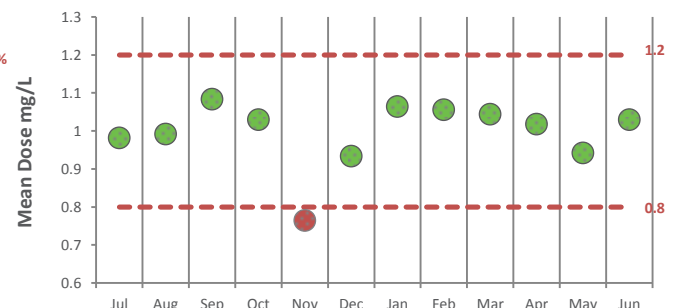


Figure 6.54.6-c Reticulation samples within target range

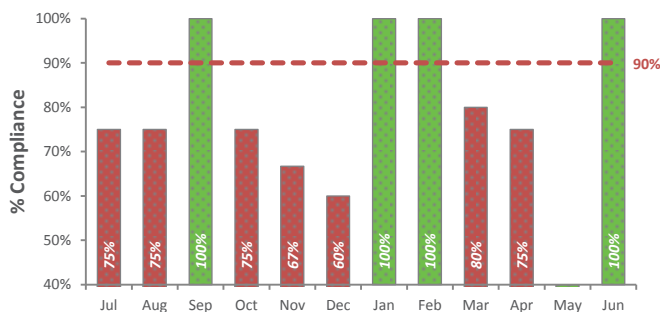
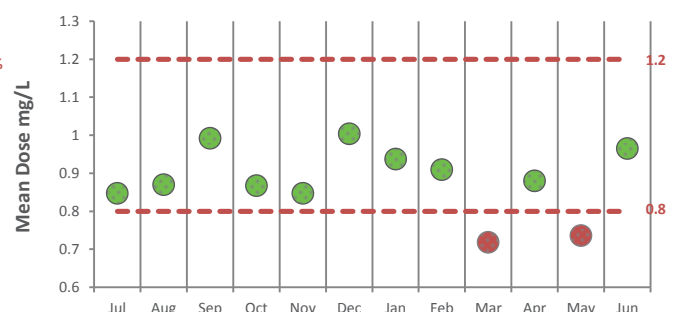


Figure 6.54.6-d Reticulation samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ Performance in the distribution network is variable which is thought to be related to field test accuracy and the fact that these are monitored daily
- ❖ Distribution sampling undertaken on 8 December 2015 recorded an initial result of 1.8 mg/L. Daily sampling in the distribution network was also undertaken with a result of 0.68 mg/L. Investigations showed the high result to be caused by sampling error. The result from the WTP was 0.82 mg/L
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.54.7. Fluoride performance – Howard Street

Seasonal performance 2015–16

Figure 6.54.7-a Operational samples within target range

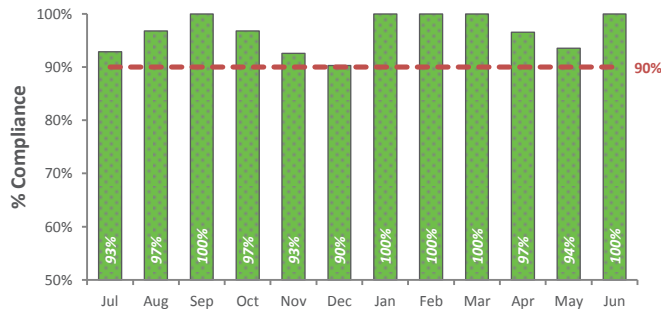


Figure 6.54.7-b Operational mean monthly dose (mg/L)

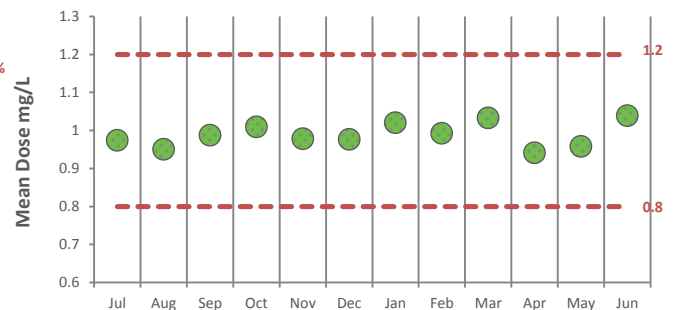


Figure 6.54.7-c Reticulation samples within target range

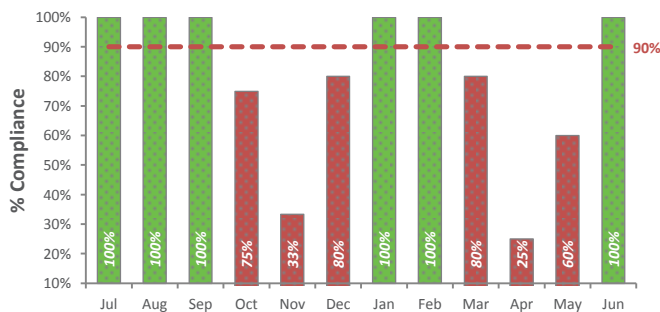
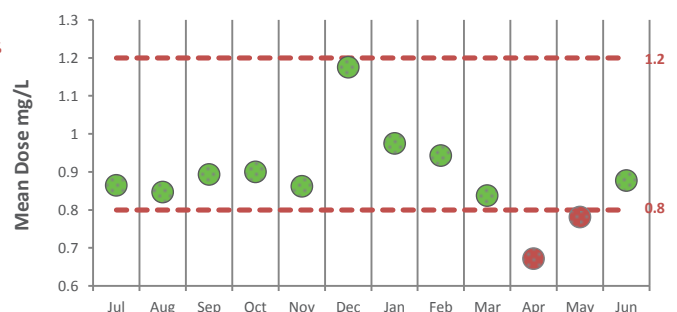


Figure 6.54.7-d Reticulation samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90%
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L
- ❖ The performance of the reticulation sample was affected by the plant being offline in November 2015 due to flow changes within the system in April and May 2016. The results were slightly below the target, which is thought to be related to field testing
- ❖ Sampling undertaken on 8 December 2015 recorded an initial result of 2.29 mg/L. Daily sampling in the distribution network was also undertaken with a result of 0.95 mg/L. Investigations showed the high result to be caused by sampling error. The result from the WTP was 1.10 mg/L.



## 6.54.8. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.54.8-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	189	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	196	0	100	< 1	< 1	< 1
Barium	2000	µg/L	196	0	100	5.88	2	18
Cadmium	2	µg/L	196	0	100	< 0.1	< 0.1	0.2
Chromium	50	µg/L	196	0	100	< 1	< 1	< 1
Copper	2000	µg/L	189	0	100	61.56	4	360
Lead	10	µg/L	206	2	99	2.1	< 0.5	13.9
Manganese	500	µg/L	196	0	100	12.46	1.2	115
Mercury	1	µg/L	189	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	196	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	189	0	100	< 0.5	< 0.5	0.9
Selenium	10	µg/L	196	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	26	3	88.5	63.88	6	130
Monochloroacetic acid	150	µg/L	26	0	100	7.28	< 5	34
Trichloroacetic acid	100	µg/L	26	0	100	48.98	< 7	98
Total trihalomethanes	250	µg/L	26	0	100	10.6	1.9	28

**Note:** All compliance figures expressed above are comprised of routine sample programs, and include any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ Metals sampling in the Rosebery system is currently conducted weekly as there has been detections of lead above ADWG health limits over the past two years. During this reporting period two samples exceeded the ADWG health limit for lead. A subsequent investigation sample taken during the ice pigging also exceeded the ADWG limits but was not part of the normal compliance sampling program
- ❖ TasWater has worked with the DHHS to introduce flushing programs that will improve the water quality of the Rosebery system and sampling programs to ensure ongoing compliance. The focus of the flushing program is to remove sediment from the reticulation system that may contain metals. The additional testing of samples in the Rosebery reticulation has indicated that overall the metals levels are well below the health limits
- ❖ There were three DPB detections above ADWG health limits in April May and June 2016. All detections were dichloroacetic acids. These events coincided with increasing turbidity and organic loading within the raw water feed from three separate sampling runs. Moving forward the removal of organic matter by the new WTP at Rosebery should see an immediate reduction in the formation of DBPs in the water.



### 6.54.9. General physical parameters

Table 6.54.9-a General physical performance

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	204	0.53	0.06	1.26
Turbidity (NTU)	202	1.09	0.2	8.5
pH	197	6.73	6.5	7.35

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are at times above the ADWG aesthetic limit of 5 NTU. On average the turbidity within the reticulation was slightly above the optimal level for maintaining effective disinfection of 1 NTU. There are ongoing issues with the water supply from the Stitt River due to the inadequacy of the current filtration process and the variable turbidity loading during high rainfall events
- ❖ Mean chlorine residuals in the Rosebery distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained just within the recommended optimal range. There is no pH adjustment for either of the systems.

### 6.54.10. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified other than the turbidity issues with the Stitt River system having inadequate filtration.

## 6.54.11. System incidents and issues

**Table 6.54.11-a Identified issues and incidents**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
27/09/2015	<i>E. coli</i> detection of 1 MPN/100ml from the Howard St sample point.	Retests were taken, and results were clear. System checks showed no abnormal events with Chlorine levels. Scouring of system to ensure adequate chlorine residuals within the township. All other system samples were clear, and probable cause was sample / analysis contamination. TasWater established a weekly scouring program to mitigate the risk associated with lead bound sediment.	Yes	Yes
01/01/2016	<i>E. coli</i> detection of 5 MPN/100ml from the Murchison Highway sample point.		Yes	Yes
7/07/2015	174RBSP0301 total lead detection 13.9µg/L	TasWater has worked with the DHHS to introduce a weekly sampling program to ensure ongoing compliance. The additional testing of samples from throughout the Rosebery reticulation has indicated that overall the levels are well below the guideline limits.	Yes	Yes
1/12/2015	174RBSP0701 total lead detection 10.1µg/L		Yes	Yes
4/08/2015	Stitt River BBQ total lead detection 69.1µg/L		Ice pigging took place in that area of the reticulation four days prior to the sample being taken. It is thought that the sample point did not have adequate flushing prior to the sampling event. Full set of samples were taken to assess the levels within the rest of the system. All returned results within guideline levels.	Yes
3/05/2016	174RBSP0701 Dichloroacetic acid 130µg/L	The cause of these failures is insufficient treatment barriers in place to reduce turbidity and organic carbon levels in the source water prior to disinfection with chlorine. Moving forward the removal of naturally occurring organic matter by the new WTP at Rosebery should see an immediate reduction in levels of DBPs formed in Rosebery water.	Yes	Yes
7/06/2016	174RBSP0701 Dichloroacetic acid 120µg/L		Yes	Yes
05/04/2016	174RBSP0301 Dichloroacetic acid 110 µg/L		Yes	Yes

Note: Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.

### 6.54.12. Customer complaints

Figure 6.54.12-a Complaint classification

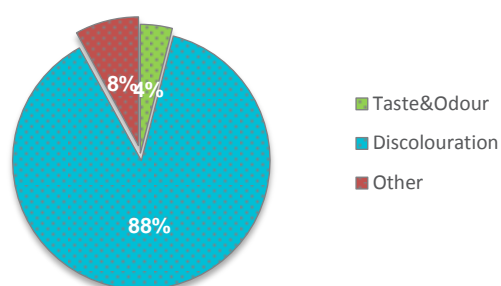
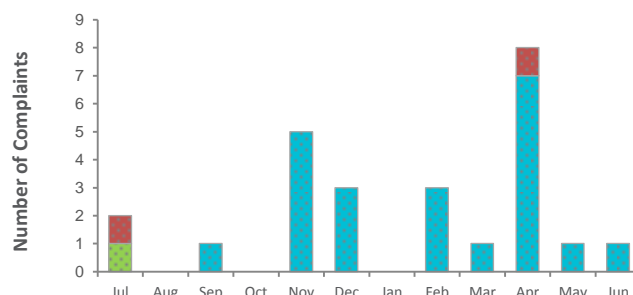


Figure 6.54.12-b Seasonal trend analysis



- ❖ Twenty five complaints were received in this reporting period. Twenty two complaints were related to discoloured water issues. Most of these complaints were raised in areas where the supply was from water from the Stitt River which has higher colour and turbidity when compared to the Mountain Creek supply.

### 6.54.13. Catchment and source water issues

- ❖ The Rosebery drinking water system is supplied by Mountain Creek and the Stitt River. The combined catchment covers 3,370 ha, and is predominantly reserved bushland with some forestry activity. The Stitt catchment has a history of metals mining and exploration, and has many abandoned workings within the catchment area. Based on catchment land uses, source water risks include:
  - Metals
  - Microbiological
  - Turbidity
  - Pesticides
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

### 6.54.14. Infrastructure and operational changes


- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.54.15. Future planning

Table 6.54.15-a Future Planning for the Rosebery drinking water system

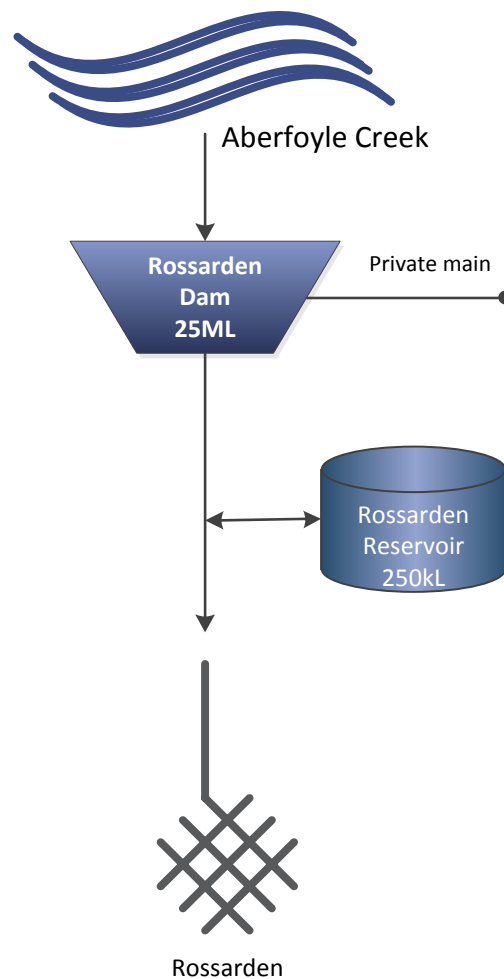
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Construction of new drinking WTP	New WTP to supply Rosebery	Business case approved. Currently reviewing detailed design documents from contractor	2016–17	\$4.6million
Reservoir roofing project	Roofing of unroofed reservoirs	Rosebery – The Mt Black reservoir is in the schedule for this year.	2016–17	TBD

### 6.55. Rossarden drinking water system

	<b>Current status</b>	<b>Do not consume</b>
	<b>Total connections</b>	99
	<b>Catchment</b>	Aberfoyle Creek
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Rossarden.</li> </ul>		

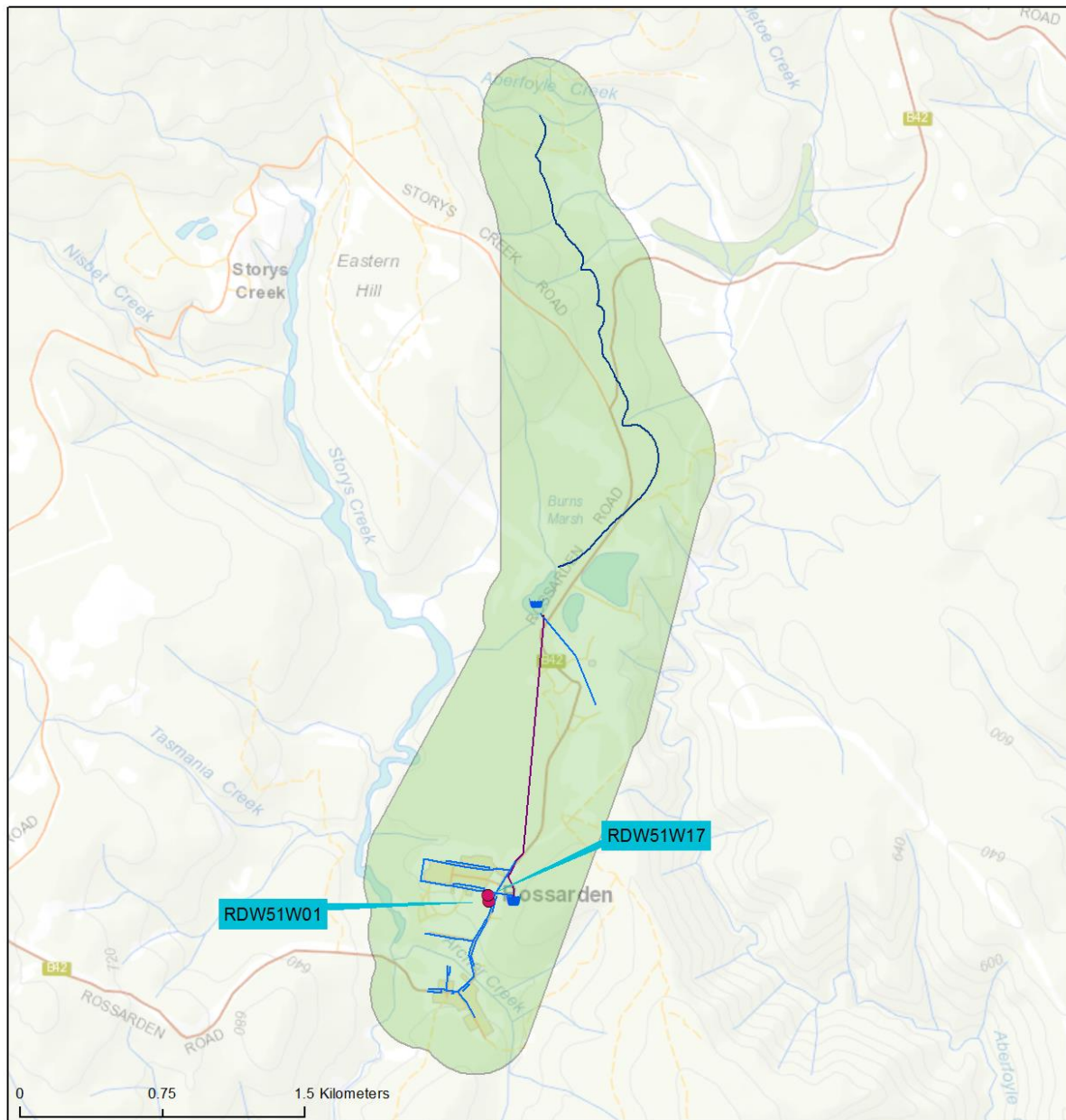
### 6.55.1. System description

Figure 6.55.1-a Rossarden system schematic



- ❖ **Catchment**  
The Rossarden drinking water system is supplied by Aberfoyle Creek.
- ❖ **Treatment**  
The Rossarden drinking water scheme is a raw water system with no treatment.
- ❖ **Distribution**  
The system feeds the township of Rossarden. There is one roofed reservoir. The system supplies 99 connections.

Map 6.55.1—a Rossarden monitoring zone



RDW51W01 = Lee Street BBQ area, Rossarden; RDW51W17 = Lee Street potable water tank, Rossarden

## 6.55.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.55.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: <b>Do not consume</b>	
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	90.2%	No <span style="color: red;">●</span>	Monthly	41	4	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	100%	Yes <span style="color: green;">●</span>	Quarterly	4	0	
<b>Metals</b> <sup>(4)</sup>	100%	Yes <span style="color: green;">●</span>	Quarterly	4	0	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes <span style="color: green;">●</span>	Quarterly	4	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (●) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.55.3. Summary of historic total system performance

Table 6.55.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance*					
	2011–12	2012–13	2013–14	2014–15	2015–16	
<b>Microbiological</b> <sup>(1)</sup>	91% <span style="color: orange;">●</span>	99% <span style="color: green;">●</span>	98.5% <span style="color: green;">●</span>	96% <span style="color: orange;">●</span>	90.2% <span style="color: orange;">●</span>	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	
	<b>Distribution fluoride testing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A		
<b>Metals</b> <sup>(3)</sup>	100% <span style="color: green;">●</span>	91% <span style="color: red;">●</span>	100% <span style="color: green;">●</span>	97.1% <span style="color: red;">●</span>	100% <sup>#</sup> <span style="color: red;">●</span>	
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	N/A	100% <span style="color: green;">●</span>		
<b>Pesticides</b> <sup>(4)</sup>	0 <span style="color: green;">●</span>	0 <span style="color: green;">●</span>	0 <span style="color: green;">●</span>	0 <span style="color: green;">●</span>	0 <span style="color: green;">●</span>	
<b>Complaints received</b> <sup>(5)</sup>	3	1	2	3	5	
<b>Public alerts issued</b> <sup>(6)</sup>	1 <span style="color: red;">●</span>	1 <span style="color: red;">●</span>	1 <span style="color: red;">●</span>	1 <span style="color: red;">●</span>	1 <span style="color: red;">●</span>	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (●) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. (#) – Compliance testing did not detect elevated metals, however >3 failures occurred at investigation sites and are not included in the compliance evaluation.

#### 6.55.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved 90 per cent. The microbiological risk to public health is mitigated through the communication of a do not consume notice
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 achieved 100 per cent. The compliance sample point was clear of metal contamination, however six lead detections exceeding ADWG health limits occurred at other investigation sample locations within the distribution system
- ❖ DBP compliance for 2015–16 achieved 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.55.5. Microbiological performance

Figure 6.55.5-a Microbiological compliance 2015–16

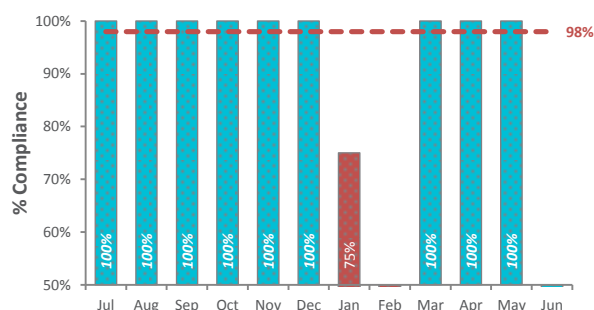
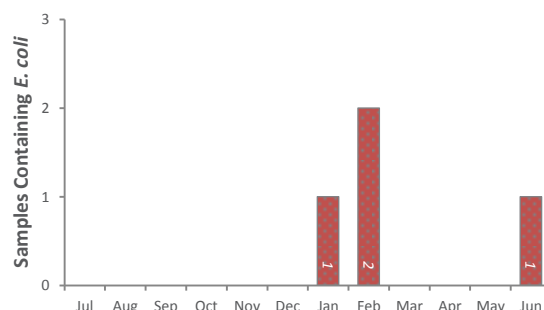


Figure 6.55.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Rossarden system was 90 per cent compliant in 2015–16. Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from Aberfoyle Creek and the Rossarden Race
- ❖ The risk to public health is mitigated through the communication of a DNC notice to customers.

#### 6.55.6. Fluoride performance

- ❖ This system is not fluoridated.



## 6.55.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.55.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	4	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	4	0	100	4.75	4	5
<b>Cadmium</b>	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	4	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	4	0	100	3.75	2	5
<b>Lead</b>	10	µg/L	4	0	100	< 0.5	< 0.5	0.7
<b>Manganese</b>	500	µg/L	4	0	100	5.42	3	10.9
<b>Mercury</b>	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Selenium</b>	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	< 4	< 1	< 4
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	< 7	< 2	< 7
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits taken as part of the routine sampling program in the 2015–16 reporting period
- ❖ The risk to public health is mitigated by a DNC notice issued in December 2014
- ❖ Following the persistent detection of metals exceeding the ADWG health limits in the 2014–15 reporting period, an intensive monitoring program at various locations within the distribution system was established to assess the extent of the metal contamination. The investigation data is not included in the compliance evaluation, however six elevated lead detections support the need for the PHA to be in place
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.55.8. General physical parameters

**Table 6.55.8-a General physical performance**

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	N/A	–	–	–
Turbidity (NTU)	41	10.77	0.56	92.9
pH	41	6.71	6.27	7.24

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well above the ADWG aesthetic limit of 5 NTU. Due to the lack of treatment barriers this system cannot mitigate against turbidity fluctuations in the raw supply
- ❖ This system is not chlorinated
- ❖ pH levels are within the recommended optimal range.

### 6.55.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.55.10. System incidents and issues

**Table 6.55.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
02/07/2015	Lead 108 µg/L	Following persistent lead detections in 2014–15 reporting period a PHA (DNC) was issued in December 2014. The lead exceedances were detected at investigation sites in the distribution system.	Yes	Yes
08/07/2015	Lead 10.3 µg/L		Yes	Yes
15/07/2015	Lead 33.1 µg/L		Yes	Yes
29/07/2015	Lead 24.8 µg/L		Yes	Yes
07/10/2015	Lead 13.5 µg/L		Yes	Yes
11/11/2015	Lead 16.3 µg/L		Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.55.11. Customer complaints

Figure 6.55.11-a Complaint classification

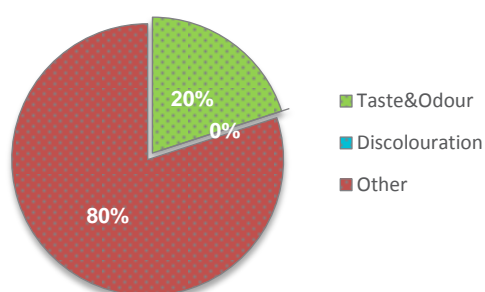
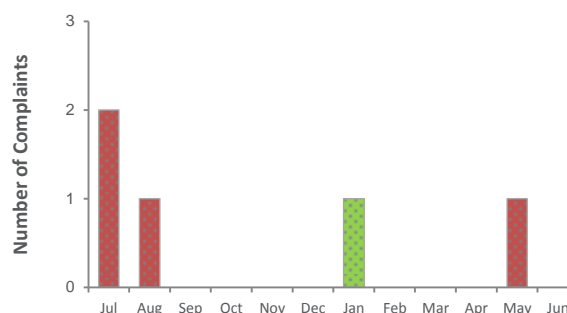


Figure 6.55.11-b Seasonal trend analysis



- ❖ Five complaints were received in this reporting period. One complaint related to taste and odour issues and four complaints were not related to water quality.

### 6.55.12. Catchment and source water issues

- ❖ The Rossarden drinking water system is supplied by Aberfoyle Creek, via the Rossarden Water Race and Rossarden Dam. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Elevated metals levels
  - Pesticide residuals.

### 6.55.13. Infrastructure and operational changes

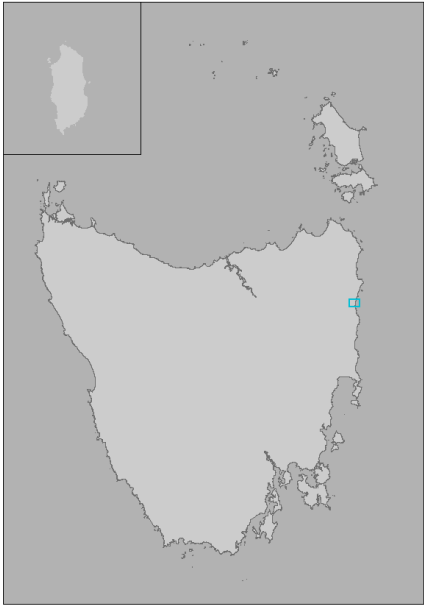
- ❖ No significant infrastructure or operational changes were made to the system during the reporting period 2015–16.

### 6.55.14. Future planning

Table 6.55.14-a Future planning for the system

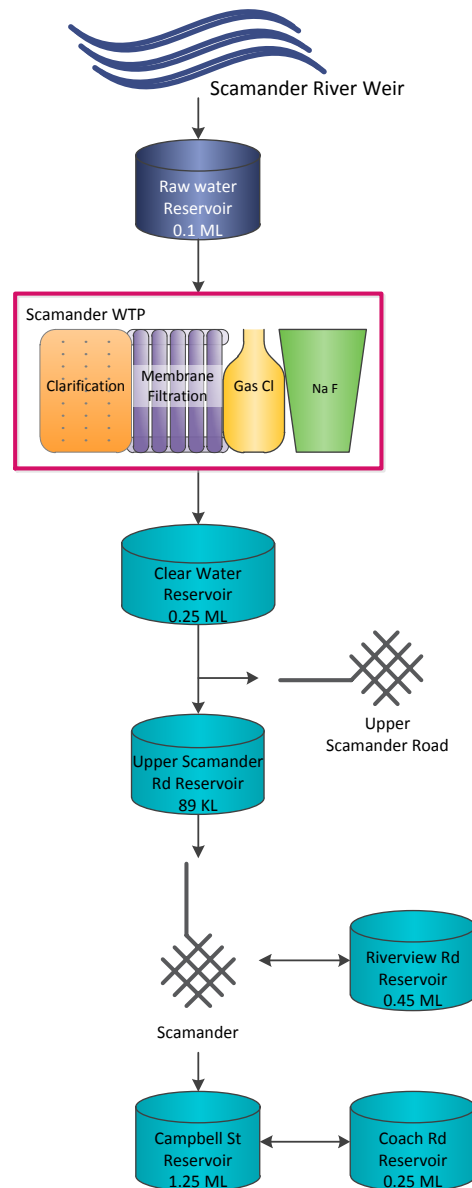
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Rossarden supply options	Investigation into options to improve water quality supplied to Rossarden	Business case under development and part of the Small Towns Water Supply Strategy	2018	To be determined

## 6.56. Scamander drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	626
	<b>Catchment</b>	Scamander River
	<b>Primary treatment</b>	Membrane filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Scamander.</li> </ul>		

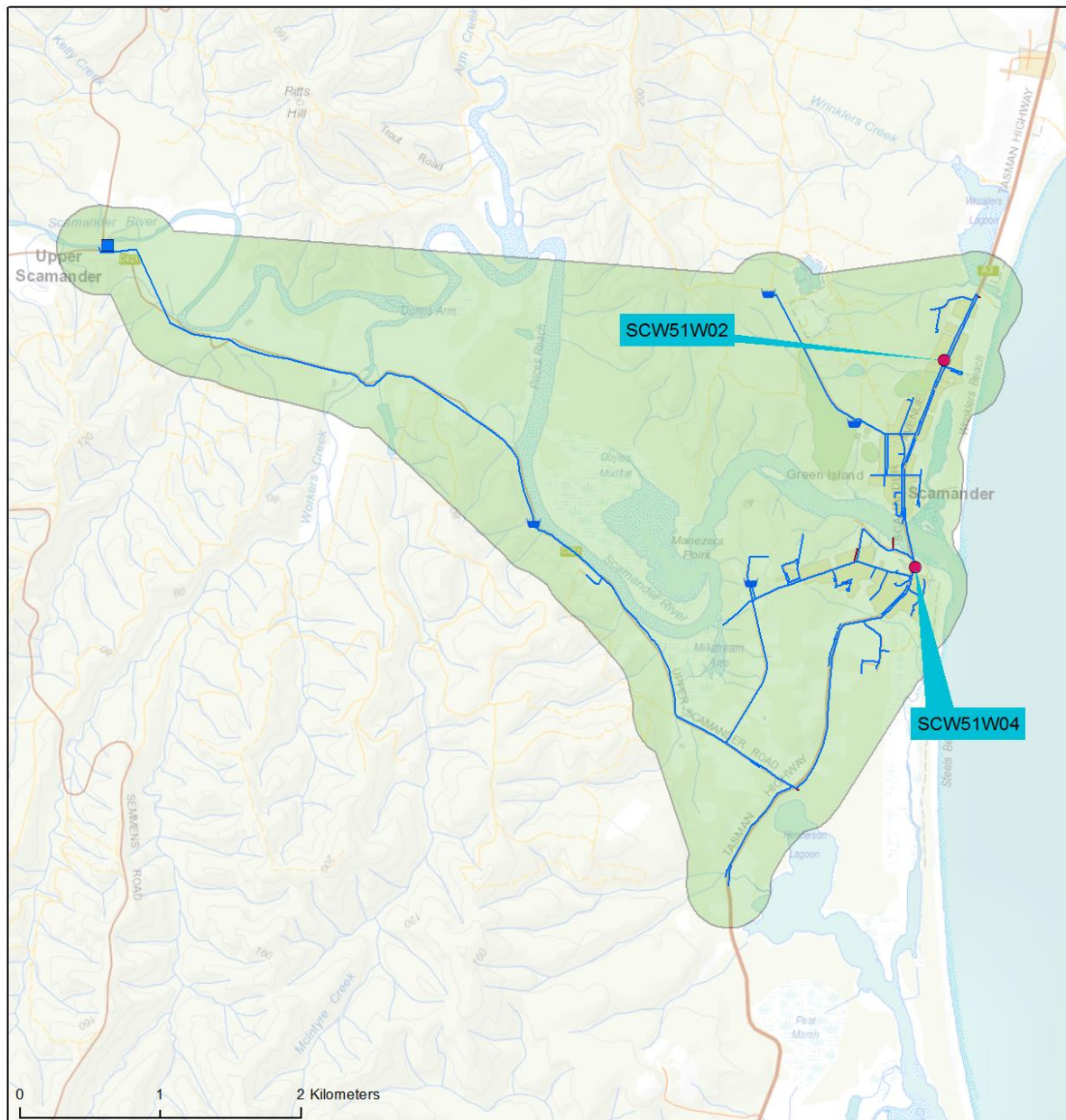
### 6.56.1. System description

Figure 6.56.1-a Scamander system schematic



- ❖ Catchment  
The Scamander drinking water system is supplied by the Scamander River
- ❖ Treatment  
The Scamander WTP employs ultra-filtration membrane filters and chlorine gas disinfection
- ❖ Distribution  
There are four roofed reservoirs, in the distribution system. The Scamander drinking water system supplies 626 connections.

Map 6.56.1—a Scamander monitoring zone



SCW51W01 = 56 Scamander Avenue, SCW51W04 = River Mouth Carpark

## 6.56.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.56.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes ●	Weekly	53	0	
<b>Fluoride</b> <sup>(2)</sup>	100%	Yes ●	Weekly	30	0	
<b>DBPs</b> <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes ●	6 monthly	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.56.3. Summary of historic total system performance

Table 6.56.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)		Performance*				
Parameter group		2011–12	2012–13	2013–14	2014–15	2015–16
<b>Microbiological</b> <sup>(1)</sup>		88% ●	99% ●	100% ●	94% ●	100% ●
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	0 ●
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	95.1% ●
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	0.93 ●
	<b>Distribution fluoride testing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	0 ●
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	46.6% ●
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	0.58 ●	
<b>Metals</b> <sup>(3)</sup>		100% ●	100% ●	100% ●	100% ●	100% ●
<b>DBPs</b> <sup>(3)</sup>		100% ●	100% ●	100% ●	100% ●	100% ●
<b>Pesticides</b> <sup>(4)</sup>		0 ●	0 ●	0 ●	0 ●	0 ●
<b>Complaints received</b> <sup>(5)</sup>		8	8	1	9	10
<b>Public alerts issued</b> <sup>(6)</sup>		1 ●	1 ●	1 ●	1 ●	1 ●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.56.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 achieved greater than 98 per cent of samples free of *E. coli*.
- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent. A new fluoride system was installed and commenced dosing in December 2016. Numerous operational issues were experienced and this affected distribution performance.
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.56.5. Microbiological performance

Figure 6.56.5-a Microbiological compliance 2015–16

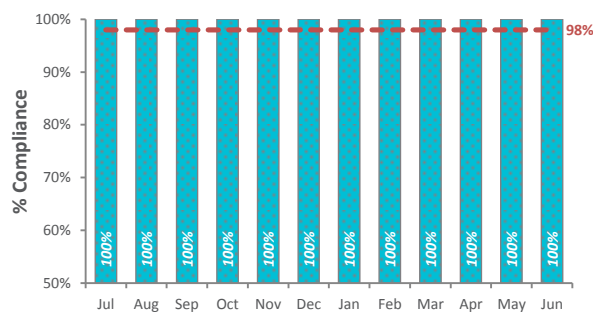


Figure 6.56.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.



## 6.56.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.56.6-a Reticulation samples within target range

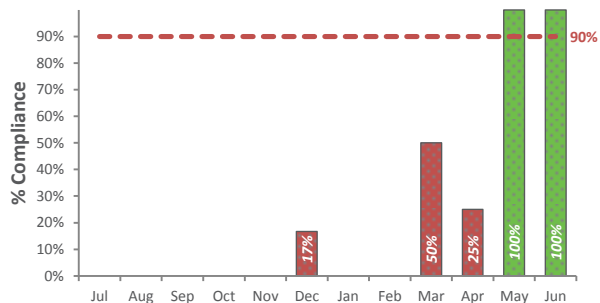


Figure 6.56.6-b Reticulation mean monthly dose (mg/L)

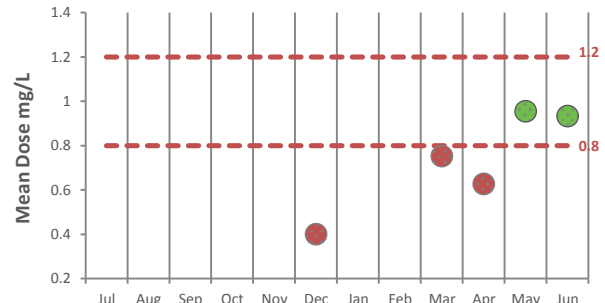


Figure 6.56.6-c Operational samples within target range

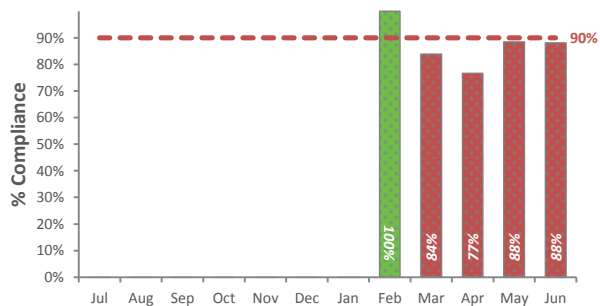
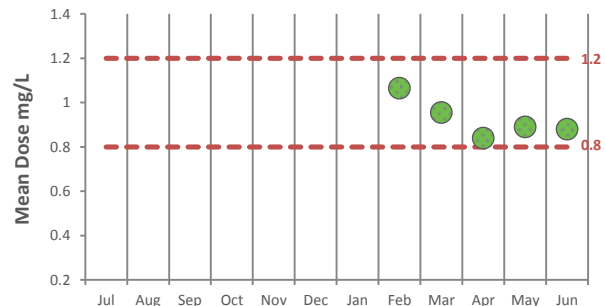


Figure 6.56.6-d Operational samples mean monthly dose (mg/L)



**Note:** (**Reticulation**) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (**Operational**) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Fluoride dosing equipment was commissioned at Scamander WTP in December 2015
- ❖ From December 2015 to early February 2016, daily testing at the dosing station was undertaken but results were not recorded due to protected action
- ❖ Intermittent pumps faults reduced the compliance from March to June. Operations are currently under review
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.56.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.56.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	4	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	4	0	100	7.5	6	9
<b>Cadmium</b>	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	4	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	4	0	100	2	1	3
<b>Lead</b>	10	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Manganese</b>	500	µg/L	4	0	100	10	10	10
<b>Mercury</b>	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Selenium</b>	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	17.75	< 4	25
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	20	10	28
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	57.5	46	71

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.56.8. General physical parameters

Table 6.56.8-a General physical performance

General physical parameters (2015–16)				
Cygnets monitoring zone	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	54	0.55	0.01	1.52
Turbidity (NTU)	54	0.3	0.1	2.1
pH	54	7.35	6.4	8.28

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate protection against re-contamination. Residuals are difficult to maintain in the extremities of the distribution system, and works are currently underway to reconfigure pipelines and reassess the storage in the system
- ❖ pH levels are maintained within the recommended optimal range.

### 6.56.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.56.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.56.11. Customer complaints

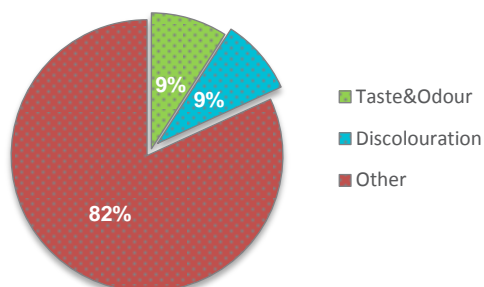


Figure 6.56.11-a Complaint classification

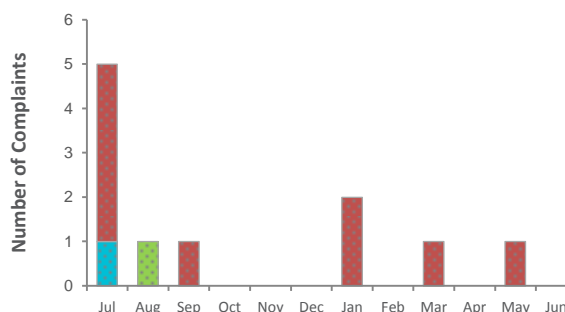


Figure 6.56.11-b Seasonal trend analysis

- ❖ Eleven complaints were received in this reporting period. The majority of complaints received were relating to the BWA.

### 6.56.12. Catchment and source water issues

- ❖ The Scamander drinking water system is supplied by the Scamander River. Activities in the catchment include native bushland and forestry. There is some limited grazing and several properties with onsite wastewater management systems immediately above the intake. Based on the catchment land uses, source water quality risks include:
  - microbial
  - turbidity issues
  - pesticides
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.56.13. Infrastructure and operational changes


- ❖ A new clarifier and fluoride dosing equipment was commissioned at Scamander WTP in December 2015.

