



Drinking Water Quality Management Plan (DWQMP) Annual Report

1 July 2017 to 30 June 2018

Central Highlands Regional Council

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Glossary of terms

ADWG	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
CFU/100mL	Colony Forming Units per 100 millilitres
CHRC	Central Highlands Regional Council
DWQMP	Drinking Water Quality Management Plan
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium that is considered to indicate the presence of faecal contamination and is a potential health risk
LOR	Limit of Reporting
mg/L	Milligrams per litre
ML	Megalitre
µg/L	Micrograms per litre
NTU	Nephelometric Turbidity Units
OFI	Opportunities for Improvement from our plan audit
pH	Power of Hydrogen
QHFSS	Queensland Health Forensic and Scientific Services
R. raciborskii and Cylindro	<i>Raphidiopsis (formerly Cylindrospermopsis) raciborskii</i> , a freshwater cyanobacteria known to produce the toxin cylindrospermopsin and a potential health risk
REC	Recommendations from our plan audit
RMIP	Risk Management Improvement Program
THM	Trihalomethanes
WTP	Water Treatment Plant
>	Greater than
≥	Greater than or equal to
<	Less than

1 Introduction

This report documents the performance of Central Highlands Regional Council's drinking water service.

It details performance of the water quality and the implementation of actions detailed in the Drinking Water Quality Management Plan (DWQMP) required under the *Water Supply (Safety and Reliability) Act 2008* (the Act).

The report assists the regulator to determine compliance with the current approved DWQMP and provides a public report on the council's management of drinking water.

2 Summary of Schemes Operated

This report relates to the drinking water supply schemes that the Central Highlands Regional Council owned and operated from 1 July 2017 to 30 June 2018.

Table 1 lists the water supply scheme, water source, water treatment process, population and drinking water treatment capacity for the water supply schemes covered in this report.

Table 1 – Summary of water supply schemes

Scheme Name	Communities Supplied	Water Source	Treatment Processes	Population Served [#]	Treatment Capacity [*]
Anakie	Anakie	May Creek Bore	Disinfection	100	0.4
Bauhinia	Bauhinia Downs	Artesian Bore	Disinfection	25	0.1
Blackwater	Blackwater	Mackenzie River	Coagulation, Filtration, pH correction, Fluoridation and Disinfection	4743	15
	Bluff			261	
Capella	Capella	Capella Creek / Mackenzie River	Coagulation, Filtration, pH correction and Disinfection	1012	0.9
Comet	Comet	Comet River	Coagulation, Filtration, pH correction and Disinfection	147	0.3
Dingo	Dingo	Springton Creek/ Dingo Creek	Coagulation, Filtration, and Disinfection	145	0.4
Duaringa	Duaringa	Dawson River	Coagulation, Filtration and Disinfection	192	0.7
Emerald	Emerald	Nogoa River	Coagulation, Filtration, pH correction, Fluoridation and Disinfection	14047	38
Rolleston	Rolleston	Comet River / Sub-artesian Bores	Coagulation, Filtration, and Disinfection	255	0.3
Sapphire / Rubyvale	Sapphire / Rubyvale	Retreat Creek Bores	Fluoridation and Disinfection	1214	2.1
Springsure	Springsure	Shallow Basalt / Deeper Sandstone Bores	Aeration and Disinfection	868	2
Tieri	Tieri	Mackenzie River	Coagulation, Filtration, pH correction, Fluoridation and Disinfection	1128	3.6

[#] Available populations sourced @ <http://www.qgso.qld.gov.au/products/tables/erp-ucl-qld/index.php> as at July 2018

^{*} Treatment capacity is in ML/day

3 DWQMP Implementation

The DWQMP describes the operating strategies, operating limits and approaches to water quality monitoring and the overall management of risks to water quality.

Specific changes or improvements to the drinking water services provided by council have occurred with the implementation of a risk management improvement program (RMIP).

3.1 Progress in implementing the risk management improvement program

A summary of that progress and descriptions of the progress made towards the completion of specific tasks can be found in Appendix B. As per section 13 of the overarching volume of the DWQMP the items have been prioritised as short, medium and long term actions. Short-term actions will be undertaken as soon as possible (and completed within 6-12 months), medium-term actions are intended to be completed in the current financial year or within 12-18 months, and long-term actions follow on from short/medium items and will be introduced as items in future council budgets to secure funding.

3.2 Revisions made to the operational monitoring program to maintain compliance with the water quality criteria in verification monitoring

The operational monitoring program was not updated this reporting period. Previously critical limits were reviewed for consistency where possible and as stated in the plan “the critical limits generally do not change, other than to improve processes” and their associated risks.

3.3 Amendments made to the DWQMP

No amendments were made to the DWQMP in 2017/2018 however following the completion of our plan review in early 2019 we anticipate making an amendment application.

4 Verification Monitoring - Water Quality Information and Summary

Appendix A provides an overview of the results from the water quality monitoring program for the reporting period of 1 July 2017 to 30 June 2018. The water quality monitoring program was generally carried out as per Section 12 of the approved Central Highlands Regional Council overarching volume of the DWQMP. A small number of missed samples are attributed to the Queensland Government Forensic and Scientific Services laboratory closing during the Christmas and New Year break. Also at least one missed sample was due to wet weather when sampling runs had to be cancelled for safety of our staff. In these cases, other parameters like chlorine residual continue to be monitored and the verification monitoring is resumed as soon as possible. This year the internal database and results in Appendix A are considered complete in so much as all the sample results have been recorded and included. This continues the maturing of our data management as identified in the risk management improvement program (items CHR 1 and CHR2).

The drinking water results were compared against the water quality criteria, i.e. the health guideline values in the current Australian Drinking Water Guidelines (ADWG), as well as the standards in the *Public Health Regulation 2005*. Appendix A (Tables 4.1 to 4.12) contain a summary of the results of the water quality monitoring program for all of council's water supply schemes. Most physicochemical drinking water quality results from the standard monitoring program met the recommended values in the ADWG. An exception was the total Trihalomethanes (THM) value in the surface water sourced scheme Rolleston. The details of this are discussed in the next section of this report. Other aesthetic exceedances like pH in Rolleston and Springsure, sodium and dissolved solids in Springsure and total hardness in Anakie were recorded with actions and projects implemented or being considered to make improvements in those areas. Appendix A (Tables 5.1 to 5.12) contain a summary of the results of the reticulation *E. coli* verification monitoring program for all council water supply schemes. While all samples taken tested negative for *E. coli*, Bauhinia did have one recorded result for coliforms which was addressed in relation to a taste and odour complaint in May/June. This is also discussed in section 6.3 of this report.

R. raciborskii levels were seasonally monitored in surface water schemes with a recognised risk. The DWQMP trigger level for cylindrospermopsin toxin testing was reached for the Capella and Rolleston schemes. Monitoring showed that while levels of the toxin varied in the raw water no detection of cylindrospermopsin was made in the treated water throughout the blue green algae bloom.

5 Incidents Reported to the Regulator

This financial year there was one instance where the regulator was notified under sections 102 or 102A of the Act. This notification did not involve the detection of *E. coli* – an organism that may not directly represent a hazard to human health but indicates the presence of recent faecal contamination.

As shown in table 2 the notification was a non-compliance with the water quality criteria related to total Trihalomethanes (THM).

This incident did not require the council to issue a 'boil water alert' or 'do not drink notice' to the public and subsequent retesting results indicated the water quality was back in compliance.

5.1 Non-compliances with the water quality criteria and corrective and preventive actions undertaken

Table 2 – Non-compliance reported to the regulator

Incident date	Scheme	Parameter	Level reported µg/L	Health Value* µg/L	Corrective and Preventive actions
17/10/2017	Rolleston	THM	320	250	Retested and reviewed chlorine dosing while not compromising effective disinfection. No subsequent exceedances recorded in the scheme monitoring to date.

* Health Value is from the ADWG.

5.2 Prescribed incidents or events reported to the regulator and corrective and preventive actions undertaken

No prescribed incidents or events were required to be reported to the regulator during this reporting period

6 Customer Complaints

The council is required to report on the number of complaints, general details of complaints, and the responses undertaken. Table 3 provides an overview of the customer complaints relating to drinking water quality during this period plus adds some context by including the complaints per 1000 customers.

Table 3 – Customer complaints about water quality (including per 1000 customers)

Scheme	Health Concern	Dirty water	Taste and Odour	Other	Total
Anakie					0
Bauhinia			2 (80)		2 (80)
Blackwater/Bluff	1 (0.2)	1 (0.2)		1 (0.2)	3 (0.6)
Capella		1 (1)			1 (1)
Comet					0
Dingo					0
Duaringa					0
Emerald		2 (0.1)		4 (0.3)	6 (0.4)
Rolleston					0
Sapphire/Rubyvale					0
Springsure					0
Tieri		5 (2.9)			5 (2.9)
Total	1	9	2	5	17

*Complaints with multiple categories or multiple complaints for a same event in the system have all been counted as individual complaints for this report. Within the system there are 17 applicable records that total the 17 complaints

The two graphs overleaf show the breakdown of customer complaints by month in Figure 1 and by scheme in Figure 2. There is a general spread of water quality complaints through the whole reporting period with slightly higher frequency of dirty water and other in the warmer months. As statistically expected, there is a higher frequency of complaints for the schemes that service larger communities.