### 6.56.14. Future planning

Table 6.56.14-a Future planning for the system

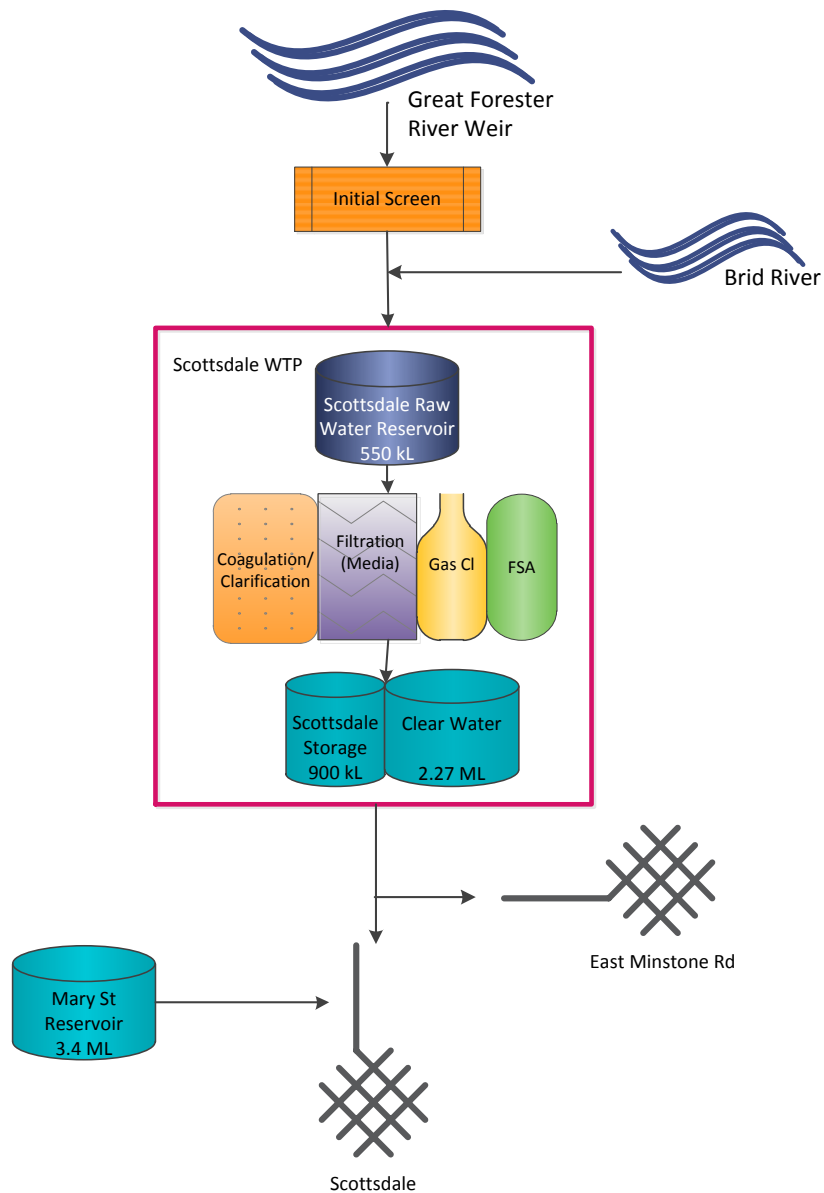
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Scamander system upgrades	Improvements to pre-treatment and the distribution system	The installation of a clarifier is complete. Network improvements are in progress and due for completion late 2016. Lifting the BWA is anticipated in 2017.	2015–16	\$1.3 million

### 6.57. Scottsdale drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	1,347
	<b>Catchment</b>	Great Forester River and Brid River
	<b>Primary treatment</b>	Conventional filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Scottsdale</li> <li>❖ Springfield (Raw water waysiders under permanent BWA)</li> </ul>		

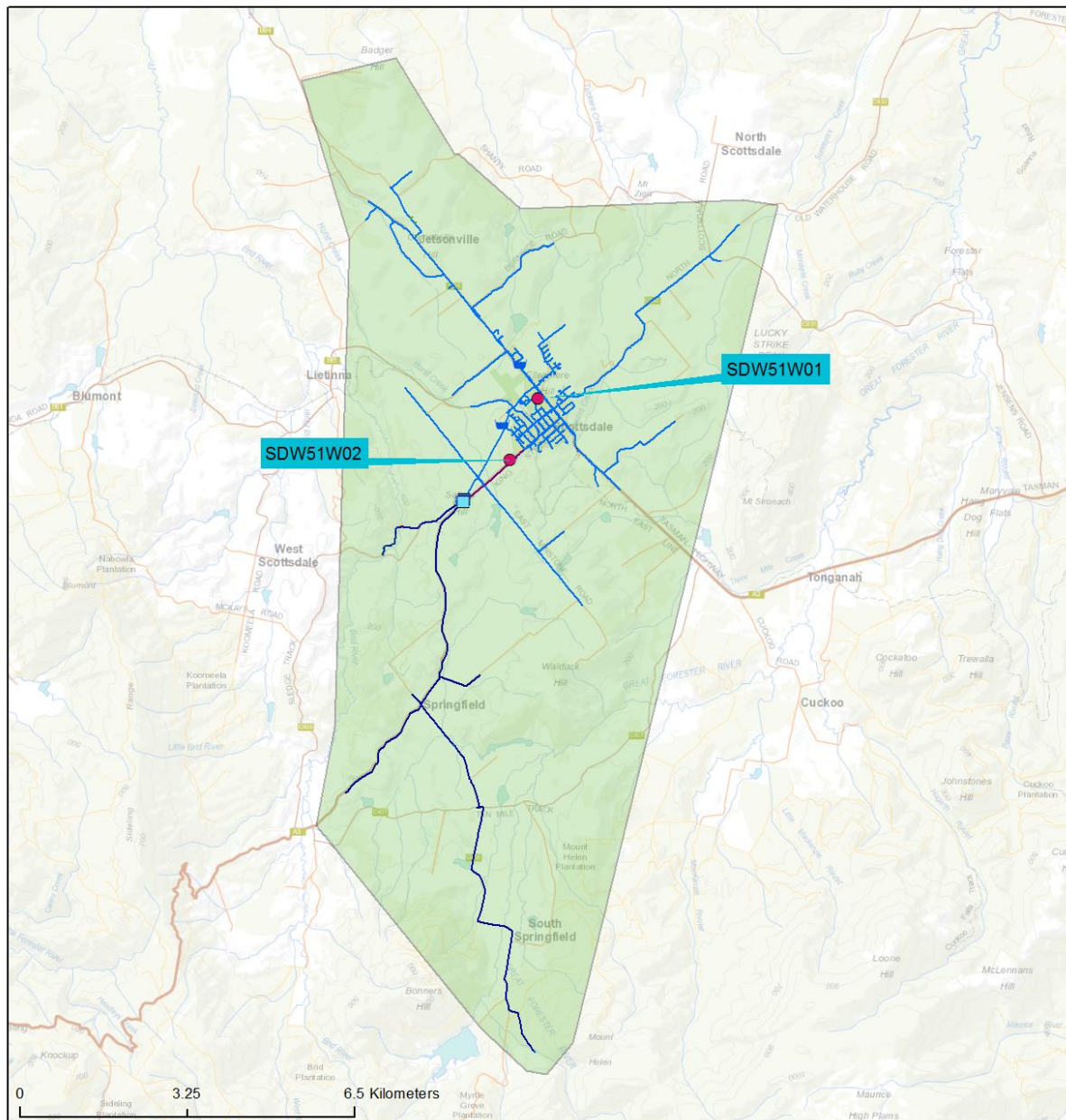
### 6.57.1. System description

Figure 6.57.1-a Scottsdale system schematic



- ❖ **Catchment**  
The Scottsdale drinking water system is supplied by the Great Forester River and Brid River.
- ❖ **Treatment**  
The Scottsdale WTP employs coagulation, clarification, gas chlorine disinfection and fluoridation by fluorosilicic acid.
- ❖ **Distribution**  
The system feeds the township of Scottsdale. There are two roofed reservoirs within the distribution system. The system supplies 1,347 connections.

Map 6.57.1—a Scottsdale monitoring zone



SDW51W01 = Recreation Ground, Scottsdale, SDW51W02 = Visitor Information King Street, Scottsdale

## 6.57.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.57.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99%	Yes ●	Weekly	105	1	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	104	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly	3 <sup>#</sup>	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting. # Routine Pesticide testing was removed from the reticulation sampling program in May 2016

## 6.57.3. Summary of historic total system performance

Table 6.57.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	98%	●	100%	●	99%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		89%	●	94%	●	97.8%	●
	mean dose (mg/L) <sup>(c)</sup>	0.95	●	0.97	●	0.97	●	0.94	●	0.98	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Required		Not Required		Not Required		98%	●	100%	●
mean dose (mg/L) <sup>(c)</sup>	Not Required		Not Required		Not Required		0.91	●	0.90	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
Complaints received <sup>(5)</sup>	7		0		15		1		5		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.



#### 6.57.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.57.5. Microbiological performance

Figure 6.57.5-a Microbiological compliance 2015–16

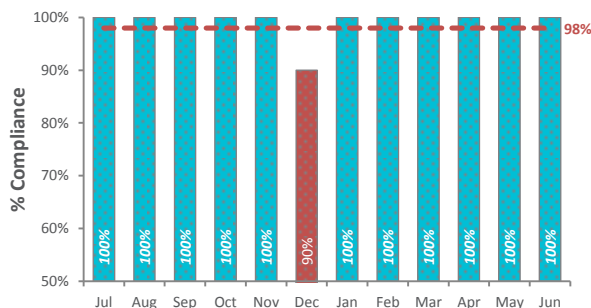
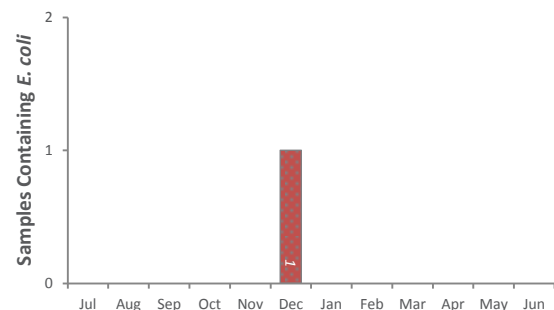


Figure 6.57.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Scottsdale system was 99 per cent compliant in 2015–16. *E. coli* greater than 1MPN/100mL was detected in one weekly sample for the reporting period
- ❖ An *E. coli* strike occurred in December 2015 with a detection of 1 MPN/100 mL. Investigations indicate a reduced level of disinfection likely led to the *E. coli* exceedance. A review of system alarms was undertaken and a re-test was conducted which confirmed the system was free of *E. coli* and microbial contamination.

## 6.57.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.57.6-a Reticulation samples within target range

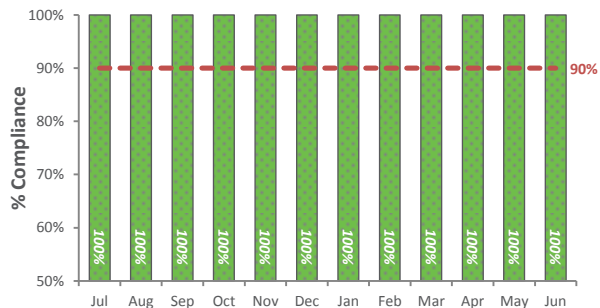


Figure 6.57.6-b Reticulation mean monthly dose (mg/L)

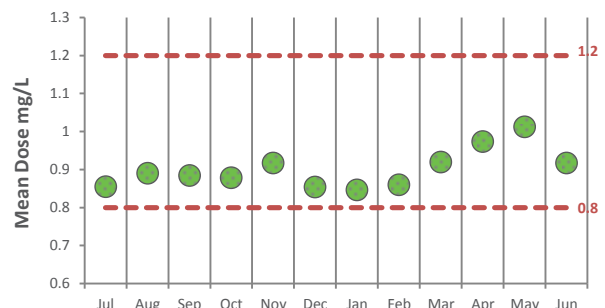


Figure 6.57.6-c Operational samples within target range

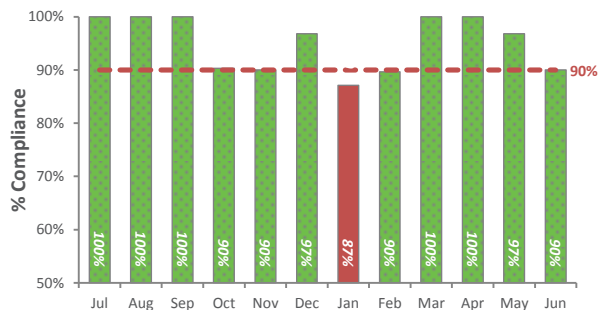
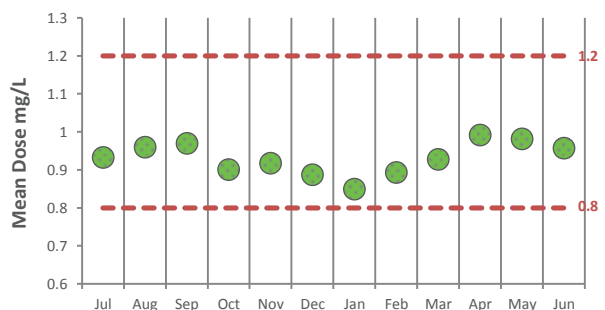


Figure 6.57.6-d Operational samples mean monthly dose (mg/L)



Note: **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.57.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.57.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	12	11	13
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	12	7	17
Lead	10	µg/L	4	0	100	0.8	0.6	1
Manganese	500	µg/L	4	0	100	1.52	1	2
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	10.5	9	12
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	13	7	19
Total trihalomethanes	250	µg/L	4	0	100	22.88	8.5	53

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.57.8. General physical parameters

**Table 6.57.8-a General physical performance**

General physical parameters (2015–16)				
Parameters	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	104	0.39	0.06	0.68
Turbidity (NTU)	104	0.34	0.1	1
pH	104	7.06	6.15	7.51

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are below the ADWG aesthetic limit of 5 NTU and within the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network, were above minimum expectations , and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.57.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.57.10. System incidents and issues

**Table 6.57.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
22/12/2015	A weekly compliance sample from King Street positive for <i>E. coli</i> 1MPN/100mL.	A main break occurred close to the sampling location four days prior to the sample collection. On the 22nd Dec operators had a chlorination issue at the WTP. Resample undertaken and result was clear.	Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.57.11. Customer complaints

Figure 6.57.11-a Complaint classification

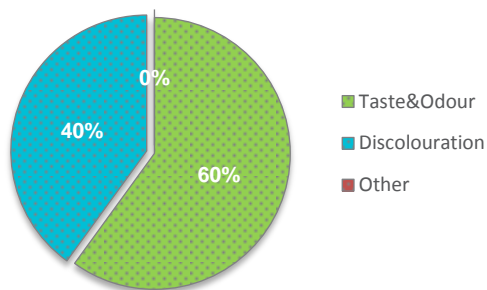
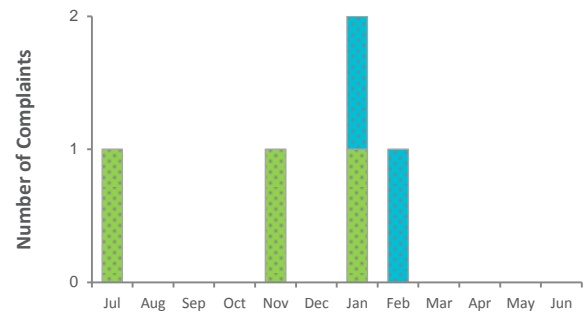


Figure 6.57.11-b Seasonal trend analysis



- ❖ Five complaints were received in this reporting period. Two complaints related to discolouration issues and three complaints related to taste issues.

### 6.57.12. Catchment and source water issues

- ❖ The Scottsdale drinking water system is supplied by Great Forester River and the Brid River. Activities in the catchment include forestry, grazing, dairy farming and cropping. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.


### 6.57.13. Infrastructure and operational changes

- ❖ Improvements to the flocculation tank and replacement of chemical dosing tanks are complete.

### 6.57.14. Future planning

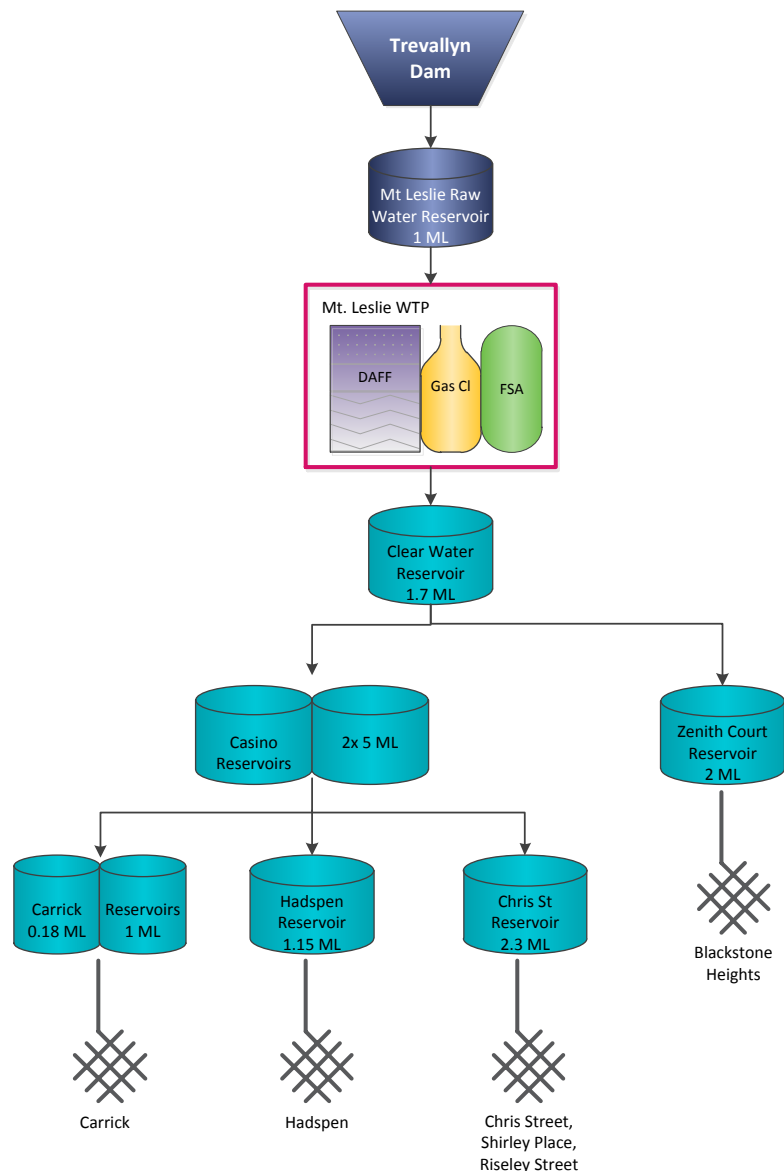
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

### 6.58. South Esk drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	5,136
	<b>Catchment</b>	South Esk
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Prospect</li> <li>❖ Blackstone Heights</li> <li>❖ Hadspen</li> <li>❖ Carrick.</li> </ul>		

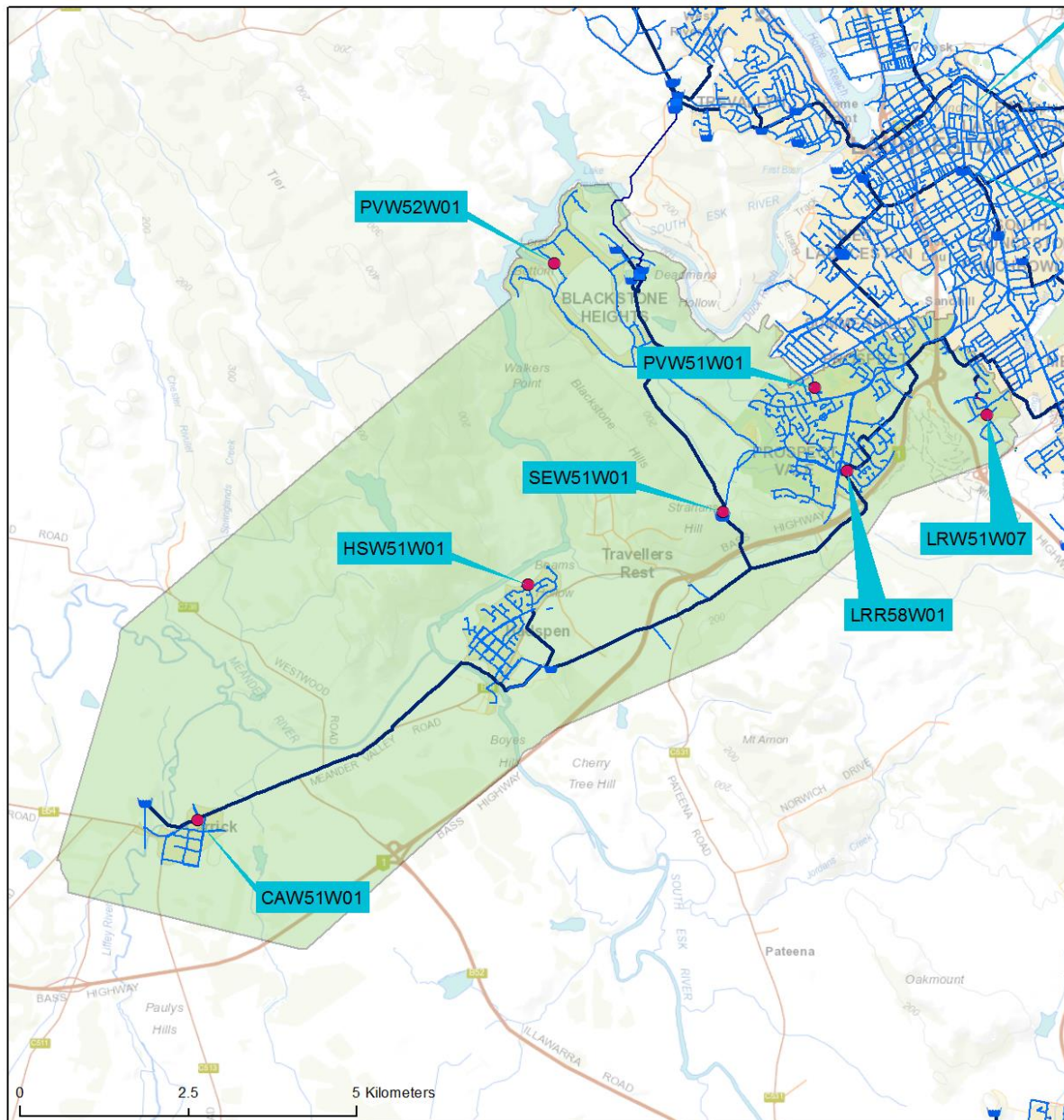
### 6.58.1. System description

Figure 6.58.1-a South Esk system schematic



- ❖ **Catchment**  
The South Esk drinking water system is supplied by the South Esk River, via Trevallyn Dam. The drinking water catchment consists of hydro–electricity generation, forestry, dairy farming, aquaculture, mining, feeds lots and cropping. The drinking water catchment also receives the effluent of several sewage treatment plants.
- ❖ **Treatment**  
The South Esk WTP employs DAFF, chlorine gas disinfection and fluoridation by fluorosilicic acid.
- ❖ **Distribution**  
There are seven roofed storages in the distribution system. The South Esk drinking water system supplies 5,136 connections.

Map 6.58.1—a South Esk monitoring zone



PVW51W01 = Prospect Vale, Willow Lane – LRR58W01 = Prospect Vale, Chris St Res – SEW51W01 = Prospect Vale, Casino Rising,  
 LRW51W07 = Kings Meadows, Connector Park – HSW51W01 = Hadspen, South Esk Drive – CAW51W01 = Carrick, Public Hall,  
 PVW52W01 = Blackstone Heights, Longvista Drive



## 6.58.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.58.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	383	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	106	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly	4	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.58.3. Summary of historic total system performance

Table 6.58.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	99%	●	100%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		98%	●	95%	●	96%	●
	mean dose (mg/L) <sup>(c)</sup>	0.97	●	0.94	●	0.95	●	0.97	●	0.99	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		Not Recorded		100%	●	98%	●
mean dose (mg/L) <sup>(c)</sup>	Not Recorded		Not Recorded		Not Recorded		1.02	●	0.97	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
Complaints received <sup>(5)</sup>	12		14		12		14		20		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.58.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance achieved greater than 90 per cent at the dose point and within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.58.5. Microbiological performance

Figure 6.58.5-a Microbiological compliance 2015–16

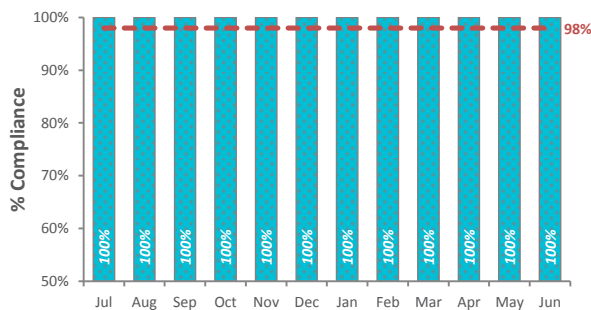


Figure 6.58.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.58.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.58.6-a Reticulation samples within target range

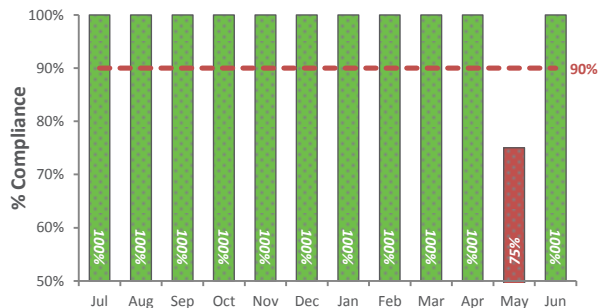


Figure 6.58.6-b Reticulation mean monthly dose (mg/L)

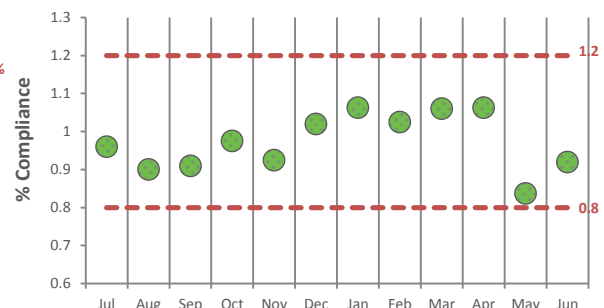


Figure 6.58.6-c Operational samples within target range

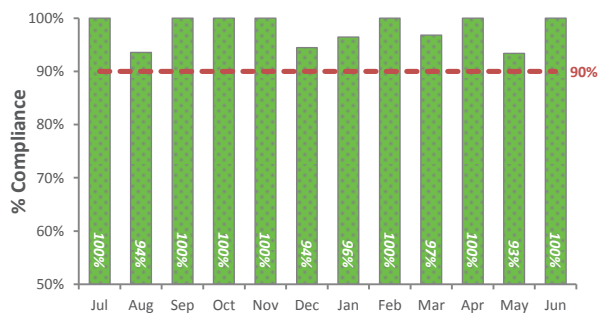
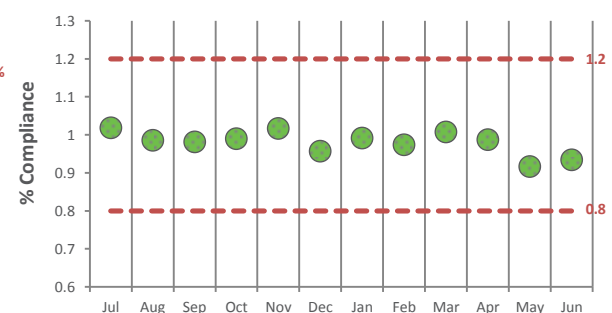


Figure 6.58.6-d Operational samples mean monthly dose (mg/L)



**Note:** (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (Operational) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ Performance in the distribution network generally achieved the regulatory target of greater than 90 per cent. A minor drop in fluoride during May reduced the levels in the distribution to 0.6 mg/L. The dose rate was amended and levels were brought back within target range
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.58.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.58.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	4	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	4	0	100	11.5	5	17
<b>Cadmium</b>	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	4	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	4	0	100	21.25	19	25
<b>Lead</b>	10	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Manganese</b>	500	µg/L	4	0	100	6.78	2.4	12
<b>Mercury</b>	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Selenium</b>	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	14	9	20
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	10.5	6	17
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	17.8	7.2	26

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (..) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.58.8. General physical parameters

**Table 6.58.8-a General physical performance**

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	364	0.47	0.02	1.07
Turbidity (NTU)	365	0.22	0.1	2.8
pH	365	7.04	6.4	7.8

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.58.9. Aesthetic issues

- ❖ Over the extended dry summer, algal metabolites increased in concentration to greater than the average taste and odour threshold. Monitoring in the distribution system and activated carbon dosing was triggered and successfully mitigated the aesthetic issue. A lag period occurred between the occurrence in the source water and the testing result notification, where 10 complaints were received from customers
- ❖ An Algal Monitoring Program is in place to pre-empt and mitigate any taste and odour issues in the source water.

### 6.58.10. System incidents and issues

**Table 6.58.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
February 2016	Taste and odour	MIB and Geosmin levels triggered the taste threshold of 10 µg/L in February causing 10 complaints. PAC dosing was implemented upon detection and mitigated levels in the distribution system to below the taste threshold.	No	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.58.11. Customer complaints

Figure 6.58.11-a Complaint classification

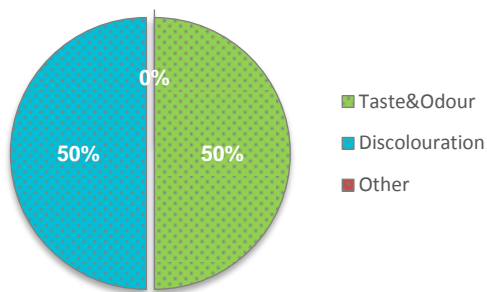
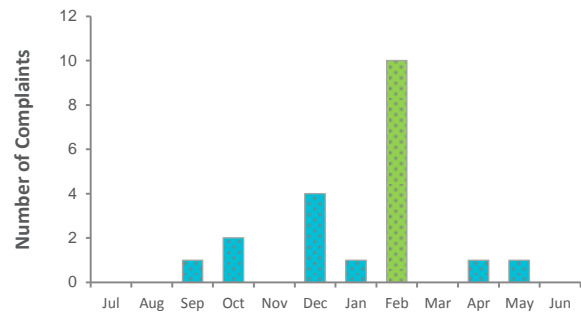


Figure 6.58.11-b Seasonal trend analysis



- ❖ Twenty complaints were received in this reporting period. Half of the complaints received were in February and can be attributed to a taste and odour event. All other complaints were for water discolouration, spread across the reporting period.

### 6.58.12. Catchment and source water issues

- ❖ The South Esk drinking water system is supplied by the South Esk River at Lake Trevallyn. The catchment covers an area of 912,685ha. Major land uses on the catchment include forestry, dairy farming, grazing and native forest. Other uses include aquaculture, mining, feeds lots and cropping. The drinking water catchment also receives the effluent of several sewage treatment plants. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ Trace levels of pesticides were detected in the South Esk catchment. Investigations were conducted in the distribution system of which all results were at levels well below the ADWG health limits.

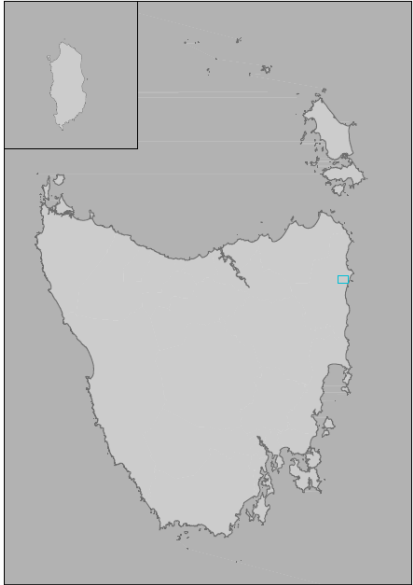
### 6.58.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.58.14. Future planning

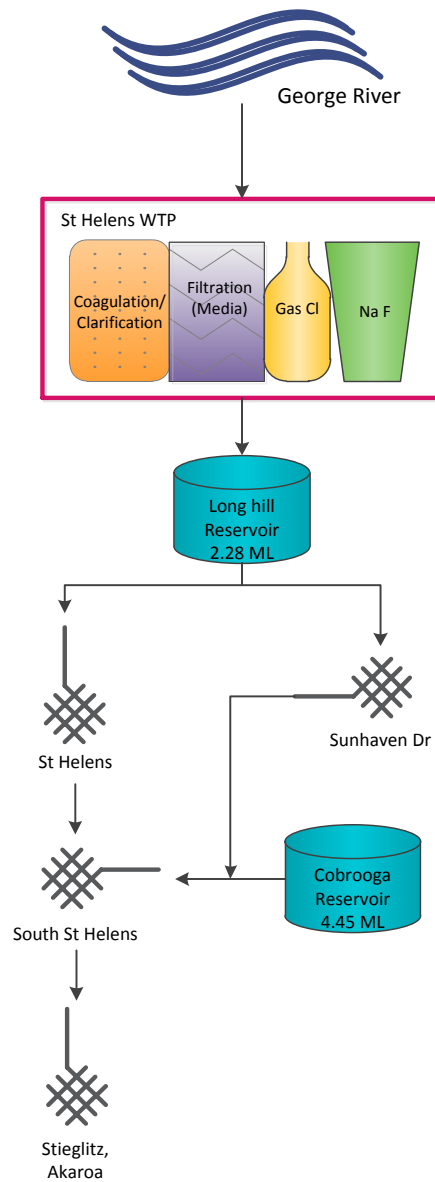
- ❖ No water quality improvement projects are planned for the current 2016–2018 PSP period.

### 6.59. St Helens drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	2001
	<b>Catchment</b>	Georges River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ St Helens</li> <li>❖ Stiglietz.</li> </ul>		

### 6.59.1. System description

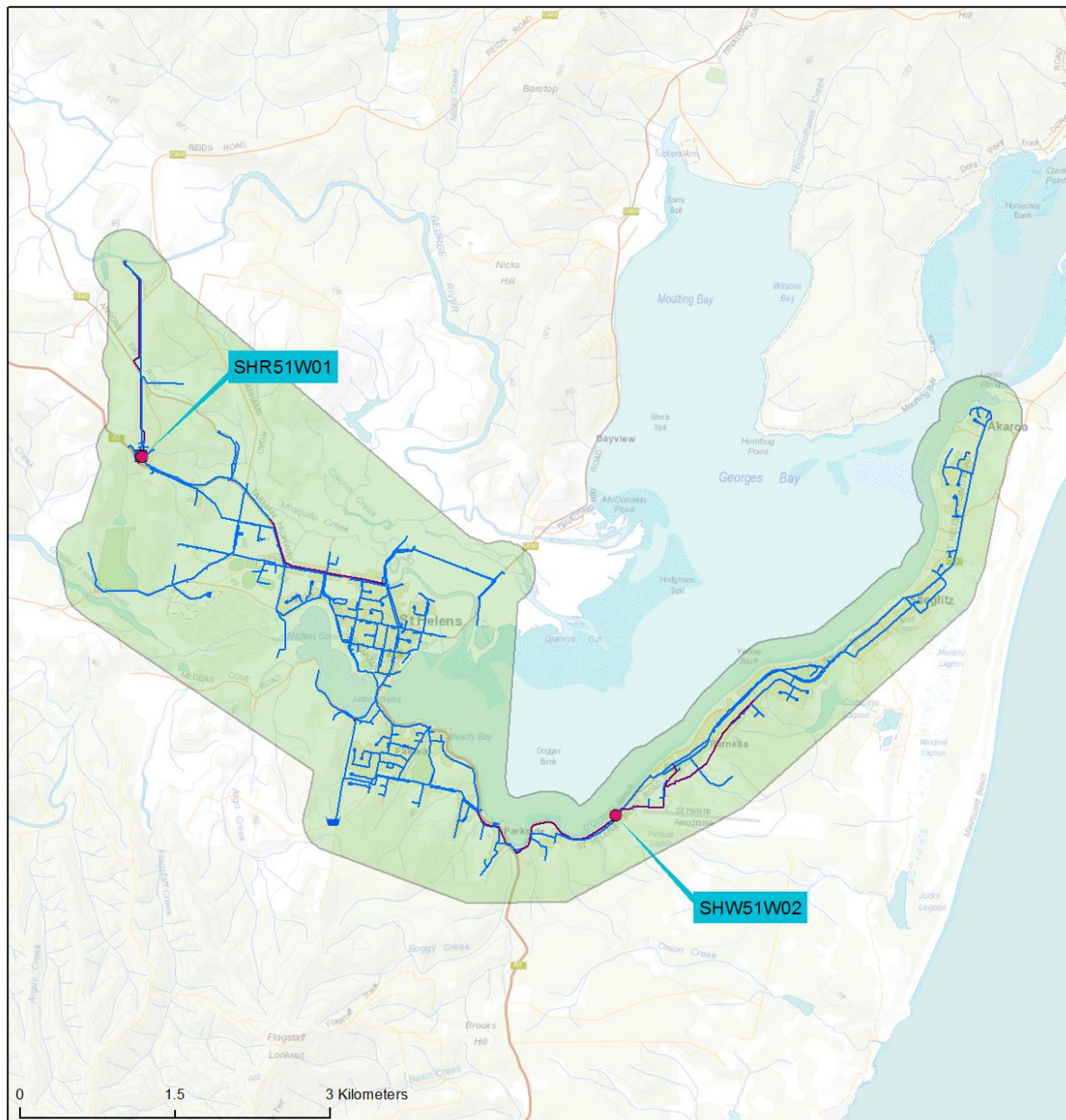
Figure 6.59.1-a St Helens system schematic



- ❖ **Catchment**  
The St Helens drinking water system is supplied by the George River.
- ❖ **Treatment**  
The St Helens WTP employs DAFF, gas chlorine disinfection and fluoridation by fluorosilicic acid.
- ❖ **Distribution**  
There are two roofed storages in the distributions system. The St Helens drinking water system supplies 2,001 connections.



Map 6.59.1-a St Helens monitoring zone



SHR51W01 = Longhill Reservoir, SHW51W02 = Stieglitz Beach

## 6.59.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.59.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	104	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	83	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting. # Pesticide testing was removed from the sampling program in June 2016.

## 6.59.3. Summary of historic total system performance

Table 6.59.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance*					
	2011–12	2012–13	2013–14	2014–15	2015–16	
Microbiological <sup>(1)</sup>	100% ●	99% ●	98% ●	100% ●	100% ●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing					
	Exceeding 1.5mg/L <sup>(a)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●
	within target range <sup>(b)</sup>	Not Recorded	Not Recorded	92% ●	97% ●	88.3% ●
	mean dose (mg/L) <sup>(c)</sup>	0.82 ●	0.89 ●	0.85 ●	0.90 ●	0.90 ●
	Distribution fluoride testing					
	Exceeding 1.5mg/L <sup>(a)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●
	within target range <sup>(b)</sup>	Not Recorded	Not Recorded	Not Recorded	97% ●	89.9% ●
mean dose (mg/L) <sup>(c)</sup>	Not Recorded	Not Recorded	Not Recorded	0.90 ●	0.93 ●	
Metals <sup>(3)</sup>	100% ●	100% ●	100% ●	100% ●	100% ●	
DBPs <sup>(3)</sup>	100% ●	100% ●	100% ●	100% ●	100% ●	
Pesticides <sup>(4)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●	
Complaints received <sup>(5)</sup>	6	3	4	2	0	
Public alerts issued <sup>(6)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.59.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 was not within target range and was marginally below the compliance target of greater than 90 per cent. Maintenance interruptions to supplies resulted in low fluoride levels for the few days following the repairs
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.59.5. Microbiological performance

Figure 6.59.5-a Microbiological compliance 2015–16

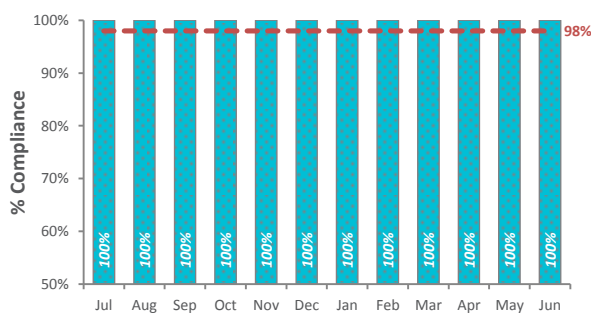


Figure 6.59.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.59.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.59.6-a Reticulation samples within target range

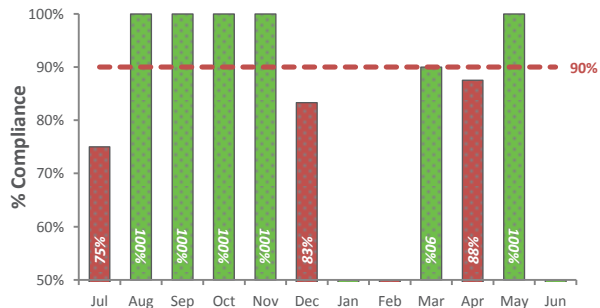


Figure 6.59.6-b Reticulation mean monthly dose (mg/L)

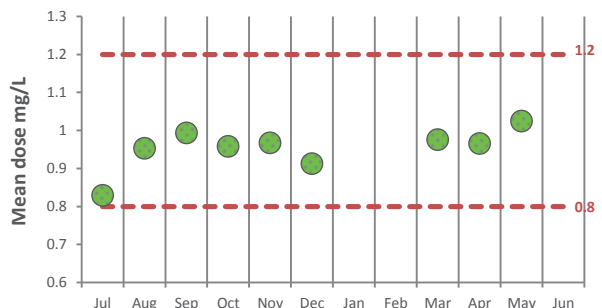


Figure 6.59.6-c Operational samples within target range

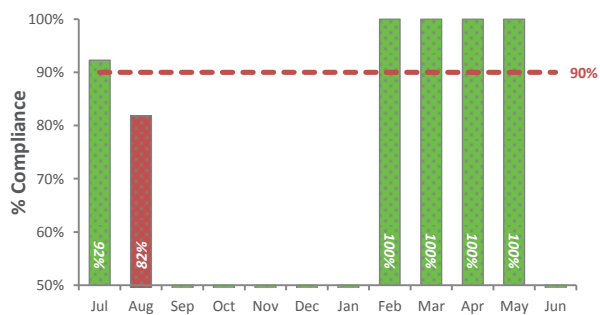
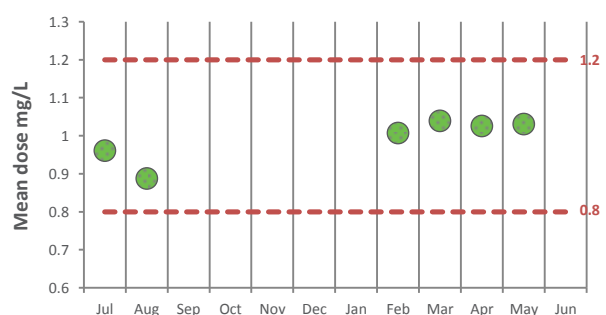


Figure 6.59.6-d Operational samples mean monthly dose (mg/L)



Note: **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station did not consistently achieve the regulatory target of greater than 90 per cent and is reflected in the distribution system
- ❖ From September 2015 to early February 2016, daily testing at the dosing station was undertaken but results were not recorded due to protected action
- ❖ Poor performance in July, August and December can be attributed to pump faults and blockages
- ❖ The fluoride system was shut down in June due to a leak and remains under maintenance
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.59.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.59.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	7.75	7	9
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	3	< 1	8
Lead	10	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	4	0	100	3.55	2	4.2
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	13.63	< 1	34
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	6
Trichloroacetic acid	100	µg/L	4	0	100	30	11	48
Total trihalomethanes	250	µg/L	4	0	100	49.75	30	96

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (••) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.59.8. General physical parameters

Table 6.59.8-a General physical performance

General physical parameters (2015–16)				
Parameter	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	102	0.75	0.05	1.4
Turbidity (NTU)	102	0.27	0.1	1.2
pH	102	7.22	6.45	7.89

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals were above minimum expectations and demonstrate protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

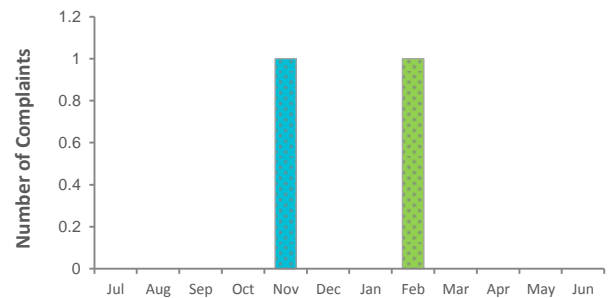
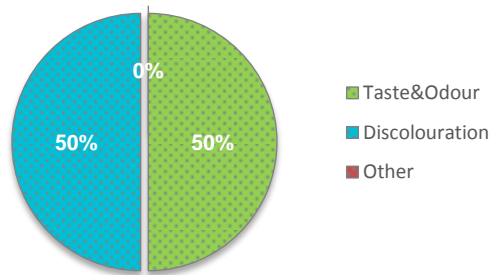
## 6.59.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

## 6.59.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period

### 6.59.11. Customer complaints



- ❖ Two water quality complaints were received during the reporting period.

### 6.59.12. Catchment and source water issues

- ❖ Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.


### 6.59.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.59.14. Future planning

- ❖ No water quality improvement projects are planned for the current 2016–2018 PSP period.

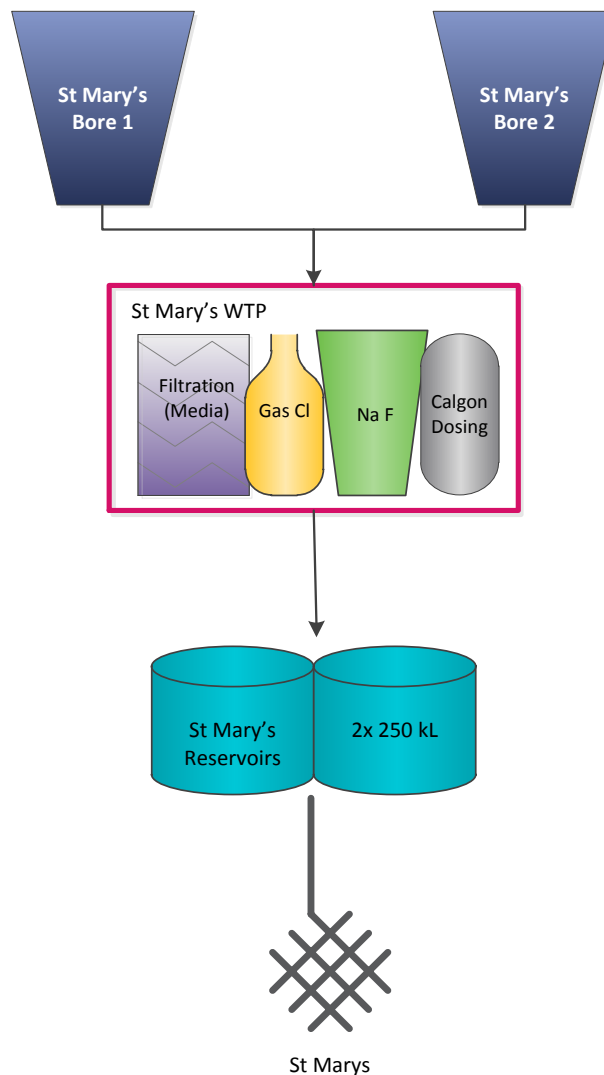
## 6.60. St Marys drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	448
	<b>Catchment</b>	Bore
	<b>Primary treatment</b>	Dynamic filter
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ St Marys.</li> </ul>		



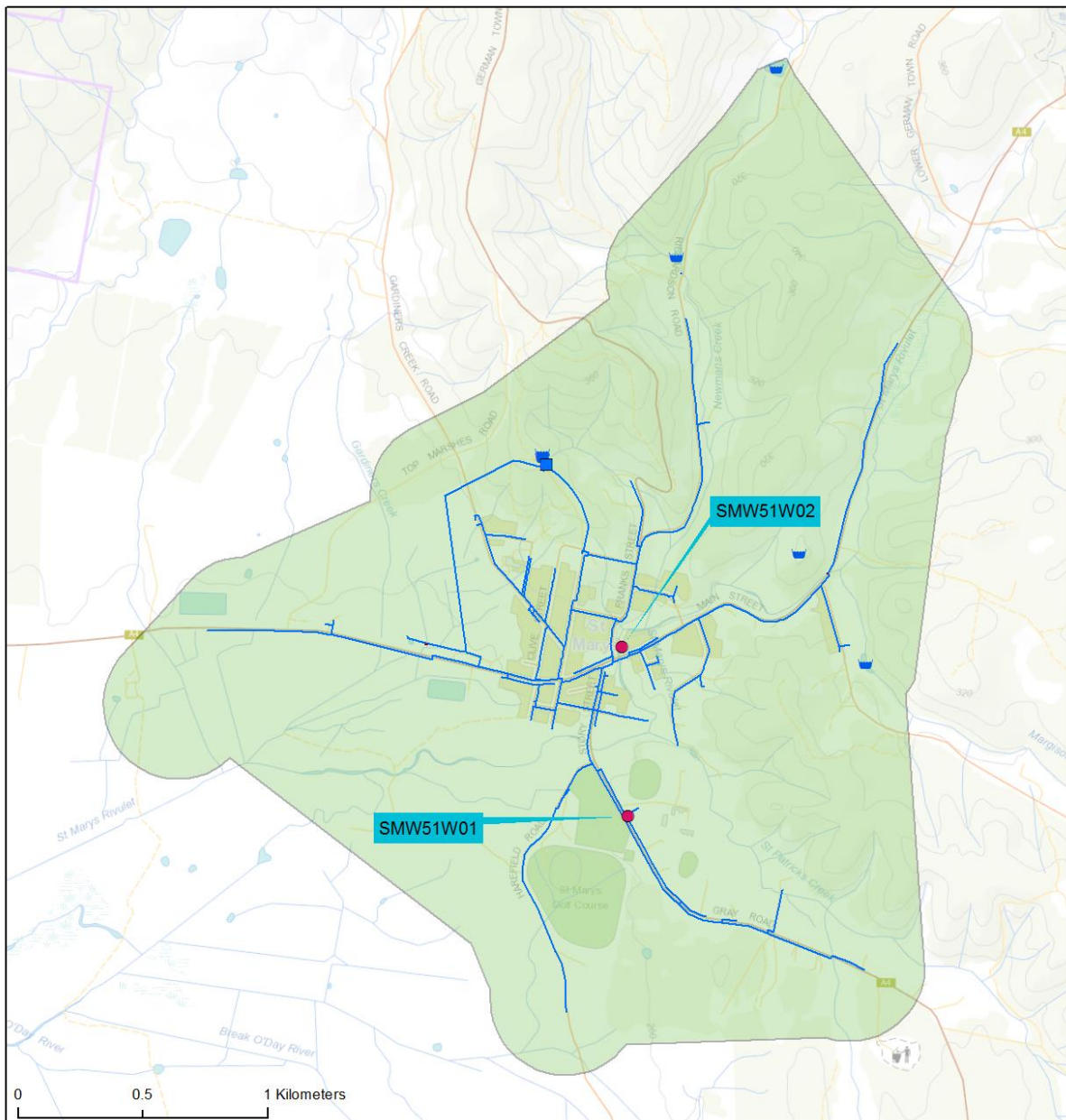
### 6.60.1. System description

Figure 6.60.1-a St Marys system schematic



- ❖ **Catchment**  
The St Marys drinking water system is supplied by a production bore and a back-up bore.
- ❖ **Treatment**  
The St Marys WTP employs filtration, gas chlorine disinfection and fluoridation by sodium fluoride.
- ❖ **Distribution**  
The system feeds the township of St Marys. There are two roofed reservoirs within the distribution system. The system supplies 448 connections.

Map 6.60.1—a St Marys monitoring zone



SMW51W01 = St Marys School, SMW51W02 = Park near Library

## 6.60.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.60.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	75	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	106	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly <sup>#</sup>	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

<sup>#</sup> Routine Pesticide testing was removed from the reticulation sampling program in May 2016.

## 6.60.3. Summary of historic total system performance

Table 6.60.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance*					
	2011–12	2012–13	2013–14	2014–15	2015–16	
Microbiological <sup>(1)</sup>	100% ●	100% ●	100% ●	100% ●	100% ●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing					
	Exceeding 1.5mg/L <sup>(a)</sup>	0 ●	0 ●	0 ●	1 ●	0 ●
	within target range <sup>(b)</sup>	Not Recorded	Not Recorded	52% ●	70% ●	93.1% ●
	mean dose (mg/L) <sup>(c)</sup>	0.84 ●	0.78 ●	0.73 ●	0.74 ●	1.00 ●
	Distribution fluoride testing					
	Exceeding 1.5mg/L <sup>(a)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●
	within target range <sup>(b)</sup>	Not Recorded	Not Recorded	Not Recorded	57% ●	70.8% ●
mean dose (mg/L) <sup>(c)</sup>	Not Recorded	Not Recorded	Not Recorded	0.72 ●	0.78 ●	
Metals <sup>(3)</sup>	100% ●	100% ●	100% ●	100% ●	100% ●	
DBPs <sup>(3)</sup>	100% ●	100% ●	100% ●	100% ●	100% ●	
Pesticides <sup>(4)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●	
Complaints received <sup>(5)</sup>	1	4	4	4	3	
Public alerts issued <sup>(6)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.60.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance at the dosing point achieved the compliance target of greater than 90 per cent, and the mean dose was within target range. Performance was not consistent within the distribution network and is currently under review
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.60.5. Microbiological performance

Figure 6.60.5-a Microbiological compliance 2015–16

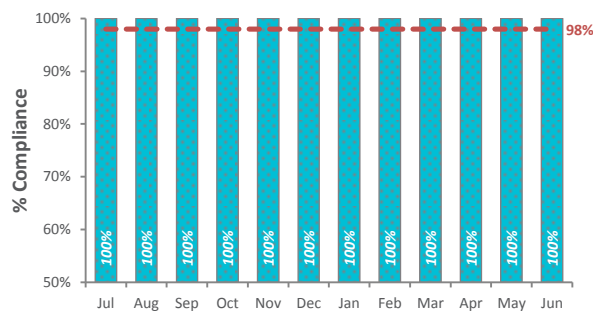
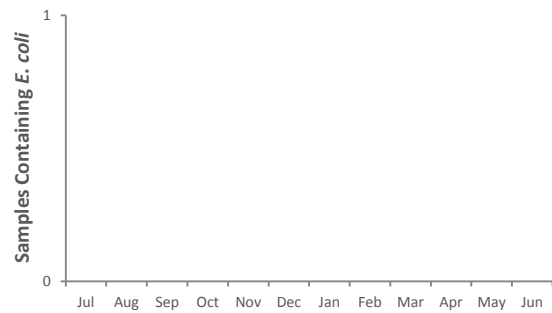


Figure 6.60.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.60.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.60.6-a Reticulation samples within target range

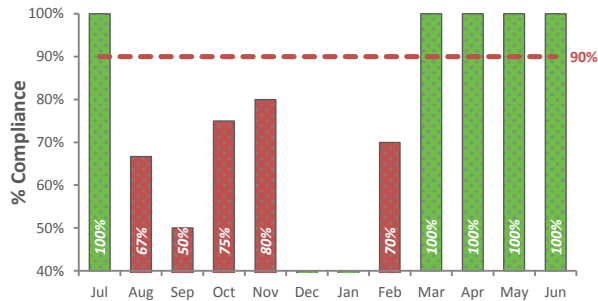


Figure 6.60.6-b Reticulation mean monthly dose (mg/L)

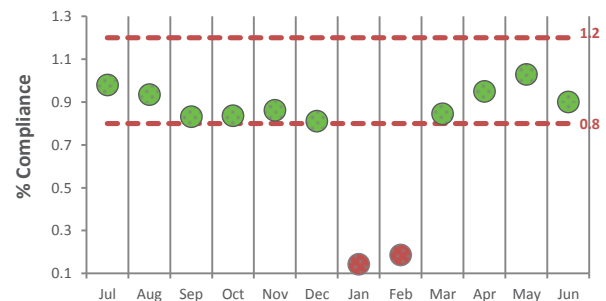


Figure 6.60.6-c Operational samples within target range

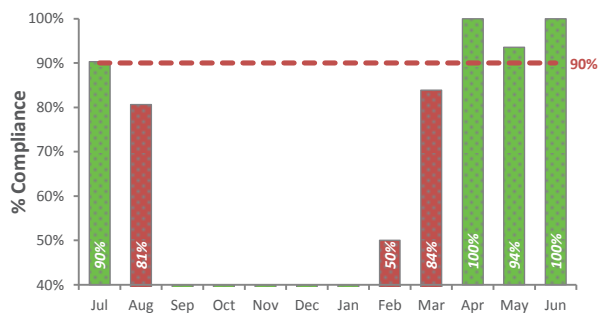
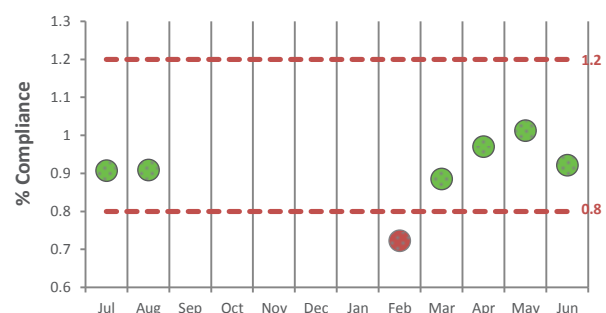


Figure 6.60.6-d Operational samples mean monthly dose (mg/L)



Note: **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. **(Operational)** samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ Performance in the distribution network is variable and is currently under review
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L
- ❖ From September 2015 to early February 2016, daily testing at the dosing station was undertaken but results were not recorded due to protected action. Fluoride dosing was switched off with agreement from DHHS from 18 December 2015 to 10 February 2016
- ❖ Maintenance issues prevented fluoride dosing from recommencing until 16 February 2016. Low results in February are attributed to the phased approach to bring fluoride back online during February.

## 6.60.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.60.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	147.25	146	150
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	6.75	4	15
Lead	10	µg/L	4	0	100	< 0.5	< 0.5	1.1
Manganese	500	µg/L	4	0	100	10.82	8.7	14
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	< 4	2	< 4
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	4	0	100	7.33	5.7	9.7

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.60.8. General physical parameters

**Table 6.60.8-a General physical performance**

General physical parameters (2015–16)				
Parameters	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	76	0.37	0.05	1.08
Turbidity (NTU)	76	0.84	0.1	4
pH	76	7.04	6.41	7.79

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. **(Chlorine residuals)** are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. **(Turbidity)** levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. **(pH)** should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU. There were 13 samples where turbidity spiked above 1 NTU with the highest at 4 NTU, on these occasions chlorine residuals remained above 0.1 mg/L
- ❖ Mean chlorine residuals measured across the distribution network were above the minimum expectations, and demonstrate a good level of protection against re-contamination
- ❖ pH levels are generally maintained within the recommended optimal range.

### 6.60.9. Aesthetic issues

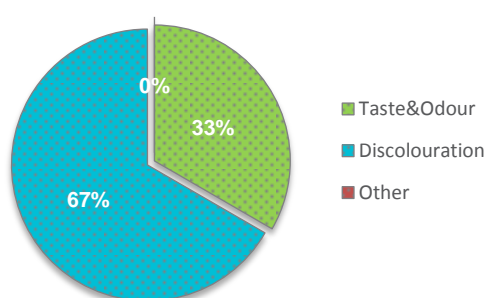
- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.60.10. System incidents and issues

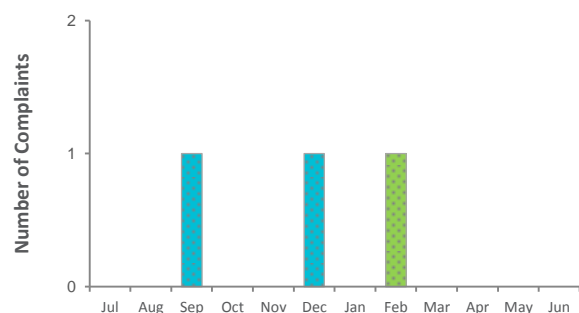
- ❖ No water quality incidents occurred in the reporting period.

### 6.60.11. Customer complaints

**Figure 6.60.11-a Complaint classification**



**Figure 6.60.11-b Seasonal trend analysis**



- ❖ Three complaints were received in this reporting period. Two complaints related to discolouration issues. The other complaint related to a chlorine taste issue in the water.

#### 6.60.12. Catchment and source water issues

- ❖ The St Marys drinking water system is supplied by a production bore and a back-up bore. Activities in the (surface) drinking water catchment include intensive agriculture, mining and Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.60.13. Infrastructure and operational changes

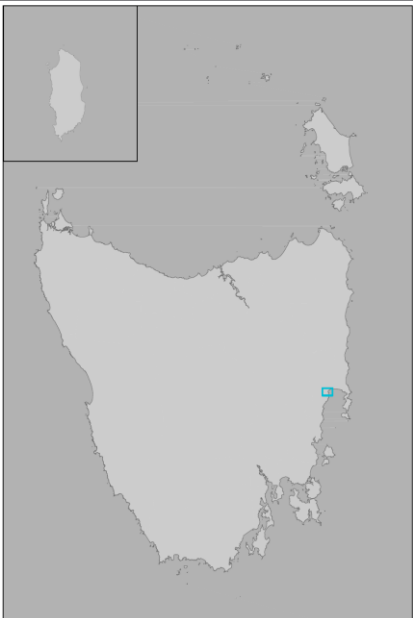
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.60.14. Future planning

- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

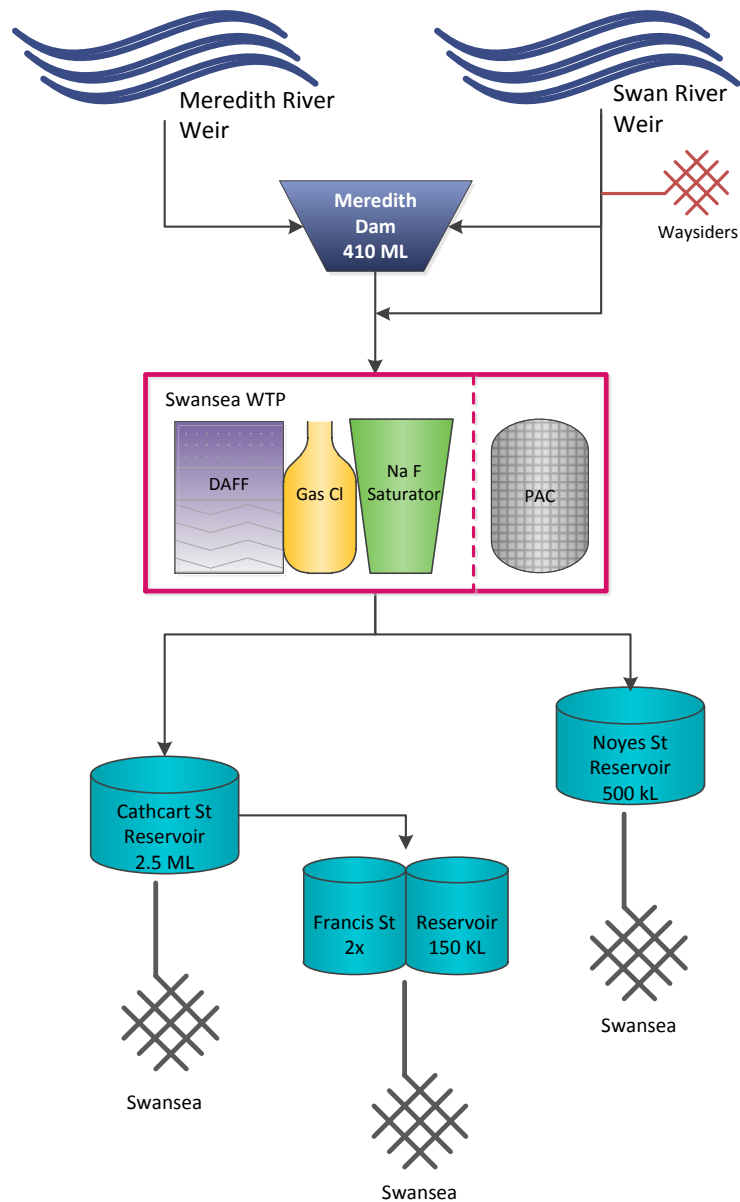


### 6.61. Swansea drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	804
	<b>Catchment</b>	Swan River + Meredith River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	PAC available
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Swansea</li> </ul>		

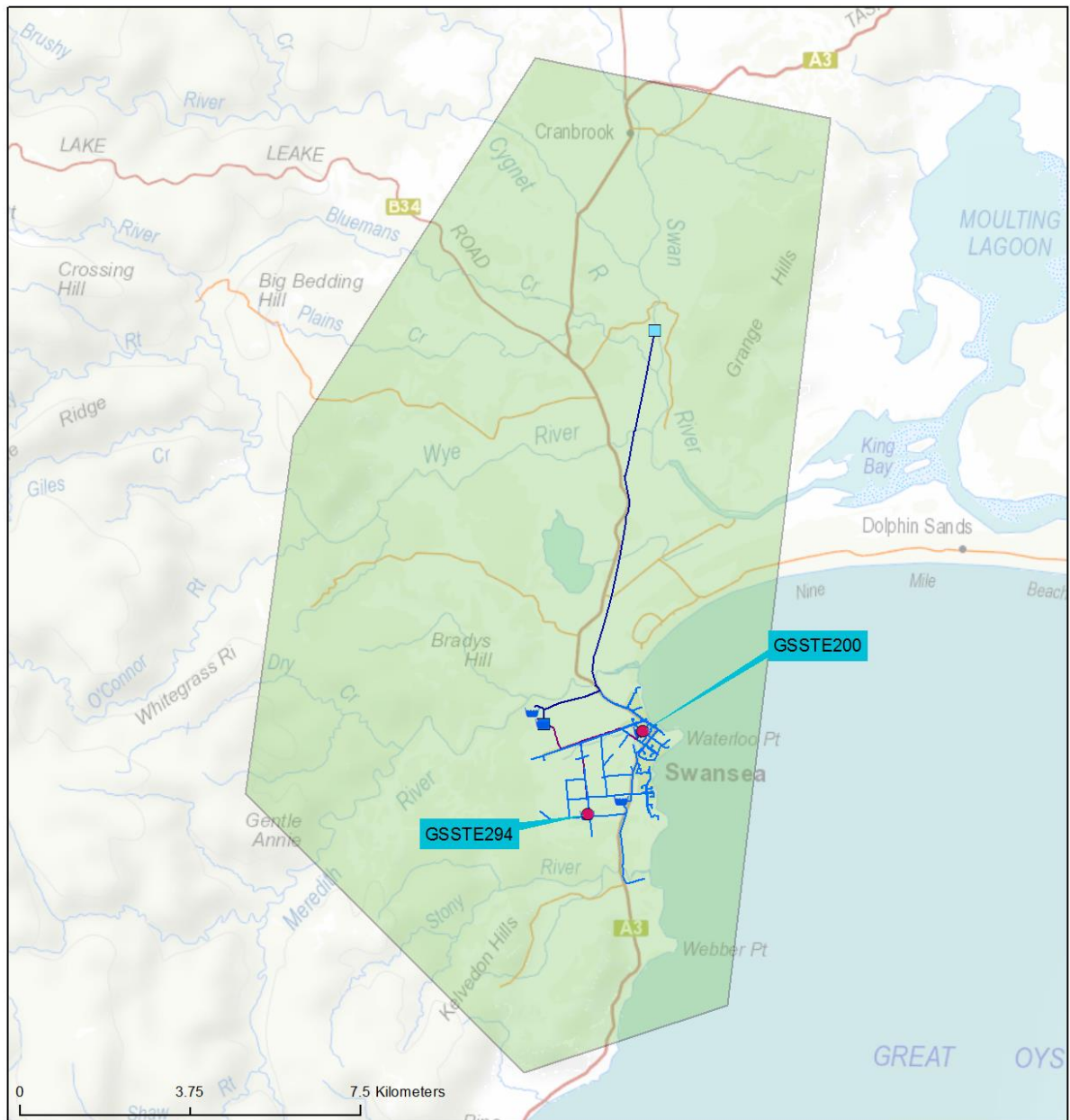
### 6.61.1. System description

Figure 6.61.1-a Swansea System schematic



- ❖ **Catchment**  
The Swansea drinking water system is supplied by the Swan and Meredith Rivers via the Meredith Dam.
- ❖ **Treatment**  
The Swansea WTP employs DAFF, gas chlorine disinfection and fluoridation by sodium fluoride.
- ❖ **Distribution**  
There are three roofed service reservoirs in the distribution system. The Swansea drinking water system supplies 804 connections.

**Map 6.61.1—a Swansea monitoring zone**



GSSTE200 = Noyse St (Regular Compliance Point) – GSSTE294 = Cathcart St (Fluoride sample point)

## 6.61.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.61.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	59	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	106	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.61.3. Summary of historic total system performance

Table 6.61.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12	2012–13		2013–14		2014–15		2015–16			
Microbiological <sup>(1)</sup>	–	100%	●	99.5%	●	100%	●	100%	●		
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	–	0	●	0	●	0	●	0	●	
	within target range <sup>(b)</sup>	–	88.8%	●	100%	●	99.2%	●	95.6%	●	
	mean dose (mg/L) <sup>(c)</sup>	–	0.94	●	1.0	●	0.96	●	0.92	●	
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not required	Not required	Not reported	78.8%	●	100%	●	100%	●	
mean dose (mg/L) <sup>(c)</sup>	Not required	Not required	Not reported	1.06	●	0.96	●	0.96	●		
Metals <sup>(3)</sup>	–	100%	●	100%	●	100%	●	100%	●		
DBPs <sup>(3)</sup>	–	100%	●	100%	●	100%	●	100%	●		
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	N/A	N/A			
Complaints received <sup>(5)</sup>	Not recorded	Not recorded	8		2		1				
Public alerts issued <sup>(6)</sup>	–	0	●	0	●	0	●	0	●		

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.61.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits

#### 6.61.5. Microbiological performance

Figure 6.61.5-a Microbiological compliance 2015–16

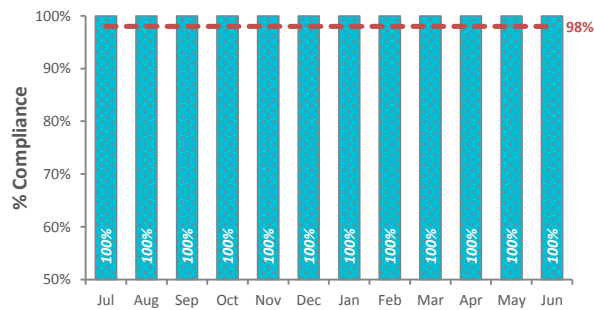


Figure 6.61.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.61.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.61.6-a Reticulation samples within target range

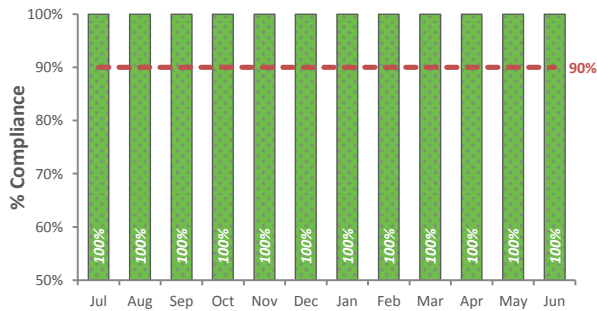


Figure 6.61.6-b Reticulation mean monthly dose (mg/L)

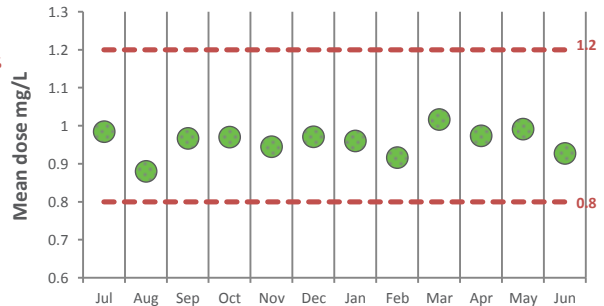


Figure 6.61.6-c Operational samples within target range

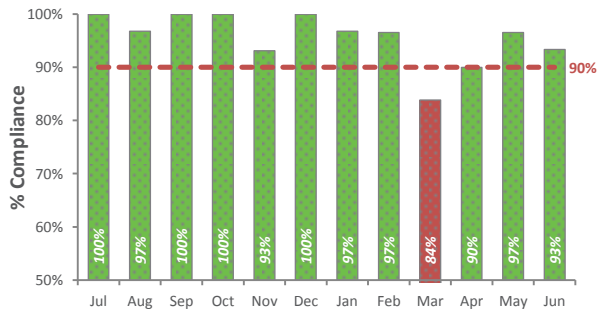
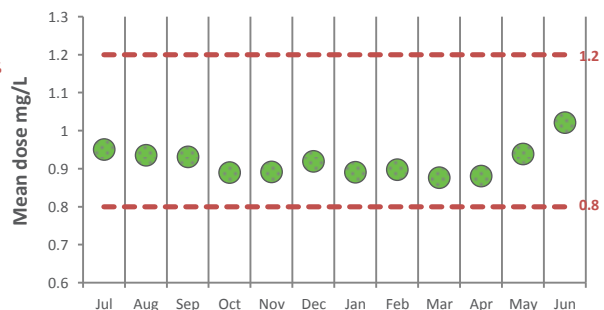


Figure 6.61.6-d Operational samples mean monthly dose (mg/L)



**Note:** (**Reticulation**) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (**Operational**) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.61.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.61.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	10	10	10
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	14.5	8	21
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	0.6
Manganese	500	µg/L	2	0	100	2.12	< 0.5	4
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	0.7
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	9	7	10
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	7.37	< 7	12
Total trihalomethanes	250	µg/L	4	0	100	24.75	10	45

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (..) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.61.8. General physical parameters

Table 6.61.8-a General physical performance

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	59	0.58	0.05	1.37
Turbidity (NTU)	60	0.48	0.1	2.3
pH	60	7.18	6.56	7.74

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Swansea distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.61.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.61.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.61.11. Customer complaints

Figure 6.61.11-a Complaint classification

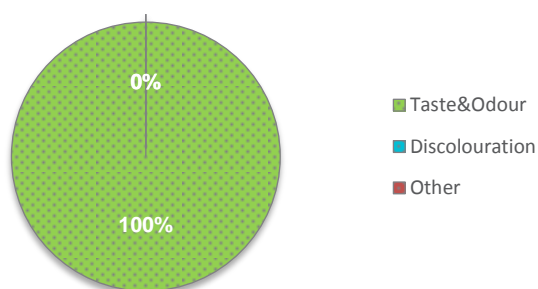
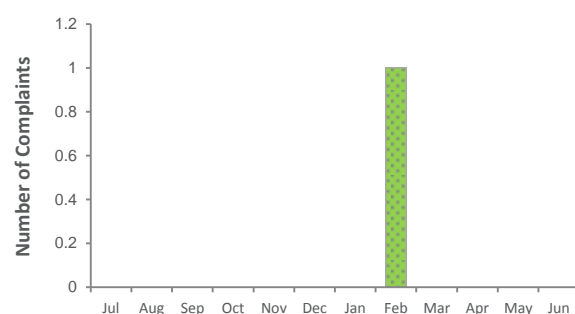


Figure 6.61.11-b Seasonal trend analysis



- ❖ One complaint was received in this reporting period related to taste and odour issues.



#### 6.61.12. Catchment and source water issues

- ❖ The Swansea drinking water system draws water from the Meredith Dam, which is supplied by water pumped from the Swan and occasionally Meredith Rivers
- ❖ The Swan River catchment covers an area of 57,335ha. Activities in the catchment include agriculture, grazing, viticulture, walnut farming, forestry and some recreation
- ❖ The Meredith River catchment covers an area of 8720ha, and is mainly native bushland with some grazing and forestry activity. Settling in the Meredith Dam is currently limited as the full storage level of the dam had been reduced due to leakage and dam structural issues. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.61.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.61.14. Future planning

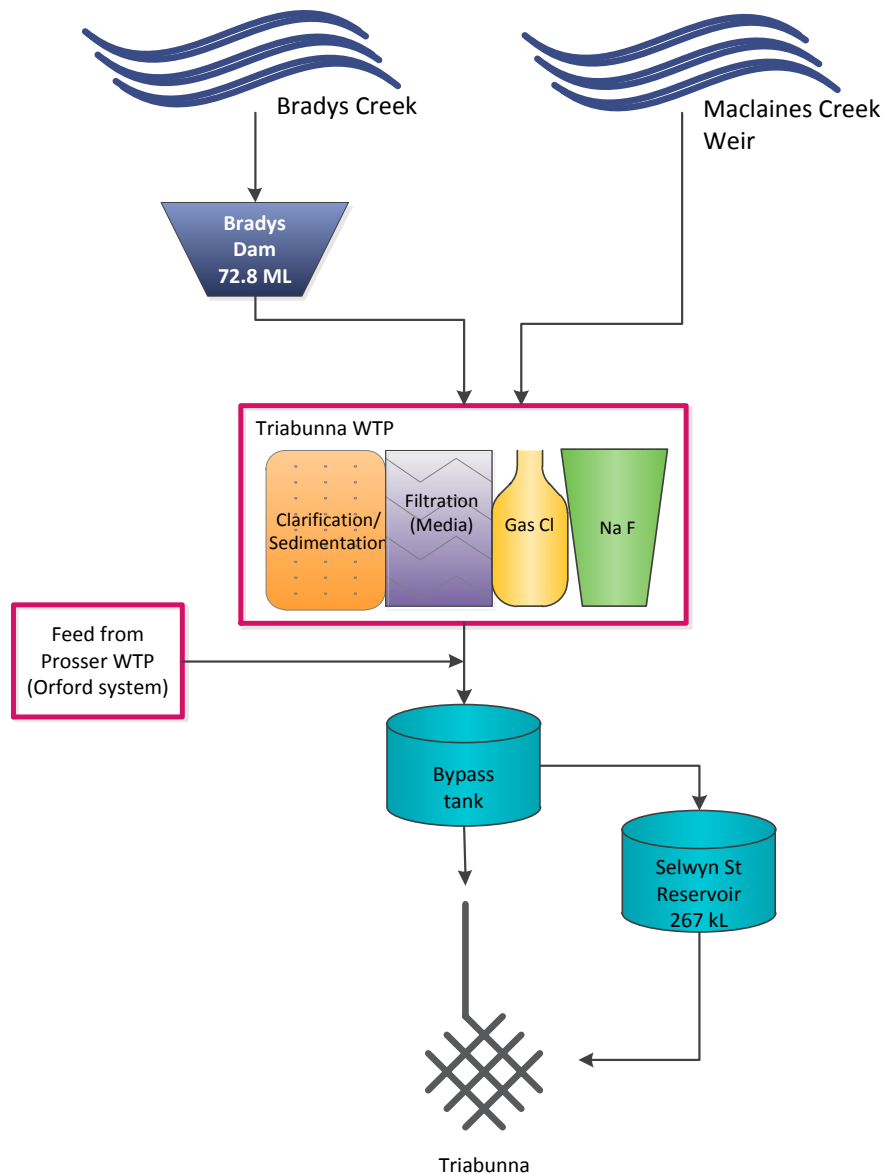
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.62. Triabunna drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	511
	<b>Catchment</b>	Maclaines & Bradys Creek
	<b>Primary treatment</b>	Clarification, filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Triabunna</li> </ul>		

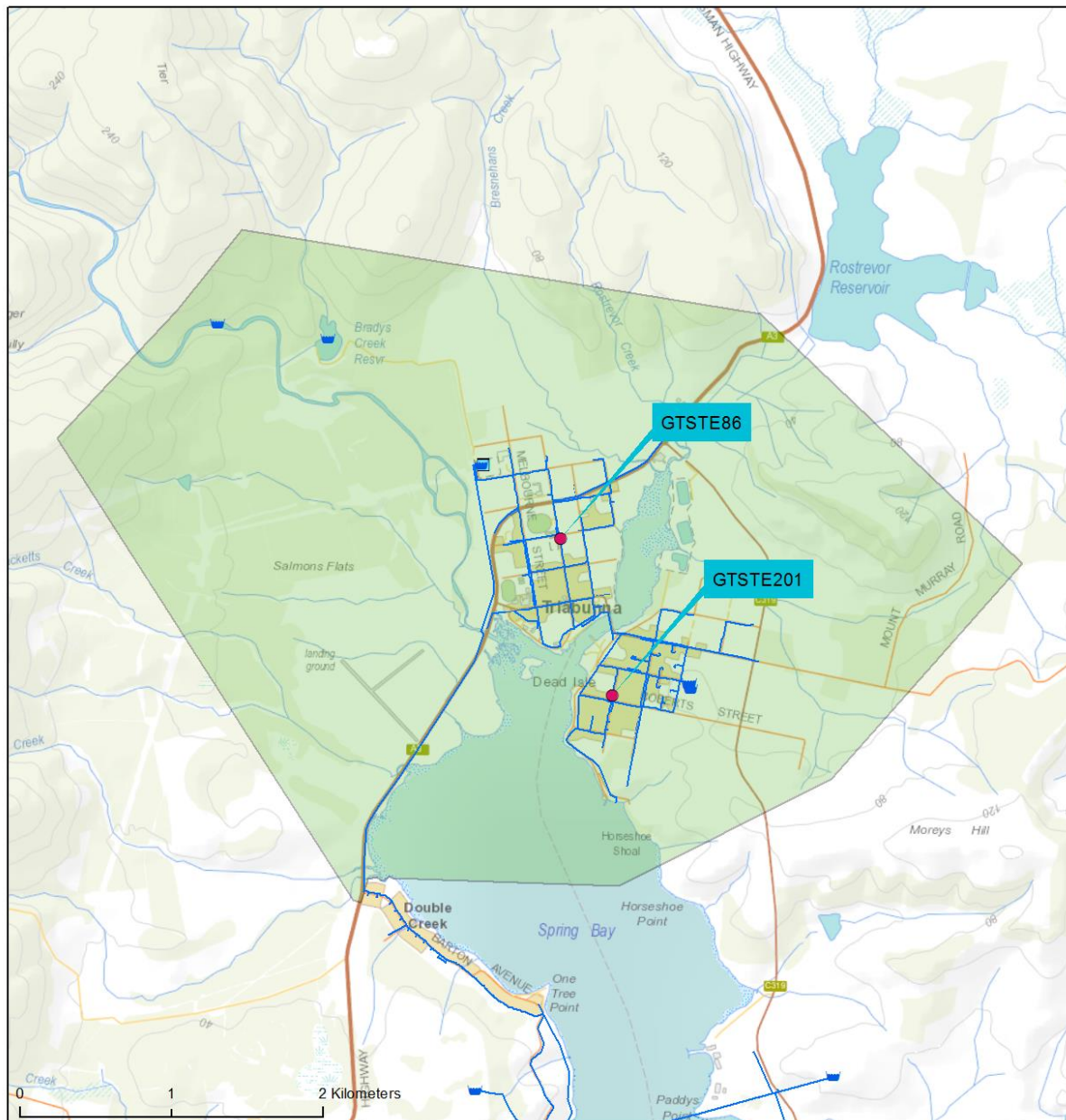
### 6.62.1. System description

Figure 6.62.1-a Triabunna system schematic



- ❖ **Catchment**  
The Triabunna drinking water system is supplied by Maclaines & Bradys Creek.
- ❖ **Treatment**  
The Triabunna WTP employs coagulation, filtration and chlorination using chlorine gas as well as fluoridation via sodium fluoride dosing.
- ❖ **Distribution**  
The Triabunna drinking water system supplies 511 connections. If required, water can be supplied to the Triabunna system from the Orford drinking water system.

Map 6.62.1—a Triabunna monitoring zone



GTSTE86 = Wellington St (Regular Compliance Point) – GTSTE201 = Sewer Pump Station Tap (fluoride site only)

## 6.62.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.62.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	53	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	108	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.62.3. Summary of historic total system performance

Table 6.62.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)											
Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	84.2%	●	89.6%	●	94.3%	●	87.2%	●	90.8%	●
	mean dose (mg/L) <sup>(c)</sup>	0.93	●	0.90	●	0.97	●	0.92	●	0.99	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Required		Not Required		Not Reported		89.1%	●	97.2%	●
mean dose (mg/L) <sup>(c)</sup>	Not Required		Not Required		Not Reported		1.00	●	1.05	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	N/A		N/A		N/A		N/A		N/A		
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		0		0		1		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.62.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve >98 per cent
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent.