Figure 1 – Monthly complaints about water quality

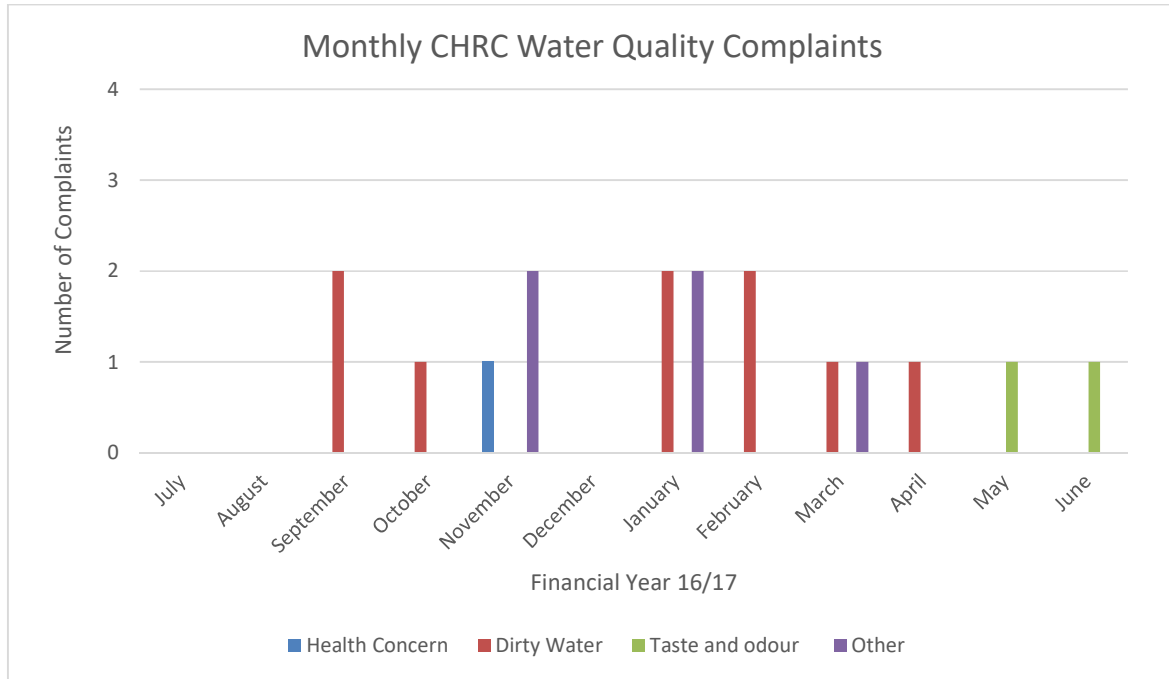
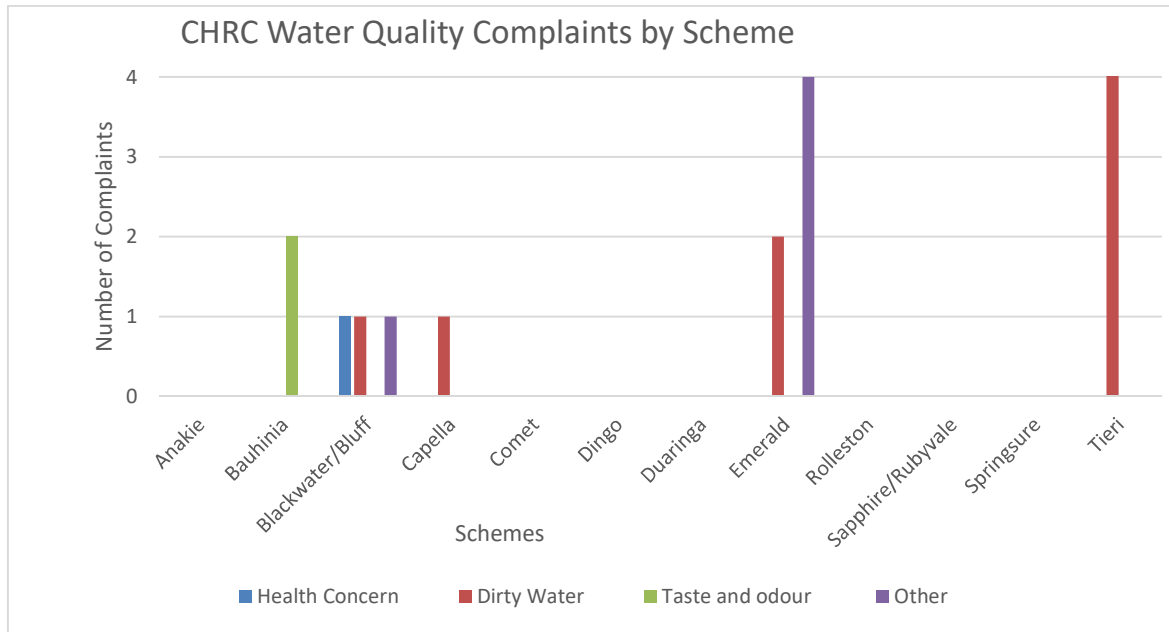


Figure 2 – Complaints about water quality by scheme



6.1 Health Concern

Complaints or enquiries are sometimes received from customers who suspect their water may be associated with an illness they are experiencing. Council investigates each complaint relating to alleged illness from its water quality, typically by testing the customer's tap and other sampling points close by for general water quality indicators, for the presence of *E. coli*. and/or getting a standard water analysis as required.

During the 2017-18 financial year council is not aware of any confirmed cases of illness arising from the water supply system. The one complaint regarding illness was investigated by council however testing results showed both compliance with the ADWG and no sign of poor quality water or Giardia that was suggested as attributing to the customer's suspected illness.

6.2 Dirty Water

A total of 9 customer complaints associated with dirty water were received between July 2017 and June 2018. The majority of complaints were for the community of Tieri with Capella also noted as a scheme with high complaint rates per 1000 customers.

Council investigates each complaint relating to discoloured water or unusual water appearance. Testing the water quality, typically by testing the customer's tap and other sampling points close by for turbidity, chlorine levels and/or getting a standard water analysis as required. Most of the complaints received are usually associated with a water main break, presence of air in the water or sedentary water at the extremities of the supply zone. When dealing with water main breaks staff conduct the repairs while ensuring the water quality is maintained, as well as managing storage levels in the affected reservoirs to ensure no one was without water. The area is then flushed to remove the dirty water and to achieve detectable chlorine residual results. The flushing targets specific areas such as dead-end mains, where it was anticipated the dirty water would not be flushed through normal use. Customers that report a complaint in this context are advised of the reasons for the dirty water or unusual water appearance and are requested to allow the main a short period of time to settle.

6.3 Taste and Odour

One customer in Bauhinia complained and then escalated their complaint associated with unfavourable taste and/or odour between July 2017 and June 2018. No parameters were recorded as exceeding the ADWG guidelines however one microbiological sample in June returned a small number of coliforms resulting in some operational changes in water use at the community hall.

6.4 Other

During the 2017-18 financial year council received 5 complaints about other water quality issues – mainly related to black or white flecks found in the customers water. While these complaints were investigated and no parameters were recorded as exceeding the ADWG guidelines, no conclusions have been made as to the sources of the issues.

7 DWQMP Review Outcomes

No review was conducted during the reporting period of 01/07/2017 to 30/06/2018. However as mentioned earlier in this report we are tracking to complete our plan review in early 2019.

8 DWQMP Audit Findings

The first regular audit of CHRC's DWQMP was undertaken in June 2018 through the engagement of Viridis Consultants Pty Ltd, who are Exemplar Global certified drinking water quality management system auditors. The auditor submitted the audit report to the regulator on 11 July 2018. The purpose of the audit was to:

- verify the accuracy of data
- assess compliance with the plan and its conditions
- assess the relevance of the plan.

A summary of the auditor's findings includes:

- One major non-compliance for the relevance of the plan
- Four minor non-compliances relating to the implementation of parts of the plan
- Reporting to the regulator under the approved plan was compliant
- CHRC is generally complying well with the plan and its conditions
- The plan remains largely relevant to the water scheme, with some changes required
- The risk register does not include some risks which were identified subsequently to previous amendments of the plan

Table 4 – DWQMP audit findings and status

Element Audited	Recommendation (REC and/or OFI)	Action / Status Update	Responsible Position
Accurate Data	<i>E. coli</i> monitoring is regulated, and improvements must be undertaken to ensure that samples meet the requirements of AS 2031-Water Quality Sampling for Microbiological Analysis. Based on the difficulties in undertaking <i>E. coli</i> monitoring, consideration should be given to in-house monitoring of <i>E. coli</i> .	REC To be investigated and implemented	Planning Engineer
	It may be worthwhile to increase the granularity of the alert levels and separate out those issues that will be treated differently. An example would be an imminent health risk (e.g. <i>E. coli</i> detection) compared to a detection of a chemical without water quality criteria (e.g. chlorate).	OFI CHRC is considering development of a standalone Incident Management Protocol as a supporting document under the DWQMP. The outcome will be documented in the DWQMP amendment	Manager WU
DWQMP Report Submission	Critical limits are an essential component of the DWQMP, it is recommended that they are reviewed, and they are set at levels that effectively manage the risks. Following this review ensure that SCADA reflects the plan, including delays. Individual filter turbidity should have a critical limit of 0.5 NTU.	REC Critical limits will be reviewed and updated as part of the DWQMP amendment	Treatment Engineer
	Consider making the verification monitoring in the DWQMP clearer. This will make it easier to follow and ensure that CHRC can maintain compliance with the plan.	OFI Verification monitoring will be reviewed and updated as part of the DWQMP amendment	Planning Engineer
	Consider adding a Document Control Sheet to the overarching DWQMP. In addition, history of the DWQMP evolution would assist in ensuring the correct documents are being used.	OFI Document control will be reviewed and updated as part of the DWQMP amendment	Planning Engineer
Implementation of preventive measures	Ensure that the preventive measures, as specified in the plan are undertaken	REC Ongoing	Treatment Engineer
	Make the preventive measures in the risk assessment clear so they can be undertaken as required and there is no ambiguity. If they are also associated with a procedure it will help implementation.	OFI The risk assessment will be reviewed and updated as part of the DWQMP amendment	Planning Engineer
	Change SCADA permissions so only supervisors and above can change critical limits.	OFI Will be reviewed and included in the RMIP as part of the DWQMP amendment	Treatment Engineer
Implementation of process for managing incidents and emergencies	Contingency plans for foreseeable events would be advantageous. This would provide a high level of preparedness and improve incident and emergency management.	OFI CHRC is considering development of a standalone Incident Management Protocol as a supporting document under the DWQMP.	Manager WU

Element Audited	Recommendation (REC and/or OFI)	Action / Status Update	Responsible Position
	Details of how communications during incidents and emergencies are to be made, the records to be completed and where they are stored should be specified in the Incident and Emergency Plan.	OFI CHRC is considering development of a standalone Incident Management Protocol as a supporting document under the DWQMP.	Manager WU
	Training should be provided on incident management. Operators must be clear on the actions they should take, as often it is this group that will identify an incident or emergency.	OFI CHRC is considering development of a standalone Incident Management Protocol as a supporting document under the DWQMP.	Manager WU
Implementation of operation and verification monitoring plan	Finalise the operational procedures and ensure that these are implemented across all sites.	REC Development of new procedures is progressed through the RMIP.	Treatment Engineer
	The monitoring specified in the DWQMPs must be undertaken as a minimum. Where monitoring is to be reduced, a plan amendment should be approved prior to the change being made	REC The review identified potential changes to the operational and verification monitoring program. The changes will be included in the DWQMP amendment.	Treatment Engineer
Implementation of risk management improvement program	<p>Make completing the RMIP easier by:</p> <ul style="list-style-type: none"> • Setting achievable dates, with consideration of risk level. • Making the appropriate position responsible for the item. • Consolidating tasks into projects. • Making the actions realistic (e.g. fill staffing vacancies in 12 months may not be possible). <p>Close out improvements when they are complete. If there are follow-on tasks, create a new task. This demonstrates progress and prevents having endless tasks.</p>	OFI RMIP has been reviewed and updated.	Planning Engineer
	Have a process to incorporate new improvements to the RMIP.	OFI New improvements will be included in the RMIP in the DWQMP amendment.	Manager WU
Maintaining records as described in the plan	Implement appropriate document version control and ensure that it is clear which is the approved version of the plan.	OFI Document control will be reviewed and updated as part of the DWQMP amendment	Admin Assistant
Undertaking reviews at the frequency specified in the Approval Notice	Consider developing a review process to ensure the currency of documents	OFI Ongoing	Manager WU