#### 6.62.5. Microbiological performance

Figure 6.62.5-a Microbiological compliance 2015–16

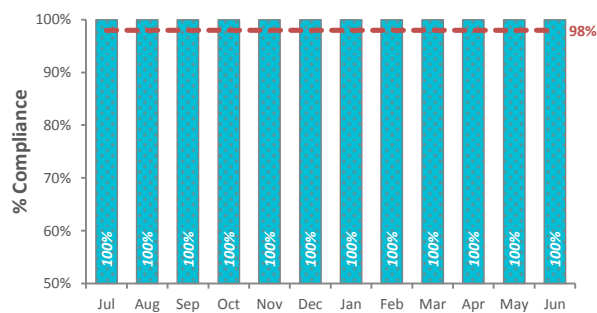
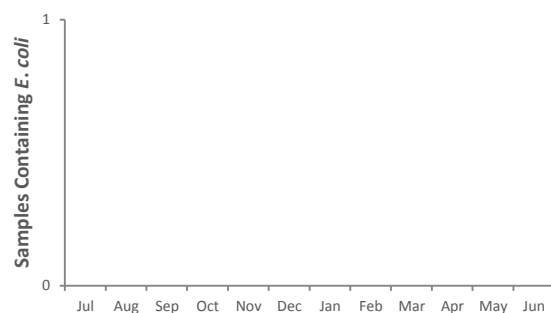


Figure 6.62.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.62.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.62.6-a Operational samples within target range

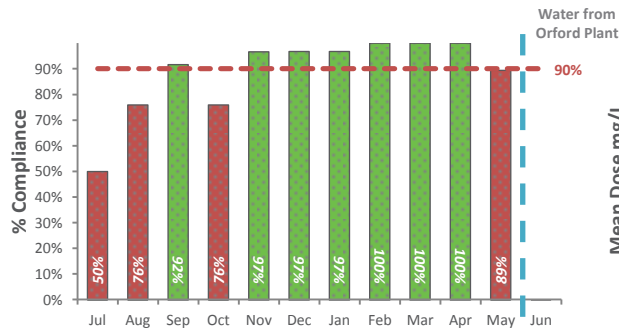


Figure 6.62.6-b Operational mean monthly dose (mg/L)

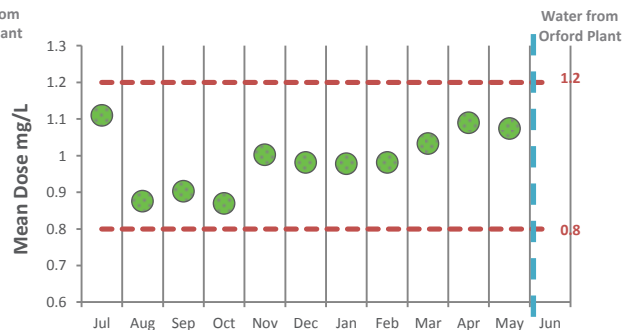


Figure 6.62.6-c Reticulation samples within target range

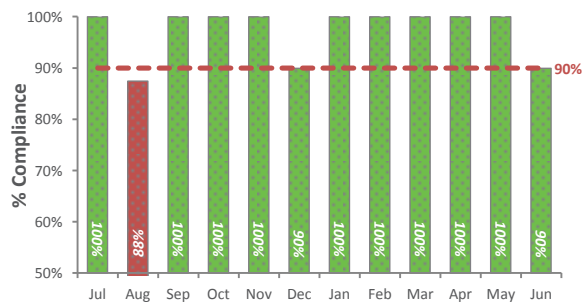
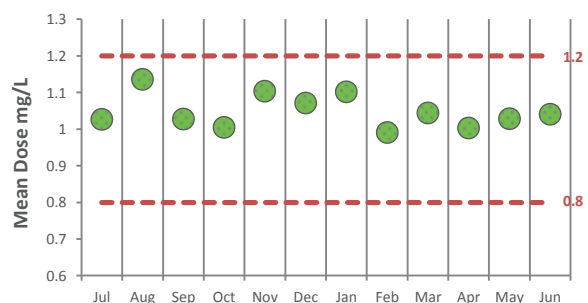


Figure 6.62.6-d Reticulation samples mean monthly dose (mg/L)



Note: (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Fluoride compliance at the dosing station achieved the regulatory target of >90 per cent of sample within target range
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L
- ❖ Fluoridated water was supplied from the Orford WTP during June 2016.

## 6.62.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.62.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	13	13	13
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	8	6	10
Lead	10	µg/L	2	0	100	1.9	0.8	3
Manganese	500	µg/L	2	0	100	2.15	1.4	2.9
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	0.6
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	15.5	9	26
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	13.75	6	17
Total trihalomethanes	250	µg/L	4	0	100	61	42	83

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (+) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

## 6.62.8. General physical parameters

**Table 6.62.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	53	0.64	0.18	1.24
Turbidity (NTU)	54	0.34	0.1	0.8
pH	54	7.14	6.62	7.95

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ Mean turbidity levels in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ pH levels are maintained within the recommended optimal range.



### 6.62.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.62.10. System incidents and issues

- ❖ No water quality issues were identified.

### 6.62.11. Customer complaints

Figure 6.62.11-a Complaint classification

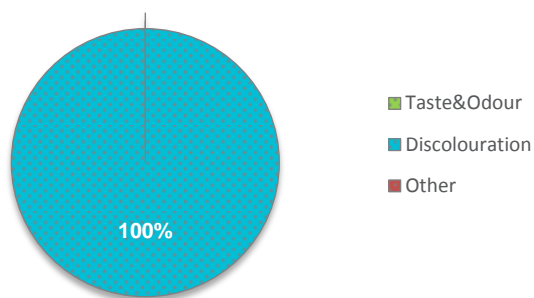
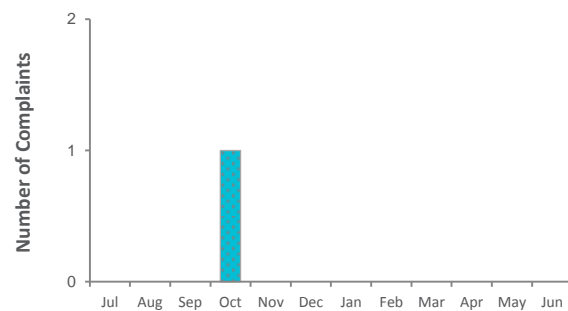


Figure 6.62.11-b Seasonal trend analysis



- ❖ One complaint was received in this reporting period relating to discoloured water.

### 6.62.12. Catchment and source water issues

- ❖ The Triabunna system receives water from Bradys Creek (dam) and Maclaines Creek (Weir). The catchment covers 6154ha, and is predominantly bushland forest with some forestry activities. There are some issues associated with aesthetic water quality from Bradys Dam.
- ❖ No health regulated pesticides were detected in the raw water monitoring program.


### 6.62.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.62.14. Future planning

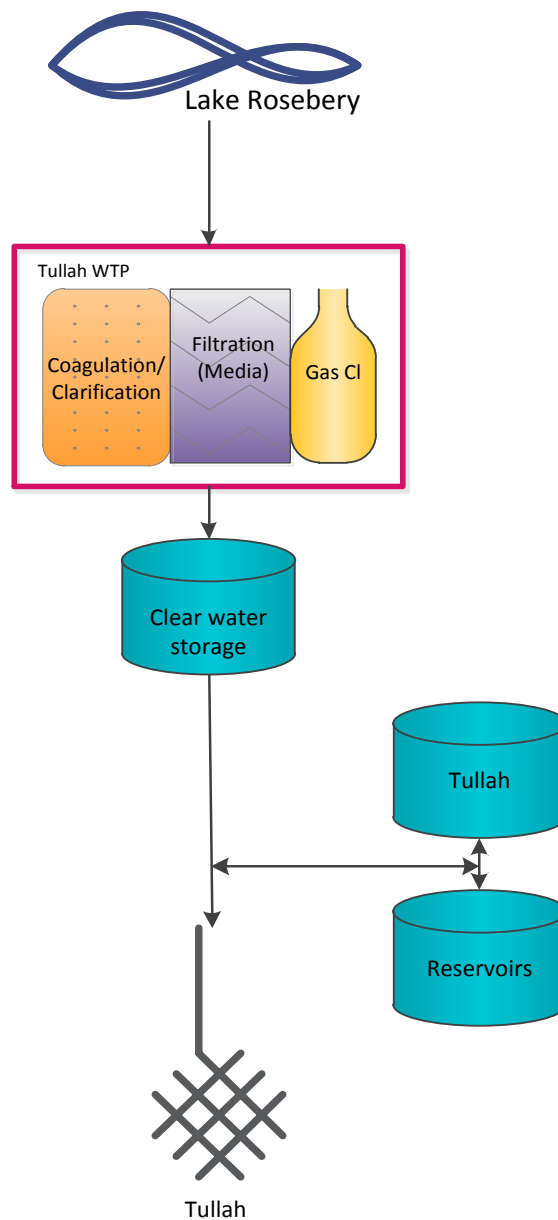
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

### 6.63. Tullah drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	237
	<b>Catchment</b>	Lake Rosebery
	<b>Primary treatment</b>	Coagulation/clarification
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Tullah.</li> </ul>		

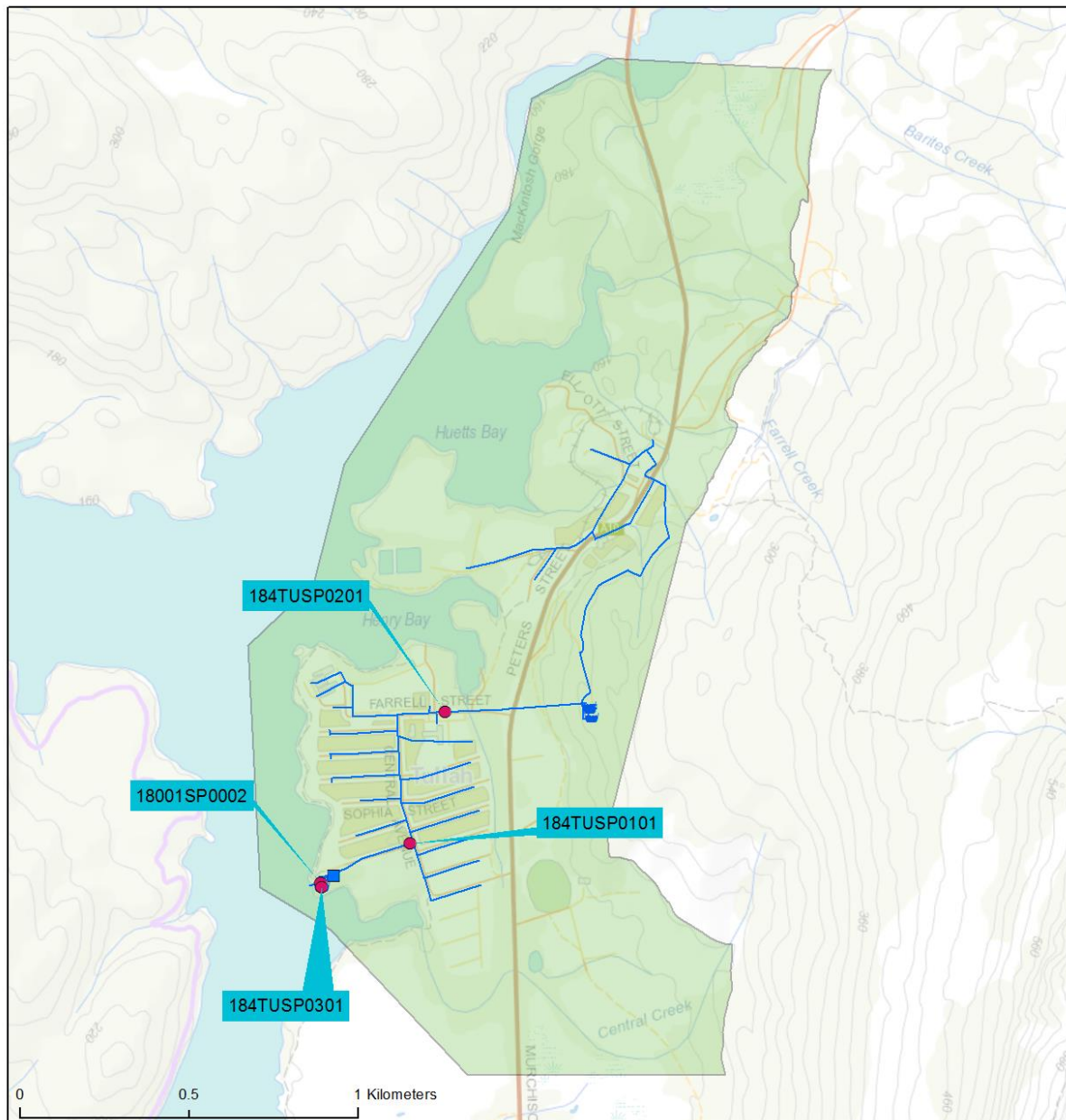
### 6.63.1. System description

Figure 6.63.1-a Tullah system schematic



- ❖ **Catchment**  
The Tullah drinking water system is supplied by Lake Rosebery. The drinking water catchment is predominantly bushland.
- ❖ **Treatment**  
The Tullah WTP employs coagulation, clarification, media filtration and chlorine gas disinfection.
- ❖ **Distribution**  
Treated water is stored in roofed clear water storage and there are two roofed reservoirs within the distribution system. The Tullah drinking water system supplies 237 connections.

Map 6.63.1—a Tullah monitoring zone



184TUSP0301 = WTP Water Storage, 184TUSP0201 = Farrell St, 18001SP0002 = Clear Water Outlet, 184TUSP0101 = Bluff St

## 6.63.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.63.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	203	0	
Fluoride <sup>(2)</sup>	N/A	N/A	–	–	–	
DBPs <sup>(3)</sup>	96.3%	No ●	Monthly	34	5	
Metals <sup>(4)</sup>	100%	Yes ●	Monthly	19	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.63.3. Summary of historic total system performance

Table 6.63.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
Microbiological <sup>(1)</sup>	100%	●	100%	●	98.9%	●	100%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Metals <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●	100%	●
DBPs <sup>(3)</sup>	N/A	N/A	100%	●	99.2%	●	96.3%	●	96.3%	●
Pesticides <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		0		0		1	
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.63.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 was 96.3 per cent and does not comply with ADWG. Five detections above ADWG health limits were recorded during this reporting period.

#### 6.63.5. Microbiological performance

Figure 6.63.5-a Microbiological compliance 2015–16

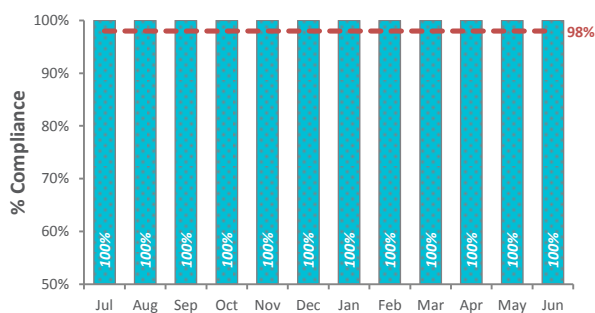


Figure 6.63.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.63.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.63.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.63.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	7	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	19	0	100	< 1	< 1	< 1
Barium	2000	µg/L	19	0	100	4.42	3	6
Cadmium	2	µg/L	19	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	19	0	100	< 1	< 1	< 1
Copper	2000	µg/L	7	0	100	< 1	< 1	2
Lead	10	µg/L	19	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	19	0	100	7.13	4.3	12.3
Mercury	1	µg/L	19	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	7	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	19	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	19	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	34	1	97	20.59	< 1	110
Monochloroacetic acid	150	µg/L	34	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	34	4	88	55.76	18	120
Total trihalomethanes	250	µg/L	34	0	100	109.76	43	170

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ Disinfection by-products were detected above ADWG health limits in August – October 2015 and again in January 2016. All detected were haloacetic acids. The filtration media was replaced toward the end of the reporting period. It is anticipated the new filter media will improve the removal of DBP precursors and improve performance.

### 6.63.8. General physical parameters

**Table 6.63.8-a General physical performance**

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	204	0.64	0.05	3.56
Turbidity (NTU)	200	0.77	0.2	6.8
pH	200	7.38	6.87	7.88

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Tullah distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.63.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.63.10. System incidents and issues

**Table 6.63.10-a Identified incidents and issues**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
11/08/2015	Dichloroacetic acid 110 µg/L	Ongoing monitoring of filtration performance and disinfection. Filtration processes are monitored to ensure DBP precursors are removed. Chlorine residuals are monitored daily to maintain a consistent residual due to current supply arrangements. The filter media was replaced in May 2016.	Yes	Yes
11/08/2015	Trichloroacetic acid 120 µg/L		Yes	Yes
22/09/2015	Trichloroacetic acid 110 µg/L		Yes	Yes
06/10/2015	Trichloroacetic acid 100 µg/L		Yes	Yes
28/01/2016	Trichloroacetic acid 120 µg/L		Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health regulated parameters.



### 6.63.11. Customer complaints

Figure 6.63.11-a Complaint classification

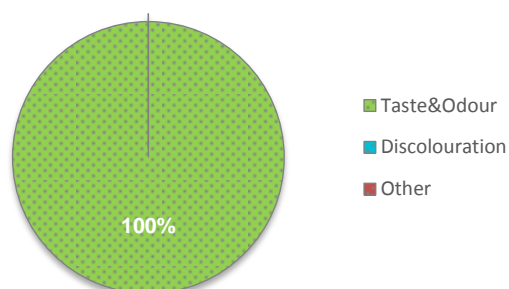


Figure 6.63.11-b Seasonal trend analysis



- ❖ One complaint was received in the reporting period. The complaint related to a customer dissatisfied with the taste and odour of the water.

### 6.63.12. Catchment and source water issues

- ❖ The Tullah drinking water system is supplied by Lake Rosebery. Lake Rosebery is a large, stable body of water controlled by Hydro Tasmania. Levels may fluctuate depending on power generation. The lake's catchment is predominantly native bushland within the state reserve estate
- ❖ No health regulated pesticides were detected from the raw water monitoring program above the ADWG.

### 6.63.13. Infrastructure and operational changes

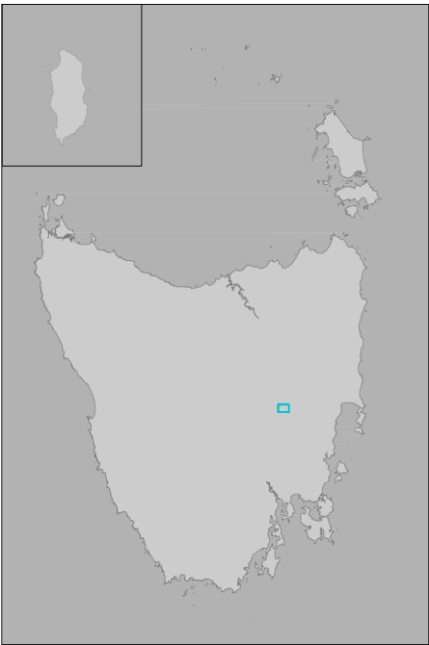
- ❖ The water treatment plant filtration media was replaced during May 2016.

### 6.63.14. Future planning

Table 6.63.14-a Future Planning for the Tullah drinking water System

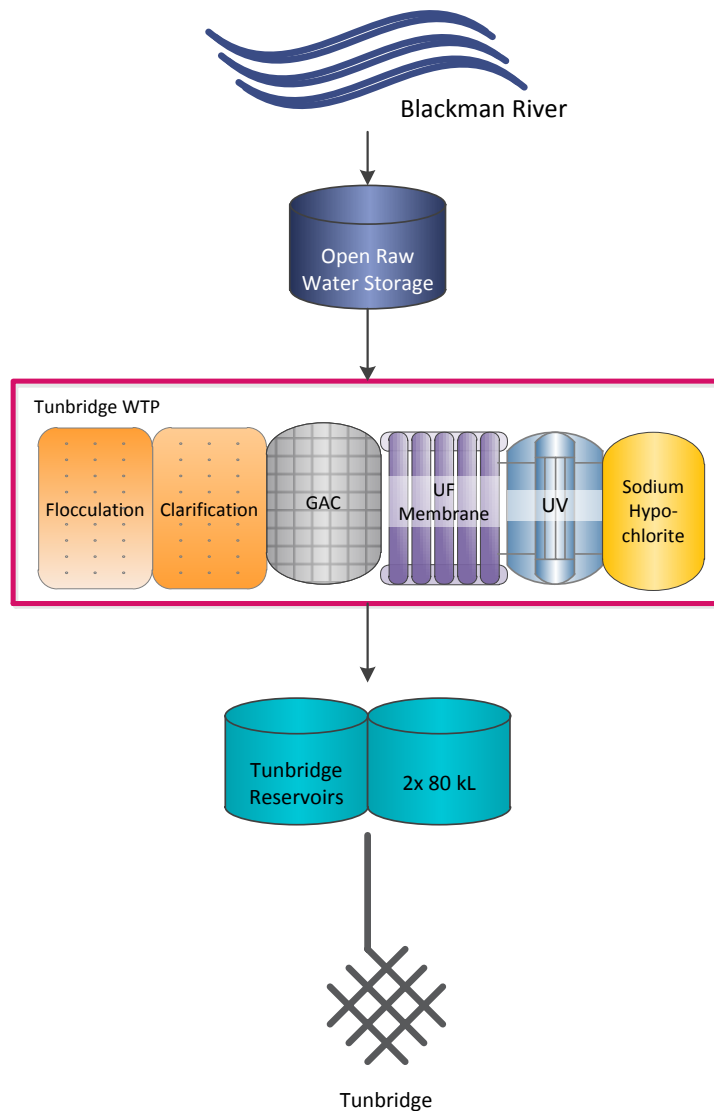
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Construction of new WTP.	Investigation into a packaged WTP to supply Tullah	Project scope	2019+	\$1.6 million

## 6.64. Tunbridge drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	111
	<b>Catchment</b>	Blackman River
	<b>Primary treatment</b>	Settlement
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Tunbridge.</li> </ul>		

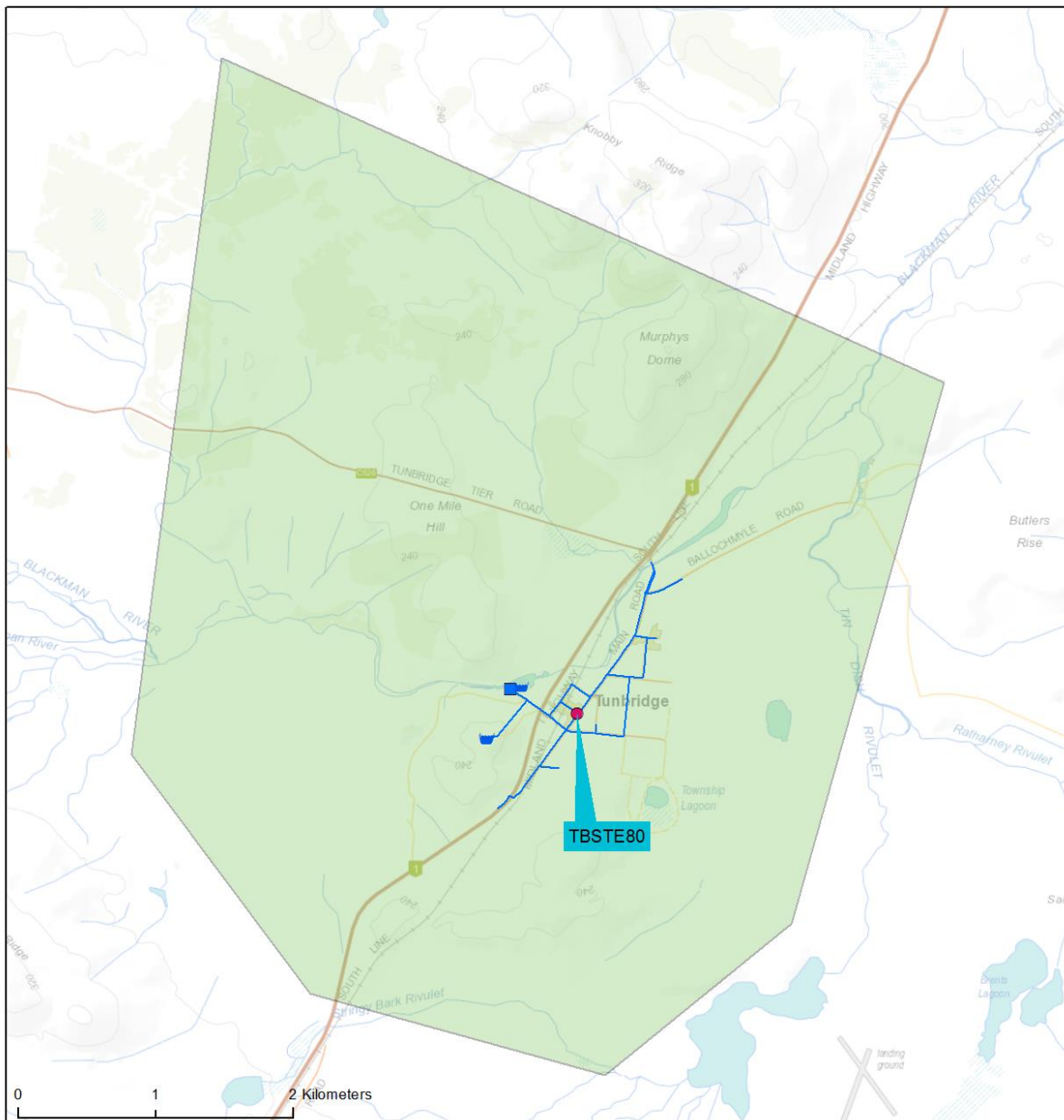
### 6.64.1. System description

Figure 6.64.1-a Tunbridge System schematic



- ❖ **Catchment**  
The Tunbridge drinking water system is supplied by the Blackman River
- ❖ **Treatment**  
The new treatment plant utilises a multiple barrier approach. It employs standard flocculation, clarification, coupled to ultra membrane filtration as the primary treatment step. Colour and dissolved organic levels are removed with GAC advance filtration and primary disinfection is by means of UV radiation
- ❖ **Distribution**  
There are two roofed reservoirs in the distribution system. The Tunbridge system supplies 111 connections.

Map 6.64.1-a Tunbridge monitoring zone



TBSTE80 = (Regular Compliance Point)

## 6.64.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.64.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: <b>Potable</b>	
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes ●	Weekly	53	0	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	100%	Yes ●	Quarterly	13	0	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	6 Monthly	14	0	
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.64.3. Summary of historic total system performance

Table 6.64.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)										
Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
<b>Microbiological</b> <sup>(1)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
<b>Fluoride</b> <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Metals</b> <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>	100%	●	98%	●	98%	●	98%	●	100%	●
<b>Pesticides</b> <sup>(4)</sup>	0	●	0	●	1	●	0	●	0	●
<b>Complaints received</b> <sup>(5)</sup>	Not Recorded		Not Recorded		8		2		2	
<b>Public alerts issued</b> <sup>(6)</sup>	1	●	1	●	1	●	1	●	1	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.64.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*. Following the commission of a new water treatment plant the existing BWA was lifted by DHHS in April 2016
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.64.5. Microbiological performance

Figure 6.64.5-a Microbiological compliance 2015–16

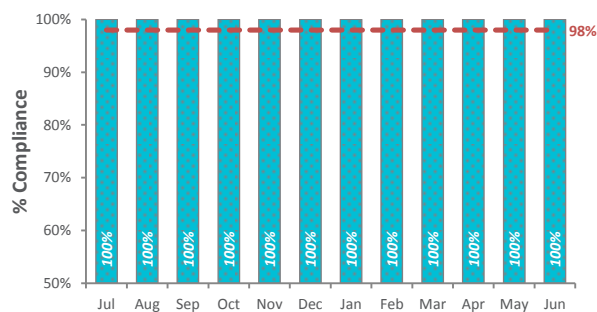


Figure 6.64.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.64.6. Fluoride performance

- ❖ The Tunbridge drinking water system is not currently fluoridated.

## 6.64.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.64.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	12.5	6	19
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	6.5	6	7
Lead	10	µg/L	2	0	100	< 0.5	< 0.5	0.6
Manganese	500	µg/L	2	0	100	< 0.5	0.7	10
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	13	0	100	11.84	< 4	37
Monochloroacetic acid	150	µg/L	13	0	100	< 5	< 5	23
Trichloroacetic acid	100	µg/L	13	0	100	10.07	< 2	28
Total trihalomethanes	250	µg/L	4	0	100	59.25	30	88

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (..) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.64.8. General physical parameters

**Table 6.64.8-a General physical performance**

General physical parameters (2015–16)				
Cygnets monitoring zone	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	73	0.36	0.02	1.15
Turbidity (NTU)	75	0.25	0.1	1
pH	75	8.07	7.46	8.6

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.64.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.64.10. System incidents and issues

**Table 6.64.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
03/03/2016	Lead 62µg/L was detected by DHHS as part of their routine monitoring program. The sample was taken from a public location not included in our routine sample program.	A full system investigation was conducted and the root cause isolated to the section of council owned main and brass tap fitting. The tap fitting was replaced by TasWater.	N/A	

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.



### 6.64.11. Customer complaints

Figure 6.64.11-a Complaint classification

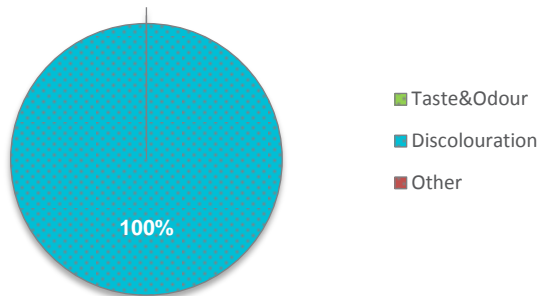
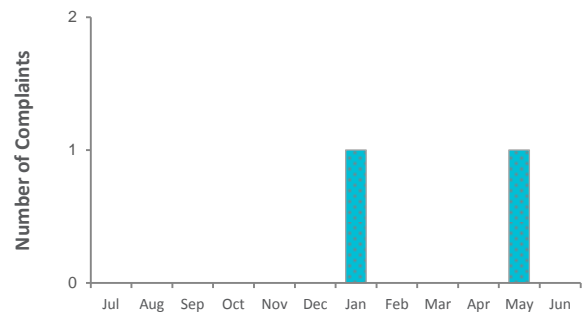


Figure 6.64.11-b Seasonal trend analysis



- ❖ Two complaints were received relating to water discolouration issues.

### 6.64.12. Catchment and source water issues

- ❖ The Tunbridge drinking water system draws water from the Blackman River
- ❖ The catchment covers an area of 17406 ha. Major land uses within the catchment include residual bushland, grazing, forestry and cropping
- ❖ Based on the known land uses, water quality risks include microbial, turbidity and pesticides. The risk associated with pesticides is mitigated via an activated carbon treatment barrier
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.64.13. Infrastructure and operational changes

- ❖ A new multi barrier WTP was commissioned in early June 2015. Initially this water still supplied under a temporary BWA until sufficient quality data was available in April 2016 to lift the alert. No subsequent infrastructure or operational changes were made to either the new treatment plant or distribution system during the rest of 2015–16.

### 6.64.14. Future planning

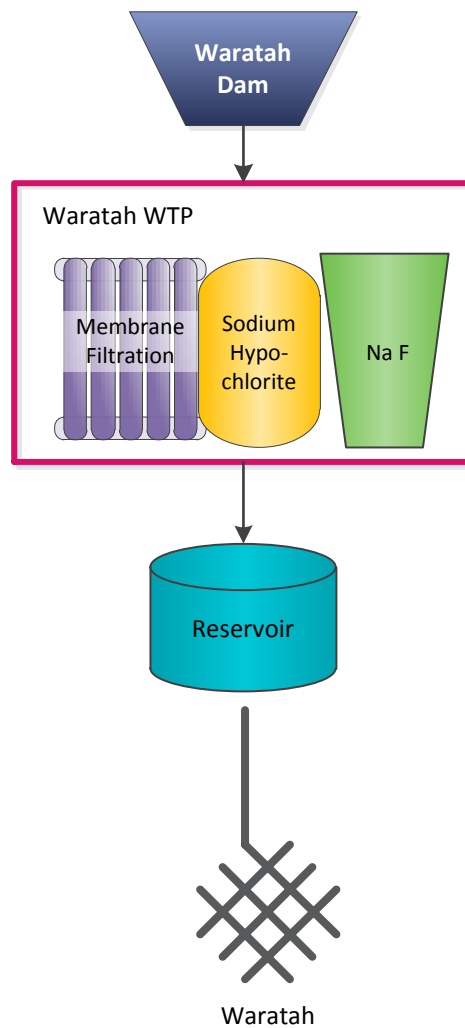
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

### 6.65. Waratah drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	182
	<b>Catchment</b>	Waratah Dam
	<b>Primary treatment</b>	Membrane filtration
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Sodium hypochlorite
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Waratah.</li> </ul>		

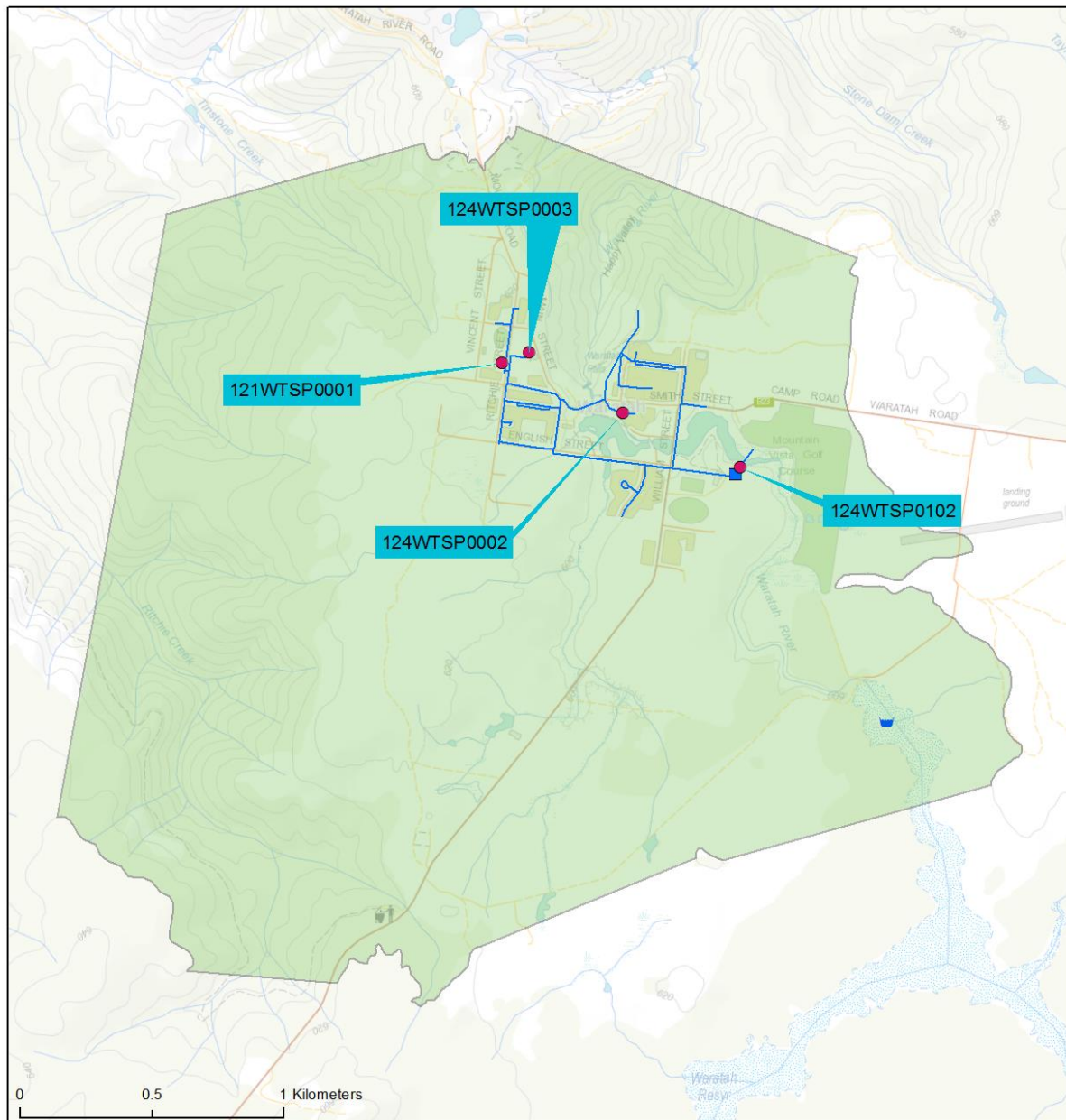
### 6.65.1. System description

Figure 6.65.1-a Waratah system schematic



- ❖ **Catchment**  
The Waratah drinking water system is supplied by the Waratah Dam. The drinking water catchment is predominantly bushland. However there are recreational activities (golf course), forestry and some animal husbandry in the catchment
- ❖ **Treatment**  
The Waratah WTP employs membrane filtration, sodium hypochlorite disinfection and fluoridation by sodium fluoride
- ❖ **Distribution**  
There is one roofed reservoir located at the treatment plant which supplies the town utilising pressure pumps. The Waratah drinking water system supplies 182 connections.

Map 6.65.1-a Waratah monitoring zone



124WTSP0102 = WTP, 121WTSP0001 = School, 124WTSP0002 = Caravan Park, 124WTSP0003 = Picnic Grounds

## 6.65.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.65.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	109	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	53	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Monthly	11	0	
Metals <sup>(4)</sup>	100%	Yes ●	Monthly & Quarterly	18	0	
Pesticides <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.65.3. Summary of historic total system performance

Table 6.65.3-a Historic trends

Parameter group	Performance*									
	2011–12		2012–13		2013–14		2014–15		2015–16	
Microbiological <sup>(1)</sup>	100%	●	100%	●	100%	●	99.1%	●	100%	●
Fluoride <sup>(2)</sup>	Operational fluoride dosing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	0	●	0	●	0	●	
	within target range <sup>(b)</sup>	N/A	N/A	99.1%	●	98%	●	100%	●	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	0.98	●	0.94	●	0.97	●	
	Distribution fluoride testing									
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	0	●	0	●		
	within target range <sup>(b)</sup>	N/A	N/A	N/A	93.7%	●	100%	●		
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	0.95	●	0.94	●			
Metals <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●		
DBPs <sup>(3)</sup>	N/A	N/A	100%	●	100%	●	100%	●		
Pesticides <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A	N/A				
Complaints received <sup>(5)</sup>	Not recorded		Not recorded		0	0	1			
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●		

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.65.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.65.5. Microbiological performance

Figure 6.65.5-a Microbiological compliance 2015–16

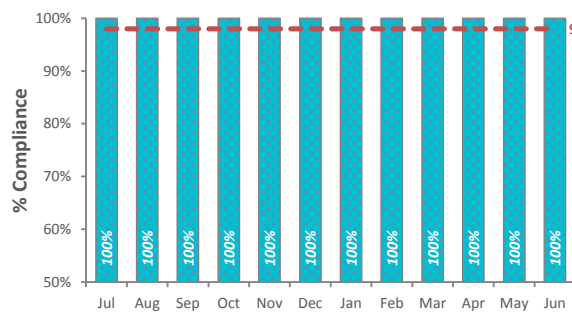


Figure 6.65.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

## 6.65.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.65.6-a Operational samples within target range

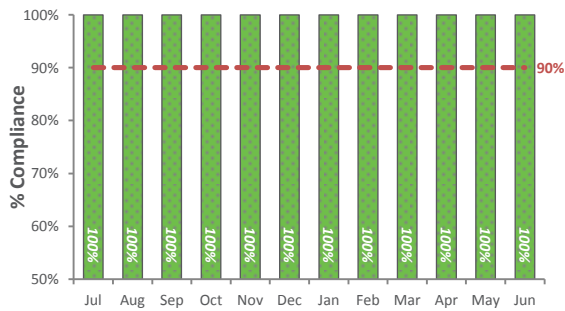


Figure 6.65.6-b Operational mean monthly dose (mg/L)

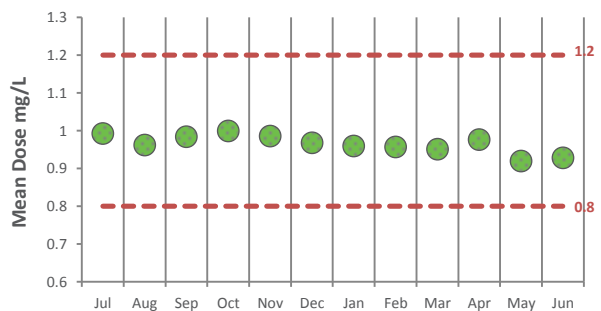


Figure 6.65.6-c Reticulation samples within target range

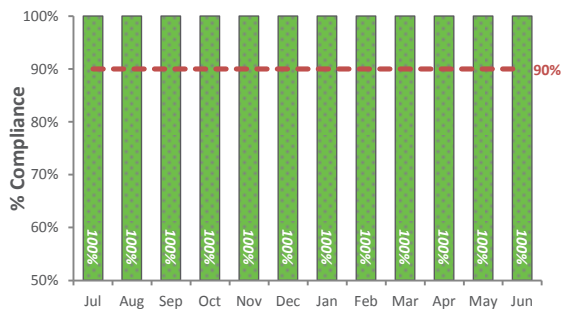
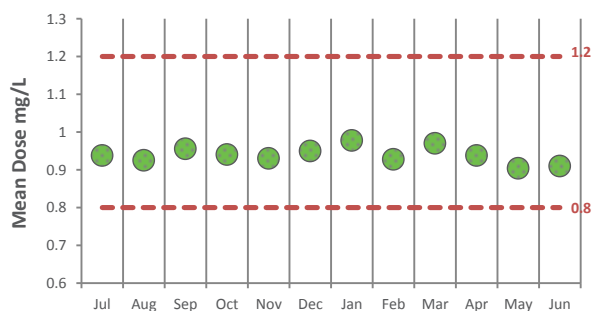


Figure 6.65.6-d Reticulation samples mean monthly dose (mg/L)



**Note: (Operational)** samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. **(Reticulation)** samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.65.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.65.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	18	0	100	< 1	< 1	< 1
Barium	2000	µg/L	18	0	100	2.17	2	3
Cadmium	2	µg/L	18	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	18	0	100	< 1	< 1	< 1
Copper	2000	µg/L	8	0	100	14.18	< 1	44
Lead	10	µg/L	18	0	100	< 0.5	< 0.5	1.4
Manganese	500	µg/L	18	0	100	11.18	2.1	21.9
Mercury	1	µg/L	18	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	18	0	100	< 0.5	< 0.5	0.7
Selenium	10	µg/L	18	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	11	0	100	30.45	2	62
Monochloroacetic acid	150	µg/L	11	0	100	< 5	< 5	9
Trichloroacetic acid	100	µg/L	11	0	100	48.91	5	76
Total trihalomethanes	250	µg/L	11	0	100	50	28	76

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.