Element Audited	Recommendation (REC and/or OFI)	Action / Status Update	Responsible Position
	Ensure that improvement items are completed within the timeframes specified	REC Ongoing	Manager WU
	Ensure that emergency contact lists are up to date and contain the relevant contacts for an emergency scenario and it is accessible to all staff	OFI CHRC is considering development of a standalone Incident Management Protocol as a supporting document under the DWQMP.	Admin Assistant
	Consider programming a maximum time that the High Turbidity Inhibitor can be selected i.e. after a set time it switches off."	OFI Will be included in the RMIP in the DWQMP amendment.	Treatment Engineer
	Check to see that immediate notification of E. coli detections is in place with QHFSS and that the contact list they have is current.	OFI CHRC consider the notification process to be in place and contact list is current	Manager WU
	Once procedures are finalized, ensure that they are readily accessible at the point of use.	OFI Procedures will have a traffic light page for the operator to have at hand and the more comprehensive procedure will be kept with the plant's volume of the DWQMP	Treatment Engineer
Relevance of the Plan	Regularly review the scheme schematics, as these are important in understanding potential risks. Changes to process should trigger a review of the DWQMP and potential impacts.	REC Schematics reviewed during the DWQMP amendment.	Planning Engineer
	The risk due to the use of standpipes for tankers should be assessed and the preventive measures must be implemented at all locations.	REC Included in the risks to be reviewed during the DWQMP amendment.	Treatment Engineer
	The risk due to the return of water from the sludge and backwash waste streams must be assessed and a target of <5% of plant flow should be adopted, with a critical limit of 10%. "	REC Included in the risks to be reviewed during the DWQMP amendment.	Treatment Engineer

Appendix A – Summary of Compliance with Water Quality Criteria

The drinking water results were compared against the water quality criteria, i.e. the health guideline values in the current Australian Drinking Water Guidelines (ADWG), as well as the standards in the *Public Health Regulation 2005*. While all samples taken tested negative for *E. coli*, Bauhinia did have one recorded result for coliforms. Most physicochemical drinking water quality results from the standard monitoring program met the recommended health value ranges in the ADWG. The exception was the total Trihalomethanes (THM) value in one scheme sourced from surface water namely Rolleston. Other aesthetic exceedances like pH in Rolleston and Springsure, sodium and dissolved solids in Springsure and total hardness in Anakie were recorded with actions and projects implemented or being considered to make improvements in those areas.

Table 5.1 to 5.14 – Verification monitoring results

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Anakie	Reticulation	Chlorine (Free)	mg/L	Monthly	11	11	0	0.41	1.13	0.865	0.01
		Coliforms	CFU/100mL	Monthly	12	0	No value	0	0	0	0
		E.coli	CFU/100mL	Monthly	12	0	0	0	0	0	0
		Conductivity	μ s/cm	Monthly	12	12	No value	690	696	693	1
		pH	at 22°C	Monthly	12	12	0	7.54	7.83	7.68	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	12	223	230	226.4	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	276	283	280.8	1
		Silica	mg/L	Monthly	12	12	0	40	49	47.2	1
		Dissolved Solids	mg/L	Monthly	12	12	0	413	425	421	1
		True Colour	hazen	Monthly	12	2	0	<1	4	1.4	1
		Turbidity	NTU	Monthly	12	1	0	<1	1	1	1
		Sodium	mg/L	Monthly	12	12	0	64	66	65.1	1
		Potassium	mg/L	Monthly	12	12	No value	1.2	1.3	1.27	0.1
		Calcium	mg/L	Monthly	12	12	No value	39	40	39.8	0.1
		Magnesium	mg/L	Monthly	12	12	No value	30	31	30.7	0.1
		Chloride	mg/L	Monthly	12	12	0	46	48	47.2	1
		Fluoride	mg/L	Monthly	12	12	0	0.16	0.26	0.23	0.01
		Nitrate	mg/L	Monthly	12	0	0	<0.5	<0.5	<0.5	0.5
		Sulphate	mg/L	Monthly	12	12	0	20	22	21	1
		Iron	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01
Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01		
Zinc	mg/L	Monthly	12	12	0	0.01	0.04	0.02	0.01		
Aluminium	mg/L	Monthly	12	0	0	<0.05	<0.05	<0.05	0.05		
Boron	mg/L	Monthly	12	12	0	0.03	0.05	0.04	0.02		
Copper	mg/L	Monthly	12	12	0	0.03	0.09	0.06	0.03		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Bauhinia	Reticulation	Chlorine (Free)	mg/L	Monthly	11	11	0	0.41	1.13	0.87	0.01
		Coliforms	CFU/100mL	Monthly	12	1	No value	0	24	2	0
		E.coli	CFU/100mL	Monthly	12	0	0	0	0	0	0
		Conductivity	μ s/cm	Monthly	12	12	No value	299	456	426.36	1
		pH		Monthly	12	12	0	7.57	8.15	7.92	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	0	38	62	55.45	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	98	156	141.64	1
		Silica	mg/L	Monthly	12	12	0	11	18	16.27	1
		Dissolved Solids	mg/L	Monthly	12	12	0	413	425	421	1
		True Colour	hazen	Monthly	12	6	0	<1	2	1.09	1
		Turbidity	NTU	Monthly	12	3	0	<1	2	1.09	1
		Sodium	mg/L	Monthly	12	12	0	37	64	57.09	1
		Potassium	mg/L	Monthly	12	12	No value	14	23	20.27	0.1
		Calcium	mg/L	Monthly	12	12	No value	7	12	10.25	0.1
		Magnesium	mg/L	Monthly	12	12	No value	4.9	8.1	7.19	0.1
		Chloride	mg/L	Monthly	12	12	0	32	50	45.82	1
		Fluoride	mg/L	Monthly	12	12	0	0.12	0.18	0.16	0.01
		Nitrate	mg/L	Monthly	12	2	0	<0.5	1.3	0.64	0.5
		Sulphate	mg/L	Monthly	12	0	0	<1	<1	<1	1
		Iron	mg/l	Monthly	12	8	0	0.01	0.04	0.02	0.01
Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01		
Zinc	mg/L	Monthly	12	2	0	0.01	0.05	0.02	0.01		
Aluminium	mg/L	Monthly	12	0	0	<0.05	<0.05	<0.05	0.05		
Boron	mg/L	Monthly	12	12	0	0.03	0.04	0.04	0.02		
Copper	mg/L	Monthly	12	2	0	<0.03	0.08	0.04	0.03		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Blackwater	Reticulation	Chlorine (Free)	mg/L	Weekly	48	48	0	0.13	0.95	0.52	0.01
		Coliforms	CFU/100mL	Weekly	51	0	No value	0	0	0	0
		E.coli	CFU/100mL	Weekly	51	0	0	0	0	0	0
		Trihalomethanes	$\mu\text{g/L}$	Seasonally/ Event	9	9	0	95	150	116.89	1
		Conductivity	us/cm	Monthly	12	12	No value	256	366	301	1
		pH	mg/L	Monthly	12	12	0	7.38	7.96	7.71	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	0	66	91	79.17	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	40	93	71.42	1
		Silica	mg/L	Monthly	12	12	0	8	15	12.17	1
		Dissolved Solids	mg/L	Monthly	12	12	0	147	197	168.08	1
		True Colour	hazen	Monthly	12	8	0	<1	15	2.58	1
		Turbidity	NTU	Monthly	12	1	0	<1	1	1	1
		Sodium	mg/L	Monthly	12	12	0	22	35	26.17	1
		Potassium	mg/L	Monthly	12	12	No value	5	6.2	5.43	0.1
		Calcium	mg/L	Monthly	12	12	No value	2	22	17.58	0.1
		Magnesium	mg/L	Monthly	12	12	No value	6.4	9.2	7.67	0.1
		Chloride	mg/L	Monthly	12	12	0	28	51	34.83	1
		Fluoride	mg/L	Monthly	12	12	0	0.08	0.6	0.2	0.01
		Nitrate	mg/L	Monthly	12	4	0	<0.5	1	0.59	0.5
		Sulphate	mg/L	Monthly	12	12	0	17	21	18.08	1
	Iron	mg/l	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01	
	Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01	
	Zinc	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01	
	Aluminium	mg/L	Monthly	12	0	0	<0.05	<0.05	<0.05	0.05	
	Boron	mg/L	Monthly	12	12	0	0.04	0.05	0.04	0.02	
	Copper	mg/L	Monthly	12	0	0	<0.03	<0.03	<0.03	0.03	
	Raw Water	Atrazine	$\mu\text{g/L}$	Seasonally	3	2	NA	<0.02	0.21	0.12	0.02
		Desethyl Atrazine	$\mu\text{g/L}$	Seasonally	3	3	NA	0.02	0.03	0.02	0.02
Simazine		$\mu\text{g/L}$	Seasonally	3	1	NA	<0.02	0.03	0.02	0.01	
Tebuthiuron		$\mu\text{g/L}$	Seasonally	3	3	NA	0.55	1.2	0.8	0.01	
Metolachlor		$\mu\text{g/L}$	Seasonally	3	3	NA	0.11	0.25	0.19	0.01	
Chlorine (Free)		mg/L	Weekly	48	48	0	0.13	0.95	0.52	0.01	
Coliforms		CFU/100mL	Weekly	51	0	No value	0	0	0	0	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Bluff	Reticulation	Chlorine (Free)	mg/L	Monthly	12	12	0	0.32	1.19	0.81	0.01
		Coliforms	CFU/100mL	Monthly	12	0	No value	0	0	0	0
		E.coli	CFU/100mL	Monthly	12	0	0	0	0	0	0
		Trihalomethanes	$\mu\text{g/L}$	Seasonally/ Event	10	10	0	100	200	160	1

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Capella	Reticulation	Chlorine (Free)	mg/L	Monthly	11	11	0	0.12	0.79	0.39	0.01
		Coliforms	CFU/100mL	Monthly	12	0	No value	0	0	0	0
		E.coli	CFU/100mL	Monthly	12	0	0	0	0	0	0
		Trihalomethanes	μ g/L	Seasonally/ Event	11	11	0	84	160	116.82	1
		Conductivity	us/cm	Monthly	12	12	No value	385	539	476.64	1
		pH	mg/L	Monthly	12	12	0	7.48	8.35	8.03	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	0	81	122	101.91	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	106	175	136.55	1
		Silica	mg/L	Monthly	12	12	0	9	14	12.09	1
		Dissolved Solids	mg/L	Monthly	12	12	0	229	317	279.36	1
		True Colour	hazen	Monthly	12	5	0	<1	2	1.09	1
		Turbidity	NTU	Monthly	12	4	0	<1	1	1	1
		Sodium	mg/L	Monthly	12	12	0	45	82	61.36	1
		Potassium	mg/L	Monthly	12	12	No value	2.9	4.9	4.01	0.1
		Calcium	mg/L	Monthly	12	12	No value	19	24	21.45	0.1
		Magnesium	mg/L	Monthly	12	12	No value	8.2	15	11.68	0.1
		Chloride	mg/L	Monthly	12	12	0	16	50	32.73	1
		Fluoride	mg/L	Monthly	12	12	0	0.1	0.19	0.14	0.01
		Nitrate	mg/L	Monthly	12	0	0	<0.5	<0.5	<0.5	0.5
		Sulphate	mg/L	Monthly	12	12	0	38	72	53.73	1
	Iron	mg/l	Monthly	12	0	0	<0.01	0.02	0.01	0.01	
	Manganese	mg/L	Monthly	12	0	0	<0.01	0.01	0.01	0.01	
	Zinc	mg/L	Monthly	12	3	0	<0.01	0.06	0.02	0.01	
Aluminium	mg/L	Monthly	12	11	0	<0.05	0.14	0.07	0.05		
Boron	mg/L	Monthly	12	12	0	0.07	0.11	0.09	0.02		
Copper	mg/L	Monthly	12	0	0	<0.03	0.03	0.03	0.03		
Raw Water	Algae (pot. toxic)	Cells/mL	Seasonally	6	6	No value	20	3125	1023.7	1	
	Toxin (cylindro)	μ g/L	Seasonally	4	0	No value	<0.2	<0.2	<0.2	0.2	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Comet	Reticulation	Chlorine (Free)	mg/L	Monthly	12	12	0	0.35	1.44	0.79	0.01
		Coliforms	CFU/100mL	Monthly	12	0	No value	0	0	0	0
		E.coli	CFU/100mL	Monthly	12	0	0	0	0	0	0
		Trihalomethanes	μ g/L	Seasonally/ Event	9	9	0	130	190	163.33	1
		Conductivity	us/cm	Monthly	12	12	No value	2.11	303	227.09	1
		pH	mg/L	Monthly	12	12	0	7.73	8.08	8.03	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	0	47	103	75.25	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	56	125	88.75	1
		Silica	mg/L	Monthly	12	12	0	12	23	18.92	1
		Dissolved Solids	mg/L	Monthly	12	12	0	110	176	144.5	1
		True Colour	hazen	Monthly	12	8	0	<1	2	1.33	1
		Turbidity	NTU	Monthly	12	2	0	<1	2	1.08	1
		Sodium	mg/L	Monthly	12	12	0	16	21	18	1
		Potassium	mg/L	Monthly	12	12	No value	4.9	6.4	5.62	0.1
		Calcium	mg/L	Monthly	12	12	No value	11	23	17.08	0.1
		Magnesium	mg/L	Monthly	12	12	No value	4.7	11	7.91	0.1
		Chloride	mg/L	Monthly	12	12	0	17	23	20	1
		Fluoride	mg/L	Monthly	12	12	0	0.11	0.17	0.15	0.01
		Nitrate	mg/L	Monthly	12	7	0	<0.5	1.5	0.68	0.5
		Sulphate	mg/L	Monthly	12	12	0	2	5	3.08	1
		Iron	mg/l	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01
		Zinc	mg/L	Monthly	12	2	0	<0.01	0.01	0.01	0.01
	Aluminium	mg/L	Monthly	12	0	0	<0.05	<0.05	<0.05	0.05	
	Boron	mg/L	Monthly	12	12	0	0.03	0.04	0.03	0.02	
	Copper	mg/L	Monthly	12	1	0	<0.03	0.03	0.03	0.03	
	Raw Water	Atrazine	μ g/L	Seasonally	2	1	NA	<0.02	0.17	0.1	0.02
Desethyl Atrazine		μ g/L	Seasonally	2	0	NA	<0.02	<0.02	<0.02	0.02	
Simazine		μ g/L	Seasonally	2	0	NA	<0.02	<0.02	<0.02	0.01	
Tebuthiuron		μ g/L	Seasonally	2	2	NA	0.11	0.13	0.12	0.01	
Metolachlor		μ g/L	Seasonally	2	2	NA	0.02	0.03	0.03	0.02	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Dingo	Reticulation	Chlorine (Free)	mg/L	Monthly	12	12	0	0.23	1.84	1.16	0.01
		Coliforms	CFU/100mL	Monthly	12	0	No value	0	0	0	0
		E.coli	CFU/100mL	Monthly	12	0	0	0	0	0	0
		Trihalomethanes	$\mu\text{g/L}$	Seasonally	10	10	0	81	150	117.1	1
		Conductivity	us/cm	Monthly	12	12	No value	141	161	149.82	1
		pH	mg/L	Monthly	12	12	0	7.12	7.63	7.36	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	0	24	29	26.36	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	33	43.3	36.94	1
		Silica	mg/L	Monthly	12	12	0	7	12	11	1
		Dissolved Solids	mg/L	Monthly	12	12	0	81	89	84.91	1
		True Colour	hazen	Monthly	12	10	0	<1	3	1.45	1
		Turbidity	NTU	Monthly	12	6	0	<1	2	1.09	1
		Sodium	mg/L	Monthly	12	12	0	14	20	16.55	1
		Potassium	mg/L	Monthly	12	12	No value	3.6	3.9	3.79	0.1
		Calcium	mg/L	Monthly	12	12	No value	4.2	5.7	5.14	0.1
		Magnesium	mg/L	Monthly	12	12	No value	2.9	3.6	3.29	0.1
		Chloride	mg/L	Monthly	12	12	0	18	25	20.64	1
		Fluoride	mg/L	Monthly	12	12	0	0.09	0.2	0.14	0.01
		Nitrate	mg/L	Monthly	12	0	0	<0.5	<0.5	<0.5	0.5
		Sulphate	mg/L	Monthly	12	12	0	1	2	1.82	1
	Iron	mg/l	Monthly	12	2	0	<0.01	0.01	0.01	0.01	
	Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01	
	Zinc	mg/L	Monthly	12	4	0	<0.01	0.02	0.01	0.01	
	Aluminium	mg/L	Monthly	12	0	0	<0.05	<0.05	<0.05	0.05	
	Boron	mg/L	Monthly	12	12	0	0.04	0.05	0.05	0.02	
	Copper	mg/L	Monthly	12	0	0	<0.03	<0.03	<0.03	0.03	
Raw Water	Atrazine	$\mu\text{g/L}$	Seasonally	2	0	NA	<0.02	<0.02	<0.02	0.02	
	Desethyl Atrazine	$\mu\text{g/L}$	Seasonally	2	0	NA	<0.02	<0.02	<0.02	0.02	
	Simazine	$\mu\text{g/L}$	Seasonally	2	0	NA	<0.02	<0.02	<0.02	0.01	
	Tebuthiuron	$\mu\text{g/L}$	Seasonally	2	2	NA	0.14	0.14	0.14	0.01	
	Metolachlor	$\mu\text{g/L}$	Seasonally	2	0	NA	<0.02	<0.02	<0.02	0.02	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Duaringa	Reticulation	Chlorine (Free)	mg/L	Monthly	12	12	0	0.59	1.75	1.32	0.01
		Coliforms	CFU/100mL	Monthly	12	0	No value	0	0	0	0
		E.coli	CFU/100mL	Monthly	12	0	0	0	0	0	0
		Trihalomethanes	$\mu\text{g/L}$	Seasonally	10	10	0	81	150	117.1	1
		Conductivity	us/cm	Monthly	12	12	No value	208	773	473.77	1
		pH	mg/L	Monthly	12	12	0	7.68	8.14	7.91	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	2	50	217	126.31	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	62	108	84.92	1
		Silica	mg/L	Monthly	12	12	0	7	16	13.23	1
		Dissolved Solids	mg/L	Monthly	12	12	0	122	418	257.62	1
		True Colour	hazen	Monthly	12	10	0	<1	6	2.38	1
		Turbidity	NTU	Monthly	12	1	0	<1	1	1	1
		Sodium	mg/L	Monthly	12	12	0	16	67	41.15	1
		Potassium	mg/L	Monthly	12	12	No value	4.8	6.9	5.65	0.1
		Calcium	mg/L	Monthly	12	12	No value	13	42	25.77	0.1
		Magnesium	mg/L	Monthly	12	12	No value	4.6	28	14.99	0.1
		Chloride	mg/L	Monthly	12	12	0	18	130	72.08	1
		Fluoride	mg/L	Monthly	12	12	0	0.09	1.15	0.21	0.01
		Nitrate	mg/L	Monthly	12	5	0	<0.5	1.2	0.68	0.5
		Sulphate	mg/L	Monthly	12	12	0	3	67	32.15	1
	Iron	mg/l	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01	
	Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01	
	Zinc	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01	
	Aluminium	mg/L	Monthly	12	0	0	<0.05	<0.05	<0.05	0.05	
	Boron	mg/L	Monthly	12	12	0	0.03	0.05	0.04	0.02	
	Copper	mg/L	Monthly	12	5	0	<0.03	0.07	0.04	0.03	
	Raw Water	Atrazine	$\mu\text{g/L}$	Seasonally	2	1	NA	<0.02	0.06	0.04	0.02
		Desethyl Atrazine	$\mu\text{g/L}$	Seasonally	2	1	NA	<0.02	0.02	0.02	0.02
		Simazine	$\mu\text{g/L}$	Seasonally	2	0	NA	<0.02	<0.02	<0.02	0.01
		Tebuthiuron	$\mu\text{g/L}$	Seasonally	2	2	NA	0.38	0.65	0.52	0.01
Metolachlor		$\mu\text{g/L}$	Seasonally	2	2	NA	0.03	0.06	0.05	0.02	
Algae (pot. toxic)		Cells/mL	Seasonally	1	1	No value	10	10	10	1	
Toxin (microcystins)	$\mu\text{g/L}$	Seasonally	0	0	No value	0	0	0	0.5		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Emerald	Reticulation	Chlorine (Free)	mg/L	Weekly	96	96	0	0.28	3.53	2.36	0.01
		Coliforms	CFU/100mL	Weekly	102	0	No value	0	0	0	0
		E.coli	CFU/100mL	Weekly	102	0	0	0	0	0	0
		Atrazine	$\mu\text{g/L}$	Seasonally	1	0	0	<0.02	<0.02	<0.02	0.02
		Desethyl Atrazine	$\mu\text{g/L}$	Seasonally	1	0	No value	0.09	0.09	0.09	0.02
		Simazine	$\mu\text{g/L}$	Seasonally	1	0	0	<0.02	<0.02	<0.02	0.01
		Tebuthiuron	$\mu\text{g/L}$	Seasonally	1	1	No value	0.37	0.37	0.37	0.01
		Metolachlor	$\mu\text{g/L}$	Seasonally	1	1	0	<0.02	<0.02	<0.02	0.01
		Conductivity	us/cm	Monthly	24	24	No value	300	382	330.33	1
		pH	mg/L	Monthly	24	24	0	7.56	8.03	7.75	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	24	24	0	84	108	95	1
		Alkalinity	mg CaCO ₃ /L	Monthly	24	24	No value	79	119	99.83	1
		Silica	mg/L	Monthly	24	24	0	7	9	8.25	1
		Dissolved Solids	mg/L	Monthly	24	24	0	167	207	182.67	1
		True Colour	hazen	Monthly	24	9	0	<1	8	2.5	1
		Turbidity	NTU	Monthly	24	3	0	<1	1	1	1
		Sodium	mg/L	Monthly	24	24	0	24	31	26.25	1
		Potassium	mg/L	Monthly	24	24	No value	6.4	8.3	7.59	0.1
		Calcium	mg/L	Monthly	24	24	No value	20	24	21.5	0.1
		Magnesium	mg/L	Monthly	24	24	No value	8.4	12	10.03	0.1
		Chloride	mg/L	Monthly	24	24	0	26	36	29.67	1
		Fluoride	mg/L	Monthly	24	24	0	0.52	0.75	0.65	0.01
		Nitrate	mg/L	Monthly	24	17	0	0.5	1.8	1.13	0.5
		Sulphate	mg/L	Monthly	24	24	0	6	22	17.67	1
		Iron	mg/l	Monthly	24	1	0	<0.01	0.01	0.01	0.01
		Manganese	mg/L	Monthly	24	0	0	<0.01	<0.01	<0.01	0.01
	Zinc	mg/L	Monthly	24	2	0	<0.01	0.1	0.02	0.01	
	Aluminium	mg/L	Monthly	24	0	0	<0.05	<0.05	<0.05	0.05	
	Boron	mg/L	Monthly	24	24	0	0.04	0.06	0.05	0.02	
	Copper	mg/L	Monthly	24	2	0	<0.03	0.04	0.03	0.03	
Raw Water	Atrazine	$\mu\text{g/L}$	Seasonally	2	1	NA	<0.02	0.05	0.04	0.02	