### 6.65.8. General physical parameters

Table 6.65.8-a General physical performance

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	109	0.47	0.01	1.18
Turbidity (NTU)	109	0.34	0.1	6.2
pH	108	6.97	6.16	7.66

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Waratah distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation generally do not meet the target of >0.1 mg/L. This is caused by low water usage within the system
- ❖ Mean pH levels are maintained within the recommended optimal range.

### 6.65.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

### 6.65.10. System incidents and issues

- ❖ No water quality issues were identified.

### 6.65.11. Customer complaints

Figure 6.65.11-a Complaint classification

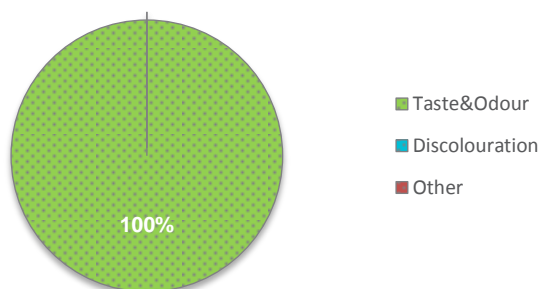
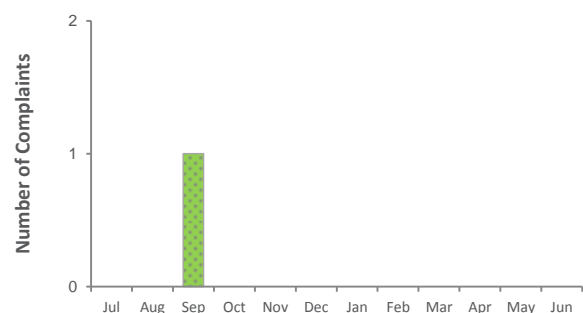


Figure 6.65.11-b Seasonal trend analysis



- ❖ One complaint was received in this reporting period. The complaint related to a customer dissatisfied with the chlorine taste and odour.

#### 6.65.12. Catchment and source water issues

- ❖ The Waratah drinking water system is supplied by the Waratah Dam. The drinking water catchment is predominantly bushland. However there are recreational activities (golf course), forestry and some animal husbandry in the catchment.
- ❖ No health regulated pesticides were detected from the raw water monitoring program.

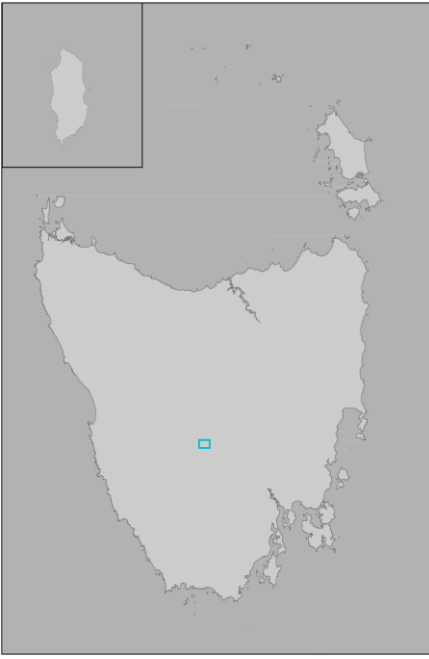
#### 6.65.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.65.14. Future planning

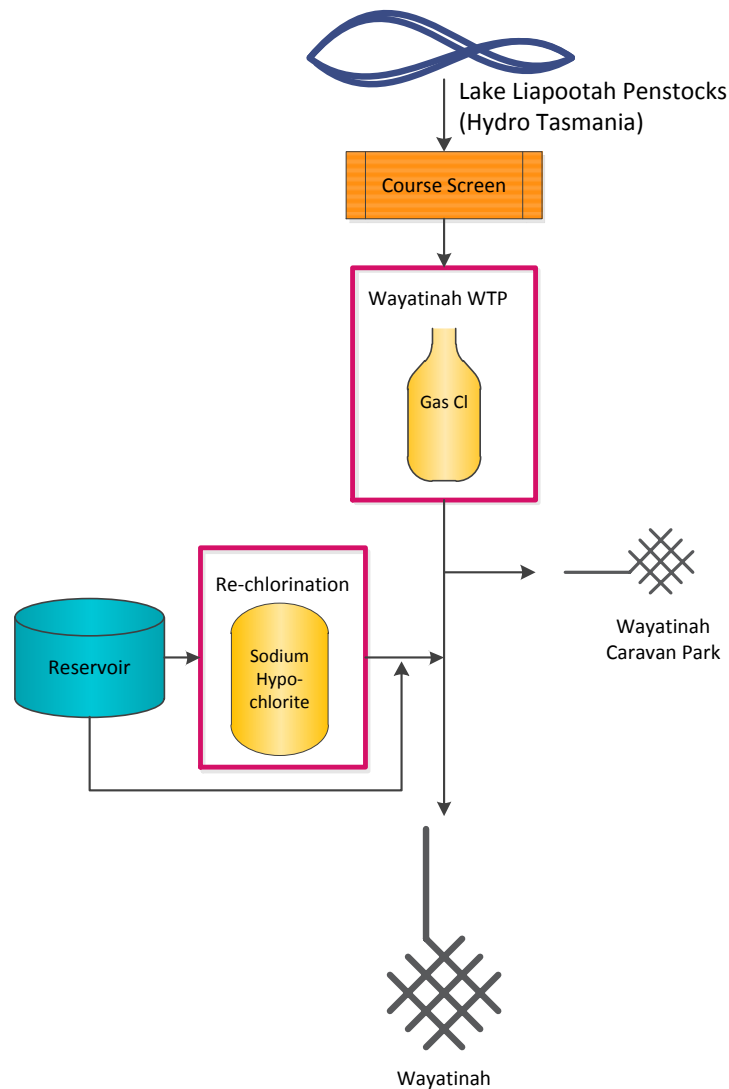
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.66. Wayatinah drinking water system

	<b>Current status</b>	<b>Permanent boil water alert</b>
	<b>Total connections</b>	77
	<b>Catchment</b>	Lake Liapootah
	<b>Primary treatment</b>	Coarse screen
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	Sodium hypochlorite
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Wayatinah.</li> </ul>		

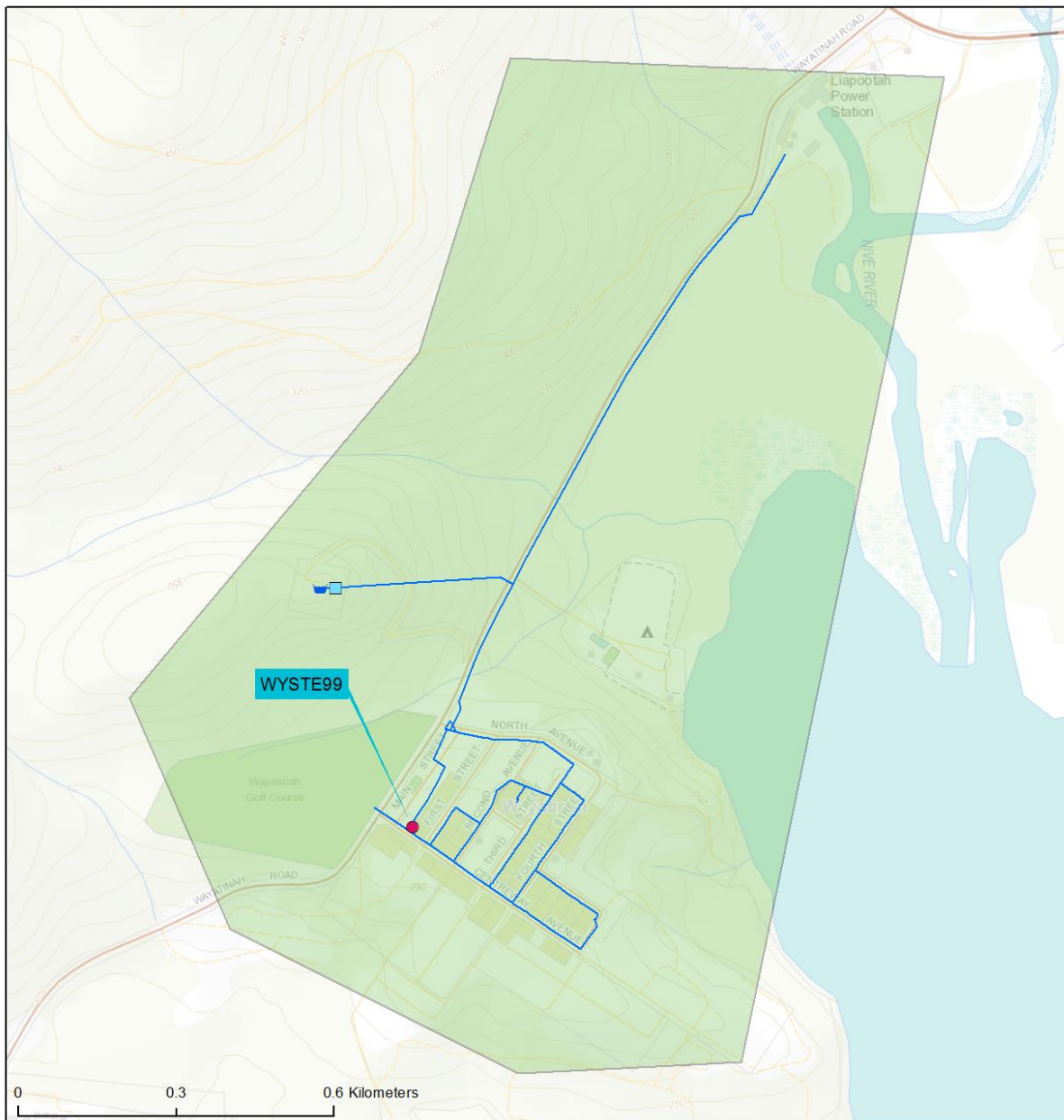
### 6.66.1. System description

Figure 6.66.1-a Wayatinah system schematic



- ❖ **Catchment**  
The Wayatinah drinking water system is supplied from Lake Liapootah by the Liapootah Penstock
- ❖ **Treatment**  
The Wayatinah dosing station employs an inline filter followed by chlorine gas disinfection. Customers receiving water from the Wayatinah system are subject to a permanent BWA
- ❖ **Distribution**  
There is one roofed reservoir in the distribution system. The Wayatinah Caravan Park takes water before the reservoir. Post storage the water receives secondary disinfection with sodium hypochlorite. The Wayatinah drinking water system supplies 77 connections.

**Map 6.66.1-a Wayatinah monitoring zone**



WYSTE99 = Corner of Second Street (Regular Compliance Point)

## 6.66.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.66.2-a Performance overview (2015–16)

Annual performance overview (2015–16)				Status: <b>Permanent boil water alert</b>		
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	100%	Yes ●	Weekly	52	0	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	86%	No ●	Quarterly	17	8	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	6 Monthly	2	0	
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.66.3. Summary of historic total system performance

Table 6.66.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)		Performance*										
Parameter group		2011–12	2012–13		2013–14		2014–15		2015–16			
<b>Microbiological</b> <sup>(1)</sup>		–	100%	●	99.5%	●	100%	^	●	100%	●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>											
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	<b>Distribution fluoride testing</b>											
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>Metals</b> <sup>(3)</sup>		–	100%	●	100%	●	100%	●	100%	●	100%	●
<b>DBPs</b> <sup>(3)</sup>		–	100%	●	100%	●	100%	●	86%	●	86%	●
<b>Pesticides</b> <sup>(4)</sup>		0	●	0	●	0	●	N/A	N/A	N/A	N/A	
<b>Complaints received</b> <sup>(5)</sup>		Not recorded	Not recorded	8	2	2	2	2	2	2	2	
<b>Public alerts issued</b> <sup>(6)</sup>		–	0	●	0	●	0	●	0	●	0	●

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

#### 6.66.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP performance for 2015–16 was 86 per cent and does not comply with ADWG. Eight detections above ADWG health limits were recorded during this reporting period

#### 6.66.5. Microbiological performance

Figure 6.66.5-a Microbiological compliance 2015–16

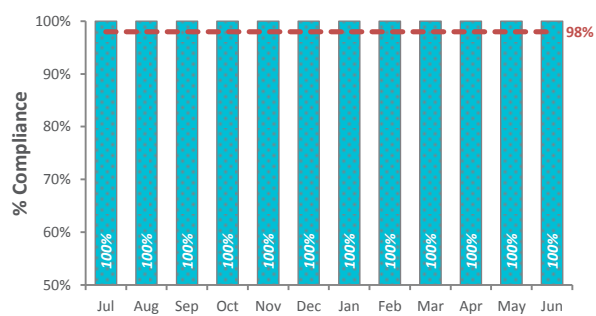


Figure 6.66.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

#### 6.66.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.66.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.66.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	2	0	100	< 1	< 1	< 1
Barium	2000	µg/L	2	0	100	2	2	2
Cadmium	2	µg/L	2	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	2	0	100	< 1	< 1	< 1
Copper	2000	µg/L	2	0	100	13	5	21
Lead	10	µg/L	2	0	100	0.75	< 0.5	1
Manganese	500	µg/L	2	0	100	15.55	10.1	21
Mercury	1	µg/L	2	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	2	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	2	0	100	< 5	< 5	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	17	0	100	40.79	< 1	80
Monochloroacetic acid	150	µg/L	17	0	100	7.14	< 5	39
Trichloroacetic acid	100	µg/L	17	8	53	93.53	12	220
Total trihalomethanes	250	µg/L	5	0	100	91.4	63	110

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (-) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ DBP performance for 2015–16 was 86 per cent and does not comply with ADWG. Eight Total Trihalomethane detections above ADWG health limits were recorded during this reporting period. The Wayatinah system has high colour and organic carbon content in its source water, and has no treatment prior to chlorination. The system is included in the Small Towns Project to define long-term management of the system.



### 6.66.8. General physical parameters

**Table 6.66.8-a General physical performance**

General physical parameters (2015–16)				
Cygnets monitoring zone	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	50	0.18	0	1.07
Turbidity (NTU)	52	2.19	1.1	5.8
pH	52	7.12	6.78	8.76

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination
- ❖ Mean pH levels are maintained within the recommended optimal range.

### 6.66.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.66.10. System incidents and issues

**Table 6.66.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
16/07/2015	Trichloroacetic acid 124µg/L	Ongoing monitoring. Chlorine residuals are monitored daily to maintain a consistent residual due to current supply arrangements. Continue to adjust chlorine dosing to a level where disinfection is not compromised, and DBPs are minimised as much as is practical	Yes	Yes
25/08/2015	Trichloroacetic acid 129µg/L		Yes	Yes
26/10/2015	Trichloroacetic acid 150µg/L		Yes	Yes

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.66.11. Customer complaints

Figure 6.66.11-a Complaint classification

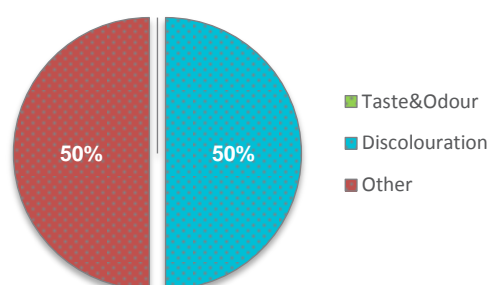
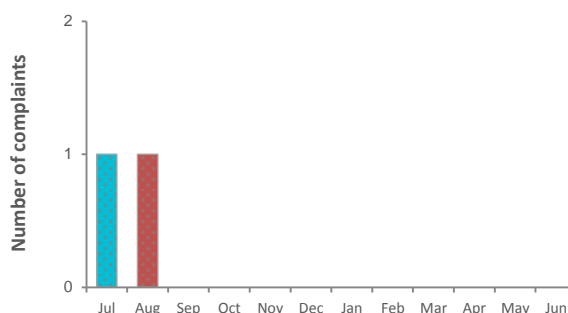


Figure 6.66.11-b Seasonal trend analysis



- ❖ Two complaints were received in this reporting period. One complaint was relating to discolouration and the other complaint was not related to water quality.

### 6.66.12. Catchment and source water issues

- ❖ The Wayatinah drinking water system is supplied by Lake Liapootah via a Hydro Tasmania pipeline. The catchment covers an area of 148,140 ha. The catchment is dominated by native forest under various reserve schemes, with limited recreation, forestry and highland grazing
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.66.13. Infrastructure and operational changes

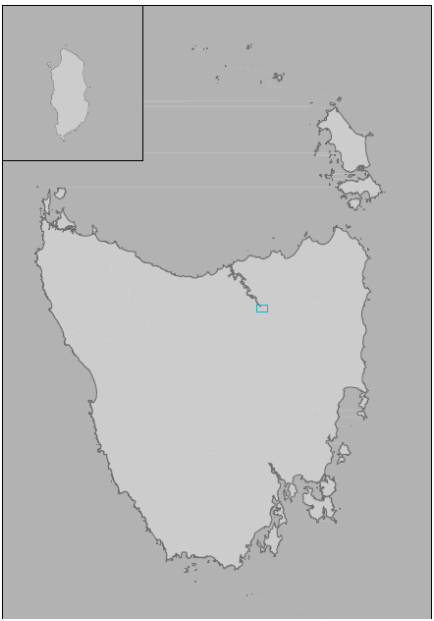
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.66.14. Future planning

Table 6.66.14-a Future planning for the system

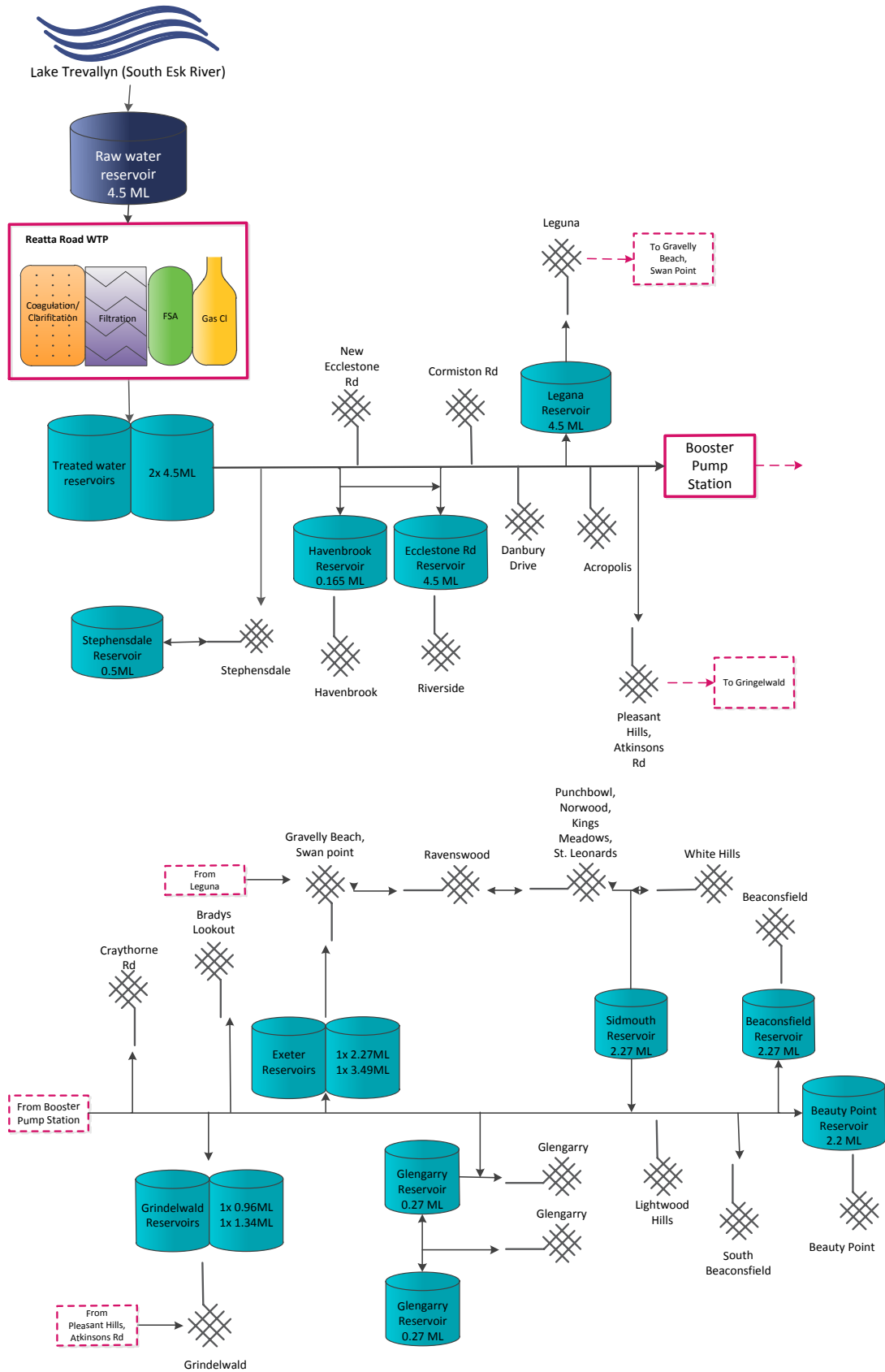
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Wayatinah supply options	Investigation into options to improve water quality supplied to Wayatinah	Business case under development and part of the Small Towns Water Supply Strategy.	2018	To be determined

## 6.67. West Tamar drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	10,007
	<b>Catchment</b>	South Esk River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Fluorosilicic acid
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Trevallyn</li> <li>❖ Riverside</li> <li>❖ Legana</li> <li>❖ Rosevears</li> <li>❖ Grindelwald</li> <li>❖ Exeter</li> <li>❖ Gravelly Beach</li> <li>❖ Swan Point</li> <li>❖ Deviot</li> <li>❖ Beaconsfield</li> <li>❖ Beauty Point.</li> </ul>		

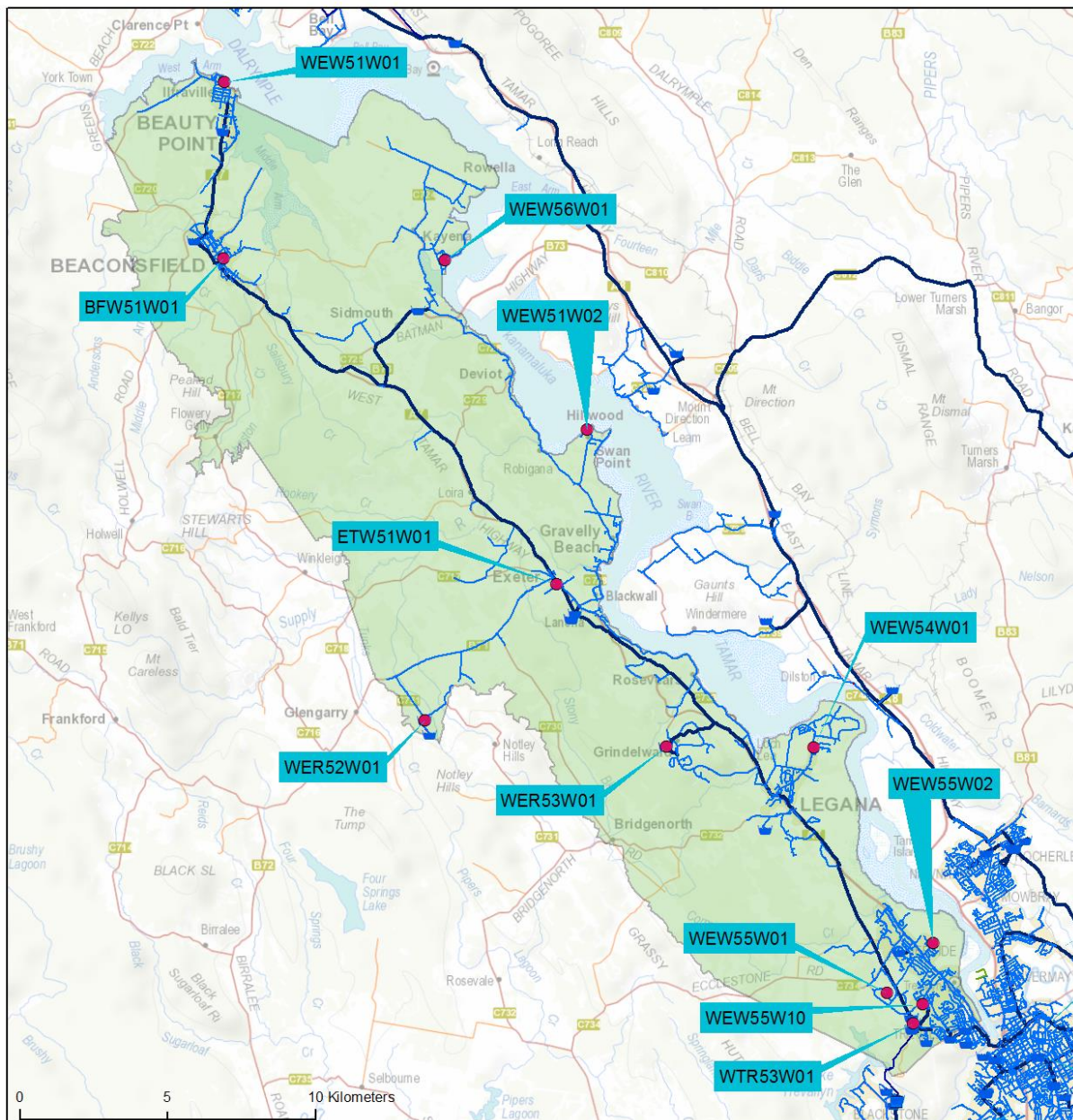
## 6.67.1. System description

Figure 6.67.1-a West Tamar system schematic



- ❖ **Catchment**  
The West Tamar drinking water system is supplied by the South Esk River.
- ❖ **Treatment**  
The Reatta Road WTP employs coagulation, clarification, media filtration, chlorine gas disinfection and fluoridation by fluorosilicic acid.
- ❖ **Distribution**  
There are 15 roofed reservoirs in the distribution system. The West Tamar drinking water system supplies 10,007 connections.

**Map 6.67.1—a West Tamar monitoring zone**



WEW51W01 = Beauty point, BFW51W01 = Beaconsfield, WEW51W02 = Swan Point – Park, ETW51W01 = Exeter, Bilou St, WER52W01 = Glengarry Reservoir, WER53W01 = Grindewald Reservoir, WEW55W02 = Cleghorn St Riverside, WEW55W01 = 14 Marlou Crt Riverside, WEW55W03 = Pomona Shop Riverside, WEW55W10 = 32 Gray St Riverside, WTR53W01 = Reatta Rd Reservoir

## 6.67.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.67.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	99.7%	Yes ●	Weekly	299	1	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	102	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	4	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	4	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly	4	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.67.3. Summary of historic total system performance

Table 6.67.3-a Historic trends

Parameter group	Performance <sup>*</sup>										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	99%	●	99%	●	99.7%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	–	●	88.8%	●	100%	●	99.2%	●	91.8%	●
	mean dose (mg/L) <sup>(c)</sup>	–	●	0.94	●	1.0	●	0.96	●	0.94	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded	●	Not Recorded	●	Not Recorded	●	99%	●	79.1%	●
mean dose (mg/L) <sup>(c)</sup>	Not Recorded	●	Not Recorded	●	Not Recorded	●	1.00	●	0.82	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
Complaints received <sup>(5)</sup>	50	●	40	●	17	●	8	●	39	●	
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2013 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.



#### 6.67.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ Fluoride performance in the distribution was affected by shutdowns at the dosing point. Protected action and maintenance issues required the system to be offline for extended periods of time
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.67.5. Microbiological performance

Figure 6.67.5-a Microbiological compliance 2015–16

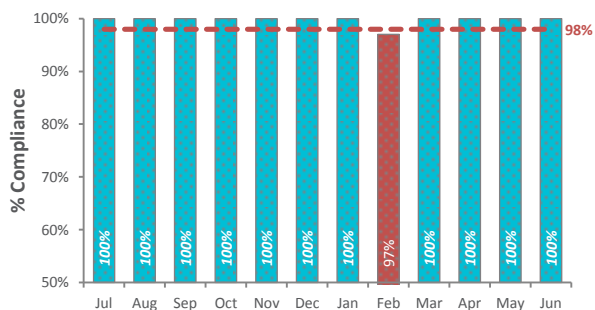
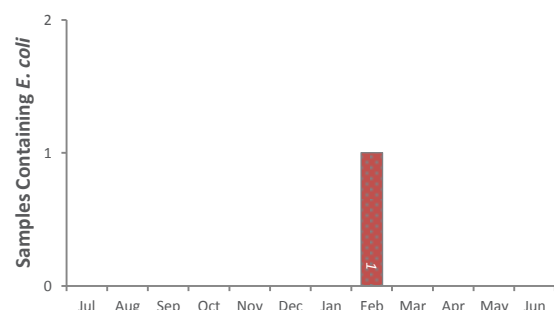


Figure 6.67.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ Microbiological compliance for 2015–16 achieved greater than 98 per cent of samples free of *E. coli*
- ❖ There was one *E. coli* strike in February 2016 at the treated water storage. Chlorine contact time to this point was reviewed and found to be acceptable. Filtration performance was reviewed and did not display any variances. All downstream operational and compliance points were clear of contamination and a retest was free of *E. coli*.

## 6.67.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.67.6-a Reticulation samples within target range

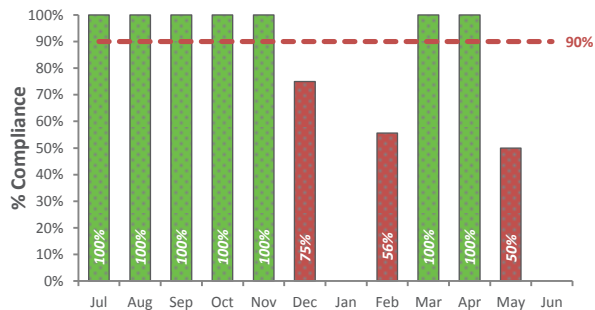


Figure 6.67.6-b Reticulation mean monthly dose (mg/L)

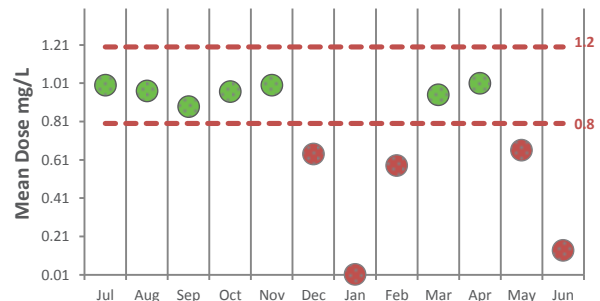


Figure 6.67.6-c Operational samples within target range

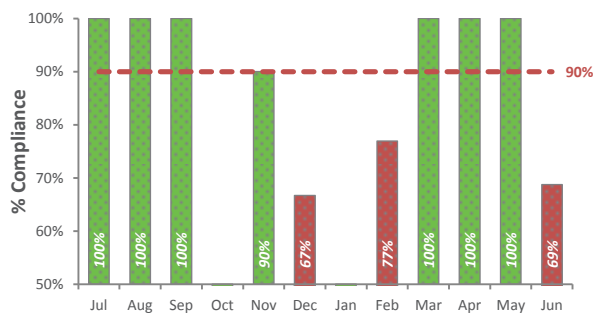
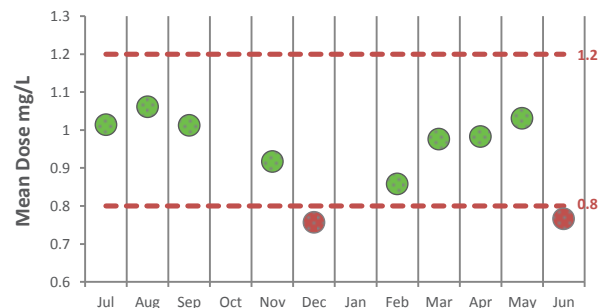


Figure 6.67.6-d Operational samples mean monthly dose (mg/L)



**Note:** (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (Operational) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Fluoride performance in both the operational point and the distribution system was affected by system shutdowns. Maintenance issues in May and June required the system to be offline for extended periods of time.
- ❖ Protected action was in place from September to February. Performance was affected by the phased reintroduction of fluoride dosing.
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.



## 6.67.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.67.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
<b>Antimony</b>	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Arsenic</b>	10	µg/L	4	0	100	< 1	< 1	< 1
<b>Barium</b>	2000	µg/L	4	0	100	9	5	13
<b>Cadmium</b>	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
<b>Chromium</b>	50	µg/L	4	0	100	< 1	< 1	< 1
<b>Copper</b>	2000	µg/L	4	0	100	10	3	17
<b>Lead</b>	10	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Manganese</b>	500	µg/L	4	0	100	4.4	2.7	8
<b>Mercury</b>	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
<b>Molybdenum</b>	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
<b>Nickel</b>	20	µg/L	4	0	100	< 0.5	< 0.5	0.6
<b>Selenium</b>	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
<b>Dichloroacetic acid</b>	100	µg/L	4	0	100	11.5	8	16
<b>Monochloroacetic acid</b>	150	µg/L	4	0	100	< 5	< 5	< 5
<b>Trichloroacetic acid</b>	100	µg/L	4	0	100	8.25	4	14
<b>Total trihalomethanes</b>	250	µg/L	4	0	100	14.25	12	18

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.67.8. General physical parameters

**Table 6.67.8-a General physical performance**

General physical parameters (2015–16)				
Cygnets monitoring zone	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	303	0.36	0	1.21
Turbidity (NTU)	303	0.22	0.1	2.9
pH	305	7.09	6	8.63

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations and demonstrate a good level of protection against re-contamination. Residuals vary in the extremities of the system and can be affected by maintenance activities such as flushing
- ❖ Mean pH levels are maintained within the recommended optimal range. A minimum pH of 6 was recorded in the network, however this did not affect any health or aesthetic parameters.

### 6.67.9. Aesthetic issues

- ❖ Over the extended dry summer, algal metabolites increased in concentration to greater than the average taste and odour threshold. Monitoring in the distribution system and activated carbon dosing was triggered and successfully mitigated the aesthetic issue. A lag period occurred between the occurrence in the source water and the testing result notification, where 10 complaints were received from customers
- ❖ An Algal Monitoring Program is in place to pre-empt and mitigate any taste and odour issues in the source water.

### 6.67.10. System incidents and issues

**Table 6.67.10-a Identified incidents and issues**

Date	Incident description	Actions taken	DHHS Notification	
			Required	Complete
08/02/2016	<i>E. coli</i> 1 MPN/100mL	Chlorine contact time and filtration performance was reviewed and did not display any variances. All downstream operational and compliance points were clear of contamination and a retest was free of <i>E. coli</i> .	Yes	Yes
February 2016	Taste and odour	MIB and Geosmin levels triggered the taste threshold of 10 µg/L in February causing 17 complaints. PAC dosing was implemented upon detection and mitigated levels in the distribution system to below the taste threshold.	No	No

**Note:** Table identifies actions taken by TasWater following analytical detections above ADWG health limits.

### 6.67.11. Customer complaints

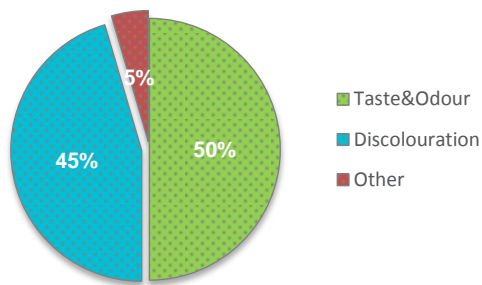


Figure 6.67.11-a Complaint classification

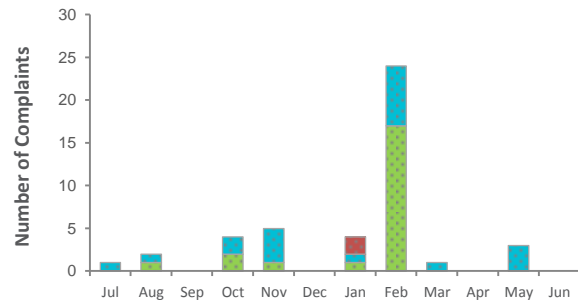


Figure 6.67.11-b Seasonal trend analysis

- ❖ Forty-four complaints were received in this reporting period. A significant spike in complaints in February can be attributed to a taste and odour event.

### 6.67.12. Catchment and source water issues

- ❖ The West Tamar drinking water system is supplied by the South Esk River at Lake Trevallyn. The catchment covers an area of 912,685 ha. Major land uses on the catchment include forestry, dairy farming, grazing and native forest. Other uses include aquaculture, mining, feed lots and cropping. The drinking water catchment also receives the effluent of several sewage treatment plants. Based on known land use, likely water quality risks include:
  - Microbial
  - Turbidity
  - Pesticides
  - Metals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

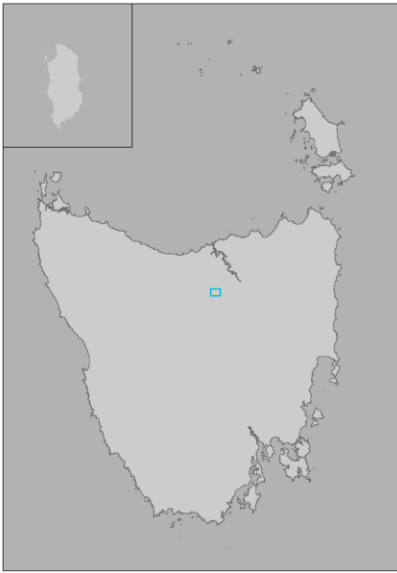
### 6.67.13. Infrastructure and operational changes

- ❖ A re-chlorination facility at Glengarry Reservoir was installed in 2015–16 to manage and improve chlorine residuals in the extremities of the system.

### 6.67.14. Future planning

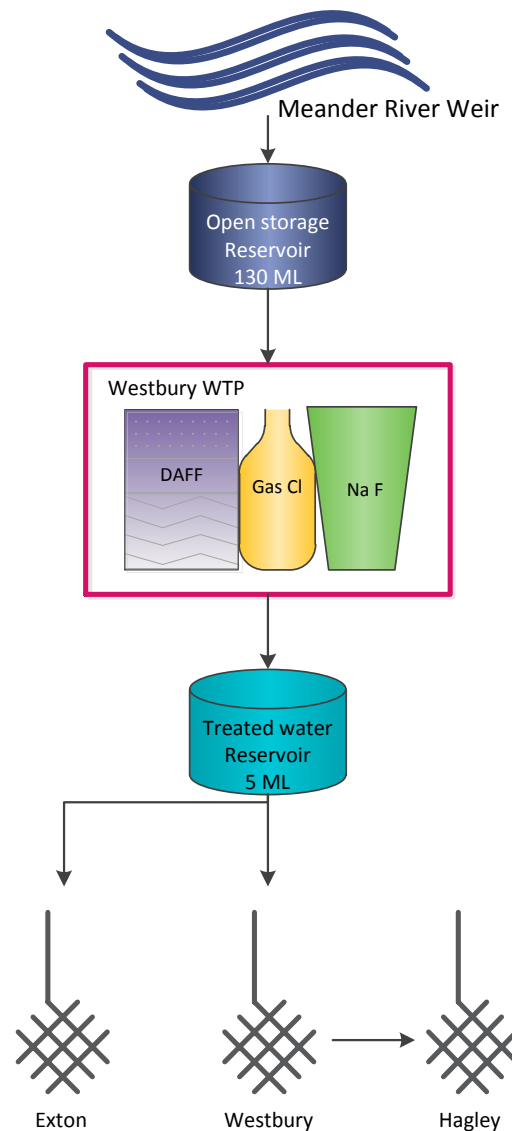
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

## 6.68. Westbury drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	1,137
	<b>Catchment</b>	Meander River
	<b>Primary treatment</b>	DAFF
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium Fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Westbury</li> <li>❖ Exton</li> <li>❖ Hagley.</li> </ul>		

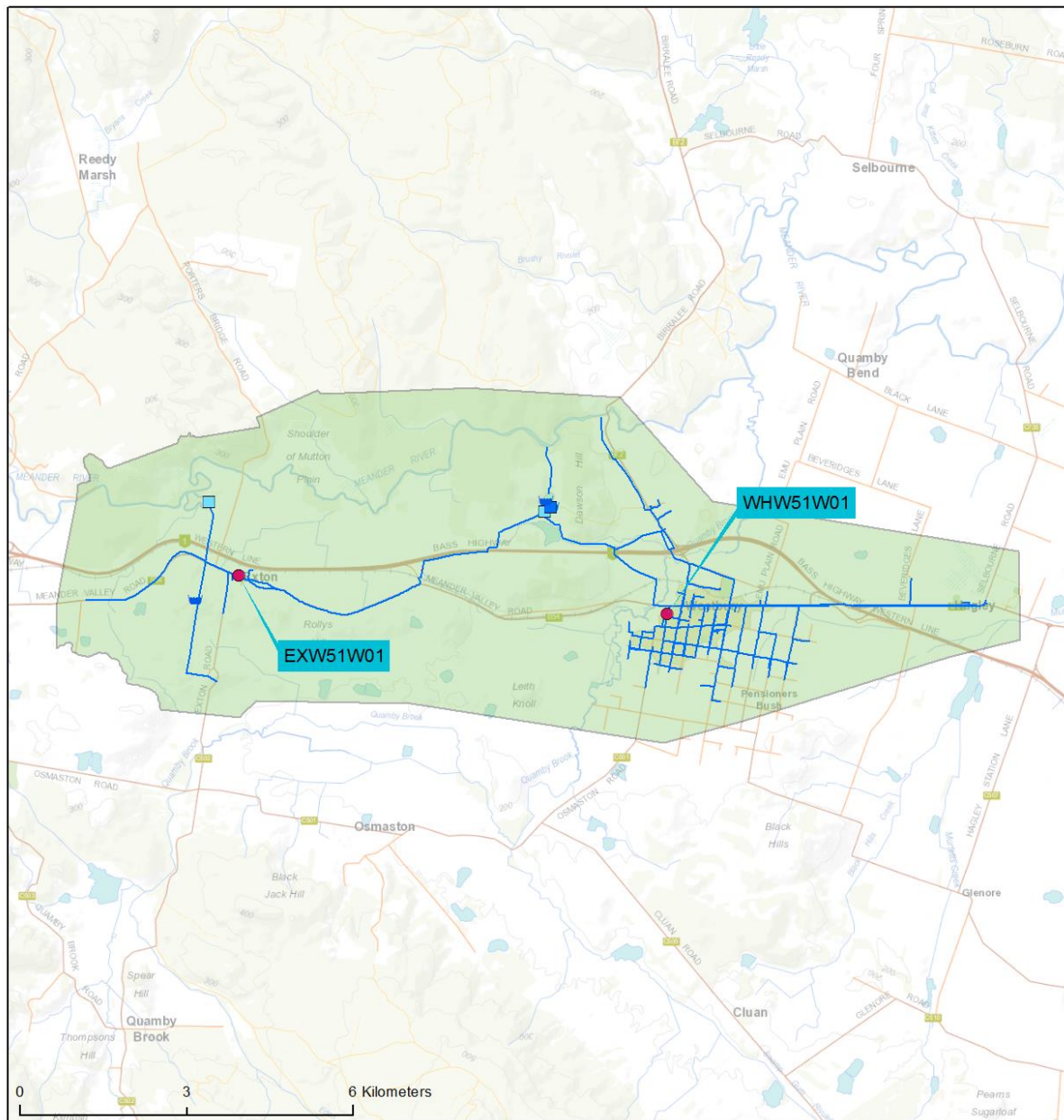
### 6.68.1. System description

Figure 6.68.1-a Westbury system schematic



- ❖ **Catchment**  
The Westbury drinking water system is supplied by the Meander River.
- ❖ **Treatment**  
The Westbury WTP employs DAFF, gas chlorine disinfection and fluoridation by sodium fluoride.
- ❖ **Distribution**  
The system feeds the township of Westbury, Exon and Hagley. There is one roofed reservoir within the distribution system. The system supplies 1,137 connections.