	Desethyl Atrazine	$\mu\text{g/L}$	Seasonally	2	1	NA	<0.02	0.02	0.02	0.02	
	Simazine	$\mu\text{g/L}$	Seasonally	2	2	NA	0.08	0.12	0.1	0.01	
	Tebuthiuron	$\mu\text{g/L}$	Seasonally	2	2	NA	0.36	0.38	0.37	0.01	
	Metolachlor	$\mu\text{g/L}$	Seasonally	2	1	NA	<0.02	0.02	0.02	0.02	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Rolleston	Reticulation	Chlorine (Free)	mg/L	Weekly	11	11	0	0.11	1.81	0.96	0.01
		Coliforms	CFU/100mL	Weekly	12	0	No value	0	0	0	0
		E.coli	CFU/100mL	Weekly	12	0	0	0	0	0	0
		Trihalomethanes	$\mu\text{g/L}$	Seasonally/ Event	11	11	0	140	320	219.09	1
		Conductivity	us/cm	Monthly	12	12	No value	283	809	430	1
		pH	mg/L	Monthly	12	12	5	8.28	8.96	8.53	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	0	53	86	74.08	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	110	202	139.33	1
		Silica	mg/L	Monthly	12	12	0	8	14	11	1
		Dissolved Solids	mg/L	Monthly	12	12	0	157	463	240.17	1
		True Colour	hazen	Monthly	12	4	0	<1	2	1.25	1
		Turbidity	NTU	Monthly	12	1	0	<1	1	1	1
		Sodium	mg/L	Monthly	12	12	0	24	160	61.92	1
		Potassium	mg/L	Monthly	12	12	No value	4.5	6.8	5.83	0.1
		Calcium	mg/L	Monthly	12	12	No value	11	17	14.83	0.1
		Magnesium	mg/L	Monthly	12	12	No value	6.3	11	9	0.1
		Chloride	mg/L	Monthly	12	12	0	19	130	48.92	1
		Fluoride	mg/L	Monthly	12	12	0	0.21	0.31	0.24	0.01
		Nitrate	mg/L	Monthly	12	0	0	<0.5	<0.5	<0.5	0.5
		Sulphate	mg/L	Monthly	12	12	0	1	14	4.25	1
		Iron	mg/l	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01
		Zinc	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01
		Aluminium	mg/L	Monthly	12	1	0	<0.05	0.05	0.05	0.05
		Boron	mg/L	Monthly	12	12	0	0.04	0.07	0.05	0.02
		Copper	mg/L	Monthly	12	3	0	<0.03	0.06	0.03	0.03
	Raw Water	Algae (pot. toxic)	Cells/mL	Seasonally	11	11	No value	140	320	219.1	1
		Toxin (cylindro)	$\mu\text{g/L}$	Seasonally	3	0	No value	<0.2	<0.2	<0.2	0.2
		Atrazine	$\mu\text{g/L}$	Seasonally	3	2	NA	<0.02	0.09	0.05	0.02
		Desethyl Atrazine	$\mu\text{g/L}$	Seasonally	3	2	NA	<0.02	0.04	0.03	0.02
Simazine		$\mu\text{g/L}$	Seasonally	3	3	NA	0.03	0.15	0.11	0.01	
Tebuthiuron		$\mu\text{g/L}$	Seasonally	3	3	NA	0.1	0.48	0.34	0.02	
Metolachlor		$\mu\text{g/L}$	Seasonally	3	3	NA	0.02	0.19	0.12	0.01	
Algae (pot. toxic)		Cells/mL	Seasonally	8	8	No value	50	17660	7169.5	1	
Toxin (cylindro)	$\mu\text{g/L}$	Seasonally	3	2	No value	<0.2	0.09	0.05	0.2		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Rubyvale	Reticulation	Chlorine (Free)	mg/L	Weekly	51	51	0	0.27	1.64	0.82	0.01
		Coliforms	CFU/100mL	Weekly	52	0	No value	0	0	0	0
		E.coli	CFU/100mL	Weekly	52	0	0	0	0	0	0
		Conductivity	us/cm	Monthly	12	12	No value	604	634	618.7	1
		pH	mg/L	Monthly	12	12	0	7.42	7.77	7.6	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	12	184	199	191.3	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	162	173	168.1	1
		Silica	mg/L	Monthly	12	12	0	27	34	33.1	1
		Dissolved Solids	mg/L	Monthly	12	12	0	354	374	361.2	1
		True Colour	hazen	Monthly	12	3	0	<1	2	1.2	1
		Turbidity	NTU	Monthly	12	0	0	<1	<1	<1	1
		Sodium	mg/L	Monthly	12	12	0	51	54	52.7	1
		Potassium	mg/L	Monthly	12	12	No value	1.5	1.6	1.52	0.1
		Calcium	mg/L	Monthly	12	12	No value	45	49	47.2	0.1
		Magnesium	mg/L	Monthly	12	12	No value	17	18	17.8	0.1
		Chloride	mg/L	Monthly	12	12	0	68	76	71.6	1
		Fluoride	mg/L	Monthly	12	12	0	0.27	0.76	0.6	0.01
		Nitrate	mg/L	Monthly	12	12	0	1.3	1.6	1.42	0.5
		Sulphate	mg/L	Monthly	12	12	0	33	38	34.4	1
		Iron	mg/l	Monthly	12	1	0	<0.01	0.04	0.01	0.01
Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01		
Zinc	mg/L	Monthly	12	12	0	0.01	0.04	0.02	0.01		
Aluminium	mg/L	Monthly	12	0	0	<0.05	<0.05	<0.05	0.05		
Boron	mg/L	Monthly	12	12	0	0.02	0.03	0.03	0.02		
Copper	mg/L	Monthly	12	12	0	0.1	0.19	0.15	0.03		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Sapphire	Reticulation	Chlorine (Free)	mg/L	Weekly	49	49	0	0.32	1.8	0.97	0.01
		Coliforms	CFU/100mL	Weekly	51	0	No value	0	0	0	0
		E.coli	CFU/100mL	Weekly	51	0	0	0	0	0	0
		Conductivity	us/cm	Monthly	12	12	No value	599	635	616.5	1
		pH	mg/L	Monthly	12	12	0	7.33	8.13	7.7	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	17	158	171	167.2	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	12	No value	158	171	167.2	1
		Silica	mg/L	Monthly	12	12	0	27	37	33.2	1
		Dissolved Solids	mg/L	Monthly	12	12	0	350	374	359.8	1
		True Colour	hazen	Monthly	12	2	0	<1	2	1.2	1
		Turbidity	NTU	Monthly	12	0	0	<1	<1	<1	1
		Sodium	mg/L	Monthly	12	12	0	50	54	51.9	1
		Potassium	mg/L	Monthly	12	12	No value	1.4	1.7	1.53	0.1
		Calcium	mg/L	Monthly	12	12	No value	46	50	47.2	0.1
		Magnesium	mg/L	Monthly	12	12	No value	17	18	17.7	0.1
		Chloride	mg/L	Monthly	12	12	0	69	77	71.6	1
		Fluoride	mg/L	Monthly	12	12	0	0.19	0.7	0.45	0.01
		Nitrate	mg/L	Monthly	12	12	0	1	2.3	1.49	0.5
		Sulphate	mg/L	Monthly	12	12	0	29	38	34	1
		Iron	mg/l	Monthly	12	1	0	<0.01	0.03	0.01	0.01
Manganese	mg/L	Monthly	12	0	0	0.01	0.01	0.01	0.01		
Zinc	mg/L	Monthly	12	10	0	<0.01	0.03	0.02	0.01		
Aluminium	mg/L	Monthly	12	0	0	0.05	0.05	0.05	0.05		
Boron	mg/L	Monthly	12	11	0	<0.02	0.03	0.03	0.02		
Copper	mg/L	Monthly	12	12	0	0.03	0.1	0.06	0.03		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Springsure	Upper Reticulation Zone	Chlorine (Free)	mg/L	Monthly	11	11	0	2.23	3.62	2.95	0.01
		Coliforms	CFU/100mL	Monthly	12	0	No value	0	0	0	0
		E.coli	CFU/100mL	Monthly	12	0	0	0	0	0	0
		Conductivity	us/cm	Monthly	12	12	No value	957	966	962.7	1
		pH	mg/L	Monthly	12	12	2	8.38	8.51	8.45	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	12	0	14	16	14.7	1
		Alkalinity	mg CaCO3/L	Monthly	12	12	No value	478	496	486.8	1
		Silica	mg/L	Monthly	12	12	0	17	22	20.4	1
		Dissolved Solids	mg/L	Monthly	12	12	1	579	595	587.9	1
		True Colour	hazen	Monthly	12	7	0	<1	3	1.5	1
		Turbidity	NTU	Monthly	12	1	0	<1	1	1	1
		Sodium	mg/L	Monthly	12	12	12	230	240	234	1
		Potassium	mg/L	Monthly	12	12	No value	3.8	4	3.89	0.1
		Calcium	mg/L	Monthly	12	12	No value	3.5	4.3	3.81	0.1
		Magnesium	mg/L	Monthly	12	12	No value	1.2	1.4	1.25	0.1
		Chloride	mg/L	Monthly	12	12	0	28	32	31.2	1
		Fluoride	mg/L	Monthly	12	12	0	0.42	0.5	0.47	0.01
		Nitrate	mg/L	Monthly	12	0	0	<0.5	<0.5	<0.5	0.5
		Sulphate	mg/L	Monthly	12	0	0	<1	<1	<1	1
		Iron	mg/l	Monthly	12	12	0	0.04	0.08	0.06	0.01
	Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01	
	Zinc	mg/L	Monthly	12	1	0	<0.01	0.01	0.01	0.01	
	Aluminium	mg/L	Monthly	12	0	0	<0.05	<0.05	<0.05	0.05	
	Boron	mg/L	Monthly	12	12	0	0.16	0.18	0.17	0.02	
	Copper	mg/L	Monthly	12	0	0	<0.03	<0.03	<0.03	0.03	
	Lower Reticulation Zone	Chlorine (Free)	mg/L	Monthly	11	11	0	0.03	2.2	1.25	0.01
		Coliforms	CFU/100mL	Monthly	12	12	No value	0	0	0	0
		E.coli	CFU/100mL	Monthly	12	12	0	0	0	0	0
		Conductivity	us/cm	Monthly	12	12	No value	1140	1160	1155	1
		pH	mg/L	Monthly	12	12	12	8.52	8.63	8.57	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	12	0	12	43	23.58	1
		Alkalinity	mg CaCO3/L	Monthly	12	12	No value	525	619	557.42	1
		Silica	mg/L	Monthly	12	12	0	14	22	18.42	1
		Dissolved Solids	mg/L	Monthly	12	12	12	680	890	719.33	1
		True Colour	hazen	Monthly	12	4	0	<1	2	1.25	1
		Turbidity	NTU	Monthly	12	1	0	<1	1	1	1
Sodium		mg/L	Monthly	12	12	12	270	310	280.83	1	
Potassium		mg/L	Monthly	12	12	No value	3.2	4.1	3.65	0.1	
Calcium		mg/L	Monthly	12	12	No value	3.2	8.4	5.2	0.1	
Magnesium		mg/L	Monthly	12	12	No value	1.1	5.3	2.6	0.1	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples with values \geq the LOR	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Tieri	Reticulation	Chlorine (Free)	mg/L	Weekly	50	50	0	0.29	1.64	0.83	0.01
		Coliforms	CFU/100mL	Weekly	51	0	No value	0	0	0	0
		E.coli	CFU/100mL	Weekly	51	0	0	0	0	0	0
		Trihalomethanes	μ g/L	Seasonally/ Event	11	11	4	120	230	172.73	1
		Conductivity	us/cm	Monthly	12	12	No value	384	609	454.17	1
		pH	mg/L	Monthly	12	12	0	7.28	8.71	7.92	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	12	0	71	117	87.58	1
		Alkalinity	mg CaCO3/L	Monthly	12	12	No value	88	172	124.75	1
		Silica	mg/L	Monthly	12	12	0	7	15	12	1
		Dissolved Solids	mg/L	Monthly	12	12	0	225	358	264.33	1
		True Colour	hazen	Monthly	12	2	0	<1	2	1.08	1
		Turbidity	NTU	Monthly	12	2	0	<1	1	1	1
		Sodium	mg/L	Monthly	12	12	0	48	87	60.33	1
		Potassium	mg/L	Monthly	12	12	No value	4.8	6.6	5.61	0.1
		Calcium	mg/L	Monthly	12	12	No value	18	24	20.92	0.1
		Magnesium	mg/L	Monthly	12	12	No value	6	14	8.52	0.1
		Chloride	mg/L	Monthly	12	12	0	24	63	36.08	1
		Fluoride	mg/L	Monthly	12	12	0	0.05	0.19	0.11	0.01
		Nitrate	mg/L	Monthly	12	0	0	0.5	0.9	0.53	0.5
		Sulphate	mg/L	Monthly	12	12	0	27	68	45.67	1
Iron	mg/l	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01		
Manganese	mg/L	Monthly	12	0	0	<0.01	<0.01	<0.01	0.01		
Zinc	mg/L	Monthly	12	6	0	<0.01	0.06	0.02	0.01		
Aluminium	mg/L	Monthly	12	9	0	<0.05	0.33	0.1	0.05		
Boron	mg/L	Monthly	12	12	0	0.04	0.11	0.05	0.02		
Copper	mg/L	Monthly	12	1	0	<0.03	0.03	0.03	0.03		