Map 6.68.1—a Westbury monitoring zone



WHW51W01 = Village Green, Westbury, EXW51W01 = Main Road, Exon

## 6.68.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.68.2-a Performance overview (2015–16)

Annual performance overview (2015–16)						Status: Potable
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
Microbiological <sup>(1)</sup>	100%	Yes ●	Weekly	106	0	
Fluoride <sup>(2)</sup>	100%	Yes ●	Weekly	106	0	
DBPs <sup>(3)</sup>	100%	Yes ●	Quarterly	7	0	
Metals <sup>(4)</sup>	100%	Yes ●	Quarterly	7	0	
Pesticides <sup>(5)</sup>	100%	Yes ●	Quarterly	9	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (\*) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.68.3. Summary of historic total system performance

Table 6.68.3-a Historic trends

Parameter group	Performance*										
	2011–12		2012–13		2013–14		2014–15		2015–16		
Microbiological <sup>(1)</sup>	100%	●	100%	●	98%	●	100%	●	100%	●	
Fluoride <sup>(2)</sup>	Operational fluoride dosing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		Offline		80%	●	92.2%	●
	mean dose (mg/L) <sup>(c)</sup>	0.87	●	0.86	●	Offline		0.86	●	0.96	●
	Distribution fluoride testing										
	Exceeding 1.5mg/L <sup>(a)</sup>	0	●	0	●	0	●	0	●	0	●
	within target range <sup>(b)</sup>	Not Recorded		Not Recorded		Offline		86%	●	84.9%	●
mean dose (mg/L) <sup>(c)</sup>	Not Recorded		Not Recorded		Offline		0.88	●	0.82	●	
Metals <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
DBPs <sup>(3)</sup>	100%	●	100%	●	100%	●	100%	●	100%	●	
Pesticides <sup>(4)</sup>	0	●	0	●	0	●	0	●	0	●	
Complaints received <sup>(5)</sup>	11		39		50		2		4		
Public alerts issued <sup>(6)</sup>	0	●	0	●	0	●	0	●	0	●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2013 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.68.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride dosing maintains improved compliance since 2014–15, with compliance achieving greater than 90 per cent within target range. Performance was not consistent within the distribution network with 84.9 per cent samples in target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.68.5. Microbiological performance

Figure 6.68.5-a Microbiological compliance 2015–16

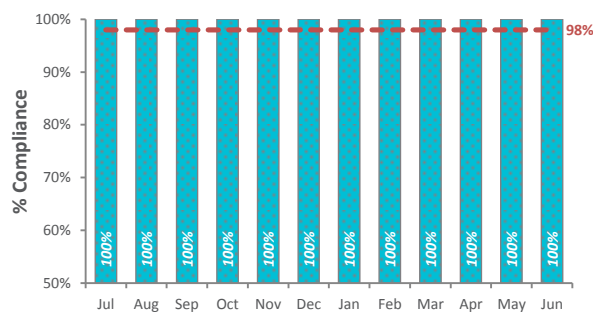


Figure 6.68.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.



## 6.68.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.68.6-a Reticulation samples within target range

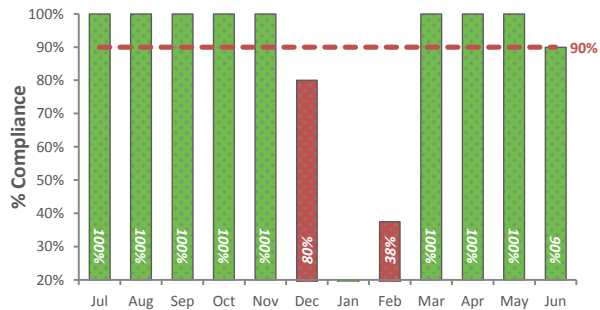


Figure 6.68.6-b Reticulation mean monthly dose (mg/L)

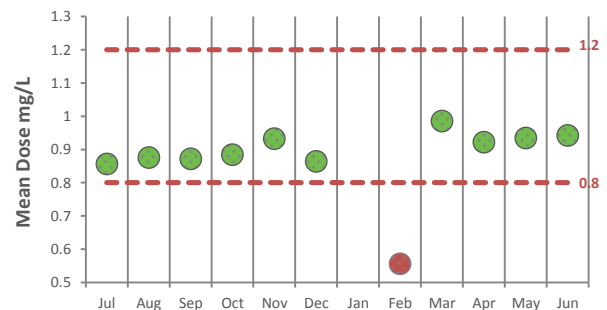


Figure 6.68.6-c Operational samples within target range

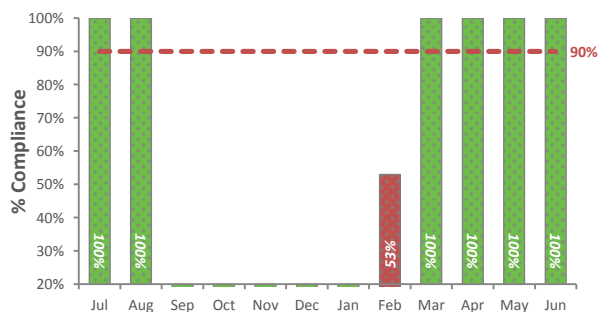
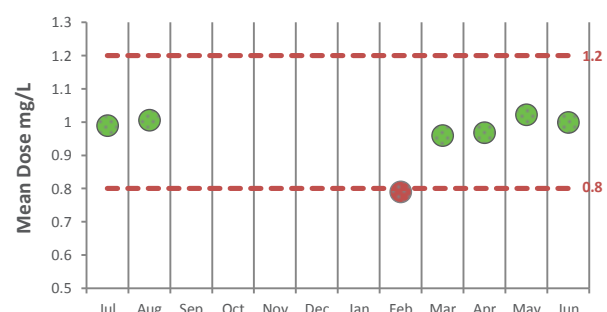


Figure 6.68.6-d Operational samples mean monthly dose (mg/L)



**Note:** (**Reticulation**) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range. (**Operational**) samples above are collected daily and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent
- ❖ Performance in the distribution network is variable and is currently under review
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L
- ❖ From September 2015 to early February 2016, daily testing at the dosing station was undertaken but results were not recorded due to protected action. Fluoride dosing was switched off with agreement from DHHS from 18 December 2015 to 10 February 2016. Low results in February are attributed to the phased approach to bring fluoride back online during February.

## 6.68.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.68.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	7	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	7	0	100	< 1	< 1	< 1
Barium	2000	µg/L	7	0	100	5.57	4	7
Cadmium	2	µg/L	7	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	7	0	100	< 1	< 1	< 1
Copper	2000	µg/L	7	0	100	< 1	< 1	1
Lead	10	µg/L	7	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	7	0	100	2.31	1	4.3
Mercury	1	µg/L	7	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	7	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	7	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	7	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	7	0	100	17	13	23
Monochloroacetic acid	150	µg/L	7	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	7	0	100	16	13	20
Total trihalomethanes	250	µg/L	7	0	100	22.89	7.2	35

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (••) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.68.8. General physical parameters

Table 6.68.8-a General physical performance

General physical parameters (2015–16)				
Parameters	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	106	0.72	0.24	1.18
Turbidity (NTU)	107	0.24	0.1	0.5
pH	107	7.43	6.8	8.33

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals measured across the distribution network were above minimum expectations, and demonstrate a good level of protection against re-contamination
- ❖ pH levels are maintained within the recommended optimal range.

### 6.68.9. Aesthetic issues

- ❖ MIB and Geosmin levels in the raw water were detected above 10 ng/L during the reporting period. Levels recorded in the distribution system during November 2015 were less than 10ng/L. No customer complaints were related to algal taste and odour issues.

### 6.68.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.68.11. Customer complaints

Figure 6.68.11-a Complaint classification

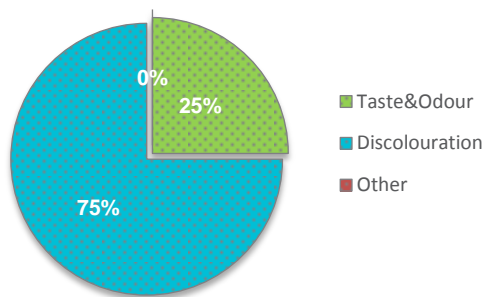
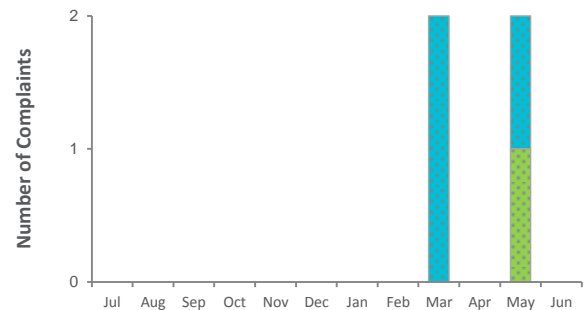


Figure 6.68.11-b Seasonal trend analysis



- ❖ Four complaints were received in this reporting period. Three complaints were related to discolouration issues. The other related to taste and odour.

### 6.68.12. Catchment and source water issues

- ❖ The Westbury catchment covers an area of 58,606 ha. Major land uses include grazing, forestry and native bushland. Dairy farming, cropping and aquaculture also occur within the catchment. The catchment receives the effluent of one sewage treatment plant. Based on the catchment land uses, source water quality risks include:
  - Microbial
  - Turbidity issues
  - Pesticide residuals
- ❖ No health regulated pesticides were detected in the raw water monitoring program.


### 6.68.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.68.14. Future planning

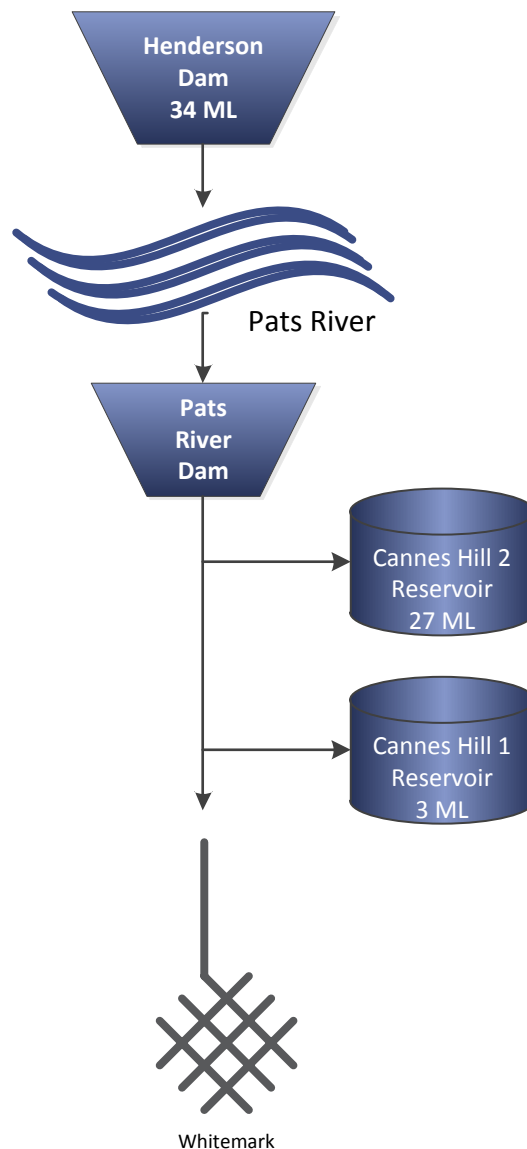
- ❖ No water quality improvement projects are planned for the current 2016–18 PSP period.

### 6.69. Whitemark drinking water system

	<b>Current status</b>	<b>Do not consume</b>
	<b>Total connections</b>	222
	<b>Catchment</b>	Pats River via Henderson Dam
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Whitemark.</li> </ul>		

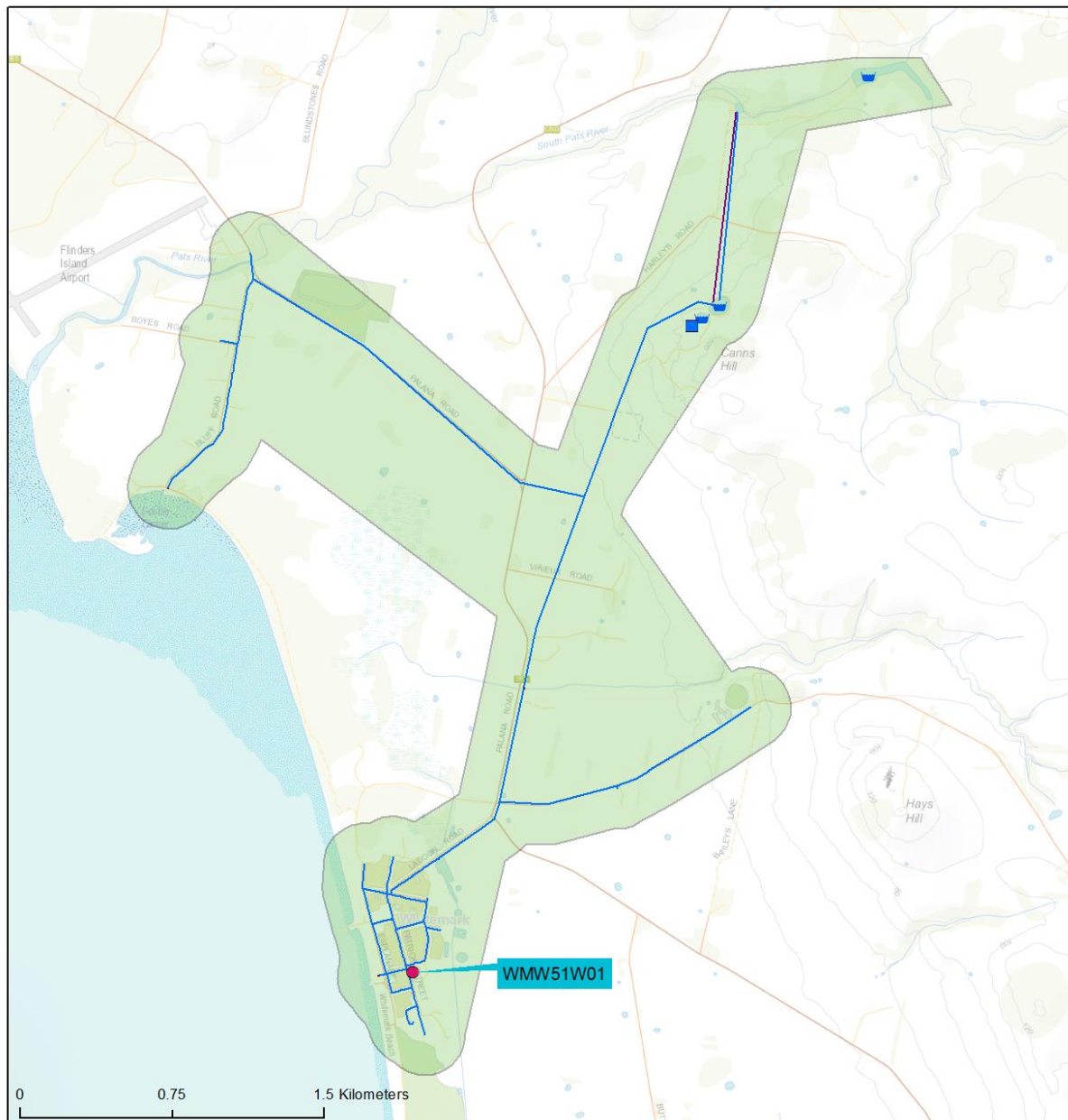
### 6.69.1. System description

Figure 6.69.1-a Whitemark system schematic



- ❖ **Catchment**  
The Whitemark drinking water system is supplied by Pats River, via Pats River Weir, downstream of the Henderson Dam.
- ❖ **Treatment**  
The Whitemark drinking water scheme is a raw water system with no treatment.
- ❖ **Distribution**  
There are two open earthen reservoirs on Cannes Hill which supply the distribution system. The Whitemark drinking water system supplies 222 connections.

Map 6.69.1—a Whitemark monitoring zone



WMW51W01 = Council Depot

## 6.69.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.69.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: <b>Do not consume</b>	
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	50%	No ●	Monthly	12	6	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	–	–	–	
<b>Metals</b> <sup>(4)</sup>	100%	UK^	Quarterly	4	0	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes ●	Annual	1	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (-) – Refers to compliance with current ADWG health guideline at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.

## 6.69.3. Summary of historic total system performance

Table 6.69.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance*					
	2011–12	2012–13	2013–14	2014–15	2015–16	
<b>Microbiological</b> <sup>(1)</sup>	50% ●	38% ●	23% ●	37.8% ^ ●	50% ●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A
	<b>Distribution fluoride testing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	N/A
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	N/A
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	N/A	
<b>Metals</b> <sup>(3)</sup>	79% ●	53% ●	100% ●	100% ●	100% ^ UK	
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	N/A	100% ●	N/A	
<b>Pesticides</b> <sup>(4)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●	
<b>Complaints received</b> <sup>(5)</sup>	1	1	1	0	0	
<b>Public alerts issued</b> <sup>(6)</sup>	1 ●	1 ●	1 ●	1 ●	1 ●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets. ^samples were not collected in accordance with the sampling program to enable assessment against DHHS targets.



#### 6.69.4. Analysis of current performance and historic trends

- ❖ Microbiological performance in 2015–16 was 50 per cent compliant. The microbiological risk to public health is mitigated through the communication of a do not consume notice to customers
- ❖ This system is not fluoridated
- ❖ Metal compliance for 2015–16 achieved 100 per cent. All regulated metals complied with the ADWG health limits. Lead detections have occurred previously in the Whitemark system. These exceedances resulted in a DNC notice issued by DHHS in May 2012
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits.

#### 6.69.5. Microbiological performance

Figure 6.69.5-a Microbiological compliance 2015–16

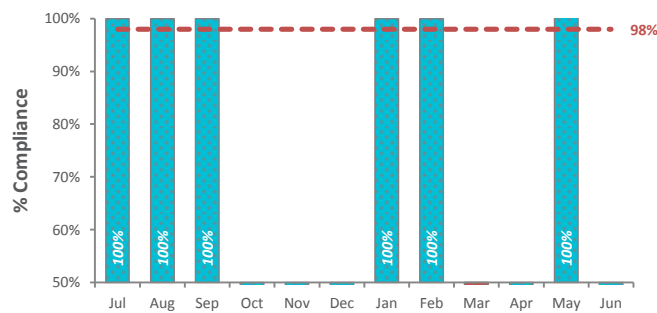
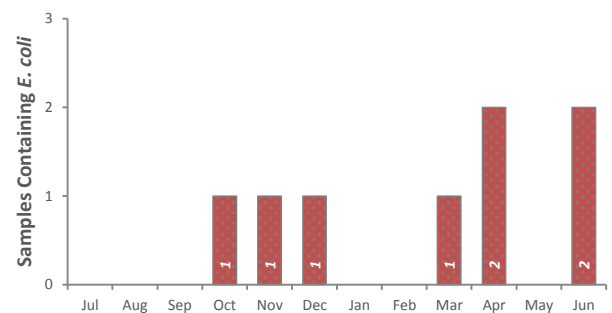


Figure 6.69.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Whitemark system was 50 per cent compliant in 2015–16. Poor microbiological performance can be attributed to a lack of barriers and the susceptibility to changes in quality from Pats River.
- ❖ The risk to public health is mitigated through the communication of the DNC notice to customers.

#### 6.69.6. Fluoride performance

- ❖ This system is not fluoridated.

## 6.69.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

Table 6.69.7-a Other ADWG health regulated parameters (2015–16)

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	11	9	13
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	23.75	13	42
Lead	10	µg/L	4	0	100	1.5	0.7	3.2
Manganese	500	µg/L	4	0	100	7.75	4.9	9.3
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Monochloroacetic acid	150	µg/L	N/A	N/A	–	–	–	–
Trichloroacetic acid	100	µg/L	N/A	N/A	–	–	–	–
Total trihalomethanes	250	µg/L	N/A	N/A	–	–	–	–

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (–) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ Detections of lead have occurred previously in the Whitemark system. These exceedances resulted in a DNC notice issued May 2012
- ❖ DBPs are not measured as chlorination does not occur in this system.

## 6.69.8. General physical parameters

Table 6.69.8-a General physical performance

General physical parameters (2015–16)				
	Samples	Mean	Min.	Max.
Chlorine residual (mg/L)	N/A	–	–	–
Turbidity (NTU)	9	3.43	0.9	16.7
pH	9	5.93	5.41	7.47

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (Chlorine residuals) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (Turbidity) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (pH) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ This system is not chlorinated
- ❖ Mean turbidity levels recorded in the distribution network below the ADWG aesthetic limit of 5 NTU. There is no treatment of the Whitemark water system to mitigate turbidity in the source water

- ❖ pH levels in this system are naturally low and generally below ADWG aesthetic limits. Being from a small catchment and from a very high rainfall area of Tasmania, pH readings tend to be slightly acidic.

#### 6.69.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified.

#### 6.69.10. System incidents and issues

- ❖ Exceedances of ADWG health guideline values for *E. coli* occurred during the reporting period, however the risk to health is mitigated by the PHA (DNC) for this supply.

#### 6.69.11. Customer complaints

- ❖ No complaints were raised during the reporting period.

#### 6.69.12. Catchment and source water issues

- ❖ The Whitemark drinking water system is supplied by Pats River, via Pats River Weir, downstream of the Henderson Dam. The catchment primarily consists of bushland within conservation areas, with some grazing and occasional human visitation in the inner catchment.

#### 6.69.13. Infrastructure and operational changes

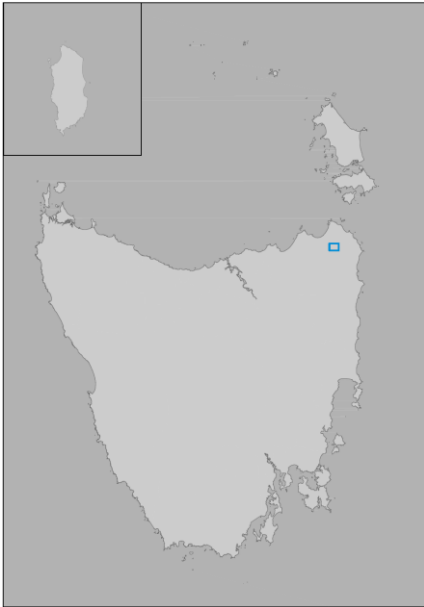
- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.69.14. Future planning

**Table 6.69.14-a Future Planning for the Whitemark drinking water System**

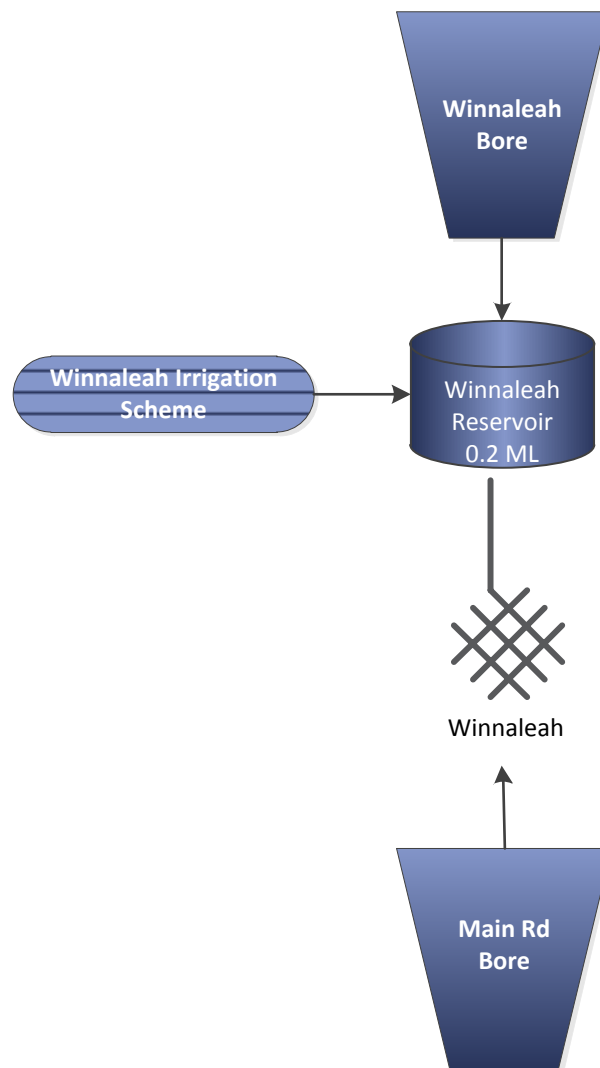
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Flinders Island water supply strategy	New WTP to service Whitemark	Construction / Commissioning	September 2016	\$7 million

### 6.70. Winnaleah drinking water system

	<b>Current status</b>	<b>Do not consume</b>
	<b>Total connections</b>	108
	<b>Catchment</b>	Bore
	<b>Primary treatment</b>	None
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	None
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	None
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Winnaleah.</li> </ul>		

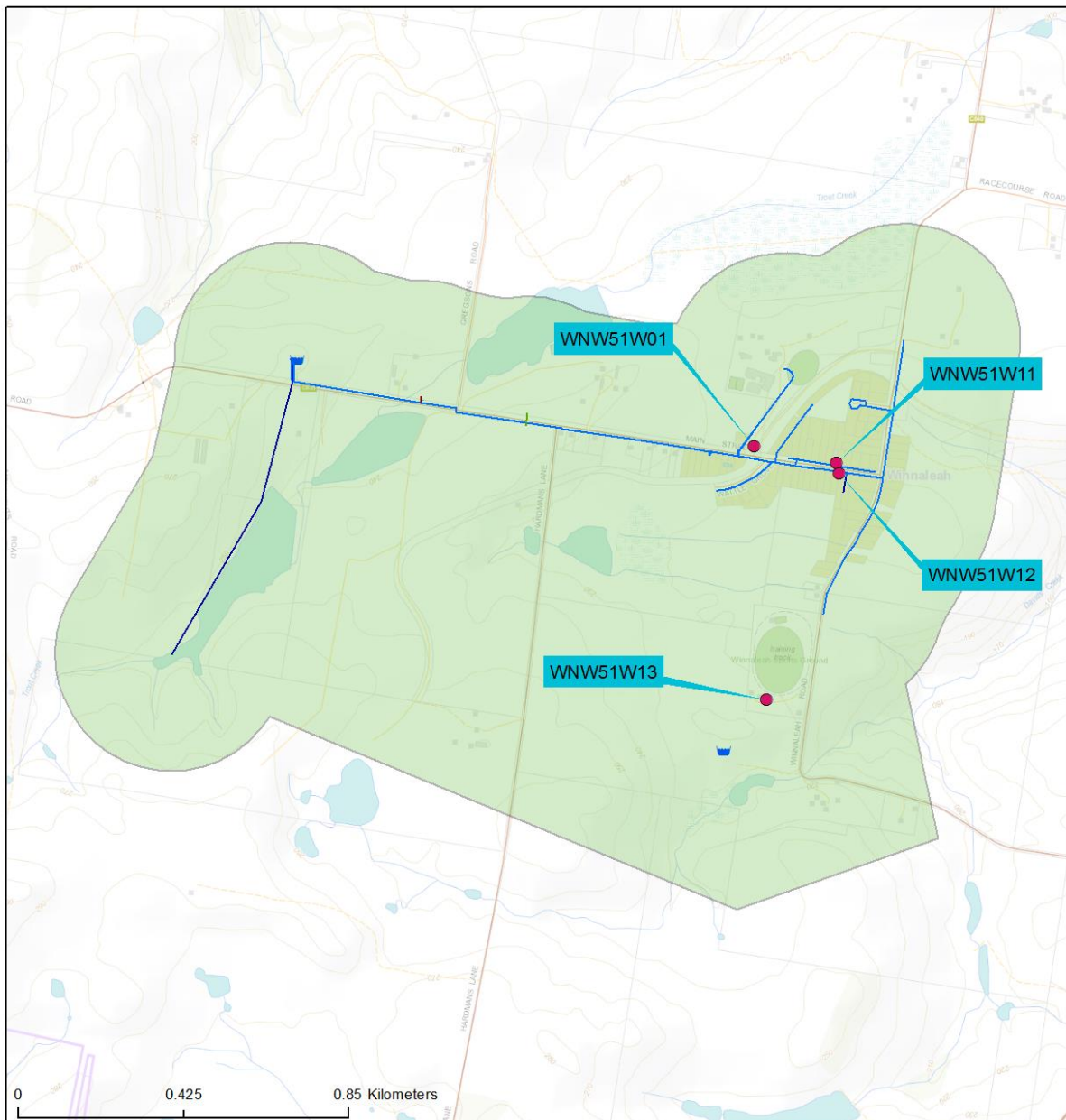
### 6.70.1. System description

Figure 6.70.1-a Winnaleah system schematic



- ❖ **Catchment**  
The Winnaleah drinking water system is sourced from a bore, however it can also be supplied by the Winnaleah Irrigation Scheme
- ❖ **Treatment**  
The Winnaleah system is a raw water system with no treatment
- ❖ **Distribution**  
There is one roofed reservoir in the distribution system. The Winnaleah drinking water system supplies 108 connections.

### Map 6.70.1-a Winnaleah monitoring zone



WNW51W01 = School, WNW51W11 = Tank at Pub, WNW51W12 = Tank opposite the Pub, WNW51W13 = Recreation ground Tank

## 6.70.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.70.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: <b>Do not consume</b>	
Parameter group	Result	Compliant*	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	50%	No <span style="color: red;">●</span>	Weekly	12	6	
<b>Fluoride</b> <sup>(2)</sup>	N/A	N/A	–	–	–	
<b>DBPs</b> <sup>(3)</sup>	100%	Yes <span style="color: green;">●</span>	Quarterly	4	0	
<b>Metals</b> <sup>(4)</sup>	100%	Yes <span style="color: green;">●</span>	Quarterly	4	0	
<b>Pesticides</b> <sup>(5)</sup>	100%	Yes <span style="color: green;">●</span>	6 Monthly	3	0	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.70.3. Summary of historic total system performance

Table 6.70.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance*					
	2011–12	2012–13	2013–14	2014–15	2015–16	
<b>Microbiological</b> <sup>(1)</sup>	100% <span style="color: green;">●</span>	66% <span style="color: red;">●</span>	45% <span style="color: red;">●</span>	61% <span style="color: red;">●</span>	50% <span style="color: red;">●</span>	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A	
	<b>Distribution fluoride testing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	N/A	
	within target range <sup>(b)</sup>	N/A	N/A	N/A	N/A	
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	N/A		
<b>Metals</b> <sup>(3)</sup>	100% <span style="color: green;">●</span>	100% <span style="color: green;">●</span>	97% <span style="color: red;">●</span>	99% <span style="color: orange;">●</span>	100% <span style="color: green;">●</span>	
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	N/A	N/A		
<b>Pesticides</b> <sup>(4)</sup>	0 <span style="color: green;">●</span>	0 <span style="color: green;">●</span>	0 <span style="color: green;">●</span>	0 <span style="color: green;">●</span>	0 <span style="color: green;">●</span>	
<b>Complaints received</b> <sup>(5)</sup>	0	0	3	1	1	
<b>Public alerts issued</b> <sup>(6)</sup>	1 <span style="color: red;">●</span>	1 <span style="color: red;">●</span>	1 <span style="color: red;">●</span>	1 <span style="color: red;">●</span>	1 <span style="color: red;">●</span>	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.70.4. Analysis of current performance and historic trends

- ❖ Microbiological performance in 2015–16 was 50 per cent compliant. The microbiological risk to public health is mitigated through the communication of a PHA (DNC) to customers
- ❖ The system is not fluoridated
- ❖ In 2014, investigations identified high levels of lead in the groundwater. The supply was switched from the bore to the Winnaleah Irrigation Scheme (which also supplies the towns of Herrick and Derby) under a permanent BWN. The community raised concerns over the significant aesthetic difference between the groundwater and the irrigation supply. In agreement with the DHHS, the supply was moved back to the bore under a PHA (DNC) on 26 November 2014
- ❖ Persistent non-compliance with ADWG health limits reinforces the need for the DNC notice currently issued
- ❖ Pesticides compliance for 2015–16 continues to achieve 100 per cent. All regulated pesticides complied with the ADWG health limits

#### 6.70.5. Microbiological performance

Figure 6.70.5-a Microbiological compliance 2015–16

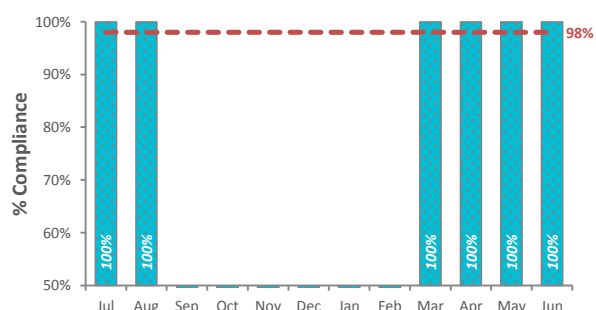
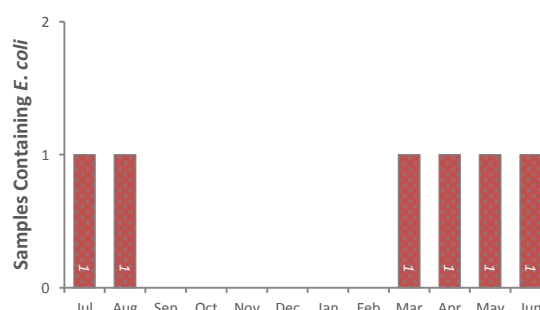


Figure 6.70.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Winnaleah system was 50 per cent compliant in 2015–16.
- ❖ Poor microbiological performance can be attributed to a lack of treatment barriers, however the risk to public health is mitigated through the communication of the PHA (DNC) to customers.

#### 6.70.6. Fluoride performance

- ❖ This system is not fluoridated.



## 6.70.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.70.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	4	0	100	< 1	< 1	< 1
Barium	2000	µg/L	4	0	100	17	16	18
Cadmium	2	µg/L	4	0	100	< 0.1	< 0.1	< 0.1
Chromium	50	µg/L	4	0	100	< 1	< 1	< 1
Copper	2000	µg/L	4	0	100	25.75	21	31
Lead	10	µg/L	4	0	100	2.27	2.5	3
Manganese	500	µg/L	4	0	100	8.7	8.5	9
Mercury	1	µg/L	4	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	4	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	4	0	100	4.55	4.3	4.8
Selenium	10	µg/L	4	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	4	0	100	< 4	< 1	< 4
Monochloroacetic acid	150	µg/L	4	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	4	0	100	< 7	< 2	< 7
Total trihalomethanes	250	µg/L	4	0	100	< 1.5	< 1.5	< 1.5

**Note:** All compliance figures expressed above are comprised of routine sample programs, however excludes any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (-) – Refers to compliance with current ADWG health limits. (\*, \*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits, however historic metal contamination has required a DNC notice to be communicated to customers
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.70.8. General physical parameters

Table 6.70.8-a General physical performance

General physical parameters (2015–16)					
Cygnet monitoring zone		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		NA			
Turbidity (NTU)		12	0.47	0.2	0.9
pH		12	5.64	5.42	5.9

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level of 1 NTU
- ❖ This system is not chlorinated
- ❖ pH levels are below the recommended optimal range. Due to a lack of treatment, pH levels are not able to be adjusted.

### 6.70.9. Aesthetic issues

- ❖ No persistent aesthetic water quality issues were identified in the reporting period.

### 6.70.10. System incidents and issues

- ❖ No water quality incidents occurred in the reporting period.

### 6.70.11. Customer complaints

Figure 6.70.11-a Complaint classification

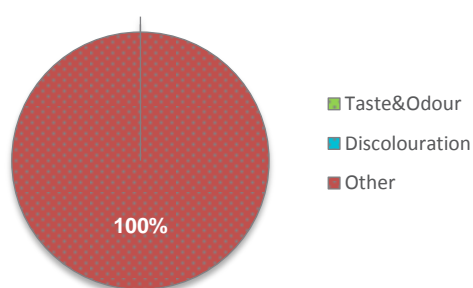
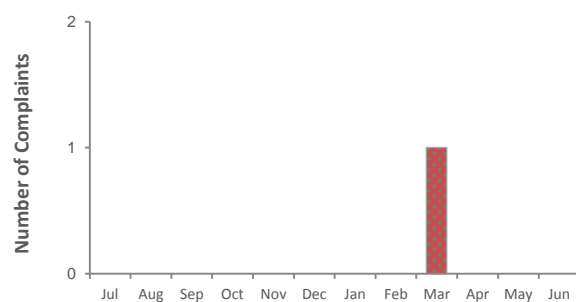


Figure 6.70.11-b Seasonal trend analysis



- ❖ One complaint was received in this reporting period and was not related to water quality.

#### 6.70.12. Catchment and source water issues

- ❖ The Winnaleah drinking water system is sourced from a bore, however it can also be supplied by the Winnaleah Irrigation Scheme
- ❖ The bore is situated within a dairy farm, and may be impacted by this activity. The bore also has a history of sporadic high lead levels, thought to be related to naturally occurring lead in the host rock geology
- ❖ The Winnaleah Irrigation Scheme is supplied from the Frome and Cascade Dams. Activities in the dams' catchment include native forest and forestry. There are aesthetic issues (iron and manganese) associated with the dam water supply
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

#### 6.70.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

#### 6.70.14. Future planning

**Table 6.70.14-a Future planning for the system**

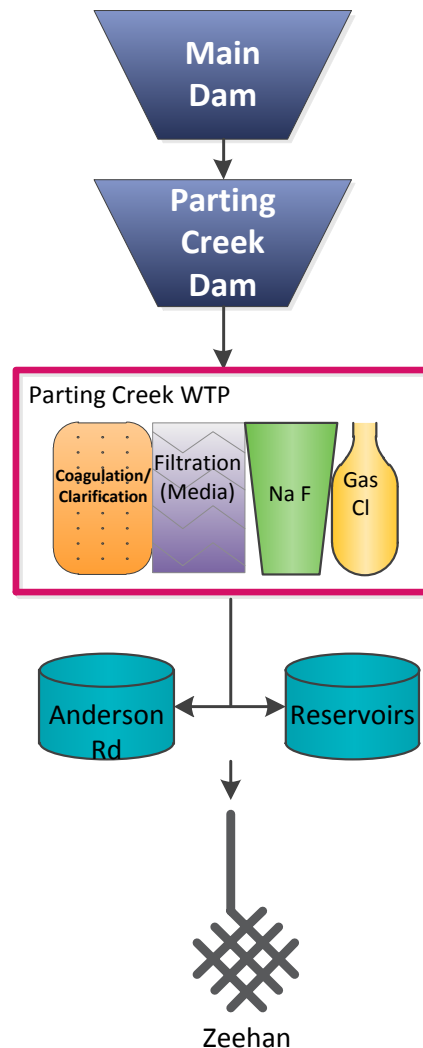
Project	Description	Progress	Anticipated Delivery	Estimated Spend
Winnaleah pipeline	Winnaleah pipeline to the Ringarooma Valley scheme to supply potable water	Project is in design phase.	2017–18	\$3.4 million

### 6.71. Zeehan drinking water system

	<b>Current status</b>	<b>Potable</b>
	<b>Total connections</b>	797
	<b>Catchment</b>	Parting Creek
	<b>Primary treatment</b>	Coagulation/clarification
	<b>Advanced treatment</b>	None
	<b>Primary disinfection</b>	Chlorine Gas
	<b>Secondary disinfection</b>	None
	<b>Fluoridation agent</b>	Sodium Fluoride
<p><b>Towns serviced:</b></p> <ul style="list-style-type: none"> <li>❖ Zeehan.</li> </ul>		

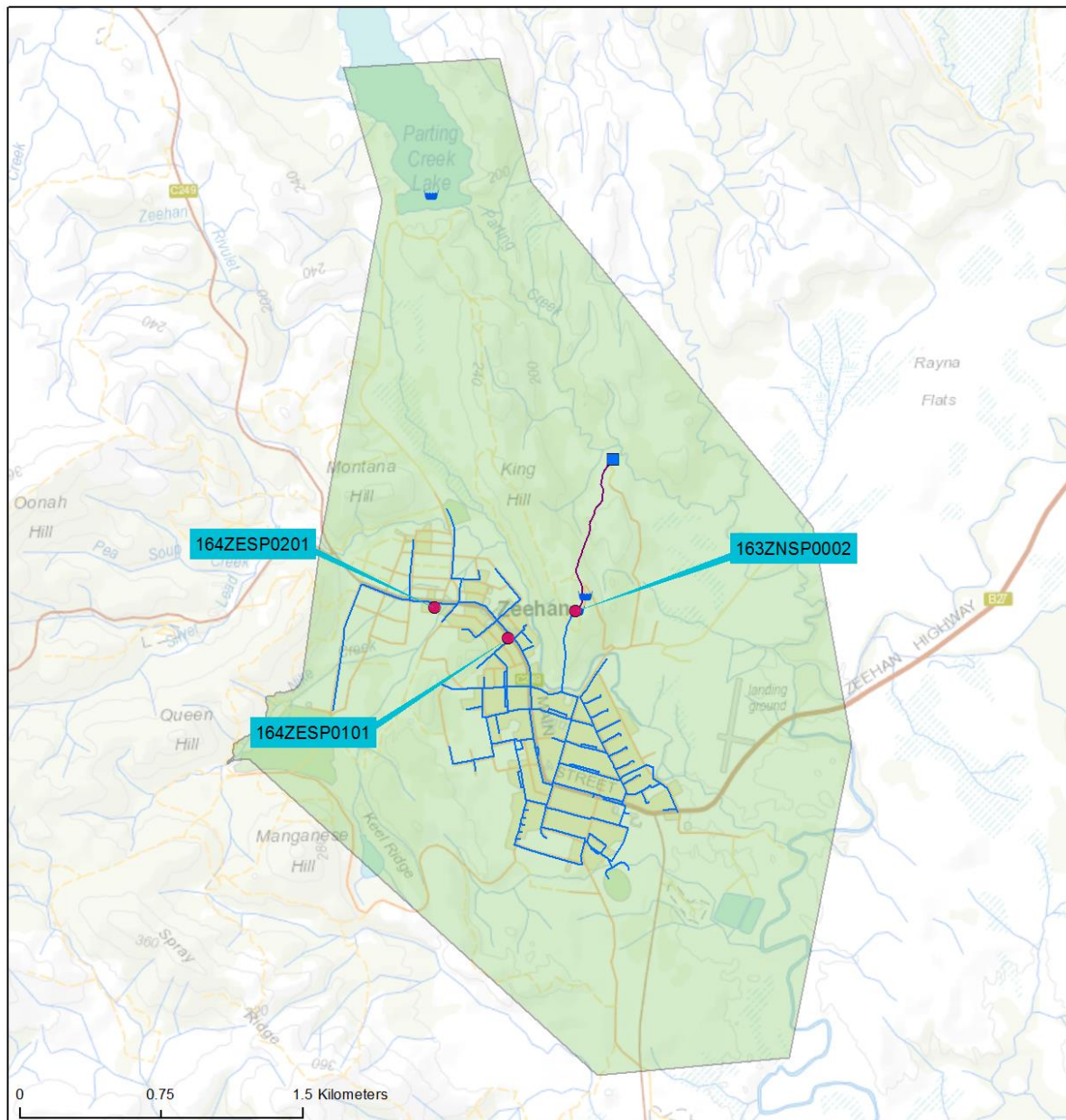
### 6.71.1. System description

Figure 6.71.1-a Zeehan system schematic



- ❖ **Catchment**  
The Zeehan drinking water system is supplied by Parting Creek via Parting Main Dam and Parting Creek Dam. The catchment covers 795 ha and is predominantly native bushland
- ❖ **Treatment**  
The Parting Creek WTP employs coagulation, flocculation, media filtration, gas chlorine disinfection and fluoridation by sodium fluoride
- ❖ **Distribution**  
There are two unroofed reservoirs in the distribution system. The Zeehan drinking water system supplies 797 connections.

Map 6.71.1—a Zeehan monitoring zone



164ZESP0201 = Depot Sample Point, 164ZESP0101 = Main Street Sample Point, 163ZNSP0002 = WTP Treated Storage Sample Point

## 6.71.2. Summary of Annual Reticulation Compliance (2015–16)

Table 6.71.2-a Performance overview (2015–16)

Annual performance overview (2015–16)					Status: <b>Potable</b>	
Parameter group	Result	Compliant <sup>†</sup>	Test frequency	Sampling events	Non-conformance	
<b>Microbiological</b> <sup>(1)</sup>	98.7%	Yes ●	Weekly	158	2	
<b>Fluoride</b> <sup>(2)</sup>	100%	Yes ●	Weekly	98	0	
<b>DBPs</b> <sup>(3)</sup>	100%	Yes ●	Monthly	22	0	
<b>Metals</b> <sup>(4)</sup>	100%	Yes ●	Monthly	18	0	
<b>Pesticides</b> <sup>(5)</sup>	N/A	N/A	–	–	–	

Key – (1) – (● = >98 per cent, ● = ≤98%) – (2) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (3) – (● = 0 failures, ● = >0 failures) – (4) – (● = 0 failures, ● = >0 failures) – (5) – (● = 0 Detections >MRL, ● = >0 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines (2015) requirement of greater than 98 per cent of annual samples having *E. coli* <1MPN/100 mL. Repeat and investigation samples excluded. (2) – Compliance assessed against the ADWG health limit of 1.5 mg/L (3) – Total compliance of ADWG health regulated halogenated by-products only. Individual programs may differ between systems dependant on risk. (4) – Total compliance of ADWG health regulated metals only. Individual programs may differ between systems dependant on risk. (5) – Compliance based on samples collected from the distribution system only. Program based on identified pesticide usage and risk in the catchment and covers where identified ADWG health regulated pesticides, herbicides, fungicides, and insecticides. (–) – Refers to compliance with current ADWG health guideline at the time of reporting.

## 6.71.3. Summary of historic total system performance

Table 6.71.3-a Historic trends

Performance trending overview (2011–12 to/and 2015–16)						
Parameter group	Performance <sup>*</sup>					
	2011–12	2012–13	2013–14	2014–15	2015–16	
<b>Microbiological</b> <sup>(1)</sup>	100% ●	100% ●	100% ●	99.4% ●	98.7% ●	
<b>Fluoride</b> <sup>(2)</sup>	<b>Operational fluoride dosing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	0 ●	0 ●	0 ●
	within target range <sup>(b)</sup>	N/A	N/A	88% ●	82% ●	96.6% ●
	mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	0.9 ●	0.87 ●	0.98 ●
	<b>Distribution fluoride testing</b>					
	Exceeding 1.5mg/L <sup>(a)</sup>	N/A	N/A	N/A	0 ●	0 ●
	within target range <sup>(b)</sup>	N/A	N/A	N/A	72% ●	94.7% ●
mean dose (mg/L) <sup>(c)</sup>	N/A	N/A	N/A	0.81 ●	0.91 ●	
<b>Metals</b> <sup>(3)</sup>	N/A	N/A	100% ●	100% ●	100% ●	
<b>DBPs</b> <sup>(3)</sup>	N/A	N/A	100% ●	100% ●	100% ●	
<b>Pesticides</b> <sup>(4)</sup>	N/A	N/A	N/A	N/A	N/A	
<b>Complaints received</b> <sup>(5)</sup>	Not recorded	Not recorded	0	1	5	
<b>Public alerts issued</b> <sup>(6)</sup>	0 ●	0 ●	0 ●	0 ●	0 ●	

Key – (1) – (● = >98 per cent, ● = >90 per cent, ● = <90%) – (2a) – based ADWG health limit of 1.5mg/L (● = 0, ● = >0) – (2b) – (● = >90 per cent, ● = >80 per cent, ● = <80%) – (2c) – (● = between 0.8 and 1.2, ● = >1.2 or <0.8) – (3) – (● = >95 per cent and/or 0 Failures, ● = >90 per cent and/or 1–3 Failures, ● = <90 per cent and/or >3 Failures) – (4) – (● = 0 Detections >MRL, ● = 1–3 Detections >MRL, ● = >3 Detections >MRL)

Note – (1) – Compliance assessed against the Tasmanian Drinking Water Quality Guidelines 2005 requirement of >98 per cent of annual samples having *E. coli* < 1MPN/100 mL. Repeat and investigation samples excluded. (2) – Operational testing conducted daily from operational dosing points. Distribution testing pre 1/7/2013 collected at a frequency determined by a risk based methodology. Post 1/7/2015 sample collected weekly in line with the requirements of the DRAFT Tasmanian Code of Practice for the Fluoridation of Public Water Supplies 2003–17 (3) – Performance figures, where available, are entered from previous annual reports. Previous programs may differ from those defined in this year's report. (4) – performance measured on distribution samples only. Sampling pre 2013–14 may also reflect raw water sample programs – (5) – Refers to the number of consumer complaints where an expression of dissatisfaction or concern was raised with regard to the quality of supplied drinking water. These figures cover written, telephone, email, or website correspondence. (6) – Covers all "Boil Water", "Do Not Consume" or "Do Not Use" public health alerts issued by DHHS. (\*) – Refers to compliance with the relevant ADWG health guideline or the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) at the time of reporting.

#### 6.71.4. Analysis of current performance and historic trends

- ❖ Microbiological compliance for 2015–16 continues to achieve greater than 98 per cent of samples free of *E. coli*
- ❖ Fluoride compliance for 2015–16 met the compliance target of greater than 90 per cent of samples within target range
- ❖ Metal compliance for 2015–16 continues to achieve 100 per cent. All regulated metals complied with the ADWG health limits
- ❖ DBP compliance for 2015–16 continues to achieve 100 per cent. All regulated DBPs complied with the ADWG health limits.

#### 6.71.5. Microbiological performance

Figure 6.71.5-a Microbiological compliance 2015–16

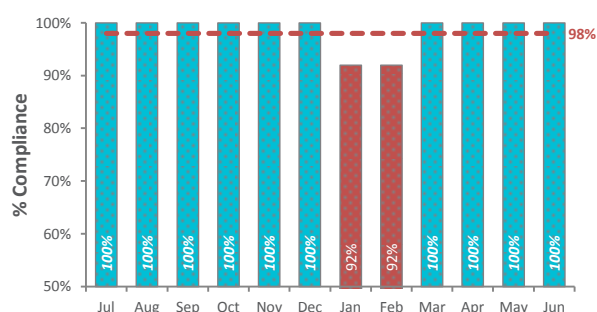
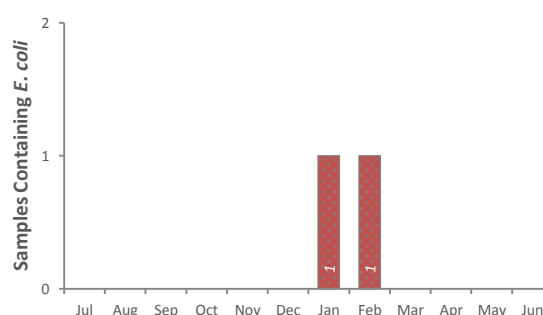


Figure 6.71.5-b Microbiological non-compliance 2015–16



Note: Microbiological performance is defined by per cent of samples free of *E. coli* (<1 MPN/100 mL). Compliance is assessed against the 98 per cent requirement of the Tasmanian Drinking Water Quality Guidelines 2015.

- ❖ The Zeehan system was 98.7 per cent compliant in 2015–16. *E. coli* was detected in two samples during the reporting period
- ❖ An *E. coli* strike occurred in January 2016 with a detection of 1 MPN/100mL. A further *E. coli* strike occurred in February 2016 with a detection of 1 MPN/100mL. Reservoirs were manually dosed and flushing of the lines was conducted to pull through chlorinated water. Retesting was free of microbiological contamination. The presence of two uncovered reservoirs within the system is thought to have contributed to these detections.



## 6.71.6. Fluoride performance

Seasonal performance 2015–16

Figure 6.71.6-a Reticulation samples within target range

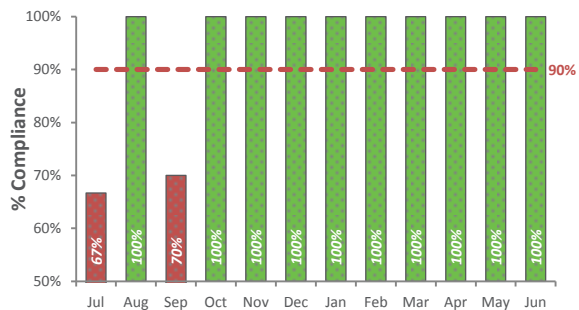


Figure 6.71.6-b Reticulation mean monthly dose (mg/L)

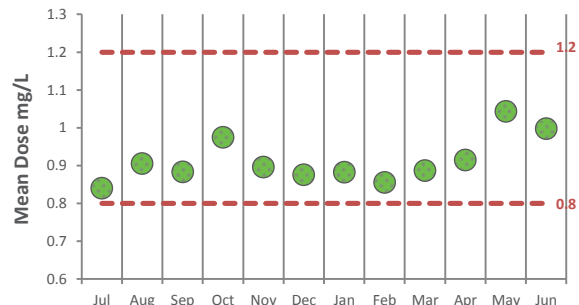


Figure 6.71.6-c Operational samples within target range

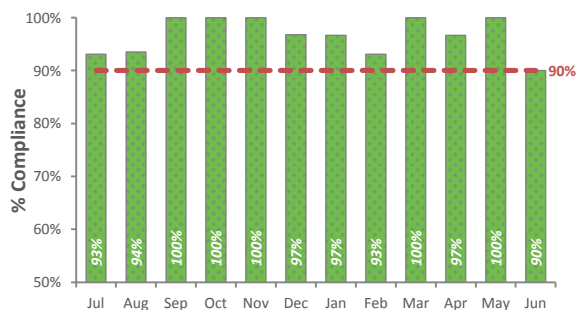
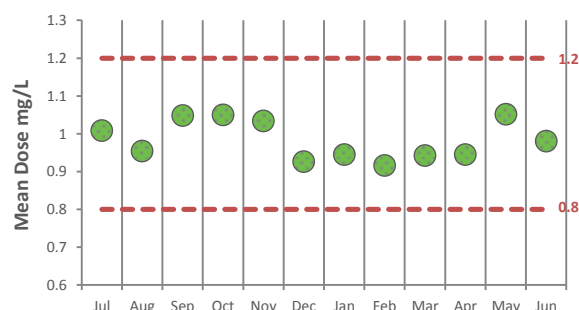


Figure 6.71.6-d Operational samples mean monthly dose (mg/L)



**Note:** (Operational) samples above are collected on a daily basis and demonstrate consistency and reliability of dosing assets. Performance is measured against a target dose of 1mg/L with an acceptable range of 0.8mg/L – 1.2mg/L. Compliance against the Tasmanian Code of Practice for the Fluoridation of Public Water Supplies (2007–10) is a measure of mean monthly dose and percentage of samples within target range. (Reticulation) samples are collected on a weekly basis and are designed to indicate the level of fluoride supplied to customers. Performance is defined by percentage of samples within target range.

- ❖ Mean fluoride compliance at the dosing station achieved the regulatory target of greater than 90 per cent and consistently maintained a residual within the target range of 0.8–1.2 mg/L
- ❖ Failures within the reticulation samples in July and September were related to the failure of reporting results into Aquarius. Daily results from the reticulation were greater than 90% compliant
- ❖ No sample exceeded the ADWG health maximum of 1.5 mg/L.

## 6.71.7. Other Australian Drinking Water Guidelines (ADWG) health regulated parameters

**Table 6.71.7-a Other ADWG health regulated parameters (2015–16)**

ADWG – Health regulated parameters (2015–16)								
Parameter	Limit	Unit	Samples**	Non-compliance*	Performance %	Mean	Min.	Max.
<b>Metals ADWG health regulated</b>								
Antimony	3	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Arsenic	10	µg/L	18	0	100	< 1	< 1	< 1
Barium	2000	µg/L	18	0	100	4.78	4	6
Cadmium	2	µg/L	18	0	100	< 0.1	< 0.1	0.2
Chromium	50	µg/L	18	0	100	< 1	< 1	< 1
Copper	2000	µg/L	8	0	100	2.5	< 1	9
Lead	10	µg/L	18	0	100	< 0.5	< 0.5	< 0.5
Manganese	500	µg/L	18	0	100	20.8	12.3	33.5
Mercury	1	µg/L	18	0	100	< 0.05	< 0.05	< 0.05
Molybdenum	50	µg/L	8	0	100	< 0.5	< 0.5	< 0.5
Nickel	20	µg/L	18	0	100	1.4	0.6	2.2
Selenium	10	µg/L	18	0	100	< 5	< 2	< 5
<b>Disinfection by-products ADWG health regulated</b>								
Dichloroacetic acid	100	µg/L	22	0	100	5.48	< 1	32
Monochloroacetic acid	150	µg/L	22	0	100	< 5	< 5	< 5
Trichloroacetic acid	100	µg/L	22	0	100	25.48	< 7	47
Total trihalomethanes	250	µg/L	22	0	100	58.73	35	79

**Note:** All compliance figures expressed above are comprised of routine sample programs, however exclude any investigative or repeat sampling. Subsequently compliance figures are not necessarily directly comparable between individual systems. In the case a qualifier of < limit of detection (MRL) is encountered in the data set, the average (mean) result for the period was derived utilising 50 per cent of that individual MRL. (\*) – Refers to compliance with current ADWG health limits. (\*\*) – See Appendix A for details of sample programs, minimum sample requirements and a listing of all test sites.

- ❖ All regulated metals complied with the ADWG health limits
- ❖ All regulated DBPs complied with the ADWG health limits.

### 6.71.8. General physical parameters

**Table 6.71.8-a General physical performance**

General physical parameters (2015–16)					
		Samples	Mean	Min.	Max.
Chlorine residual (mg/L)		156	0.23	0.04	1.61
Turbidity (NTU)		153	0.49	0.2	4.6
pH		152	7.31	7.04	7.79

**Note:** General physical parameters expressed above are indicative of distribution network performance. Results are compiled from field based analysis, and conducted via calibrated, portable instrumentation. (**Chlorine residuals**) are expressed herein as the arithmetic annual mean. For the purposes of internal monitoring, residuals should aim to exceed 0.1 mg/L. To minimise aesthetic complaints residuals should target <0.8 mg/L. (**Turbidity**) levels should target <1 NTU to minimise aesthetic complaints and optimise disinfection. (**pH**) should ideally remain between 6.5–8.5 to maintain disinfection and minimise corrosion. For a listing of all test sites refer to Appendix A.

- ❖ Mean turbidity levels recorded in the distribution network are well below the ADWG aesthetic limit of 5 NTU and below the optimal level for maintaining effective disinfection of 1 NTU
- ❖ Mean chlorine residuals in the Zeehan distribution network were just above minimum expectations and demonstrate a good level of protection against re-contamination. Chlorine residuals toward the end of the reticulation generally do not meet the target of greater than 0.1 mg/L because of the loss of chlorine due to the unroofed reservoirs within the system
- ❖ pH levels are maintained within the recommended optimal range.

### 6.71.9. Aesthetic issues

- ❖ There were six complaints relating to discoloured water. These seem to relate directly to the flushing program that was instigated after the microbiological failures in January 2016.

### 6.71.10. System incidents and issues

**Table 6.71.10-a Identified incidents and issues**

Date	Incident Description	Actions Taken	DHHS Notification	
			Required	Complete
27/01/2016	<i>E. coli</i> detection 2 cfu/100mL MPN	Resamples were arranged. The system was manually dosed, flushing of the system was conducted to pull through chlorinated water. The test result on the resample was clear. The presence of two uncovered reservoirs within the system is thought to have contributed to the detections.	Yes	Yes
2/02/2016	<i>E. coli</i> detection 1 cfu/100mL MPN		Yes	Yes

### 6.71.11. Customer complaints

Figure 6.71.11-a Complaint classification

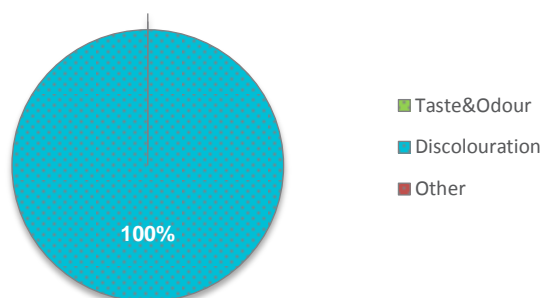
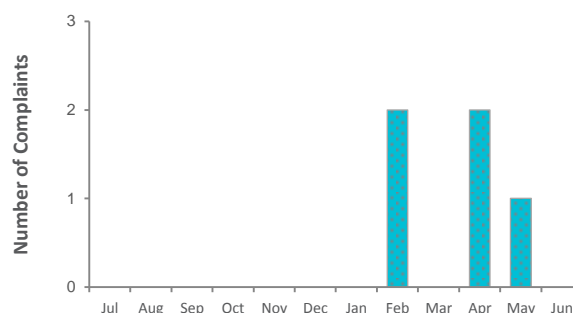


Figure 6.71.11-b Seasonal trend analysis



- ❖ There were five complaints relating to discoloured water. These seem to relate directly with our flushing program.

### 6.71.12. Catchment and source water issues

- ❖ The Zeehan drinking water system is supplied by Parting Creek via Parting Main Dam and Parting Creek Dam. The catchment covers 795 ha and is predominantly native bushland
- ❖ No health regulated pesticides were detected in the raw water monitoring program.

### 6.71.13. Infrastructure and operational changes

- ❖ No significant infrastructure or operational changes were made to either the treatment plant or distribution system during 2015–16.

### 6.71.14. Future planning

Table 6.71.14-a Future planning for the system

Project	Description	Progress	Anticipated Delivery	Estimated Spend
Reservoir roofing	Cover both of the existing reservoirs	Design complete, tender for construction underway	2016–17	TBD

## Appendix A: Sampling Program

Key: W = Weekly; M = Monthly; Q = Quarterly; (Lab) = Laboratory analysed sample; (Field) = Field based analysis via calibrated portable instrumentation; N/A = Not applicable;

System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Avoca	AVW51W01	M	M	Q	Q	N/A	N/A	Q	N/A
Avoca Tanks	AVW51W03	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Avoca Tanks	AVW51W04	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Avoca Tanks	AVW51W05	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Bicheno	GBSTE83	W	W	Q	Q	W	M	Q	N/A
Bicheno	GBSTE84	N/A	N/A	N/A	N/A	W	N/A	N/A	N/A
Bothwell	BOSTE98	W	W	Q	Q	N/A	N/A	Q	N/A
Bracknell	BNW51W01	W	W	Q	Q	N/A	N/A	Q	N/A
Branxholm	BHW51W07	M	M	Q	N/A	N/A	N/A	Q	N/A
Bridport	BRW51W01	W	W	Q	Q	W	M	Q	N/A
Bridport	BRW51W02	W	W	N/A	N/A	W	N/A	N/A	N/A
Bruny Island (Adventure Bay)	ABSTE288	W	W	Q	N/A	N/A	N/A	Q	N/A
Cam River (Wynyard, Somerset)	03001SP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Cam River (Wynyard, Somerset)	0335SSP0003	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Cam River (Wynyard, Somerset)	0335SSP0004	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Cam River (Wynyard, Somerset)	033WYSP0002	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Cam River (Wynyard, Somerset)	0345SSP0007	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Cam River (Wynyard, Somerset)	0345SSP0008	W	W	Q	Q	W	M	N/A	N/A
Cam River (Wynyard, Somerset)	034WYSP0002	W	W	Q	Q	W	N/A	Q	N/A
Campbell Town	CTW51W01	W	W	N/A	N/A	W	M	N/A	N/A
Campbell Town	ROW51W01	W	W	Q	Q	W	N/A	Q	N/A
Colebrook	COSTE81	W	W	Q	M	N/A	N/A	Q	N/A
Coles Bay	GCSTE86	W	W	Q	M	N/A	N/A	Q	N/A
Conara	CNW51W01	W	W	Q	Q	N/A	N/A	Q	N/A
Conglomerate Creek (Queenstown)	19001SP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Conglomerate Creek (Queenstown)	194QTSP0101	W	W	Q	N/A	W	M	N/A	N/A
Conglomerate Creek (Queenstown)	194QTSP0301	W	W	Q	Q	W	N/A	Q	N/A
Conglomerate Creek (Queenstown)	194QTSP0401	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Cornwall	COW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Currie	254CUSP0002	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Currie	254CUSP0003	W	W	Q	Q	N/A	N/A	Q	N/A
Currie	254CUSP0004	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Deep Creek (Smithton)	02101SP0001	W	W	N/A	N/A	N/A	N/A	Q	M
Deep Creek (Smithton)	0235MSP0101	W	W	Q	Q	N/A	N/A	N/A	N/A

System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Deep Creek (Smithton)	0235MSP0201	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Deep Creek (Smithton)	0235MSP0301	W	W	N/A	N/A	W	M	N/A	N/A
Deep Creek (Smithton)	0235MSP0401	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Deep Creek (Smithton)	0235MSP0501	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Deep Creek (Smithton)	0245MSP0401	W	W	Q	Q	W	N/A	Q	N/A
Deep Creek (Smithton)	0245MSP0501	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Deep Creek (Smithton)	0245MSP0601	W	W	Q	Q	N/A	N/A	Q	N/A
Deloraine	DLW51W01	W	W	Q	Q	W	M	Q	N/A
Deloraine	DLW51W02	W	W	Q	Q	W	N/A	Q	N/A
Derby	DBW01W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Distillery Creek	LRP54W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W10	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W11	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W14	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W09	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W13	W	W	N/A	N/A	W	N/A	N/A	N/A
Distillery Creek	LRW51W16	W	W	Q	Q	W	M	Q	N/A
Distillery Creek	LRW51W12	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRP57W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Dover	DOSTE37	W	W	Q	Q	W	M	Q	N/A
Dover	DOSTE38	W	W	N/A	N/A	W	N/A	N/A	N/A
Dowlings Creek (Yolla)	034YLSPO001	W	W	Q	Q	N/A	N/A	Q	N/A
Dowlings Creek (Yolla)	101YLSPO002	W	W	N/A	N/A	N/A	N/A	N/A	M
Dowlings Creek (Yolla)	103YLSPO001	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Ellendale	EDSTE62	W	W	Q	M	N/A	N/A	Q	N/A
Epping	EP51W01	W	W	Q	Q	N/A	N/A	Q	N/A
Fentonbury	FBSTE01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Fingal	FIW51W01	W	W	Q	Q	N/A	N/A	Q	N/A
Forth River (Devonport)	074DNSP0003	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Forth River (Devonport)	07101SP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Forth River (Devonport)	073FOSP0101	W	W	N/A	N/A	N/A	N/A	Q	N/A
Forth River (Devonport)	073LTSP0401	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Forth River (Devonport)	073PSSP0101	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Forth River (Devonport)	073WDSPO101	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Forth River (Devonport)	074DCSP0201	W	W	Q	Q	N/A	N/A	Q	N/A
Forth River (Devonport)	074EDSP0201	W	W	Q	N/A	N/A	N/A	N/A	N/A
Forth River (Devonport)	074LTSP0201	W	W	N/A	N/A	W	M	N/A	N/A
Forth River (Devonport)	074PSSP0201	W	W	Q	Q	W	N/A	Q	N/A
Forth River (Devonport)	074SPSP100	W	W	Q	Q	N/A	N/A	Q	N/A

System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Forth River (Devonport)	083PASP0101	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Forth River (Devonport)	083PASP0201	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gawler River (Ulverstone)	06101SP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Gawler River (Ulverstone)	063EUSP0101	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gawler River (Ulverstone)	063EUSP0201	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gawler River (Ulverstone)	063EUSP0301	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gawler River (Ulverstone)	063EUSP0401	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gawler River (Ulverstone)	063GASP0201	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gawler River (Ulverstone)	064EUSP0201	W	W	Q	N/A	W	M	Q	N/A
Gawler River (Ulverstone)	064UVSP0101	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gawler River (Ulverstone)	064WUSP0101	W	W	Q	N/A	W	N/A	Q	N/A
Gawler River (Ulverstone)	074Tbsp0101	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gladstone	GSW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Gormanston	234GLSP0004	M	Q	N/A	N/A	N/A	N/A	Q	N/A
Gormanston	234GLSP0004	M	M	Q	N/A	N/A	N/A	Q	N/A
Grassy	241GRSP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Grassy	241GRSP0003	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Grassy	241GRSP0004	W	W	Q	Q	N/A	N/A	Q	N/A
Greater Hobart - Brighton	BRSTE107	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Brighton	BRSTE108	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Brighton	BRSTE110	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Brighton	BRSTE111	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - Brighton	BRSTE112	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Brighton	BRSTE114	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Brighton	BRSTE217	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Brighton	CASTE82	W	W	Q	Q	N/A	N/A	Q	N/A
Greater Hobart - Brighton	NLSTE09	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Brighton	NLSTE10	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Brighton	SRSTE03	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE135	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE136	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE137	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE139	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE141	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE142	W	W	Q	Q	N/A	N/A	Q	N/A
Greater Hobart - Clarence	CLSTE143	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE148	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE149	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE150	W	W	N/A	N/A	N/A	N/A	N/A	N/A

System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Greater Hobart - Clarence	CLSTE153	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE154	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE155	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - Clarence	CLSTE156	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE289	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE290	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE301	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE303	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE312	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE313	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE314	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE315	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	CLSTE316	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	SOSTE04	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Clarence	SRSTE01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Coal Valley	RISTE317	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - Glenorchy	GOSTE301	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE03	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE10	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE116	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE117	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE118	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE121	W	W	Q	Q	N/A	N/A	Q	N/A
Greater Hobart - Glenorchy	GOSTE122	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE123	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE124	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE125	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE126	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE128	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE130	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - Glenorchy	GOSTE131	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	GOSTE290	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	LFSTE02	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	LFSTE14	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	WDSTE01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Glenorchy	WDSTE06	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE190	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE201	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE202	W	W	N/A	N/A	N/A	N/A	N/A	N/A



System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Greater Hobart - Hobart	HDSTE158	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE161	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE163	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE164	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE166	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE167	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE170	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE171	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - Hobart	HDSTE172	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE173	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE174	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE183	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Hobart	HDSTE19	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE301	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE302	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE303	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE304	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE305	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE306	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE222	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE224	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE225	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - Kingborough	KBSTE226	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE227	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE228	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE229	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE231	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Kingborough	KBSTE234	W	W	Q	Q	N/A	N/A	Q	N/A
Greater Hobart - National Park	DVSTE60	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - National Park	DVSTE61	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - New Norfolk	DVSTE58	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - New Norfolk	DVSTE80	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - New Norfolk	DVSTE81	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - New Norfolk	DVSTE82	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - New Norfolk	DVSTE83	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - New Norfolk	DVSTE84	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - New Norfolk	DVSTE85	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - New Norfolk	DVSTE86	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - New Norfolk	DVSTE87	W	W	N/A	N/A	N/A	N/A	N/A	N/A

System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Greater Hobart - New Norfolk	DVSTE88	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Sorell	SCITE05	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - Sorell	SCITE06	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Sorell	SCITE07	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Sorell	SCITE08	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Southern Midlands	BDSTE76	W	W	Q	Q	W	M	Q	N/A
Greater Hobart - Southern Midlands	KESTE78	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Southern Midlands	SMSTE75	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Greater Hobart - Southern Midlands	SMSTE77	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Gretna	GRSTE103	M	M	Q	N/A	N/A	N/A	Q	N/A
Hamilton	HASTE104	W	W	Q	Q	N/A	N/A	Q	N/A
Herrick	HRW51W04	M	M	Q	N/A	N/A	N/A	Q	N/A
Huon Valley	ARSTE35	W	W	N/A	Q	N/A	N/A	N/A	N/A
Huon Valley	FRSTE45	W	W	N/A	Q	N/A	N/A	N/A	N/A
Huon Valley	HVSTE39	W	W	N/A	Q	N/A	N/A	N/A	N/A
Huon Valley	HVSTE40	W	W	Q	Q	W	M	Q	N/A
Huon Valley	HVSTE42	W	W	Q	Q	W	N/A	Q	N/A
Huon Valley	GVSTE38	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Huon Valley	HVSTE60	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Huon Valley	NRSTE43	W	W	N/A	Q	N/A	N/A	N/A	N/A
Judbury	JDSTE41	M	M	Q	N/A	N/A	N/A	Q	N/A
Lady Barron	LBW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Lake Barrington (Railton, Sheffield)	09101SP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Lake Barrington (Railton, Sheffield)	093BAS0201	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Lake Barrington (Railton, Sheffield)	093BAS0301	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Lake Barrington (Railton, Sheffield)	094RTSP0101	W	W	Q	Q	W	N/A	Q	N/A
Lake Barrington (Railton, Sheffield)	094SFP0001	W	W	Q	Q	W	M	Q	N/A
Ledgerwood	LWW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Leven River (Penguin)	051PGSP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Leven River (Penguin)	053HBSP0001	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Leven River (Penguin)	053PGSP0001	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Leven River (Penguin)	054HBSP0001	W	W	Q	Q	W	M	Q	N/A
Leven River (Penguin)	054PGSP0001	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Leven River (Penguin)	054PGSP0003	W	W	Q	Q	W	N/A	Q	N/A
Longford	CSW51W01	W	W	Q	Q	W	N/A	Q	N/A
Longford	EDW51W01	W	W	Q	Q	N/A	N/A	Q	N/A
Longford	LOW51W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Longford	LOW52W01	W	W	N/A	N/A	W	M	N/A	N/A
Manuka River (Strahan)	203SNSP0002	N/A	N/A	N/A	N/A	N/A	N/A	Q	M

System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Manuka River (Strahan)	204SNSP0001	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Manuka River (Strahan)	204SNSP0002	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Manuka River (Strahan)	204SNSP0003	W	W	Q	Q	W	M	Q	N/A
Manuka River (Strahan)	204SNSP0004	W	W	Q	Q	W	N/A	N/A	N/A
Manuka River (Strahan)	204SNSP0005	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Manuka River (Strahan)	204SNSP0006	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Manuka River (Strahan)	204SNSP0007	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Mathina	MAW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Maydena	MASTE59	W	W	Q	M	N/A	N/A	Q	N/A
Mole Creek	MCW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Mountain River	MRSTE36	M	M	Q	-	N/A	N/A	Q	N/A
North Esk	LRW51W01	W	W	N/A	N/A	W	N/A	N/A	N/A
North Esk	LRW51W20	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	LRW51W04	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	LRW51W21	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	LRW51W02	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	LRW51W05	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	NEW53W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	WIW51W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	HWW51W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	LRR57W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	GTW51W01	W	W	Q	Q	W	M	Q	N/A
North Esk	LHDSTW19	W	W	N/A	N/A	N/A	N/A	N/A	N/A
North Esk	NER51W02	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Oatlands	OASTE79	W	W	Q	Q	W	M	Q	N/A
Oatlands	OASTE85	N/A	N/A	N/A	N/A	W	N/A	N/A	N/A
Orford	GFSTE92	N/A	N/A	N/A	N/A	W	N/A	N/A	N/A
Orford	GFSTE87	W	W	Q	Q	W	M	Q	N/A
Ouse	OUSTE102	W	N/A	Q	Q	N/A	N/A	Q	N/A
Pet River (Burnie)	043RGSP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Pet River (Burnie)	043RGSP0003	W	W	N/A	Q	W	N/A	N/A	N/A
Pet River (Burnie)	044BUSP0002	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Pet River (Burnie)	044BUSP0003	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Pet River (Burnie)	044BUSP0004	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Pet River (Burnie)	044BUSP0005	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Pet River (Burnie)	044BUSP0006	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Pet River (Burnie)	044BUSP0007	W	W	Q	Q	W	M	Q	N/A
Pet River (Burnie)	044BUSP0008	W	W	Q	Q	N/A	N/A	Q	N/A
Pioneer	PNW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A

System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Pioneer - TANK	PNW51W03	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Ringarooma	RRW51W01	M	M	M	N/A	N/A	N/A	M	N/A
Ringarooma	RRW51W14	M	M	Q	N/A	N/A	N/A	Q	N/A
Ringarooma - TANK	RRW51W06	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Ringarooma - TANK	RRW51W07	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Ringarooma - TANK	RRW51W08	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Ringarooma - TANK	RRW51W15	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Rocky Creek	RCSTE44	W	W	Q	M	W	M	Q	N/A
Rocky Creek	RCSTE46	W	W	N/A	N/A	W	N/A	N/A	N/A
Rosebery	174RBSP0121	N/A	N/A	W	N/A	N/A	N/A	N/A	N/A
Rosebery	174RBSP0301	W	W	W	Q	W	N/A	Q	N/A
Rosebery	174RBSP0401	W	W	W	N/A	N/A	N/A	N/A	N/A
Rosebery	174RBSP0701	W	W	W	M	W	M	Q	N/A
Rosebery	174RBSP1301	W	W	W	N/A	N/A	N/A	N/A	N/A
Rosebery	174RBSP1401	N/A	N/A	W	N/A	N/A	N/A	N/A	N/A
Rossarden	RDW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Rossarden Tank	RDW51W17	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Scamander	SCW51W04	N/A	N/A	N/A	N/A	W	N/A	N/A	N/A
Scamander	SCW51W02	W	W	Q	Q	W	M	Q	N/A
Scottsdale	SDW51W01	W	W	Q	Q	W	M	Q	N/A
Scottsdale	SDW51W02	W	W	N/A	N/A	W	N/A	N/A	N/A
South Esk	PVW52W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
South Esk	PVW51W02	W	W	N/A	N/A	N/A	N/A	N/A	N/A
South Esk	LRW51W07	W	W	N/A	N/A	N/A	N/A	N/A	N/A
South Esk	LRR58W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
South Esk	CAW51W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
South Esk	PVW51W01	W	W	N/A	N/A	W	N/A	N/A	N/A
South Esk	HSW51W01	W	W	Q	Q	W	M	Q	N/A
St Helens	SHR51W01	W	W	N/A	N/A	W	M	N/A	N/A
St Helens	SHW51W02	W	W	Q	Q	W	N/A	Q	N/A
St Marys	SMW51W02	N/A	N/A	N/A	N/A	W	N/A	N/A	N/A
St Marys	SMW51W01	W	W	Q	Q	W	M	Q	N/A
Swansea	GSSTE200	W	W	Q	Q	W	M	Q	N/A
Swansea	GSSTE294	W	W	Q	Q	W	N/A	Q	N/A
Triabunna	GTSTE201	N/A	N/A	N/A	N/A	W	N/A	N/A	N/A
Triabunna	GTSTE86	W	W	Q	Q	W	M	Q	N/A
Tullah	18001SP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Tullah	184TUSP0101	W	W	Q	N/A	N/A	N/A	Q	N/A
Tullah	184TUSP0201	W	W	N/A	M	N/A	N/A	N/A	N/A

System	Site code	Microbiological indicators	General Physico-chemical parameters	Metals	Disinfection By-products	Fluoride (Field)	Fluoride (Lab)	Other Chemicals and Chemical Profile	Process Chemicals
Tullah	184TUSP0301	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Tunbridge	TBSTE80	W	W	Q	Q	N/A	N/A	Q	N/A
Waratah	121WTSP0001	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Waratah	124WTSP0002	W	W	Q	Q	W	M	Q	N/A
Waratah	124WTSP0102	W	W	N/A	N/A	N/A	N/A	Q	M
Wayatinah	WYSTE99	W	W	Q	M	N/A	N/A	Q	N/A
West Tamar	ETW51W01	W	W	Q	Q	W	M	Q	N/A
West Tamar	WEW55W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW55W10	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW55W02	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW54W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	WER53W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW51W02	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	WER52W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW56W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW51W01	W	W	N/A	N/A	N/A	N/A	N/A	N/A
West Tamar	BFW51W01	W	W	N/A	N/A	W	N/A	N/A	N/A
Westbury	EXW51W01	W	W	N/A	N/A	W	N/A	N/A	N/A
Westbury	WHW51W01	W	W	Q	Q	W	M	Q	N/A
Whitemark	WMW51W01	M	M	Q	N/A	N/A	N/A	Q	N/A
Winnaleah	WNW51W02	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Winnaleah	WNW51W01	M	M	Q	Q	N/A	N/A	Q	N/A
Winnaleah TANK	WNW51W11	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Winnaleah TANK	WNW51W12	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Winnaleah TANK	WNW51W13	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Winnaleah TANK	WNW51W18	W	W	N/A	N/A	N/A	N/A	N/A	N/A
Zeehan	163ZNSP0002	W	W	N/A	N/A	N/A	N/A	Q	M
Zeehan	164ZESP0101	W	W	N/A	N/A	W	M	N/A	N/A
Zeehan	164ZESP0201	W	W	Q	Q	W	N/A	Q	N/A

During 2015-16 an updated sampling program was initiated to ensure a consistent state-wide program. Operational and logistical constraints meant that all changes were not implemented by 1 July 2015. The following table details the original sampling schedule for the sites where the sampling program was updated after 1 July 2015.