All samples taken tested negative for *E. coli* and below are summaries of the results of the reticulation *E. coli* verification monitoring program for all council water supply schemes.

Table 6.1 to 6.12 – Reticulation *E. coli* verification monitoring

Drinking water scheme: Anakie scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*.

This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Bauhinia Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Blackwater & Bluff Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	6	5	6	5	4	6	5	5	5	6	5
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	61	61	61	62	62	62	62	62	63	63	64	63
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Capella Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Comet Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Dingo Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Duaringa Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	14	14	14	14	14	14	14	12	12	12	12	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Emerald Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	10	8	8	10	8	6	10	8	8	10	8	8
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	104	102	102	104	102	102	102	102	102	104	102	102
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Rolleston Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Sapphire and Rubyvale Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	10	8	8	10	8	6	10	8	8	10	8	8
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	105	102	102	104	102	102	102	102	102	104	102	102
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Springsure Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	2	2	2	2	2	2	2	2	2	2	2	2
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	24	24	24	24	24	24	24	24	24	24	24	24
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Tieri Scheme

Year	2017 to 2018											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	4	4	4	5	3	5	4	4	5	4	4
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	52	51	51	50	51	51	51	51	51	52	51	51
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 7.1 to 7.14 – Progress against the RMIP program in the approved DWQMP

Legend - Complete Similar Similar Similar Similar Similar Similar Changes

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2018	Responsible Position
		Short term	Medium term	Long term		
CHRC WIDE						
CHR 1, CHR 2	SWIM Local Project	Ensure all schemes (verification monitoring location) are represented in SWIM and all new data is captured	Work to fill any gaps in the data, collected between old DEWS database and new CHRC SWIM database and also KPI required data		WORKING (example of work to do - response times/properties affected)	Planning Engineer
ANAKIE						
ANA 1	Procedures		Procedures required for bore inspection, reservoir inspection, disinfection, mains breaks.		Disinfection procedure drafted and under review	Treatment Engineer
ANA 2	Raw water storage	Inspect			Inspection to be done by consultant with recommendations given	Planning Engineer
ANA 3	System Wide		plan for upskilling		Cert III training provider engaged for new operators	Treatment Supervisor
BAUHINIA						
BAU 1	Procedures		Procedures required for bore inspection, reservoir inspection, disinfection, mains breaks.		Disinfection procedure drafted and under review	Treatment Engineer
BAU 1, BAU 2	Disinfection	roll out procedure	increase reporting into SWIM to monitor		Daily rounds data being collected and added to SWIM approximately monthly	Treatment Supervisor
BAU 4	Treated water storage/ Reservoirs		Investigate extra capacity online permanently		Permanent set up - only 1 reservoir online	Operator
BAU 3	System Wide	fill vacancies	plan for up skilling and Blackwater rotation		Supervision improved with regular visits	Treatment Supervisor
BLACKWATER						
BLK 1	Procedures		Procedures required for bore inspection, reservoir inspection, disinfection, mains breaks.		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
BLK 1, BLK 2, BLK 3		data collection for procedure target ranges	procedures to be documented / New filter media		New filter media in	-
BLK 1, BLK 4		procedure being documented at present	permanganate		System commissioned	-
BLK 1, BLK 2		data collection for procedure target ranges	procedure to be documented with auto shutdown of plant (coagulate failure)		Auto shutdown commissioned	-
BLK 5	Raw Water Abstraction		Investigate new raw water pumps		Design completed - work in 2018-19 CAPEX budget	Manager WU
BLK 1, BLK 2, BLK 3, BLK 6	Filtration	data collection for procedure target ranges	procedure to be documented / new media	auto backwash, shutdowns	New filter media in / drafted procedure / Auto backwash and shutdowns	-
BLK 1, BLK 2			ripen to waste		2 filters need to be investigated	Manager WU
BLK 1, BLK 2, BLK 7	Disinfection	data collection for procedure target ranges	procedure to be documented / WTP upgrades		WTP upgrades complete	-
BLK 1, BLK 7		chlorination procedure being documented at present	online monitoring and alarms		Online monitoring into SCADA	-
BLK 9, BLK 10			data collection for options analysis	Investigate options / Chlorine gas	Awaiting prioritisation within CAPEX budget	Manager WU
BLK 1, BLK 11	Treated water storage/ Reservoirs	chlorination procedure being documented at present	Formalise inspection checklist	need to vermin proof reservoirs	To be done by consultant with recommendations given	Planning Engineer
BLK 12	Reticulation		Investigate standby generator (reservoirs)		Awaiting prioritisation in CAPEX budget	Manager WU
BLK 13			need to develop routine flushing program		Planning to change the program action after plan review	Network Supervisor
BLK 14	Redosing (Bluff Reservoir)			replace generator on site	Awaiting prioritisation in CAPEX budget	Manager WU
BLK 15	System Wide		More operators to cert 3		All current Blackwater operators have Cert III	Treatment Supervisor
BLK 16			Plan for up skilling		Multiple operators know Bluff, Dingo and Duaringa plants	Treatment Supervisor
BLK 17			Investigate SCADA lockout		Being reviewed in as greatest risk order	Treatment Engineer
BLK 18, BLK 19			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventive maintenance	Preventive maintenance of blower, air compressors	Treatment Supervisor