Key: W = Weekly; F = Fortnightly; M = Monthly; Q = Quarterly; 6M = Six-monthly; A = Annually; Lab = Laboratory analysed sample; Field = Field based analysis via calibrated portable instrumentation; N/A = Not applicable; RW = Not tested, collected in raw water program

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
Adventure Bay	ABSTE288	Bruny Island, Adventure Bay/Shop	W	W	N/A	A	A-LAB	RW	A
Avoca	AVW51W01	Avoca/West Side of Hall	W	W	Q	Q	N/A	Q	Q
Bicheno	GBSTE83	Bicheno/Primary School Garden Tap	W	W	Q	6M	W-FIELD + 6M-LAB	RW	6M
Bothwell	BOSTE98	Bothwell/Michael St,	W	W	Q	6M	6M-LAB	RW	6M
Branxholm	BHW51W01	Branxholm/Recreation Ground	M	M	Q	Q	Q-LAB	Q	Q
Bridport	BRW51W01	Bridport/Visitor Centre	W	W	Q	Q	W-FIELD + M-LAB +Q-LAB	Q	Q
Cam River (Wynyard, Somerset)	0335SSP0003	Somerset/Big Cardigan Res	W	W	M	Q	W-FIELD + M-LAB	RW	Q
Cam River (Wynyard, Somerset)	03001SP0002	Somerset/Clear Water Outlet	W	W	N/A	Q	Q-LAB	RW	Q
Cam River (Wynyard, Somerset)	0335SSP0004	Somerset/Little Cardigan Res	W	W	M	Q	N/A	RW	N/A
Cam River (Wynyard, Somerset)	0345SSP0007	Somerset/Murchison Highway	W	W	M	Q	N/A	RW	N/A
Cam River (Wynyard, Somerset)	0345SSP0006	Somerset/Pot 4 Toilet Block	N/A	N/A	M	Q	N/A	RW	N/A
Cam River (Wynyard, Somerset)	034WYSP0002	Wynyard/Big Creek	W	W	N/A	Q	Q-LAB	RW	Q
Cam River (Wynyard, Somerset)	033WYSP0002	Wynyard/Wynyard Grants Reservoir	W	W	M	Q	W-FIELD + M-LAB	RW	N/A
Colebrook	COSTE81	Colebrook/Public Toilets	W	W	F	6M	6M-LAB	RW	6M
Coles Bay	GCSTE86	Coles Bay/Park Esp.	W	W	Q	6M	6M-LAB	RW	6M
Conara	CNW51W01	Conara/Conara Public Toilets	W	W	Q	Q	Q-LAB	Q	Q
Currie	254CUSP0004	Currie/Depot Site 3	W	W	N/A	Q	Q-LAB	RW	Q
Currie	254CUSP0002	Currie/Netherby Rd Pump Station Site 1	W	W	N/A	N/A	N/A	RW	N/A
Deep Creek (Smithton)	024SMSP0201	Smithton/Gibson St	W	W	N/A	6M	N/A	RW	N/A
Deep Creek (Smithton)	024SMSP0301	Smithton/Kings Park	W	W	N/A	N/A	Q-LAB	RW	Q
Deep Creek (Smithton)	023SMSP0301	Smithton/Little Massey Res	W	W	M	N/A	W-FIELD + M-LAB	RW	N/A
Deep Creek (Smithton)	024SMSP0401	Smithton/Marine Park	W	W	N/A	6M	W-FIELD	RW	N/A
Deep Creek (Smithton)	024SMSP0501	Smithton/Nelson St	W	W	N/A	6M	N/A	RW	N/A
Deep Creek (Smithton)	024SMSP0601	Smithton/Scotchtown Rd	W	W	N/A	N/A	N/A	RW	N/A

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
Deep Creek (Smithton)	02101SP0001	Smithton/Treated Water Storage	W	W	N/A	N/A	Q-LAB	RW	Q
Deep Creek (Smithton)	0235MSP0201	Smithton/Wells Res	W	W	M	N/A	N/A	RW	N/A
Deep Creek (Smithton)	0235MSP0101	Smithton/Youngs Res	W	W	M	N/A	Q-LAB	RW	Q
Deloraine	DLW51W01	Deloraine/Deloraine, Barrack St	W	W	Q	Q	W-FIELD + M-LAB +Q-LAB	Q	Q
Derby	DBW01W01	Derby/Council Depot	M	M	N/A	Q	N/A	Q	Q
Distillery Creek	DCR51W01	Distillery Creek/Treatment Plant, Res Outflow	W	W	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRP52W01	Distillery Creek/East Launceston, High St Pump Station	W	W	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRP54W01	Distillery Creek/Denman Rd PS	M	M	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRP57W01	Distillery Creek/West Launceston, Granville St	M	M	N/A	N/A	W-FIELD	N/A	N/A
Distillery Creek	LRR53W01	Distillery Creek/East Launceston, Hill St Res Yard	F	F	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRR65W01	Distillery Creek/Wst Launceston, Upper Brougham St Res	M	M	N/A	N/A	W-FIELD	N/A	N/A
Distillery Creek	LRW51W08	Distillery Creek/Mowbray, Vermont Rd Bridge	W	W	N/A	N/A	W-FIELD + M-LAB	N/A	N/A
Distillery Creek	LRW51W13	Distillery Creek / Mowbray, 7 Derby St	M	M	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W10	Distillery Creek/Kings Meadows, 9/11 Blaydon St	M	M	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W11	Distillery Creek/East Launceston, Crn High & Adelaide St	M	M	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W12	Distillery Creek/Summerhill, 194 Peel St	M	M	N/A	N/A	W-FIELD	N/A	N/A
Distillery Creek	LRW51W14	Distillery Creek/Invermay, Mayne St	M	M	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRW51W15	Distillery Creek/West Launceston, Cambridge St. Bus Shelter	M	M	N/A	N/A	N/A	N/A	N/A
Distillery Creek	LRR54W01	Distillery Creek / South Launceston, Effingham St	M	M	N/A	N/A	N/A	N/A	N/A
Dover	DOSTE38	Dover/No.4 P/S Kent Beach Rd	N/A	N/A	N/A	N/A	W-FIELD	RW	N/A
Dover	DOSTE37	Dover	W	W	Q	6M	W-LAB + M-LAB+ 6M-LAB	RW	6M
Dowlings Creek (Yolla)	103YLSPO001	Yolla/Reservoir	W	W	Q	N/A	N/A	RW	N/A
Dowlings Creek (Yolla)	034YLSPO001	Yolla/School	W	W	Q	Q	M-LAB	RW	M
Dowlings Creek (Yolla)	101YLSPO002	Yolla/WTP Outlet	W	W	N/A	Q	M-LAB	RW	M
Ellendale	EDSTE62	Ellendale	W	W	Q	6M	6M-LAB	RW	6M
Epping	EP51W01	Epping/Epping Forest, Behind Hall	W	W	Q	Q	Q-LAB	Q	Q
Fingal	FIW51W01	Fingal/Miners Park	W	W	Q	Q	Q-LAB	Q	Q
Forth River (Devonport)	083PASPO201	Forth / Big Kelcey Reservoir	W	W	Q	Q	M-LAB	RW	N/A

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
Forth River (Devonport)	074LTSP0101	Forth/Bradshaw St Latrobe	N/A	N/A	N/A	Q	N/A	RW	N/A
Forth River (Devonport)	07101SP0002	Forth/Clear Water Outlet	W	W	N/A	M	M-LAB	RW	M
Forth River (Devonport)	073LTSP0401	Forth/Dooleys Res	N/A	N/A	Q	Q	Q-LAB	RW	N/A
Forth River (Devonport)	073FOSP0101	Forth/Girdlestons Res	W	W	Q	Q	W-FIELD + M-LAB	RW	Q
Forth River (Devonport)	073LTSP0301	Forth/Little Papas Res	W	W	N/A	N/A	N/A	RW	N/A
Forth River (Devonport)	074DNSP0001	Forth/Mackays Castings	W	W	N/A	N/A	N/A	RW	N/A
Forth River (Devonport)	074DCSP0201	Forth/Mersey Bluff Surf Club	N/A	N/A	N/A	Q	N/A	RW	N/A
Forth River (Devonport)	083PASP0101	Forth / Paloona Res, Sample Point	W	W	N/A	Q	M-LAB	RW	N/A
Forth River (Devonport)	074DCSP0103	Forth/Panorama Reservoir	N/A	N/A	Q	N/A	N/A	RW	N/A
Forth River (Devonport)	073PSSP0101	Forth/Port Sorell Res,	W	W	N/A	N/A	M-LAB	RW	N/A
Forth River (Devonport)	074PSSP0201	Forth/Port Sorell Surf Club	W	W	N/A	Q	Q-LAB	RW	Q
Forth River (Devonport)	074DCSP0104	Forth/Shannon Drive	N/A	N/A	N/A	Q	N/A	RW	N/A
Forth River (Devonport)	073WDSP0101	Forth/Williams Res	W	W	Q	Q	Q-LAB	RW	Q
Forth River (Devonport)	074EDSP0201	Forth/Wright St	W	W	N/A	Q	N/A	RW	Q
Forth River (Devonport)	074SPSP100	Forth / Wrenswood Drv Res Sample Point	W	W	N/A	N/A	N/A	RW	N/A
Gawler River (Ulverstone)	064WUSP0101	Gawler/Flora St Wst Ulverstone	W	W	N/A	Q	N/A	RW	Q
Gawler River (Ulverstone)	063GASP0201	Gawler/Hearps Res	W	W	Q	N/A	N/A	RW	N/A
Gawler River (Ulverstone)	063EUSP0101	Gawler/Hazelwood Res	W	W	N/A	N/A	W-FIELD + M-LAB	RW	N/A
Gawler River (Ulverstone)	063EUSP0401	Gawler/Kimberley Res	W	W	Q	N/A	N/A	RW	N/A
Gawler River (Ulverstone)	064UVSP0101	Gawler/Ulverstone Council Chambers	W	W	N/A	Q	N/A	RW	Q
Gawler River (Ulverstone)	063EUSP0201	Gawler/Von Bibra Res	W	W	Q	N/A	W-FIELD + M-LAB	RW	Q
Gawler River (Ulverstone)	06101SP0002	Gawler/WTP Treated Storage Outlet	W	W	N/A	M	N/A	RW	Q
Gladstone	GSW51W01	Gladstone/Fire Station	M	M	Q	Q	Q-LAB	Q	Q
Gormanston	234GLSP0004	Gormanston/Mongomery St.	M	M	N/A	Q	Q-LAB	RW	Q
Grassy	241GRSP0003	Grassy/Sassafrass St Site 2	W	W	N/A	N/A	Q-LAB	RW	Q
Grassy	241GRSP0004	Grassy/Ti Tree Drive Site 3	W	W	N/A	Q	N/A	RW	N/A
Grassy	241GRSP0002	Grassy/Treated Water Storage	W	W	6M	M	N/A	RW	N/A
Greater Hobart - Brighton	BRSTE112	Compton Downs, St Anne's	W	W	Q	A	A-LAB	RW	A



Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
Greater Hobart - Brighton	BRSTE114	Jordan River/School	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Brighton	BRSTE107	Old Beach/238 Old Beach Rd	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Brighton	BRSTE111	Pontville/Old Council Chambers	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Brighton	BRSTE108	Tea Tree/Glen Rose Dr	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Brighton	BRSTE110	Tea Tree/Merriworth Rd	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Clarence	CLSTE289	Acton Park/222 Acton Drive, PRV Shed	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Clarence	CLSTE137	Cambridge/13 Maxwells Rd	M	M	N/A	N/A	N/A	RW	N/A
Greater Hobart - Clarence	CLSTE134	Geilston Bay/101 Clinton Ave	M	M	N/A	N/A	N/A	RW	N/A
Greater Hobart - Clarence	CLSTE151	Geilston Bay/64 Walana St	N/A	N/A	Q	A	A-LAB	RW	A
Greater Hobart - Clarence	CLSTE144	Lauderdale/320 South Arm Rd	M	M	N/A	N/A	N/A	RW	N/A
Greater Hobart - Clarence	CLSTE139	Mt Rumney/193 Grahams Rd	M	M	N/A	N/A	N/A	RW	N/A
Greater Hobart - Clarence	CLSTE141	Otago/21 Otago Bay Rd	M	M	N/A	N/A	N/A	RW	N/A
Greater Hobart - Clarence	CLSTE153	Risdon Vale/87 Gardenia Rd	M	M	Q	A	A-LAB	RW	A
Greater Hobart - Clarence	CLSTE290	Risdon/26 Saundersons Rd	M	M	N/A	N/A	N/A	RW	N/A
Greater Hobart - Clarence	CLSTE143	Seven Mile Beach, 24 Leyden Avenue	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Clarence	CLSTE142	Tranmere, 21 Vaughan Court	M	M	Q	A	A-LAB	RW	A
Greater Hobart - Coal Valley	CASTE82	Campania/Public Toilet/Tennis Crt	W	W	Q	6M	6M-LAB	RW	6M
Greater Hobart - Coal Valley	RISTE317	Richmond, 12 Victoria St/Fire Station	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE117	Austins Ferry/1 Sharon Drive	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE123	Austins Ferry/20 Wendourie Pde	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE130	Austins Ferry/Primary School	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE128	Chigwell/Shop 2 Allunga Rd	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE116	Claremont/12 Chatterton Crt	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE131	Claremont/59 Toffolis Rd, Garden Tap	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE124	Derwent Park/49 Windsor St	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE126	Glenorchy City Council chambers	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE125	Goodwood, Gepp Parade Outside Public Toilets	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE118	Lutana/10 Birch Rd	W	W	N/A	A	A-LAB	RW	A

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
Greater Hobart - Glenorchy	GOSTE290	Montrose/1 Beneve Crt	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE121	Moonah, 2 Gerrard St	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Glenorchy	GOSTE122	Moonah, 2/10 Dawkins Court	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Hobart	HDSTE164	Hobart/Argyle St	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Hobart	HDSTE160	Lenah Valley/43 Girrabong Rd	F	F	Q	N/A	N/A	RW	N/A
Greater Hobart - Hobart	HDSTE171	Sandy Bay / 762 Sandy Bay Rd, Sample Tap	W	W	N/A	N/A	N/A	RW	N/A
Greater Hobart - Hobart	HDSTE170	Sandy Bay/345 Sandy Bay Rd	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Hobart	HDSTE163	Sandy Bay/8 Lindeith Crt	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Hobart	HDSTE165	South Hobart/114 Marlyn Rd	W	W	N/A	N/A	N/A	RW	N/A
Greater Hobart - Hobart	HDSTE172	South Hobart/317 Strickland Ave	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Hobart	HDSTE158	South Hobart/56 Cascade Rd	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Hobart	HDSTE173	Tolmans Hill/9 Woodridge Rd	W	W	Q	A	A-LAB	RW	A
Greater Hobart - Kingborough	KBSTE222	Blackmans Bay (at STP)	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Kingborough	KBSTE219	Blackmans Bay/33 Aldinga St	N/A	N/A	Q	N/A	N/A	RW	N/A
Greater Hobart - Kingborough	KBSTE220	Bonnet Hill/55 Harpers Rd	N/A	N/A	Q	N/A	N/A	RW	N/A
Greater Hobart - Kingborough	KBSTE225	Kingston Beach/Foreshore	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Kingborough	KBSTE224	Kingston Primary School, Boronia Low Level	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Kingborough	KBSTE221	Margate, 90 Esplanade	N/A	N/A	Q	N/A	N/A	RW	N/A
Greater Hobart - Kingborough	KBSTE227	Margate, Sandfly Rd, Margate Cemetery	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - Kingborough	KBSTE230	Snug/22 Pybus St	N/A	N/A	Q	N/A	N/A	RW	N/A
Greater Hobart - Kingborough	KBSTE234	Taroona/Soccer Field	W	W	N/A	A	A-LAB	RW	A
Greater Hobart - National Park	LFSTE15	Box Hill/Fenton Res/Glebe Street	W	W	Q	6M	W-FIELD + M-LAB	RW	6M
Greater Hobart - National Park	DVSTE60	National Park/Hotel	W	W	Q	6M	6M-LAB	RW	6M
Greater Hobart - National Park	DVSTE61	Westerway Community Centre	W	W	Q	6M	W-FIELD	RW	6M
Greater Hobart - New Norfolk	DVSTE58	New Norfolk/George St	W	W	Q	6M	6M-LAB	RW	6M
Greater Hobart - Sorell	SCITE08	Midway Point/24 Honolulu St	W	W	Q	6M	6M-LAB	RW	6M
Greater Hobart - Sorell	SCITE07	Midway Point/24 Penna Road	W	W	Q	6M	6M-LAB	RW	6M
Greater Hobart - Sorell	SCITE05	Sorell/10 Somerville St	W	W	Q	6M	6M-LAB	RW	6M

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
Greater Hobart - Sorell	SCITE06	Sorell/William Street	W	W	Q	6M	6M-LAB	RW	6M
Greater Hobart - Southern Midlands	BDSTE76	Bagdad/Caltex Fuel Station, Sample Post	W	W	Q	6M	6M	RW	6M
Greater Hobart - Southern Midlands	KESTE78	Kempton/Caravan Bay	W	W	Q	6M	6M	RW	6M
Greater Hobart - Southern Midlands	SMSTE75	Mangalore/Park Sample Post	W	W	Q	6M	6M	RW	6M
Greater Hobart - Southern Midlands	SMSTE77	Dysart/Crn Ely & Church Lane	W	W	Q	6M	6M	RW	6M
Gretna	GRSTE103	Gretna/Picnic Grounds	M	M	N/A	6M	6M-LAB	RW	6M
Herrick	HRW51W03	Herrick/Primary School	M	M	N/A	Q	Q-LAB	Q	Q
Huon Valley	ARSTE35	Cygnets/Football Ground, Bridge	W	W	Q	6M	6M-LAB	RW	6M
Huon Valley	HVSTE39	Franklin/Opposite No. 1 PS	W	W	Q	6M	6M-LAB	RW	6M
Huon Valley	HVSTE42	Geeveston/Intersection Bridge, School Rd, Main Rd	W	W	Q	6M	W-FIELD + M-LAB + 6M-LAB	RW	6M
Huon Valley	HVSTE40	Huonville Retic/Football Club Entrance, Wilmott Rd	W	W	Q	6M	W-FIELD + M-LAB + 6M-LAB	RW	6M
Huon Valley - Cygnet Nichols	NRSTE43	Cygnets/Nicholls Rivulet	W	W	Q	6M	W-FIELD + M-LAB + 6M-LAB	RW	6M
Huon Valley - Geeveston Donnelly	GVSTE38	Geeveston/Fourfoot Rd 1st Bridge	W	W	Q	6M	W-FIELD + M-LAB + 6M-LAB	RW	6M
Huon Valley - Geeveston Kermantie	KESTE51	Geeveston/Bridge, crn Kermantie McKibens Rd	W	W	Q	6M	W-FIELD + M-LAB + 6M-LAB	RW	6M
Huon Valley - Jacksons Road	FRSTE45	South Franklin, Jacksons Rd	M/W	M/W	Q	6M	6M-LAB	RW	6M
Judbury	JDSTE41	Judbury/Hall	M	M	N/A	6M	6M-LAB	RW	6M
Lake Barrington (Railton, Sheffield)	093BASP0301	Barrington/Butlers Res	W	W	Q	Q	W-FIELD + M-LAB	RW	Q
Lake Barrington (Railton, Sheffield)	094RTT0101	Barrington/Crockers Rd (Town Centre)	N/A	N/A	N/A	Q	N/A	RW	N/A
Lake Barrington (Railton, Sheffield)	094SGSP0101	Barrington/Kermode St	N/A	N/A	N/A	Q	N/A	RW	N/A
Lake Barrington (Railton, Sheffield)	094RTT0103	Barrington/Kimberly Rd	N/A	N/A	N/A	Q	N/A	RW	N/A
Lake Barrington (Railton, Sheffield)	094RTT0102	Barrington/Latrobe St	N/A	N/A	N/A	Q	N/A	RW	N/A
Lake Barrington (Railton, Sheffield)	093BASP0201	Barrington/Munros Res	W	W	Q	Q	N/A	RW	Q
Lake Barrington (Railton, Sheffield)	094RTSP0101	Barrington/Railton Park	W	W	N/A	N/A	N/A	RW	N/A
Lake Barrington (Railton, Sheffield)	093BASP0101	Barrington/Railway BP Tank	N/A	N/A	N/A	Q	N/A	RW	Q
Lake Barrington (Railton, Sheffield)	094SFSP0001	Barrington/Sheffield Council Office	W	W	N/A	Q	W-FIELD + M-LAB	RW	Q
Lake Barrington (Railton, Sheffield)	094SFSP0005	Barrington/West Nook Rd	N/A	N/A	N/A	Q	N/A	RW	N/A
Lake Barrington (Railton, Sheffield)	09101SP0002	Barrington/WTP Clear Water Outlet	W	W	N/A	Q	M-LAB	RW	M
Legerwood	LWW51W01	Legerwood/Public Hall	M	M	N/A	Q	Q-LAB	Q	Q

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
Leven River (Penguin)	054HBSP0001	Whitehills/Heybridge Fire Station Tap	N/A	N/A	N/A	N/A	N/A	RW	Q
Leven River (Penguin)	053HBSP0001	Whitehills/Heybridge Res	W	W	Q	N/A	W-FIELD	RW	N/A
Leven River (Penguin)	053PGSP0001	Whitehills/Murfets Res	W	W	Q	N/A	N/A	RW	N/A
Leven River (Penguin)	054PGSP0003	Whitehills/Patrick St Clinic	W	W	N/A	N/A	N/A	RW	N/A
Leven River (Penguin)	054PGSP0001	Whitehills/Penguin Surf Club Tap	W	W	N/A	Q	W-FIELD + M-LAB	RW	N/A
Leven River (Penguin)	051PGSP0002	Whitehills/WTP Storage	W	W	N/A	Q	N/A	RW	Q
Longford	CSW51W01	Longford/Cressy Public Toilets	W	W	N/A	N/A	W-FIELD	N/A	N/A
Longford	EDW51W01	Longford/Evandale History Centre, High St	W	W	N/A	N/A	N/A	N/A	N/A
Longford	LOW51W01	Longford/Lyttleton St Toilets	W	W	Q	Q	Q-LAB	Q	Q
Manuka River (Strahan)	204SNSP0002	Strahan/Esplanade	W	W	Q	Q	W-FIELD + M-LAB	RW	Q
Manuka River (Strahan)	204SNSP0003	Strahan/Harvey St	W	W	Q	N/A	W-FIELD	RW	N/A
Manuka River (Strahan)	204SNSP0001	Strahan/Letts Bay	W	W	Q	N/A	N/A	RW	N/A
Manuka River (Strahan)	204SNSP0004	Strahan/Regatta Point	W	W	Q	N/A	N/A	RW	N/A
Manuka River (Strahan)	203SNSP0002	Strahan/Treated Water Storage	N/A	N/A	N/A	M	M-LAB	RW	Q
Mathinna	MAW51W01	Mathinna/Rec Ground Recreation Ground	M	M	N/A	Q	N/A	Q	M
Maydena	MASTE59	Maydena/Community Hall	W	W	Q	6M	6M-LAB	RW	6M
Mole Creek	MCW51W01	Mole Creek/Pioneer Drive	M	M	N/A	Q	Q-LAB	Q	Q
Mountain River	MRSTE36	Mountain River/431 Mountain River Rd	M	M	N/A	6M	6M-LAB	RW	6M
North Esk	GTW51W01	North Esk/George Town, Information Centre	M	M	N/A	N/A	W-FIELD	N/A	N/A
North Esk	HWW51W01	North Esk/Hillwood, Jetty	M	M	N/A	N/A	W-FIELD	N/A	N/A
North Esk	LHDSTW18	North Esk/Newnham Camira St Pump Station	M	M	N/A	N/A	N/A	N/A	N/A
North Esk	LHDSTW80	North Esk/Rocherlea/Australis Dr	W	W	N/A	N/A	W-FIELD + M-LAB	N/A	N/A
North Esk	LRR57W01	North Esk/Lilydale, 1972 Lilydale Rd (Public Toilets)	W	W	Q	Q	W-FIELD	Q	Q
North Esk	LRW51W01	North Esk/Youngtown, Poplar Parade	M	M	N/A	N/A	N/A	N/A	N/A
North Esk	LRW51W02	North Esk/Newnham, Franmaree St	M	M	N/A	N/A	N/A	N/A	N/A
North Esk	LRW51W04	North Esk/Kings Meadows, Leith St	M	M	N/A	N/A	N/A	N/A	N/A
North Esk	LRW51W05	North Esk/Rocherlea, TasWater Depot	M	M	N/A	N/A	N/A	N/A	N/A
North Esk	LRW51W06	North Esk/Ravenswood, Reservoir	M	M	N/A	N/A	N/A	N/A	N/A

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
North Esk	LRW51W20	North Esk/Norwood, Charlton Park	M	M	N/A	N/A	N/A	N/A	N/A
North Esk	NEW53W01	North Esk/Dilston Hall	M	M	N/A	N/A	W-FIELD	N/A	N/A
North Esk	NEW61W01	North Esk/White Hills, Pressure Reducing Valve	W	W	Q	Q	N/A	Q	Q
North Esk	WIW51W01	North Esk/Windermere, Church	M	M	N/A	N/A	W-FIELD	N/A	N/A
North Esk	NHDSTW20	North Esk / Kings Meadows, Franklin Village Res 1	M	M	N/A	N/A	N/A	N/A	N/A
North Esk	NHDSTW21	North Esk / Kings Meadows, Franklin Village Res 2	M	M	N/A	N/A	N/A	N/A	N/A
North Esk	LHDSTW67	North Esk / Kings Meadows, Watchorn St Res	M	M	N/A	N/A	N/A	N/A	N/A
Oatlands	OASTE79	Oatlands/Wellington St, Sample Post	W	W	Q	6M	M-LAB/W-FIELD	RW	6M
Oatlands	OASTE315	Oatlands/WTP, Basin Tap at Plant	N/A	N/A	N/A	N/A	W-FIELD	RW	N/A
Orford	GFSTE87	Orford/Old Convict Rd	W	W	Q	6M	M-LAB/W-FIELD	RW	6M
Ouse Hamilton	OUSTE102	Ouse/Public Toilets	W	W	Q	6M	6M-LAB	RW	6M
Ouse Hamilton	HASTE104	Hamilton/Park	W	W	Q	6M	6M-LAB	RW	6M
Pet River (Burnie)	043RGSP0002	Burnie/C.W.S Outlet	W	W	N/A	M	Q-LAB	RW	M
Pet River (Burnie)	044BUSP0006	Burnie/Cadburys	W	W	N/A	Q	M-LAB	RW	Q
Pet River (Burnie)	044BUSP0001	Burnie/Cascade Inlet	N/A	N/A	M	Q	N/A	RW	Q
Pet River (Burnie)	044BUSP0002	Burnie/Cascade Outlet	W	W	N/A	Q	N/A	RW	Q
Pet River (Burnie)	044BUSP0008	Burnie/Chasm Cr	W	W	M	Q	Q-LAB	RW	Q
Pet River (Burnie)	044BUSP0003	Burnie/Lactos	W	W	N/A	Q	N/A	RW	Q
Pet River (Burnie)	044BUSP0005	Burnie/Moorville Rd Outlet	W	W	M	Q	N/A	RW	Q
Pet River (Burnie)	043RGSP0003	Burnie/Ridgley Mount Road	W	W	M	N/A	W-FIELD + M-LAB	RW	N/A
Pet River (Burnie)	044BUSP0007	Burnie/Scarfe St	W	W	M	Q	W-FIELD + M-LAB	RW	Q
Pet River (Burnie)	044BUSP0004	Burnie/Upper Outlet	W	W	M	Q	N/A	RW	Q
Pioneer	PNW51W01	Pioneer/Pioneer, Public Hall	M	M	N/A	Q	Q-LAB	Q	Q
Ringarooma	RRW51W01	Ringarooma/Opposite Police Station	M	M	N/A	Q	Q-LAB	Q	Q
Ringarooma	RRW51W14	Ringarooma / PRV Main Street	M	M	N/A	Q	Q-LAB	Q	Q
Rocky Creek	RCSTE44	Ranelagh Showgrounds	W	W	Q	6M	M-LAB/W-FIELD	RW	6M
Rocky Creek	RCSTE46	Ranelagh / Grove Fire Station	N/A	N/A	N/A	N/A	W-FIELD	N/A	N/A
Rossarden	RDW51W01	Rossarden/Lee St BBQ Area	M	M	N/A	Q	Q-LAB	Q	Q

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
Scamander	SCW51W02	Scamander/56 Scamander Ave	W	W	Q	Q	W-FIELD + M-LAB	Q	Q
Scottsdale	SDW51W01	Scottsdale/Recreation Ground	W	W	Q	Q	W-FIELD + M-LAB	Q	Q
South Esk	CAW51W01	South Esk/Carrick, Public Hall	W	W	N/A	N/A	W-FIELD	N/A	N/A
South Esk	HSW51W01	South Esk/Hadspen, South Esk Drive	W	W	N/A	N/A	W-FIELD	N/A	N/A
South Esk	LRR58W01	South Esk/Prospect Vale, Chris St Res	W	W	N/A	N/A	W-FIELD	N/A	N/A
South Esk	LRW51W07	South Esk/Kings Meadows, Connector Park	W	W	N/A	N/A	W-FIELD	N/A	N/A
South Esk	PVW52W01	South Esk/Blackstone Heights, Longvista Drive	W	W	N/A	N/A	W-FIELD	N/A	N/A
South Esk	SEW51W01	South Esk/Prospect Vale, Casino Rising	W	W	Q	Q	W-FIELD + M-LAB +Q-LAB	Q	Q
St Helens	SHW51W02	St Helens/Stieglitz Beach	W	W	Q	Q	W-FIELD + Q-LAB	Q	Q
St Marys	SMW51W01	St Marys/St. Marys School	W	W	Q	Q	W-FIELD + M-LAB +Q-LAB	Q	Q
Swansea	GSSTE294	Swansea/Cathcart St Sampling Point	N/A	N/A	N/A	N/A	W-FIELD	RW	N/A
Swansea	GSSTE200	Swansea/Noyse St Reservoir	W	W	Q	6M	W-FIELD + M-LAB	RW	6M
Triabunna	GTSTE86	Triabunna/Cemetery, Charles St	W	W	Q	6M	W-FIELD + M-LAB	RW	6M
Tullah	184TUSP0101	Tullah/Bluff St	W	W	N/A	Q	Q-LAB	RW	Q
Tullah	18001SP0002	Tullah/Clear Water Outlet	W	W	N/A	Q	Q-LAB	RW	Q
Tullah	184TUSP0201	Tullah/Farrell	W	W	N/A	N/A	N/A	RW	N/A
Tullah	184TUSP0301	Tullah/WTP Water Storage	W	W	Q	Q	N/A	RW	N/A
Tunbridge	TBSTE80	Tunbridge/Tunbridge St Sample Post	W	W	Q	6M	6M-LAB	RW	6M
Waratah	124WTSP0102	Waratah/WTP	W	W	N/A	M	M-LAB	RW	Q
Wayatinah	WYSTE99	Wayatinah	W	W	Q	6M	6M-LAB	RW	6M
West Tamar	ETW51W01	West Tamar/Exeter, Biloo St	W	W	N/A	N/A	W-FIELD + M-LAB	N/A	N/A
West Tamar	WER52W01	West Tamar/Glengarry Res, Reservoir	M	M	N/A	N/A	N/A	N/A	N/A
West Tamar	WER53W01	West Tamar/Grindlewald Res, Sample Point	M	M	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW51W01	West Tamar/Beauty Point, Esplanade Toilets	M	M	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW51W02	West Tamar/Swan Pt, Park	M	M	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW54W01	West Tamar/Legana Freshwater Point Rd	M	M	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW55W01	West Tamar/Stephensdale, 14 Marlou Crt	F	F	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW55W02	West Tamar/Riverside, Cleghorn St	F	F	N/A	N/A	N/A	N/A	N/A

Former sampling program variations									
System	Site Code	Site Name	Microbiological Indicators	Physico-chemical parameters	Disinfection By-products	Metals	Fluoride	Pesticides	Process chemicals
West Tamar	WEW55W10	West Tamar/Riverside, 32 Gray St	M	M	N/A	N/A	N/A	N/A	N/A
West Tamar	WEW56W01	West Tamar/Kayena, Bonnie Beach	M	M	N/A	N/A	N/A	N/A	N/A
West Tamar	WTR53W01	West Tamar/Reatta Rd Treatment Plant, Reservoir	W	W	Q	Q	N/A	Q	Q
Westbury	WHW51W01	Westbury/Village Green	W	W	Q	Q	W-FIELD + M-LAB +Q-LAB	Q	Q
Whitemark	WMW51W01	Whitemark/Council Depot	M	M	N/A	Q	N/A	Q	N/A
Winnaleah	WNW51W01	Winnaleah/School	M	M	N/A	Q	N/A	Q	Q
Zeehan	164ZESP0101	Zeehan/Main Street	W	W	Q	N/A	W-FIELD + M-LAB	RW	N/A
Zeehan	163ZNSP0002	Zeehan/WTP Treated Storage	W	W	N/A	M	N/A	RW	Q

## Appendix B: List of towns serviced

Towns	Drinking Water Systems
Abbotsfield	Greater Hobart
Acton Park	Greater Hobart
Adventure Bay	Adventure Bay
Akaroa	St Helens
Ambleside	Forth River (Devonport)
Austins Ferry	Greater Hobart
Avoca	Avoca
Bagdad	Greater Hobart
Battery Point	Greater Hobart
Beaconsfield	West Tamar
Beauty Point	West Tamar
Bell Bay	North Esk
Bellerive	Greater Hobart
Berriedale	Greater Hobart
Bicheno	Bicheno
Blackmans Bay	Greater Hobart
Blackstone Heights	South Esk
Blythe Heads	Leven River (Penguin)
Bonnet Hill	Greater Hobart
Bothwell	Bothwell
Bracknell	Bracknell
Branxholm	Branxholm
Bridgewater	Greater Hobart
Bridport	Bridport
Brighton	Greater Hobart
Burnie	Pet River (Burnie)
Campania	Greater Hobart
Campbell Town	Campbell Town
Carrick	South Esk
Cascades	Greater Hobart
Castle Forbes Bay	Greater Hobart
Chasm Creek	Pet River (Burnie)
Chigwell	Greater Hobart
Claremont	Greater Hobart
Clarendon Vale	Greater Hobart
Colebrook	Colebrook
Coles Bay	Coles Bay
Collinsvale	Greater Hobart
Conara	Conara
Cornelian Bay	Greater Hobart
Cornwall	Cornwall
Crabtree	Rocky Creek
Cressy	Longford
Currie	Currie
Cygnets	Huon Valley
Cygnets – Nicholls Rivulet	Huon Valley
Deloraine	Deloraine
Derby	Derby
Derwent Park	Greater Hobart
Deviot	West Tamar
Devon Hills	Longford
Devonport	Forth River (Devonport)
Dilston	North Esk
Dover	Dover
Dowsing Point	Greater Hobart
Dynnyrne	Greater Hobart



Towns	Drinking Water Systems
Dysart	Greater Hobart
East Devonport	Forth River (Devonport)
East Launceston	Distillery Creek
Electrona	Greater Hobart
Ellendale	Ellendale
Elwick	Greater Hobart
Epping Forest	Epping
Eugenana	Forth River (Devonport)
Evandale	Longford
Exeter	West Tamar
Exton	Westbury
Fentonbury	Greater Hobart
Fern Tree	Greater Hobart
Fingal	Fingal
Firthside	Greater Hobart
Flagstaff Gully	Greater Hobart
Forth	Forth River (Devonport)
Franklin	Huon Valley
Franklin – Jacksons Road	Franklin – Jacksons Road
Freycinet National Park Visitors Centre	Coles Bay
Gagebrook	Greater Hobart
Gawler	Gawler River (Ulverstone)
Geeveston	Huon Valley
Geeveston – Kermandie	Geeveston Kermandie Road (post 25 November 2015 supplied by Huon Valley)
Geilston Bay	Greater Hobart
George Town	North Esk
Gladstone	Gladstone
Glebe	Greater Hobart
Glen Huon	Huon Valley
Glengarry	West Tamar
Glenlusk	Greater Hobart
Glenorchy	Greater Hobart
Goodwood	Greater Hobart
Gormanston	Gormanston
Granton	Greater Hobart
Grassy	Grassy
Gravelly Beach	West Tamar
Green Point	Greater Hobart
Gretna	Gretna
Grindelwald	West Tamar
Grove	Rocky Creek
Hadspen	South Esk
Hagley	Westbury
Hamilton	Hamilton
Havenbrook	West Tamar
Hawley	Forth River (Devonport)
Herrick	Herrick
Heybridge	Leven River (Penguin)
Hillcrest	Pet River (Burnie)
Hillwood	North Esk
Hobart	Greater Hobart
Howden	Greater Hobart
Howrah	Greater Hobart
Howth	Leven River (Penguin)
Huntingfield	Greater Hobart
Huonville (partial)	Huon Valley
Huonville (partial)	Rocky Creek
Invermay	Distillery Creek

Towns	Drinking Water Systems
Irishtown	Deep Creek (Smithton)
Judbury	Judbury
Karoola	North Esk
Kayena	West Tamar
Kempton	Greater Hobart
Kings Meadows (partial)	Distillery Creek
Kings Meadows (partial)	North Esk
Kings Meadows (partial)	South Esk
Kingston	Greater Hobart
Kingston Beach	Greater Hobart
Lady Barron	Lady Barron
Latrobe	Forth River (Devonport)
Lauderdale	Greater Hobart
Launceston	Distillery Creek
Legana	West Tamar
Legerwood	Legerwood
Leith	Forth River (Devonport)
Lenah Valley	Greater Hobart
Lilydale	North Esk
Lindisfarne	Greater Hobart
Longford	Longford
Low Head	North Esk
Lower Sandy Bay	Greater Hobart
Lutana	Greater Hobart
Mangalore	Greater Hobart
Maranoa Heights	Greater Hobart
Margate	Greater Hobart
Mathinna	Mathinna
Maydena	Maydena
Mayfield	North Esk
Melrose	Forth River (Devonport)
Merton	Greater Hobart
Midway Point	Greater Hobart
Mole Creek	Mole Creek
Montagu Bay	Greater Hobart
Montello	Pet River (Burnie)
Montrose	Greater Hobart
Moonah	Greater Hobart
Mornington	Greater Hobart
Mount Nelson	Greater Hobart
Mount Rumney	Greater Hobart
Mount Stuart	Greater Hobart
Mountain River	Mountain River
Mowbray	Distillery Creek
National Park	Greater Hobart
New Norfolk	Greater Hobart
New Town	Greater Hobart
Newnham	North Esk
Newstead	North Esk
Nook	Lake Barrington (Railton, Sheffield)
North Hobart	Greater Hobart
Norwood	North Esk
Oakdowns	Greater Hobart
Oatlands	Oatlands
Old Beach	Greater Hobart
Orford	Orford
Otago	Greater Hobart
Ouse	Ouse

Towns	Drinking Water Systems
Paloona	Forth River (Devonport)
Penguin	Leven River (Penguin)
Perth	Longford
Pioneer	Pioneer
Pontville	Greater Hobart
Port Huon	Huon Valley
Port Sorell	Forth River (Devonport)
Preservation Bay	Leven River (Penguin)
Prospect Vale	South Esk
Punchbowl	North Esk
Queenstown	Queenstown
Railton	Lake Barrington (Railton, Sheffield)
Raminea	Dover
Ranelagh (partial)	Huon Valley
Ranelagh (partial)	Rocky Creek
Ravenswood	North Esk
Relbia	North Esk
Richmond	Greater Hobart
Ridgeway	Greater Hobart
Ridgley	Pet River (Burnie)
Ringarooma	Ringarooma
Risdon	Greater Hobart
Risdon Vale	Greater Hobart
Riverside	West Tamar
Rocherlea	North Esk
Roches Beach	Greater Hobart
Rocky Creek	Rocky Creek
Rokeby	Greater Hobart
Romaine	Pet River (Burnie)
Rose Bay	Greater Hobart
Rosebery	Rosebery
Rosetta	Greater Hobart
Rosevears	West Tamar
Rosny	Greater Hobart
Rosny Park	Greater Hobart
Ross	Campbell Town
Rossarden	Rossarden
Sandy Bay	Greater Hobart
Scamander	Scamander
Scottsdale	Scottsdale
Seven Mile Beach	Greater Hobart
Shearwater	Forth River (Devonport)
Sheffield	Lake Barrington (Railton, Sheffield)
Shorewell Park	Pet River (Burnie)
Sidmouth	West Tamar
Sisters Beach	Cam River (Wynyard, Somerset)
Smithton	Deep Creek (Smithton)
Snug	Greater Hobart
Somerset	Cam River (Wynyard, Somerset)
Sorell	Greater Hobart
South Hobart	Greater Hobart
South Launceston	Distillery Creek
Southern Midlands	Greater Hobart
Spreyton	Forth River (Devonport)
Springfield (Raw water waysiders)	Scottsdale
St Helens	St Helens
St Leonards	North Esk
St Marys	St Marys

Towns	Drinking Water Systems
Stanley	Deep Creek (Smithton)
Stephensdale	West Tamar
Stieglitz	St Helens
Strahan	Manuka River (Strahan)
Strathblane	Dover
Sulphur Creek	Leven River (Penguin)
Summerhill	Distillery Creek
Swan Bay	North Esk
Swan Point	West Tamar
Swansea	Swansea
Taroona	Greater Hobart
Tolmans Hill	Greater Hobart
Tranmere	Greater Hobart
Trevallyn	West Tamar
Triabunna	Triabunna
Triabunna (seasonally)	Orford
Tullah	Tullah
Tunbridge	Tunbridge
Turners Beach	Gawler River (Ulverstone) * Can also be supplied by Forth
Ulverstone	Gawler River (Ulverstone)
Upper Burnie	Pet River (Burnie)
Waratah	Waratah
Warrane	Greater Hobart
Waverley	North Esk
Wayatinah	Wayatinah
Wesley Vale	Forth River (Devonport)
West Hobart	Greater Hobart
West Launceston	Distillery Creek
West Ulverstone	Gawler River (Ulverstone)
Westbury	Westbury
Western Junction	Longford
Westerway	Greater Hobart
Whitemark	Whitemark
Windermere	North Esk
Winnaleah	Winnaleah
Wivenhoe	Pet River (Burnie)
Wynyard	Cam River (Wynyard, Somerset)
Yolla	Dowlings Creek (Yolla)
Youngtown	North Esk
Zeehan	Zeehan

## Appendix C: Supporting data

All supporting raw data sets can be found in the CD Rom attached below.