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2018	Responsible Position
		Short term	Medium term	Long term		
CAPELLA						
CAP 1	Procedures		Procedures required for pH correction, coagulation, filtration, disinfection, mains breaks, reservoir inspection, transfer procedure		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
CAP 1, CAP 3, CAP 4	Catchment	chlorination procedure being documented at present	online monitoring	Media Replacement	Not online (SCADA) chlorine and turbidity on final water - media replace designed... awaiting prioritisation in CAPEX budget	Manager WU
CAP 1, CAP 2, CAP 5	Coagulation	data collection for procedure target ranges	coagulation procedure to be documented / investigate online monitoring	clarifier Turbidity monitoring	Awaiting prioritisation in CAPEX budget	Manager WU
CAP 1, CAP 6, CAP 7, CAP 4	Filtration	Investigate alarm level and lockout to operators	auto backwash , shutdowns, to be investigated. procedure to be documented	Investigate replace filter media	Media replacement design undertaken. awaiting prioritisation in CAPEX budget. Other tasks to be included with media replacement project	Manager WU
CAP 8, CAP 9		Data collection on turbidity spikes	Investigate ripening to waste		Awaiting prioritisation within CAPEX budget - to be included with media replacement project	Manager WU
CAP 10, CAP 11	Disinfection	Investigate ACH option and collect data	Investigate pH correction options		Design completed - work in 2018-19 CAPEX budget	Manager WU
CAP 12	Transfer from Tieri to Capella			monitor for THMs	Seasonal sampling added verification monitoring	Samplers
CAP 1, CAP 13	Treated water storage/ Reservoirs		Formalise inspection checklist	investigate to confirm vermin proof reservoirs	To be done by consultant with recommendations given	Planning Engineer
CAP 14, CAP 15	Reticulation	Investigate bypass and back up power options	Implement option		Awaiting prioritisation within CAPEX budget	Manager WU
CAP 16				monitor for THMs	Seasonal and event based sampling added verification monitoring	Samplers
CAP 1, CAP 17	System Wide	Continued procedure development	More operators to Cert 3 - purchase order issued		Cert III training provider engaged for new operators	Treatment Supervisor
CAP 18 CAP 19			Fill vacancies	Plan for up skilling	One vacancy - recruit with Cert III or add to training list	Treatment Supervisor
CAP 20		Investigate alarm level and lockout to operators			Being reviewed in as greatest risk order	Treatment Engineer
CAP 21, CAP 22			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventative maintenance	Preventive maintenance of blower, air compressors - spare retic pumps fixed, replaced dam switchboards and included generator plugs	Treatment Supervisor
Risk Management Improvements						
RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2018	Responsible Position
		Short term	Medium term	Long term		
COMET						
COM 1	Procedures		Procedures required for pH correction, coagulation, filtration, disinfection, mains breaks, reservoir inspection		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
COM 3	Raw Water Abstraction		Reinstate duty standby pumps		Awaiting prioritisation within CAPEX budget	Manager WU
COM 1, COM 2, COM 4	Coagulation	data collection for procedure target ranges	coagulation procedure to be documented / online monitoring	clarifier Turbidity monitoring	Awaiting prioritisation within CAPEX budget	Manager WU
COM 1, COM 5, COM 6	Filtration	develop filtration procedure	auto backwash , shutdowns, to be investigated.	Investigate need to replace filter media	Filter media was replenished and can do auto backwash and/or shutdown	Treatment Supervisor
COM 2, COM 7		Data collection on turbidity spikes	Investigate ripening to waste		Task is physical done - waiting process/electrical work completion	Treatment Engineer
COM 2, COM 8			data collection for options analysis	Investigate options / dual storage	Awaiting prioritisation within CAPEX budget	Manager WU
COM 1, COM 9, COM 10	Treated water storage/ Reservoirs	Formalise inspection checklist	Investigate how vermin proof is storage.	Implement appropriate action	To be done by consultant with recommendations given	Planning Engineer
COM 11, COM 12	Reticulation		Investigate UPS and generator for transfer pumps	Implement appropriate action	Plug installed for mobile generator - permanent generator awaiting prioritisation within CAPEX budget and Tower UPS to be included	Manager WU
COM 13	System Wide		More operators to cert 3 - purchase order issued		Most operators that go to Comet have Cert III	Treatment Supervisor
COM 14, COM 15			Fill vacancies	Plan for up skilling	Most operators roles filled - some support roles empty	Treatment Supervisor
COM 16			Investigate SCADA lockout		Being reviewed in as greatest risk order	Treatment Engineer
COM 17, COM 18			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventative maintenance	Preventive maintenance of blower - generator plug installed	Treatment Supervisor

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2018	Responsible Position
		Short term	Medium term	Long term		
DINGO						
DIN 1	Procedures		Procedures required for coagulation, filtration, disinfection, mains breaks, reservoir inspection		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
DIN 1, DIN 3, DIN 4	Catchment	chlorination procedure being documented at present	online monitoring	Media Replacement	manual monitoring - Online chlorine and turbidity on final water - media/filter structure replacement scoped... waiting for project delivery timeline	Manager WU
DIN 1, DIN 22		procedure being documented at present	Investigate need and use of PAC		Awaiting prioritisation within CAPEX budget	Manager WU
DIN 5	Raw Water Abstraction			Two large pumps and one small pump	Determined that no extra capacity required	-
DIN 6				Relocated pumps	Awaiting prioritisation within CAPEX budget	Manager WU
DIN 1, DIN 2, DIN 7		data collection for procedure target ranges	coagulation procedure to be documented	relocation and add extra check valve	Complete	-
DIN 1, DIN 2, DIN 8, DIN 9	Coagulation	PLC replacement / data collection for procedure target ranges	Develop Clarification/Coagulation procedure / Turbidity meter online monitoring	clarifier Turbidity monitoring	Manual monitoring - not continuous online yet - work in 2018-19 CAPEX budget	Manager WU
DIN 8, DIN 10	Filtration		Turbidity meter online monitoring, develop procedure	Filtered Turbidity monitoring	Continue manual monitoring - not continuous online yet - work in 2018-19 CAPEX budget	Manager WU
DIN 2, DIN 11		Collect data	Investigate ripen to waste option		Scoped and waiting for project delivery timeline and linked to filter replacement	Manager WU
DIN 1, DIN 12	Disinfection	chlorination procedure being documented at present	online monitoring and alarms		Improved monitoring for alarm awaiting prioritisation within CAPEX budget	Manager WU
DIN 13, DIN 14			data collection for options analysis	Investigate options / dual storage	Awaiting prioritisation within CAPEX budget	Manager WU
DIN 15	Treated water storage/ Reservoirs		install overflow frog proofing		Awaiting prioritisation	Treatment Supervisor
DIN 23			Investigate permanently disconnecting tanks		Disconnected	Operator
DIN 16	Reticulation		need to develop routine flushing program		Planning to change the program action after plan review	Network Supervisor
DIN 17				monitor for THMs	Seasonal and event based sampling added verification monitoring	Samplers
DIN 18	System Wide		More operators to cert 3		Most Blackwater based operator have or are getting Cert III	Treatment Supervisor
DIN 19			Plan for up skilling		More Blackwater based operators know Dingo plant - as contingency of loss of local operator	Treatment Supervisor
DIN 20, DIN 21			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventive maintenance	Preventive maintenance of blower	Treatment Supervisor
RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2018	Responsible Position
DUARINGA						
DUA 1	Procedures		Procedures required for coagulation, filtration, disinfection, mains breaks, reservoir inspection		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
DUA 1, DUA 3, DUA 4	Catchment	chlorination procedure being documented at present	online monitoring	Media Replacement	manual monitoring - not continuous online yet - temporary media replacement- media/filter replacement scoped... waiting for project delivery timeline	Manager WU
DUA 5	Raw Water Abstraction			Two large pumps and one small pump	Completed	-
DUA 1, DUA 2, DUA 6	Coagulation	data collection for procedure target ranges	coagulation procedure to be documented	flow switch	Awaiting PCL project work	Manager WU
DUA 1, DUA 2, DUA 7		data collection for procedure target ranges	coagulation procedure to be documented / online monitoring	clarifier Turbidity monitoring	Continue manual monitoring - not continuous online yet - work in 2018-19 CAPEX budget	Manager WU
DUA 1, DUA 2, DUA 8,	Filtration	data collection for procedure target ranges	filtration procedures to be documented	Filtered Turbidity monitoring	Continue manual monitoring - not continuous online yet - work in 2018-19 CAPEX budget	Manager WU
DUA 2, DUA 9		Collect data	Investigate ripen to waste		Completed - is manually operated	Operator
DUA 10, DUA 11		Operator checks	Investigate to Seal the well		Planned removal during filter replacement and waiting for project delivery timeline	Manager WU
DUA 12, DUA 13		Investigate lockout		Investigate blanking off	Final bypass removal to be complete in 2018-19	Treatment Supervisor
DUA 14, DUA 15	Disinfection		data collection for options analysis	Investigate options / dual storage	Awaiting prioritisation within CAPEX budget	Manager WU
DUA 1, DUA 16, DUA 17	Treated water storage/ Reservoirs	Formalise inspection checklist	Investigate how vermin proof is storage.	Implement appropriate action	To be done by consultant with recommendations given	Planning Engineer
DUA 18				monitor for THMs	Seasonal and event based sampling added verification monitoring	Samplers
DUA 19	System Wide		More operators to cert 3		Most Blackwater based operator have or are getting Cert III	Treatment Supervisor
DUA 20			Plan for up skilling		More Blackwater based operators know Dingo plant - as contingency of loss of local operator	Treatment Supervisor
DUA 21, DUA 22			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventive maintenance	Preventive maintenance of blower	Treatment Supervisor

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2018	Responsible Position
		Short term	Medium term	Long term		
EMERALD EAST NOGOA						
EMEN 1	Procedures		Procedures required for pH correction, coagulation, filtration, disinfection, mains breaks, reservoir inspection		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
EMEN 1, EMEN 3	Coagulation	develop operational rules and document procedure	investigate control of supernatant return		Recycle control requires further optimisation to minimise return rates - operational trails underway at EN WTP	Treatment Engineer
EMEN 1, EMEN 2, EMEN 4		data collection for procedure target ranges	procedure to be documented. Investigate lowering target and critical limits over time.		Clarifier limit currently 5 NTU and it is currently required for operation - review of limit in the plan	Treatment Engineer
EMEN 1, EMEN 2, EMEN 5	Filtration	data collection for procedure target ranges	procedure to be documented. Investigate dropping limit to 0.3 NTU		Filtration limit currently at 0.3 NTU	Treatment Engineer
EMEN 6, EMEN 7	Treated water storage/ Reservoirs		Investigate how vermin proof is storage.	Implement appropriate action	To be done by consultant with recommendations given	Planning Engineer
EMEN 1, EMEN 8			Formalise inspection checklist	check vermin proofing.	To be done by consultant with recommendations given	Planning Engineer
EMEN 9	Reticulation		need to develop routine flushing program		Planning to change the program action after plan review	Network Supervisor
EMEN 10				monitor for THMs	Seasonal and event based sampling added verification monitoring	Samplers
EMEN 11	System Wide		More operators to cert 3 - purchase order issued		Cert III training provider engaged for new operators	Treatment Supervisor
EMEN 12, EMEN 13		Fill vacancies	Plan for up skilling		More Emerald based operators know other plants, operator rotations but vacancies add pressure - Cert III training provider engaged for new operators. Trainees starting 2018/19	Treatment Supervisor
EMEN 14			Investigate SCADA lockout		Lockouts in place - this plant has the standard we will be work towards	Treatment Engineer
EMEN 15, EMEN 16			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventive maintenance	Preventive maintenance of blower, air compressors, centrifuges, chlorine gas maintenance, fluoride plant	Treatment Supervisor
EMERALD OPAL ST						
EMOS 1	Procedures		Procedures required for coagulation, reservoir inspection, mains breaks.		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
EMOS 3	Coagulation		develop contingency plan		contingency plan is to use poly at a work around	Treatment Supervisor
EMOS 4		investigate alarm at 2.5			not yet - currently 5 NTU - filters at 0.5 NTU - check numbers in the review	Treatment Engineer
EMOS 5, EMOS 6	Filtration		auto backwash, shutdowns, to be investigated.	Investigate need to replace filter media	Media replace design undertaken...awaiting prioritisation in CAPEX budget - no auto backwash but backwashed on time as a work around. Auto backwash at peak time is a risk and we should investigate new backwash pumps	Manager WU
EMOS 7			investigate installing actuators and ripen to waste		Completed	Treatment Supervisor
EMOS 8			need to install a valve to prevent backflow.		Awaiting prioritisation within CAPEX budget - we should investigate new backwash pumps	Manager WU
EMOS 9			investigate blanking off valve		Awaiting prioritisation within CAPEX budget - pump changes and control being worked into 19-20 Capital budget	Manager WU
EMOS 10, EMOS 11	Treated water storage/ Reservoirs		Investigate how vermin proof is storage.	Implement appropriate action	To be done by consultant with recommendations given	Planning Engineer
EMOS 1, EMOS 12			Formalise inspection checklist	money in budget to replace roof, will also vermin proof.	To be done by consultant with recommendations given	Planning Engineer
EMOS 13, EMOS 14, EMOS 15	Reticulation	talk to hospital about water issues	Investigate UPS and water tower options	Implement appropriate action	Awaiting prioritisation within CAPEX budget	Manager WU
EMOS 16			need to develop routine flushing program		Planning to change the program action after plan review	Network Supervisor
EMOS 17				monitor for THMs	Seasonal and event based sampling added verification monitoring	Samplers
EMOS 18	System Wide		More operators to cert 3 - purchase order issued		Cert III training provider engaged for new operators	Treatment Supervisor
EMOS 19, EMOS 20		Fill vacancies	Plan for up skilling		More Emerald based operators know other plants, operator rotations but vacancies add pressure - Cert III training provider engaged for new operators. Trainees starting 2018/19	Treatment Supervisor
EMOS 21			Investigate SCADA lockout		Being reviewed in as greatest risk order	Treatment Engineer
EMOS 22			remove dead tree near 9ML clear water tank.		Completed	
EMOS 23, EMOS 24			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventive maintenance	Preventive maintenance of blower, air compressors. Chlorine and Fluoride plants	Treatment Supervisor

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2018	Responsible Position
		Short term	Medium term	Long term		
ROLLESTON						
ROL 1	Procedures		Procedures required for bore inspection, reservoir inspection, PAC, coagulation, filtration, disinfection, mains breaks.		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
ROL 2	Bore water		test each bore for SWA and heavy metals.		All 3 bores have been checked - identified issue with bore 6 and currently it is not to be used without escalation.	Treatment Supervisor
ROL 16	PAC		PAC procedure to be documented		no yet	Treatment Engineer
ROL 1, ROL 4, ROL 5, ROL 6	Coagulation	manual turbidity testing at clarifier (ROL 4)	turbidity meters, jar testing, take spare pump (same pump for coagulant and disinfection)(ROL 5) / coagulation procedure to be documented	SCADA (ROL 6)	Have spare parts and pumps and continue manual turbidity samples. SCADA and online monitoring project is in the planning stage	Manager WU
ROL 1, ROL 6, ROL 7,	Filtration	manual turbidity testing of filtrate	filtration procedure to be documented / turbidity meter	SCADA	Continue manual turbidity samples. SCADA and online monitoring project is in the planning stage	Manager WU
ROL 8, ROL 9	Disinfection		calculation of CT, probably OK, but need to check.	pH adjustment to be considered.	Concept design for pH undertaken and waiting for project delivery timeline	Manager WU
ROL 10			Check chlorate levels		no yet	Manager WU
ROL 1, ROL 11	Bore Disinfection	Check configuration	develop procedure for bore operation only.		Have confirmed that all 3 bores get chlorine dosed through bore 7	Treatment Supervisor
ROL 16	Treated water storage/ Reservoirs		Reservoir inspection program		To be done by consultant with recommendations given	Planning Engineer
ROL 12			continue THM testing		Seasonal and event based sampling added verification monitoring	Samplers
ROL 1, ROL 6, ROL 13	System Wide	Operator currently doing cert III	Developing procedures for WTP	SCADA	No current operator based in Rolleston - recruit with Cert III or add to training list	Treatment Supervisor
ROL 14, ROL 15		fill vacancies	plan for upskilling		More Emerald based operators know Rolleston plant, operator rotations but vacancies add pressure	Treatment Supervisor
SAPPHIRE						
SAP 1	Procedures		Procedures required for bore inspection, reservoir inspection, disinfection, mains breaks.		Disinfection, bore inspection and reservoir inspection procedures drafted and under review	Treatment Engineer
SAP 2	Treated water storage	Inspect and identify ingress location	Vermin proof		Reservoir inspection templates done and one inspection complete. Vermin proofing improved - to be checked by consultant with recommendations given	Planning Engineer
SAP 3, SAP 4	System Wide	fill vacancies	plan for upskilling		More Emerald based operators know Sapphire plant, operator rotations but vacancies add pressure	Treatment Supervisor
SPRINGSURE						
SPR 1	Procedures		Procedures required for bore inspection, reservoir inspection, disinfection, mains breaks.		Disinfection procedure drafted and under review	Treatment Engineer
SPR 2	Disinfection		Need to upgrade to auto dosing		Requires investigation into dose control... awaiting prioritisation within CAPEX budget (18/19 Twin Tanks SCADA online)	Manager WU
SPR 3, SPR 4	Cooling systems	Check integrity and sealing	Seal if this is an issue		To be done by consultant with recommendations given	Planning Engineer
SPR 5, SPR 6	System Wide	fill vacancies	plan for upskilling		No current operator based in Springsure - recruit with Cert III or add to training list	Treatment Supervisor
SPR 5, SPR 7, SPR 8			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventive maintenance	Preventive maintenance of chlorine dosing	Treatment Supervisor

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2018	Responsible Position
		Short term	Medium term	Long term		
TIER I						
TIE 1	Procedures		Procedures required for pH correction, coagulation, filtration, disinfection, mains breaks, reservoir inspection		Coagulation, filtration and disinfection procedures drafted and under review	Treatment Engineer
TIE 1, TIE 2, TIE 3	Catchment	chlorination procedure being documented at present	online monitoring	Media Replacement	Media replacement design undertaken. Waiting for project delivery timeline - raw and filtered online monitoring	Manager WU
TIE 1, TIE 3, TIE 4		data collection for procedure target ranges (TIE 4)	Backwash, Coagulation and filtration procedures to be documented /online monitoring	Media Replacement	Media replacement design undertaken. Waiting for project delivery timeline - not started online monitoring, manual trigger to backwash	Manager WU
TIE 1, TIE 5	Raw Water Abstraction	develop operational rules and document procedure	investigate turbidity meter as control of supernatant return		Awaiting prioritisation within CAPEX budget	Manager WU
TIE 1, TIE 4, TIE 6	Coagulation	data collection for procedure target ranges	coagulation procedure to be documented / online monitoring	clarifier Turbidity monitoring	Awaiting prioritisation within CAPEX budget	Manager WU
TIE 1, TIE 7		document recycle procedure	investigate control		Awaiting prioritisation within CAPEX budget	Manager WU
TIE 1, TIE 3, TIE 4, TIE 8, TIE 9	Filtration	Investigate alarm level and lockout to operators, data collection for procedure target ranges	auto backwash, shutdowns, to be investigated, procedure to be documented	Investigate replace filter media	Media replacement design undertaken. Waiting for project delivery timeline - not started on auto backwash and shutdown but recommendations in filter media replacement report	Manager WU
TIE 4, TIE 10		Data collection on turbidity spikes	Investigate ripening to waste		Awaiting prioritisation within CAPEX budget with recommendations in filter media replacement report	Manager WU
TIE 11, TIE 12		Investigate lockout		Investigate blanking off	To be investigated and actioned	Treatment Supervisor
TIE 13, TIE 14	Disinfection	Investigate ACH option and collect data	Investigate pH correction options		Planned to follow Capella ACH dosing changes	Manager WU
TIE 15	Treated water storage/ Reservoirs			investigate to confirm vermin proof reservoirs	To be done by consultant with recommendations given	Planning Engineer
TIE 1, TIE 16	System Wide	Continued procedure development	More operators to cert 3 - purchase order issued		Cert III training provider engaged for new operators	Treatment Supervisor
TIE 17, TIE 18			Fill vacancies	Plan for up skilling	One vacancy - recruit with Cert III or add to training list	Treatment Supervisor
TIE 19		Investigate alarm level and lockout to operators			Being reviewed in as greatest risk order	Treatment Engineer
TIE 20, TIE 21			develop internal skills to reduce reliance on external support, critical spares to be identified	Preventative maintenance	Preventive maintenance of blower, air compressors fluoride plant maintenance and chlorine replacement work.	Treatment Supervisor